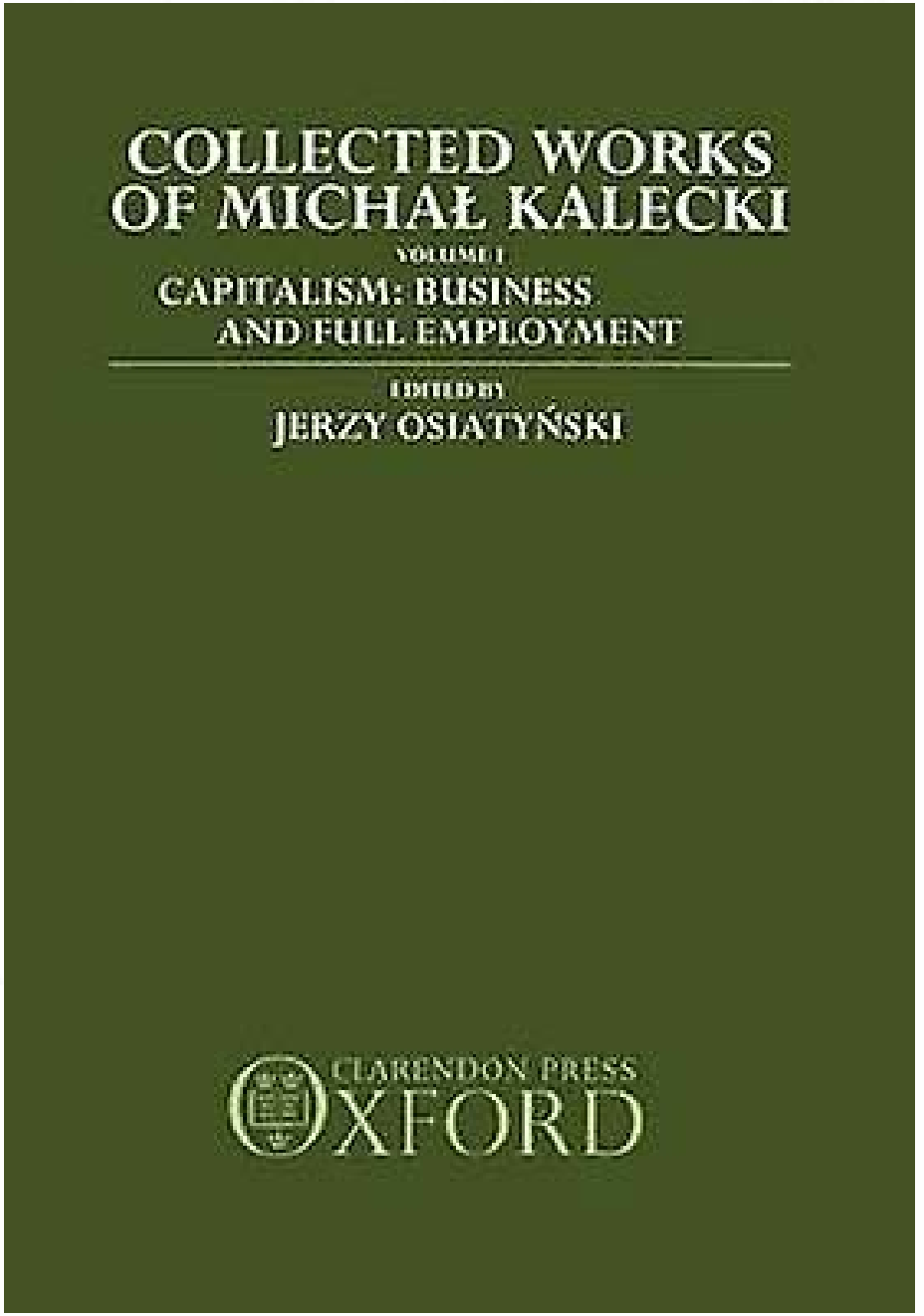

Collected Works of

MICHAŁ KALECKI

VOLUME I

CAPITALISM

Business Cycles and Full Employment

Edited by
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I want to thank the many publishers who generously granted permission to reprint various papers by Kalecki. More specific acknowledgements are made in editorial commentaries following individual essays.

The editorial commentaries and notes make use of verbal information obtained from Mrs Adela Kalecki, Michał Kalecki's widow, verbal information or notes on Kalecki from his associates and friends, and notes from reminiscences related by him to Tadeusz Kowalik (in connection with the latter's work on a biography of Kalecki). The editorial commentaries and notes also make extensive use of Kalecki's scholarly correspondence and his various papers and documents, which are in the possession of Mrs Adela Kalecki. Although all the papers left behind when the Kaleckis left Poland in 1935 were destroyed during the war, all the material that has survived (mainly relating to the period after 1935) has been treasured by Mrs Kalecki since her husband's death in April 1970.

I sincerely thank all those who made this information available to me and granted their permission for its use in the editorial material. I also wish to thank Z. Dobrska, H. Hagemejer, C. Józefiak, W. Sadowski, A. Szeworski, and J. Zagórski for their critical comments on the earlier versions of the editorial footnotes and commentaries. J. Zagórski, besides many specific remarks, also provided valuable reminiscences on Kalecki from the time when both worked in the Institute for the Study of Business Cycles and Prices. Separate thanks are due to T. Kowalik, who in all phases of preparing this volume continually offered his advice and experience, as well as biographical material on Michał Kalecki.

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Finally, I wish to thank the Director and the staff of the Library of the Main School of Planning and Statistics in Warsaw for their extraordinary assistance to me in making use of the library's collections.

J. O.

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List of Abbreviations

COMECON (also CMEA)	Council of Mutual Economic Assistance
EUI	European University Institute (Florence)
ILO	International Labour Organization
ISBCP	Institute for the Study of Business Cycles and Prices (Instytut Badania Koniunktur Gospodarczych i Cen, Warsaw)
NBER	National Bureau of Economic Research
PS	*Przegląd Socjalistyczny*
PWE	Państwowe Wydawnictwo Ekonomiczne (Polish Economic Publishers, Warsaw)
PWN	Państwowe Wydawnictwo Naukowe (Polish Scientific Publishers, Warsaw)
SGPiS	Main School of Planning and Statistics (Szkoła Główna Planowania i Statystyki, Warsaw)

List of Polish Journals

Ekonomista	Economist
Koniunktura Gospodarcza	Business Review
Koniunktura Włókiennicza	Textile Business
Kwartalnik Statystyczny	Statistical Quarterly
Polska Gospodarcza	Polish Economy
Przegląd Gospodarczy	Economic Review
Przegląd Socjalistyczny	Socialist Review
Przegląd Socjologiczny	Sociological Review
Przemysł i Handel	Industry and Commerce

Editor's Note

Michał Kalecki's *Collected Works* are divided into volumes according to the main subjects of his papers. Each volume is in turn divided into parts, each of which consists of essays on a similar problem. Individual papers in each part are arranged in chronological order according to the date of their first publication.

The texts are presented in the final version accepted by Kalecki during his lifetime. However, when successive versions show interesting differences, these are noted in the editorial comments.

Two departures from this principle are made in the first volume. Part 3 contains the original text of the 1933 *Essay on the Business Cycle Theory* as well as its 1935 *Econometrica* version. Also, although Part 5 gives the final version of 'A Theory of the Business Cycle,' the original version of this paper is included as Annex 4.

In the texts written and published during the author's lifetime, only obvious linguistic or stylistic slips have been corrected. While we have attempted to standardize the terminology used, some differences have been retained in terms used in works from various periods of the author's life.

The papers are published in their entirety; abbreviations made by the author in later editions of a given paper are indicated in the editorial comments.

The author's notes—numbered through each paper—are placed at the foot of the page.

The editorial comments appear in a section at the end of each volume. They too are numbered through each paper, and are marked—like the references to them in the texts—by successive numbers in square brackets. They consist of information on the first publication of each work, its reprints and translations, together with (generally) a brief commentary on the conditions and circumstances in which a given work was written and the discussions associated with it. These commentaries as a rule concern the paper as a whole, while the annexes—meant as supplements to the basic texts—contain the more important polemical statements, extensions, or explanations by Kalecki in connection with a specific work.

The commentary on the first essay of a given part of the volume is, however,—to avoid repetition—more general in nature and refers to the whole of that part, providing a background for the papers it contains, their genesis, development, and relation to contemporary economic theory. The following editorial notes, of a more specific nature, refer to definite fragments of each essay. Sometimes a fragment of a text by Kalecki or another author quoted in the footnotes or editorial notes itself requires a brief explanation. In such cases, editorial comments within this text or the author's footnotes appear in square brackets. Cross-references to editorial notes take the form 'see p. 222 n. [3]; Cross-references to original footnotes take the form 'see p. 222 n. 3'.

In the editorial notes and annexes, in general all Kalecki's writings are printed in full-size type. All other writings and all editorial matter are printed in smaller type. The only exception to this general rule is that occasional short quotations from Kalecki, used in editorial material to clarify the context, are also printed in smaller type.

J. O.

Warsaw
January 1977

Editor's Note to the English Edition

In preparing, ten years after original publication, this English edition of Kalecki's *Collected Works*, I have taken into account the intervening discussions of various aspects of Kalecki's scientific output, as well as editorial material and Kalecki's correspondence which were not available at the time when the Polish edition went to press.

There are three important changes in volume i. First, in part 3, the classic, 1935 *Econometrica* version of Kalecki's business cycle theory is presented as a separate paper, next to the famous 1933 *Essay on the Business Cycle Theory*. Secondly, in part 5, Kalecki's 1939 *Essays in the Theory of Economic Fluctuations*, a book which gained him world renown as an outstanding Keynesian, is reprinted in full, thus allowing a better comparison of Kalecki's theory with Keynes's *General Theory*. Finally, the Keynes–Kalecki correspondence discovered in 1976 in Tilton, together with some other correspondence, is included in the editorial material.

In updating and revising the editorial material some selectivity was unavoidable. In the past decade interest in Kalecki's theories has increased sharply, while the space available for editorial comment remains limited. Moreover, the fact that an increasing number of Western periodicals and books are now unavailable in Poland, coupled with my own possible oversights, may well be the cause of other omissions.

J. O.

Warsaw
December 1987

Introduction

Michał Kalecki (1899–1970) is today unquestionably regarded as one of the most prominent economists of the twentieth century. Substantial scholarly monographs are devoted to him. His publications are often cited, especially those on the theories of business cycles, national income distribution and the dynamics of the capitalist economy, the theory of growth of a socialist economy, mathematical economics, econometrics, the methodology of planning, and the calculation of the efficiency of investments. These works have also been the subjects of separate studies and books, and of symposia and conferences in Poland and abroad. His works, many of which have become economic classics, have been frequently reissued and translated.

Michał Kalecki turned to economics from engineering and mathematical studies, which he began in 1917 in Warsaw and continued—after military service—in 1921 in Gdańsk. After his father lost his job, however, Kalecki had to withdraw from college to earn his own living.

Kalecki had already become interested in economic problems as a student at Gdańsk Engineering College. During those years he became familiar with the main theses of Marx's economic theory and Marxian schemata of reproduction. One of the many jobs he held after withdrawing from the college was working for a credit-rating company in Łódź. This was Kalecki's first practical training in economic analysis. From 1927 onwards he published a large number of review articles on individual commodity markets (in *Przegląd Gospodarczy*—Economic Review—he wrote a regular column on commodity markets). This prompted him to study the structure and operations of large cartels and concerns. He wrote many articles on this subject; later they won him his first steady job. At the end of 1929, Professor Edward Lipiński offered him a research assistantship in the Institute for the Study of Business Cycles and Prices, founded the previous year in Warsaw. Kalecki's initial responsibility there was to study cartels and other monopolistic market structures.

In 1933 Kalecki's *Essay on the Business Cycle Theory* was published by the ISBCP. This small booklet, less than 60 pages long, with the later translations and reissues of its central part, assured him a permanent place in the history of economics. It contained an analysis

of cyclical fluctuations in production and employment in capitalism. It gave rise to the first line of Kalecki's scholarly investigations, which was devoted to the mechanisms of the capitalist economy. He conducted extensive theoretical as well as empirical studies in this field (together with Ludwik Landau, for example, making the first estimates of Poland's social income in 1929 and 1933). From the beginning of the 1930s to the end of his life he studied the contradictions of monopoly capitalism and the chances of overcoming them by means of government intervention.

The synthesis of Kalecki's theoretical studies on capitalism was his *Theory of Economic Dynamics*, first published in 1954. This book, which today—like his *Essay on the Business Cycle Theory*—is one of the classics of economic theory, not only contains a criticism of the internal contradictions of contemporary capitalism, but also shows how they can be overcome in a socialist economy. The starting-point of his investigations was the cyclical character of capitalist reproduction, which, he believed, in the absence of technical progress or increasing government intervention, would be incapable even of overcoming a crisis, let alone of a sustained expanded reproduction.

From the very beginning Michał Kalecki's scholarly work was orientated towards criticism of the social injustice and paradoxes of capitalism, and concerned with the development of the idea of socialism in Poland and abroad. From at least the time he left the Gdańsk Engineering College he held radical views and had close links with the political left. He was a Polish Communist Party sympathizer, and followed economic developments in the USSR with friendly interest. He expressed his social views directly in journalistic articles and indirectly in scholarly studies. From dry quantitative analyses of the mechanisms and dynamics of capitalism, based on Marxian schemata of reproduction, he did not hesitate to draw radical political conclusions, often spiced with anger and irony. His affiliation with socialist ideas and with the intellectual left was strengthened still further at the beginning of the 1930s, when (together with the brothers Antoni and Jerzy Pański, Oskar Lange, Stefan Purman, and Stefan Arski) he prepared the publication of the popular front's *Przegląd Socjalistyczny* (Socialist Review), for which he wrote many articles until the journal was closed down by the government. Kalecki remained faithful to these leftist views from his early youth to the end of his life. He was always consistent in his beliefs, independent in his thinking, and of unbroken character.

One of the features of Kalecki's studies was their link with social practice. He was contemptuous of ivory-tower university economics, believing that genuine science must come from life and serve life. He devoted his own life to such a science, one rooted in reality, and the ultimate criterion of truth; a science in the unswerving service of man.

'Michał Kalecki's works', said Oskar Lange in his speech on the occasion of the doctorate *honoris causa* presented to Kalecki in 1964 by the University of Warsaw, 'stemmed from the Marxian theory of reproduction; he did not treat it dogmatically, however, but developed it.' The economics which Kalecki taught is political economics in the genuine sense of the term, a science which has us looking beyond economic values and the interrelationship between them, for social relations, class or group interests, and their conflicts. For the contradictions of monopoly capitalism, as well as the essence, forms, and effects of the capitalist government, can be understood only when the analysis of economic mechanisms is strictly linked to the analysis of social forces. Kalecki used this broad Marxian methodological directive in his studies of capitalism as well as of the centrally planned economies and of the developing countries.

Essay on the Business Cycle Theory in its French and English versions won Kalecki a Rockefeller Foundation fellowship. At the beginning of 1936 he went to Sweden. Following the publication of J. M. Keynes's *General Theory of Employment, Interest, and Money*, Kalecki moved to London. At the end of 1936, in protest against the disciplinary dismissing of two of his closest friends and colleagues, Kalecki resigned from the Institute for the Study of Business Cycles and Prices.

He used his stay in London primarily to pursue studies whose aim was to substantiate and develop his first work on business cycles, and to confront Keynes's theory by his own. In 1936 he also spent a few months in Paris, studying the effects of the economic policy of Leon Blum's Popular Front government. The result of these studies was the article. 'The Lesson of the Blum Experiment', which contained a statistical verification of Kalecki's theory of money and real wages, a theory that would be further developed in his subsequent studies, but which was already present in embryo in *Essay on the Business Cycle Theory*. This article was also of great political importance. Though the Blum experiment itself failed, Kalecki's analysis revealed the sources of its failure and identified the main principles and measures of economic

policy that could bring success to the plans of Popular Front governments (existing then in France and Spain).

At the beginning of 1938 Kalecki moved to Cambridge, where he established close relationships with members of Keynes's circle. He used the first period of his stay in Cambridge mainly to write his *Essays in the Theory of Economic Fluctuations* (published in 1939). In this book Kalecki concentrated on three questions: (i) filling in gaps in Keynes's short-period theory, (ii) its refinement and statistical verification, and (iii) integrating Keynes's short-period theory with his own theory of business cycles. For these reasons his collection of essays was recognized as a development and popularization of Keynes's theory, supplemented with empirical verification. *Essays* brought Kalecki recognition far beyond the circle of business cycle theorists, but at the same time provided the foundation for his paradoxical international career as a pupil and interpreter of Keynes.

It is this book, however, more than any other that shows the clearly different, Marxist, background to Kalecki's theory. In the chapter on investments and income he emphasizes the basic similarity between his equations of equilibrium and Marxian schemata of expanded reproduction. He noted that Marx was not interested (at least in the second volume of *Capital*) in the problem of what happens when investment outlays are too small to ensure dynamic equilibrium. This problem was taken up by Rosa Luxemburg in her *Accumulation of Capital*, in which she claimed that, if capitalists save, the profits can be realized only when they are matched by a particular volume of investments. 'The theory cannot be accepted as a whole', wrote Kalecki in the *Essays* (see p. 255 below), 'but the necessity of covering the "savings gap" by home investment or exports was outlined by her perhaps more clearly than anywhere else before the publication of Mr Keynes's *General Theory*.'

In 1939, at the request of the Ministry of Labour and Social Welfare, Kalecki wrote a study on *Money and Real Wages*. It contained a detailed outline of Kalecki's theory of wages, and a refutation of the then popular view that the source of unemployment was the downward inflexibility of wages. Kalecki's theory provided an important argument in the struggle of the working class against bearing the burden of the crisis through reductions in wages. In this study Kalecki developed the thesis presented earlier in his *Essay on the Business Cycle Theory*, that a reduction in wages during crisis not only does not increase capitalists' profits but—by reducing workers' consumption—in fact deepens the crisis.

When the war broke out, Kalecki was at Oxford. Oxford University Institute of Statistics gave shelter to many economists, often with leftist views, who escaped from fascism in various European countries. In Oxford they pursued ambitious studies on many aspects of the British war economy, regarding this as their contribution to the fight against fascism. Kalecki took up problems such as general mobilization of material resources and labour force for the war effort, war finance, rationing and price controls (in the bulletin of the institute Kalecki presented the first plan for expenditure rationing in England), distributing the financial burden of the war among all social classes, distribution of the national income, and full employment in the period of post-war reconstruction. The institute flourished during that period, a situation due in large part to Kalecki, who influenced many of the institute's research projects and took up the most immediate and pressing problems in his own studies.

At the University of Oxford Kalecki also began his teaching career, giving a course of lectures on the findings of his enquiries. In 1943 his next book appeared—*Studies in Economic Dynamics*—which was another step forward in the development of his theory of capitalist reproduction.

After the war, Kalecki worked for a year in the international Labour Office in Montreal, and then spent a few months in Warsaw, having been invited as an expert by the Ministry of Reconstruction to 'make an analysis of the present situation of the country and give an opinion on the best methods for carrying out the reconstruction' (letter of 8 November 1945 from the Minister of Reconstruction, Michał Kaczorowski, to Kalecki). During his stay, he prepared 'Observations on Rationing and the Price System' and 'Observations on Savings and Money Circulation in Poland', as well as projects related to the financial plans for the second half of 1946 and the first half of 1947.

From the end of 1946 to the end of 1954 Kalecki worked as assistant director in the economic department of the United Nations Secretariat in New York. He directed the UN reports on inflationary and deflationary tendencies in particular countries, studies on various aspects of full employment, and the *World Economic Report* series. His work in the UN also brought to his attention the economic problems of developing countries. This was the beginning of the second line of his scholarly interest, which continued to the end of his life. After he resigned from his job in the UN Secretariat, on account of McCarthyism, he served as an economic consultant for the govern-

ments of many developing countries. The result of this interest was a series of theoretical studies on the main problems of economic development and ways to finance it in the so-called 'mixed economies'; the last of these studies appeared in 1970.

The enquiries which he conducted in the first half of the 1950s in the UN Secretariat led Kalecki to formulate some hypotheses concerning the basic problems of the theory of growth of a socialist economy. He presented the first outline of this theory after he returned to Poland, at the Second Congress of Polish Economists in June 1956. Thus the third line of his theoretical investigation also began during his work for the UN.

After his return to Poland, Kalecki concentrated on the problems of the practice and theory of the centrally planned economy, with special emphasis on Polish conditions. His scholarly work was always closely connected with practical needs. His theoretical models were developed to help solve specific problems of economic policy. So it is not surprising that he worked simultaneously in several areas. He was an economic adviser to the government and in the Planning Commission; chairman of the Commission for the Perspective Plan and main author of the first perspective plan for the economic development of Poland for 1960–75; one of the vice-chairmen of the Economic Council; and chairman of the Polish delegation to the economic commission of COMECON. Kalecki's work as an adviser is reflected in a series of articles on the problems of economic development in post-war Poland.

The second area of his work after his return to Poland, inseparably connected with the first, was theoretical studies. He created the foundations for a theory of growth of a socialist economy, and foundations for the methodology of planning and for calculating the efficiency of investments. He always addressed subjects which were especially complex and the most pressing from the point of view of the country's needs.

A 'world of absurdity', so penetratingly presented in his studies of capitalism (see p. 318 below), in his studies of the socialist economy once again becomes a 'normal world', in which the volume of investments and the growth rate are limited only by technical and material constraints and labour supply, and in which the rational determination of effective demand makes possible the harmonious utilization of existing productive capacity. Hence the main subject of his *Introduction to the Theory of Growth in a Socialist Economy* (see vol. iv) is to determine the rate of growth in this economy, with special

emphasis on such limiting factors as consumption in the short term, the foreign trade balance, and balance of the labour force.

In his speech on receiving his doctoral degree from the University of Warsaw in 1964, Kalecki spoke modestly about his own accomplishments, and described the present state of the theory of growth of a socialist economy in the following words: '[We are] only on the threshold of developing this extremely complicated discipline. We are still far from mastering even its most essential issues.' This expression of modesty shows how far ahead his thoughts ran, how every new discovery only led him to further areas of enquiry.

While he emphasized the possibilities for increasing productive potential within the socialist economy, Kaleckis' thoughts were far from simplifications and easy optimism. He warned especially against voluntarism in setting the growth rate at an unrealistically high level. Since the attempts to achieve unrealistic targets have in the final analysis mainly a negative effect on consumption, which in turn is followed by a number of negative economic and political consequences, Kalecki stressed the necessity for observing 'the principle of plan realism'. Consequently, in his theory of growth the analysis of limiting factors, especially so-called investment barriers, plays an important role.

This hardly led him to support timid minimalism in planning, or to argue for passive adjustment to 'barriers'. Kalecki did not see the solution to this dilemma in the construction of 'heroic' plans, which are—as he wrote (see 'On the Basic Principles of Long-Term Planning' in vol. iv)—'a flight into the realms of fantasy, away from the arduous dilemma of consumption in the short and the long terms', plans of which the practical consequences, from the angle of average annual results obtained during the entire planning period, are usually losses, since 'if such a plan fails, which can easily happen . . . , the outcome is worse than if planning had been more cautious'. He saw the solution in investigating ways and means to increase economic efficiency (by variant planning, among other strategies), and in creating suitable conditions for applying the results of these studies in economic practice. 'Abiding by the principles of plan realism and maintaining consumption in the near future leads to restraint in setting the growth rate, while the avoidance of waste and conscientious analysis of investment efficiency allows this rate to be kept notwithstanding at a relatively high level.' These words are typical of his general approach to this problem.

Kalecki's studies were inspired by the basic economic and social conflicts of our times; and his theories addressed specific social problems. This was so in the 1930s, in his analyses of the business cycle, in which he studied the reasons for crises in capitalism, and in the article written during the war on the political aspects of cyclical fluctuations, in which he foresaw the character of the deformation of the business cycle in the post-war capitalist economy with astonishing accuracy. This was also the case in his study of the relationship between investments and savings, factors of national income distribution, and effective demand, when he discovered the complicated and seemingly paradoxical tangle of dependencies which determines the level of employment and national income in a capitalist economy.

Kalecki's studies of the socialist economy are of a similar nature. In the *Introduction* he concentrated on the problem of determining the rate of growth of this economy, since the verdict which history passes on this social system depends largely on its growth ability. But Kalecki used formal mathematical constructions—for example the well-known growth rate formula—to search for those factors of economic development which lay outside his formal deductive system, such as technical and organizational barriers, or political decisions by planning and other authorities. Kalecki deduced such factors from the context of economic decision-making, and from procedures which are quantitatively unmeasurable but embedded in routine, stereotypical opinions, and institutional and organizational entanglements.

In his strictly theoretical studies one can also sense a clear social inspiration. Especially in his highly deductive, pioneering analysis of the transition processes associated with changing the rate of growth, one can clearly hear echoes of recent great moral and political conflicts connected with the strategy of social industrialization and realization of full employment programmes.

Finally we come to Kalecki's teaching career. In 1956 the Central Qualifications Commission gave Kalecki his first academic title—full professor. In the following year the Polish Academy of Sciences elected him as a corresponding member; in 1966 he became a full member of the Polish Academy of Sciences. From 1955 to 1961 in the Institute of Economics of the Polish Academy of Sciences, he headed a team working on the problems of contemporary capitalism, and also supervised a research project conducted by the Polish Academy of Sciences Committee for Studies in the Social Problems of People's Poland, acting as chairman of this committee from 1961 until 1968;

from 1962 to 1968 he chaired the board of the Institute for underdeveloped Countries at the University of Warsaw, and the Main School of Planning and Statistics; from 1961 to 1968 he lectured at this school, where he also conducted seminars on the economic problems of developing countries and on the theory of socialist economic growth. He participated in many conferences, seminars, and scientific symposia in Poland and abroad. He gathered around himself an active and receptive circle of younger researchers. This did not last long, but long enough to gain the name of the 'Warsaw economic school'.

In the conferring speech mentioned above, Oskar Lange continued:

> [Michał Kalecki] is among the world's leading economic thinkers; he looks for bold solutions, does not avoid professing controversial theoretical as well as practical opinions. These were always fertile controversies, however, and were inspired by the ardent desire to serve the cause of social progress.
>
> Here one should stress his moral attitude, so important for an economist who decided to devote his scholarship to social practice. Michał Kalecki was not afraid of expressing unpopular opinions. In his scholarly work he was guided by only one criterion: the search for truth and devotion to social progress. These two things are inseparably connected.
>
> As Marx has already said: 'In political economy, independent scientific studies do not encounter merely the same enemy as in all other fields.' The obstacles to the search for scientific truth are the interests of classes defending their privileges, biases connected with these interests, and often pure intellectual laziness, the attachment to tradition and routine. All these factors impeding the progress of knowledge are also factors impeding social progress. Michał Kalecki never made concessions to these factors, but was always guided by scientific truth, which he regarded as an indispensable condition for social progress.

Kalecki often used mathematics in his economic argument. He acquired a good mathematical background at engineering college. His works on economic theory generally have the form of mathematical statements. He was also a pioneer in econometrics. He wrote and thought in the language of mathematics even when he did not use formulae and equations. He was an exceptional example of conciseness and precision. His works need to be studied sentence by sentence, for each is an indispensable link in the chain of reasoning and contains—expressed as succinctly as possible—an idea that will not be repeated later, and without which it will be impossible to understand his argument. However, he used mathematical tools with moderation; he

never lost sight of economic and social aspects, and unmasked the pseudo-mathematical escape from real economic problems.

Successive generations of economic theorists and practitioners in Poland and abroad have been trained on the basis of Kalecki's published work. Today his studies are being widely continued and tested by the present generation of economists. Consequently, shortly after his death it was decided to publish a scholarly edition, as complete as possible, of his work, in order to acquaint a wider circle of readers with his work.

This edition is scholarly in character, and hence in principle will not include Kalecki's early and purely empirical articles. For example, numerous business analyses of particular commodity and regional markets have been omitted—with the exception of those studies that touch on more general methodological problems. The same applies to his journalistic articles. Only those which contain Kalecki's general intellectual creed will be included in this edition. We have aimed to include all of Kalecki's studies that have lasting scholarly value and those which are indispensable for understanding the evolution of his views. Faced with several versions of the same publication or publications on a similar subject, we have tried to select the most complete and mature one, basing our choice wherever possible on the opinion of the author himself.

Kalecki's legacy will be presented in seven volumes, each of which is a separate whole and may appeal, at least partially, to a different circle of readers. It has finally been decided to arrange the *Collected Works* according to subject-matter, although in each individual volume and its parts a chronological order is as a rule followed. This makes it easier to show the development of Kalecki's views and the evolution of his analytical methods.

The first two volumes of the *Collected Works* contain Kalecki's studies on capitalism. Volume i includes studies on the theory of the business cycle and full employment. The single most important study in this volume is *Essay on the Business Cycle Theory*, but other parts of this volume are also important, especially the *Essays in the Theory of Economic Fluctuations*, in which Kalecki confronts his own theory with Keynes's, and his studies on full employment. Volume ii includes studies on the theory of distribution of national income in monopoly capitalism and on economic dynamics. The crucial place here is taken by the *Theory of Economic Dynamics*, which is a synthesis of Kalecki's

theories of income distribution, of the business cycle, and of the long-run development of the capitalist economy.

The next two volumes will contain Kalecki's studies on socialism. Volume iii will deal with problems of the functioning of a socialist economy and its long-term planning; volume iv with the problems of growth and methodology for calculation of the efficiency of investments.

Volume v will include Kalecki's studies on the economic problems of developing countries: the basic questions of economic underdevelopment, ways of financing development, and specific programmes of development and reports which he wrote as economic adviser to several governments. This volume is supplemented by Kalecki's sketches on economists and political economy.

Volume vi and vii will contain empirical studies of capitalism, methodological papers on statistical enquiry into the business cycle, estimates of the national income in pre-war Poland, and studies on the war economy and post-war business conditions. Volume vii is supplemented by a bibliography of Kalecki's publications and a chronology of his life and career.

Kalecki's world-wide reputation came from his thorough understanding of the socio-economic realities of pre-war Poland, which gained support in progressive social and economic circles in Poland and abroad. Moreover, his later works were always characterized by realism in assessing facts and in drawing conclusions. In his keen understanding of the essence of post-war Poland's socio-economic system, his great contribution to the building of socialism in Poland, and the insight of his analysis of Polish development, Kalecki had a great influence on Polish economic thought, and left an indelible mark on it.

We hope that this edition of Michał Kalecki's works will not only help to popularize and preserve his legacy, but will also demonstrate the greatness of a scholar who made a lasting contribution to economic thought.

Committee of Economic Sciences
Polish Academy of Sciences

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PART 1

FIRST THEORETICAL STUDIES

On Activating the Balance of Trade[1]

(1929)

1. Social output (by which we understand an increase in value in the social process of production) is balanced with the following expenditures:

Social output	Final consumption
	Increasing property, equipment, and stocks
	Active trade balance account

If the trade balance is passive, then instead of the last item on the right-hand side, the item 'Passive trade balance account' will appear on the left-hand side. Social output in the above sense is identical with social income if we eliminate from it income transferred from abroad. Hence we obtain:

Social income less	Final consumption
Transfer of income from abroad	Increasing property, equipment, and stocks
	Active trade balance account

Breaking down social income into individual items of its use, we obtain:

Final consumption	Final consumption
Increase of funds saved[1]	Increase in property, equipment, and stocks
Transfer of income abroad less	
Transfer of income from abroad	Active trade balance account

And after some manipulations:

Increase in funds saved	Increase in property, equipment, and stocks
Active balance of transferred incomes	Active trade balance account

[1] Saved in the broadest sense of the word, that is, all funds not consumed and not transferred.

This in turn gives us the following equation:

Active trade balance account = Increase in funds saved − Increase in property, equipment, and stocks + Active balance of transferred incomes

Or, after replacing the first two items on the right-hand side with conceptual abbreviations:

Active trade balance account = Capitalization − Investments + Active balance of transferred incomes

In the case of a passive trade balance account this equation would read:

Passive trade balance account = Investments − Capitalization − Active balance of transferred incomes

or:

Passive trade balance account + Active balance of transferred incomes = Investments − Capitalization

The last equation is adapted to the present Polish conditions. Both items on the left-hand side of the equation represent an outflow of money abroad: an active balance of transferred incomes represents it by definition, while a passive trade balance account does so when it is not entirely offset by foreign credits. Hence activization of the passive trade balance account, which threatens stability of the currency, can only take place if the gap between investments and captalization is reduced.

2. Using the conclusions reached above, let us now examine how support of local industry combined with import restrictions will influence the trade balance. Let us assume that a new branch of production is founded, and that checks on imports of the product concerned are simultaneously introduced. This will require certain investments, which in accordance with our conclusions will even increase the passive trade balance account. Let us ignore this single expense, however, and examine the permanent improvement that will take place. It follows from our equation that this can be effected by rising social capitalization.

Let us imagine that the product in question was previously imported for 10 zlotys per kilogram; we assume that now the local product is

sold at the same price. We further assume for the sake of simplicity that raw materials and machines for this new branch of production are imported; let the price structure (in zlotys) be the following:

Raw materials	5
Capital depreciation	1 6
Income consumed by workers	2
Income consumed by capitalists	1
Capitalization	1 4
Total	10

Social capitalization increases here for two reasons: first, the capitalization in the productive process of zl 1 per kg., and second, the increased capitalization of the unemployment fund, which, because the jobless have been put to work, is relieved of having to pay them unemployment benefits by 40% of zl 2,[2] that is, by zl 0.80 per kg. Hence the total increase of capitalization is zl 1.80.

It is clear that this improvement of the trade balance account cannot equal the total value of the product, since raw materials and machines (depreciation) are still imported; but the reduction in the trade deficit calculated above is also much less than the value added in the production process, which equals zl 4 per kg. There is nothing paradoxical in this. Workers' consumption previously amounted to 40% of their present consumption, and hence it increased by zl 1.20; added to this was new consumption by capitalists, equal to zl 1 (all per kg. of the output in question); thus the total increase in consumption came to zl 2.20. This consumption reduced export or increased import by zl 2.20, and consequently, of zl 4 only zl 1.80 was left to improve the trade balance.

The conditions assumed above were rather favourable for activating the trade balance account by starting up a new branch of production. The production costs of a given article at home, however, may turn out to be significantly higher than abroad, and its price would have to be raised accordingly. Let us assume that the new price is zl 13 per kg., with the cost of labour equal to zl 3, and capitalization equal to zl 1.50. The position is now entirely different. The increase of social capitalization will be zl 2.70, zl 1.50 due to capitalization in the productive

[2] Here we identify the cost of labour with workers' consumption, which in our conditions is not far from reality.

process and zl 1.20 due to relieving the unemployment fund (that is, 40% of zl 3). However, the price is zl 3 higher than that of the imported product. These zl 3 per kg. will have to be paid by consumers, and this will indirectly or directly affect overall social capitalization, over-compensating for the increase of capitalization from the previously mentioned sources. Consequently, the passive trade balance account not only would not decrease, but would even increase.

Generally more favourable for activating the trade balance account than creating new branches of production is the situation where existing plants intensify their employment. In such a case capitalization in the production process increases not only directly, as a result of the expansion of output, but also indirectly, owing to the reduction of production costs with increased scale of production. On the other hand, more intensive use of existing plants often involves more intensive employment of those who previously worked part-time, rather than the hiring of new workers, in which case there is neither any relief of the unemployment fund (and hence no increase in social capitalization) nor any reduction in the trade balance deficit.

Thus a general rule must be recognized, that activating the trade balance by substituting home-produced output for foreign manufacture relieves the trade balance only by a fraction of the value of goods previously imported. Moreover, if the domestic production costs are higher than abroad (as in our second example), the outcome may be opposite to the intended one, i.e. the passive trade balance may even increase.

3. Finding new export markets influences activization of the trade balance in the same way as do import restrictions. A passive trade balance is reduced, not by the full value of new output,[3] but only by the increase of social capitalization, which is caused by increasing capitalization in the production process and by relieving the unemployment fund. In the case of export dumping, there may even be an opposite effect.

Let us assume that in a certain branch of industry 1 million kg. of output has been produced, and that the selling price on the local market has been zl 10 per kg., capitalization amounting to zl 1 per kg. (hence total capitalization equal to zl 1 million), and labour costs equal to zl 2 per kg. Subsequently another 1 million kg. of output was

[3] By the value of output we understand throughout an increase of value in the relevant production process.

produced for export, and was sold abroad for zl 7 per kg. For the average price of total sales to be—as previously—zl 10, the local price was raised to zl 13 per kg. As a result of a reduction in manufacturing costs due to mass production, and leaving the average sales price at the former level, capitalization increased to zl 1.50 per kg.; hence at 2 million kg. of output it amounted to zl 3 million. The increase of capitalization in the production process amounted to zl 3 million − zl 1 million = zl 2 million, while relief of the unemployment fund came to 40% of zl 2 million, or zl 0.8 million.[4] Hence the total increase of capitalization from these two sources amounts to zl 2 million + zl 0.8 million = zl 2.8 million. Yet the local market now pays zl 3 more per kg. of output for 1 million kg., or a total of zl 3 million more than previously, and this directly and indirectly affects general capitalization, over-compensating for the increase of capitalization from the previously mentioned sources. Thus the passive trade balance will increase further. Dumping export activates the trade balance only when an increase in the scale of production of the plants affected causes considerable reductions in production costs. For example, if in the above case capitalization in the production process increased from zl 1 to zl 2 per kg., then the influence of dumping on the trade balance would be positive.

4. Import restrictions or the gaining of new export markets can activate the trade balance by increasing social capitalization, which reduces the gap between investments and capitalization. Another, perhaps more radical, way of reducing this gap would be to restrain investments. First of all, following the argument which we put forward when introducing our formula for the trade balance account at the beginning of this article, it should be emphasized that not only imported equipment but indeed all investments should be restrained. Every investment encumbers the trade balance; the import of machines influences it directly, while building a plant generates increased consumption both by construction workers and by those employed in brick and cement works as well as by the respective entrepreneurs; the result of this, however, is an increase in imports or a decline in export of consumption goods, which increases the passive trade balance account.

[4] In reality somewhat less, for as a result of mass production, labour costs will have increased by less than zl 2 million.

If, in order to activate the trade balance, the government wished to resort to restraining investments (directly limiting investments in government-owned enterprises and through credit restrictions in private enterprises), then the question might arise of which enterprises should be singled out positively from the standpoint of their impact on the future trade balance. The rule which underlies our argument throughout this paper, and according to which activating the trade balance account consists in reducing the gap between investments and capitalization (or in reversing this gap), gives an unequivocal answer to this question: the trade balance account will be activated if those enterprises are selected in which a large excess of capitalization over investments is foreseen in the future.

Influence of a Reduction in the Prices of Industrial Consumer Goods on the Course of the Business Cycle[1]

(1930)

The fall in prices, which in recent months has become more pronounced, in various groups of industrial consumer goods,[2] raises the problem of the influence of these reductions on the future course of the business cycle. Below we examine this question against the background of a numerical example, making the following general assumptions:

1. We assume that price reductions are fully passed on to the retail trade.
2. We assume that a reduction in prices for industrial goods, with the total money income of consumers remaining unchanged, will not cause increased spending on these goods; i.e. it cannot cause a reduction of expenditure on other consumer goods, for example food, in order to increase the purchase of industrial products. The consequence of this assumption is that the volume of industrial goods purchased with the total money income of consumers remaining unchanged will increase at the same rate as the index of relevant prices will fall.
3. We examine only the case in which workers' wages remain unchanged, with a reduction in prices of the goods in question.

Let us now denote the unit price of an industrial consumer product by a, and its volume by b; hence the value of total output will be ab. We arbitrarily assume that the basic components of the price a will be as follows: foreign raw materials, $0.30a$; cost of labour, $0.40a$; and gross profit, $0.30a$.

By cost of labour and gross profit we understand the sum of labour costs and gross profits respectively at various stages of production; thus the only independent item of costs is foreign raw materials. The major components of gross profit are capital depreciation and capitalization; besides this there are overheads, taxes (where they are not capitalized by the State but used for current expenses), and finally that

part of net profit which has not been capitalized but instead consumed by entrepreneurs.

In keeping with the above, the value of production, ab, can be broken down into: foreign raw materials, $0.30ab$; cost of labour, $0.40ab$; and gross profit, $0.30ab$. In the last item we should still make one adjustment: when considering the social income generated from the manufacture of consumer goods, we should also include payment of unemployment benefits for the jobless in the respective branches of industry, as this payment causes social decapitalization. If we assume in our example that the unemployment rate is 30% and that unemployment benefits (together with unpaid rent) are 50% of wages, then this decapitalization will be $0.30 \times 0.50 = 0.15$ of the total wage bill of the industry in question which is, in turn, equal to $0.40ab$; i.e. this decapitalization is $0.15 \times 0.40ab = 0.06ab$. In the social income balance sheet this decapitalization reduces the gross profit of the branch of industry under consideration from $0.30ab$ to $0.24ab$. We can now present the results of our numerical example (see Table 1).

We shall now consider the consequences of a reduction of 10% in the price index without a reduction in wages, i.e. through reducing gross profit. Then the price will be $0.90a$, of which foreign raw materials are $0.30a$, cost of labour is $0.40a$, and gross profit is $0.20a$. If for the moment we ignore changes in the money purchasing power of consumers (see below), then output will increase by the same proportion as prices fall and hence output will be $ab/0.90a = 1.11b$. An increase in employment of 11% will follow, but this in turn will generate a further increase in the money purchasing power of consumers. Every newly employed worker will spend his entire wages, whereas before he spent only his unemployment benefits, which were 50% of his wages; and thus his purchasing power will increase by 50% of his wages.

Table 1. *Price Structure and Capitalization before Price Reduction*

	Per unit of output	Volume of output	Per total output
Foreign raw materials	$0.30a$	b	$0.30ab$
Cost of labour	$0.40a$	b	$0.40ab$
Gross profit	$0.30a$	b	$0.30ab - 0.06ab^a = 0.24ab$

[a] Decapitalization due to the payment of unemployment benefits.

As a rule only 20% of this increase will be spent on industrial goods, while 30% will go to improve the worker's diet. However, even this 30% will not be lost to industry as purchasing power. It will go to the countryside, in exchange for food products, and will in turn be spent there on industrial goods. Here one could obviously raise the objection that increased sales of agricultural products in the domestic market will be effected at the expense of reducing their export. In the present situation this seems doubtful, however, since large stocks of agricultural products and considerable quantities used unproductively on local farms (feeding cattle with grain, etc.) make it possible to increase domestic sales of agricultural products without reducing exports. The incentive to raise supply adequately will be a reduction in the price of industrial goods (which in the present context is equivalent to an increase in the prices of agricultural products).[1] Hence if we denote by x the increase in production due to a reduction in prices, and assuming that the cost of labour per unit of output continues to be $0.40a$, we find that the increase in the money purchasing power will be 50% of $0.40ab$, i.e. $0.20ax$; that is, the money purchasing power will be: $ab + 0.20ax = (b + 0.20x)a$.

At a unit price equal to $0.90a$ the total volume of new production will be $b + x$. On the condition that the money value of production must be equal to the money value of the relevant purchasing power, we obtain:

$$(b + x)0.90a = (b + 0.20x)a$$
$$x = 0.143b$$
$$b + x = 1.143b$$

Hence, on our assumption, a 10% reduction in prices causes an increase in employment of more than 14%.

We shall now calculate gross profit after a reduction in prices. Unit gross profit will now be $0.20a$, the volume of production $1.143b$, and total gross profit, $0.20a \times 1.143b = 0.2286ab$.

Let us now consider a correction due to the payment of unemployment benefits. Before the expansion of output which followed a reduction in prices, unemployment benefits were 30% of $0.50 \times 0.40ab$; now, employment being increased by 14.3%, decapitalization will be only 15.7% of $0.50 \times 0.40ab$, i.e. $0.0314ab$; gross profit after making this

[1] Obviously part of the increase in purchasing power, though not very significant, will be spent on foreign products, but this will probably be compensated for by increased sales of industrial goods at the cost of reduced imports, which we have not taken into account in our argument.

Table 2. *Price Structure and Capitalization after Price Reduction*

	Per unit of output	Volume of output	Per total output
Foreign raw materials	$0.30a$	$1.143b$	$0.3429ab$
Cost of labour	$0.40a$		$0.4572ab$
Gross profit	$0.20a$		$0.2286ab - 0.0314ab$[a] $= 0.1972ab$

[a] Decapitalization due to the payment of unemployment benefits.

Table 3. *Price Structure per Total Output before and after Price Reduction*

	Before price reduction	After price reduction	Change (increase or decrease)	Change (%)
Foreign raw materials	$0.30ab$	$0.343ab$	$+0.043ab$	+14
Cost of labour	$0.40ab$	$0.457ab$	$+0.057ab$	+14
Gross profit	$0.30ab$	$0.229ab$	$-0.071ab$	−24
Gross profit less decapitalization due to payment of unemployment benefits	$0.24ab$	$0.197ab$	$-0.043ab$	−18

correction will be $0.1972ab$. Schematically the situation will appear as in Table 2.

We shall now compare the total values of individual items before and after a reduction in prices (see Table 3).

The reduction in the 'corrected' gross profit (in absolute terms) is equal to the increased use of foreign raw materials. This is not accidental. For in our argument no allowance was made for changes in any elements of foreign trade other than imported raw materials, neither did we consider the consequences of possible changes in industrial investments and stocks. Under these conditions, an increase in imports can take place only at the expense of capitalization.[2] However, if the increase in imports was accompanied by a corresponding increase in commercial credits, then the reduction in capitalization could be automatically offset in the capital account of the country's balance of payments. Such a turn of events can be regarded as highly probable, since in the present phase of the depression solvency has

[2] See 'On Activating the Balance of Trade' [this volume].

definitely improved, and the very increase in the volume of output due to a reduction in prices would raise confidence abroad.

It follows from the above that the entire argument would cease to hold if simultaneously there occurred a reduction in industrial renovations and investments, or a reduction in stocks. However, owing to the fact that renovations and investments are at the moment already at an absolute minimum, and that stocks on the whole have long since shrunk, the consequences of a price reduction sketched above would probably not diverge significantly from reality—provided, of course, as we assumed at the very beginning, that the price reduction is passed along to retail trade.

We must still consider whether the decline in gross profit of 24% is at all possible, since in many cases there would be no net profit. However, we must bear in mind that one of the most important items of gross profit is depreciation charges, and that it pays an entrepreneuer to operate without net profit during a depression, even if he receives only part of the depreciation. For depreciation charges only represent part of the wear and tear of plants during operation (buildings and equipment also wear out when idle, and depreciation charges on equipment also include obsolescence resulting from technological progress: a machine can be retired, not because it is worn out, but because it is obsolete). Thus it pays to keep the business going as long as depreciation covers at least the wear and tear on machines being kept running.

Obviously an expansion in output of industrial consumer goods, due to a reduction in their prices, will only relieve the business depression, rather than facilitating entry into the recovery phase of the business cycle. However, this relief may create the foundations for stimulating the business upswing.

Consequences of Dumping[1]

(1931)

1. To facilitate consideration of the problem of dumping we first make certain definitions in the area of the foreign trade balance. In the balance of payments account of a given country, the foreign trade balance, together with the balance of inflows and outflows of services (interest on loans, payments for services, etc.) is balanced by the outflow or inflow of capital, i.e. by a change in the balance of credits and debits with foreign countries:

$$H + U = C$$

where H is the trade balance, U is the balance of services, and C is a change in the balance of foreign credits and debits (we include here shipments of gold, which we treat in the same way as foreign exchange, i.e. we regard the inflow of gold as an increase in claims on foreign countries).

For example, for England H is negative, while U and C are positive: current inflows of interest from loans, of foreign payments for the services of the British fleet, etc., more than balance the deficit in the trade balance, thus permitting some export of capital. For Poland U is small by comparison with H and C; the latter two are usually negative, i.e. the deficit in Poland's trade balance is covered by an increase in her foreign indebtedness.

A change in the balance of foreign credits and debits is strictly connected with other entries on the balance sheet of social income and expenditure. The overall accumulation of capital is used for investments and to change stocks in store. Its excess over investments and changes in inventories flows abroad (an increase in the balance of foreign credits and debits). Its deficit, on the other hand, is covered by an inflow of capital from overseas (thus reducing the balance of foreign credits and debits). This can be expressed as follows:

$$A = (I + Z) + C \tag{1}$$

where A is the accumulation of capital (in which we also include the sums written off for the depreciation of natural resources), I are

investments, Z is the change in stocks, and C is the change in the balance of foreign credits and debits.

Substituting for C its value from equation (1) we obtain:

$$A = (I + Z) + H + U$$

or

$$H = A - (I + Z) - U \tag{2}$$

Hence we can draw the important conclusion that when I, Z, and U are all constant, the change in the trade balance account is equal to the change in the accumulation of capital:

$$\Delta H = \Delta A, \text{ for } I = \text{const}, Z = \text{const}, U = \text{const} \tag{3}$$

2. By dumping we mean selling a given article abroad at a price lower than at home. Generally, the prices on the home market, protected by customs or geographical location and cartelized as well, are calculated in such a way that the average price of total foreign and domestic sales is maintained at a certain level m. Cartelization of the home market is a necessary condition here, since with free competition domestic prices would tend towards the level of export prices. (Cartelization in this field can be replaced by export bonuses, whose influence is not considered here.)

To gain an idea of the essence of dumping, let us imagine that initially an article was sold at price m, and there was no export at all; then its export was begun at a price $n < m$, and the domestic price was raised to a level at which the average price was still m; we shall examine what consequences this has for the domestic economy.

First of all we must note that these consequences can be precisely defined only under certain assumptions. If a given product is not intended for final consumption, then raising its price increases the production costs of other branches of industry. If these branches raise their prices accordingly, then their export will decrease or, as the case may be, competitive imports will increase. Then it is impossible to predict whether and to what extent total domestic production will increase; its level may even decrease. These difficulties in prediction would not exist if the input in question constituted only a small item in the production costs of the branches of industry using it. In this case an increase in the price of this input is not passed on by the respective industry to the prices of its goods—or, if it is, the industry changes these prices so little that respective exports and imports are hardly influenced.

There are, however, industries in which the production of a dumped article plays a fundamental role. As regards industries in which there is competition from imports, they often win for themselves increases in customs duties, enabling them to pass on to their prices the rise in their input price without harming their competitiveness with importers. On the other hand, an increase in customs duties is not sufficient for exporting industries. Wishing to keep their export prices unchanged with no reduction in their profits, they would have to raise their domestic prices, i.e. also engage in dumping. As we saw earlier, besides customs protection of the domestic market, this strategy also requires cartelization. Only when this latter condition is met does dumping of the manufactured product follow dumping of the raw material.

However, if the customers of the cartel of the dumped raw material are themselves not cartelized, then the cartel in whose interest it lies not to reduce the exports of its customers will often grant them 'export compensations', i.e. will settle accounts with them by charging world prices for the raw material used by them for export products.

Hence we conclude that dumping of a raw material very often does not reduce the competitiveness, either at home or overseas, of the branches of industry using this raw material. Bearing in mind this conclusion, an analysis of the consequences of dumping can lead to more definite results.

3. Earlier we denoted by m the domestic price of a given article before dumping started, and the export price of this article by n; after beginning export, the volume of which is N, if the average price of total sales is to remain m, the domestic market, purchasing a given article at higher prices, must pay $N(m-n)$ more, thereby compensating for the 'losses' of the dumping industry. The sum $N(m-n)$ is paid either by consumers, or by capitalists in those industries which are users of the dumped product and which do not pass on the rise in its domestic price to the prices of their goods. (As we noted earlier, this will often occur in industries where a given input is only a small item in their production costs.) Hence the 'payment' will be effected in part at the expense of consumption, in part at the expense of accumulation of capital.

These losses in the social income should be contrasted with gains due to: (i) an increase in the wage bill in the dumping industry, following the expansion of output by N which is now exported; (ii) an increase in the accumulation of capital in this industry.

For simplicity let m and n represent, not the actual prices, but the excess of these prices over the value of foreign inputs per unit of output

in question. Then, if we denote by αm the total labour costs per unit of output in question, the profit per unit of output will be $m-\alpha m=(1-\alpha)m$.[1] The above components of price—foreign raw materials, labour costs, and profits—are understood here as taken throughout all stages of production of a given output; in calculating labour costs of the production of heavy bar iron, for instance, labour costs at the stage of mining the ore, in the metallurgic process, and in rolling, and also labour costs embodied in depreciated equipment, should all be taken into account.

Hence the advantages of dumping are as follows: (i) consumption will increase by $N\alpha m$, since the increase in the wage bill in the dumping industry will amount to this much; (ii) the accumulation of capital will increase by $N(1-\alpha)m$. (We assume here that workers do not save, and that consumption by capitalists of the dumping industry will not change with increased profits.)

As mentioned earlier, compensation for the 'losses' of the dumping industry, amounting to $N(m-n)$, can be effected at the expense of consumption, or of the accumulation of capital. We shall examine three cases: (i) when the sum $N(m-n)$ is completely charged to consumption; (ii) when it is completely charged to capitalization; (iii) when it is shared between consumption and the accumulation of capital: ((i) and (ii) are obviously special cases of (iii)).

4. In case (i), charging the sum $N(m-n)$ only to consumption, the purchasing power of consumers decreases by its amount; at the same time, however, it increases due to a rise in employment, and hence by the additional wage bill in the dumping industry, equal to $N\alpha m$. Thus the total change in the social consumption is:

$$S=N\alpha m-N(m-n)=Nn-N(1-\alpha)m$$

Social accumulation of capital rises by the sum of the increase in profit of the dumping industry, i.e. by $K=N(1-\alpha)m$. Thus, while the accumulation of capital will increase in any case, the overall change in consumption can be positive, negative, or equal to zero, depending on the price ratio n/m:

$$S=Nn-N(1-\alpha)m \gtreqless 0, \text{ if } n/m \gtreqless 1-\alpha \qquad (4)$$

[1] α will be a proper fraction, usually greater than 0.5, and consequently $1-\alpha$ will also be a proper fraction, usually less than 0.5.

Equation (4) can also be written as:

$$Nn - S = N(1-\alpha)m \gtrless K \qquad (5)$$

If we now assume that a change in consumption, S, is covered by a change in import, P, i.e. $S = P$, then we obtain:

$$Nn - P = N(1-\alpha)m = K$$

Since Nn is an increase in export, P is a change in import, and K is an increase in the accumulation of capital, we can see that an increase in the foreign trade balance is equal to an increase in the accumulation of capital. This is entirely consistent with equation (3) from the introductory section. It is clear, however, that the assumption that an increase in consumption is wholly covered by increased import is not only arbitrary but false: unquestionably part of this increase will be covered by domestic production. Then $P < S$, and $Nn - P > K$.

Hence, apparently, in this case equation (3), representing the equalization of the trade balance and capital accumulation, is not met. In reality, however, with an increase in domestic production necessary partially to cover the increase in consumption, S, the symbols used no longer strictly represent the relevant magnitudes. Since in this additional production new workers have been hired, total consumption has now increased, not by $S = Nn - N(1-\alpha)m$, but by $S' > S$ and thus import as well was $P' > P$. Finally, this 'secondary' production generated a 'secondary' accumulation of capital, and the total increase in accumulation was not $K = N(1-\alpha)m$ but $K' > K$. K' and P' reach such a level that instead of the inequality $Nn - P > K$, we obtain the equation:

$$Nn - P' = K' \qquad (6)$$

(P' will remain less than S, for already, if $P' = S$, from equations (6) and (5) it follows that $K' = K$, i.e. that the 'secondary' production will not be generated at all.)

From the inequalities:

$$S' > Nn - N(1-\alpha)m$$
$$K' > N(1-\alpha)m$$

we obtain by adding them:

$$S' + K' > Nn$$

This means that the increase in social income is greater than the value of the dumped export; the surplus is obviously a result of starting up a

'secondary' production partially to cover the increase in demand for consumer goods.

In the case where $n/m < 1-\alpha$, social consumption decreases. As in the previous case, the fall in consumption, S, is greater than that which results from the formula $Nn - N(1-\alpha)m$:

$$S' < Nn - N(1-\alpha)m$$

(where both sides of the inequality are negative).

For capitalization, K', we correspondingly obtain:

$$K' < N(1-\alpha)m$$

One can show that in this case the social income may even fall. For example, if the total reduction in consumption affects only domestic output, leaving import unchanged, $P' = S$ and equation (6) will take the form:

$$K' = Nn$$

Then, since $S' < Nn - N(1-\alpha)m$,

$$K' + S' < 2Nn - N(1-\alpha)m$$

If $n/m < (1-\alpha)/2$, the right-hand side of this inequality will be less than zero, which means that there will be a reduction in the social income.

Let us sum up. When the industry engaged in dumping throws its 'losses' in export activity completely onto the backs of consumers, the real income of every worker declines owing to an increase in the costs of living, but simultaneously employment increases. Whether total consumption rises or falls depends on whether the ratio of the export price to the average sales price, n/m, is greater or smaller than $1-\alpha$, where α is the share of labour costs in the value of output. In the first case the increase in social income is greater than the value of the dumped export, since additional production was started up partially to cover the increase in consumption (part of the increase in consumption is covered by import). It is the reverse in the second case; the increase in social income is smaller than the value of the dumped export, and in some cases this income may even fall. Social accumulation of capital increases in both cases.

In the above argument we have ignored the fact that increased accumulation of capital can be invested, and that, in so far as these investments are produced at home, they will contribute, like the increased wage bill, to a 'secondary' increase in the social income. However, with no accumulation of capital from dumping, these

investments eventually could have been made with the inflow of foreign capital too, besides which the increase of capital accumulation could also flow overseas. As it is impossible to establish whether and when an increase in capital accumulation generates investments which would not have been made without it, we have not considered this factor here. In any case, this factor does not weaken the validity of the above conclusions concerning the case when $n/m > 1-\alpha$; only the negative effects of the case $n/m < 1-\alpha$ can be mitigated when increased capital accumulation is invested.

5. We now move to case (ii), when the burden of 'losses' of the dumping industry, equal to $N(m-n)$, is entirely borne by capital accumulation of other branches of industry. Then social consumption increases originally by the sum $S = N\alpha m$ of the new wage bill in the dumping industry; capitalization in this industry increases by $N(1-\alpha)m$ and in other industries it declines by $N(m-n)$. Hence its change will be:

$$K = N(1-\alpha)m - N(m-n) = Nn - N\alpha m$$

The sign of this expression depends on the ratio n/m:

$$K \gtreqless 0, \text{ if } n/m \gtreqless \alpha$$

The above equation can also be written as:

$$K = Nn - S$$

If the entire increase in consumption is covered by import, then:

$$S = P;\ K = Nn - P$$

—that is, in conformity with the trade balance equation (3), the change in the accumulation of capital equals the change in the trade balance account. In reality, however, $P < S$ and $Nn - P > K$. Apparently the trade balance equation (3) is not met, but this again follows from the fact that the symbols which were used no longer strictly represent the relevant magnitudes. For, as a result of the starting up of the additional production necessary to cover the increase in consumption S, a 'secondary' consumption and a 'secondary' accumulation have been generated. Hence the total increase in consumption is not $S = N\alpha m$, but $S' > S$; the total increase in import is $P' > P$; the total increase in capital is not $K = Nn - N\alpha m$, but $K' > K$. P' and K' reach the level at which equation (6) is met.

Thus it turns out that, if $n/m > \alpha$, then K' is certainly greater than zero, but with $n/m < \alpha$, in some cases K' can also be positive. For instance, if the total increase in consumption is covered by domestic production, i.e. $P' = 0$, then $K' = Nn$ regardless of the ratio n/m.

The increase in social income will always be greater than Nn. Indeed:

$$S' > N\alpha m$$
$$K' > Nn - N\alpha m$$
$$S' + K' > Nn$$

6. We now move to case (iii), when the 'losses' of the dumping industry, $N(m-n)$, are borne partly at the expense of consumption and partly at the expense of the accumulation of capital.[2] Denoting the share of consumption in this coverage of 'losses' by ϕ, and the share of capital accumulation correspondingly by $1-\phi$, we could run the argument similarity as in cases (i) and (ii). We shall forego this, however, since if the product in question is a consumer good, then $\phi = 1$, and we are back at case (i); if it is an input, it cannot be determined what part of the 'losses' was ultimately shifted to consumers, and what part reduced the profits of other industries; for this reason it is also impossible to claim that one is dealing with case (ii), i.e. that $\phi = 0$.[3] In any event, for the mixed case (iii) the line of argument concerning case (i) will be *a fortiori* correct, i.e. if $n/m > 1-\alpha$, then social consumption increases. This increase in consumption will make the increase in social income exceed the value of dumped export.

If this condition is fulfilled, will the social accumulation of capital also increase? If we consider the most unfavourable case, (ii), then—as we have seen above—only condition $n/m > \alpha$ can give complete certainty in this respect. We have seen, however, that even in case (ii) this limit is too high, owing to 'secondary' capital accumulation by domestic industry, generated in the process of meeting the increased demand for consumer goods. Hence in the mixed case (iii) the increase in capital accumulation will appear already at a ratio n/m, relatively

[2] It should be noted that case (iii) also covers a situation in which the dumping industry receives a lower average price than before the dumping started, and not the same average price, as we have assumed in our argument. Then one can imagine that the loss $N(m-n)$ is borne in part by consumers or by capital accumulation of other industries, and in part by the capital accumulation of the dumping industry itself.

[3] However, case (i), in which the 'losses' due to dumping are completely shifted to consumers, also rarely appears in a pure form, since rising living costs cause workers to demand higher wages; as a result of such action part of the 'losses' are shifted to capitalist profits.

much less than α(α, which represents the share of total labour costs in the value of output, will usually be greater than the share of accumulation $1-\alpha$). Then the condition $n/m > 1-\alpha$ will still not give complete certainty as to the increase of capitalization, though at this value of the n/m ratio the capital accumulation will often rise.

Thus our general conclusions are as follows. Dumping causes a reduction in the real income of every worker, but it increases employment. As a result, total consumption increases if the ratio of the export and the average price, n/m, is greater than $1-\alpha$, where α represents the share of total labour costs in m. Then the social income increases by an amount exceeding the value of the dumped export. In many cases, when this condition is met, the accumulation of capital also increases; complete certainty in this last respect is given by the condition $n/m > \alpha$, usually more stringent than the condition $n/m > 1-\alpha$. When $n/m < 1-\alpha$, either the social consumption or the accumulation of capital may decline, and even, in some cases, the social income as a whole may decline too.

It should also be pointed out that in the above argument we have tacitly assumed that there is some under-utilization of fixed capital in the dumping industry, and that consequently export production can be started without investing new capital. If such a necessity occurs, however, then it would obviously be more sensible to invest this capital, for example, in an industry which could achieve no smaller exports than the industry in question and which would not engage in dumping, i.e. would not simultaneously raise domestic prices.

The investment of profits by the dumping industry gives rise to similar reservations. The possibilities of forcing sales through dumping often encourages the industry in question to invest in its own firms. If dumping were not pursued, however, the accumulation of capital by the industry in question would certainly be smaller; but with no incentive to expand the plants of the dumping industry, the accumulation would flow 'instead' to the capital market and thus serve for more reasonable investments.

For these reasons the above argument applies without serious qualifications *only* to the dumping which is pursued during temporary under-utilization of the productive capacity of the industry in question.

PART 2

TOWARDS THE THEORY OF BUSINESS CYCLES

The World Financial Crisis[1]

(1931)

1. The period which preceded the present economic crisis abounded in capitalist utopias. American economists in particular excelled in forecasting an everlasting era of prosperity and—what is most astonishing—themselves believed in these horoscopes. The crash on the New York stock exchange at the end of 1929 dealt a fatal blow to these 'theories', which vegetated for a short time (nourished by Hoover's optimism) until they passed into oblivion in 1930.

New apologists of capitalism have been found, however, who—without denying the sharp fall in output—assert that the present crisis differs from previous ones in its lack of financial perturbations, which, they claim, is a result of an improvement in the mechanisms of the capitalist economy. Meanwhile, by 1930 the financial crisis had already reached its climax in the raw-materials-producing countries of South America and in Australia: a sharp fall in export prices for their products made it impossible for them to pay both the instalments and the interest on their loans. This checked the inflow of new capital and even caused the outflow of old capital. As a consequence, these countries suspended the convertibility of their currencies into gold.

These storms on the peripheries of the capitalist world were only faintly felt in its centre. The losses incurred in the raw materials-producing countries were offset by gains derived from the cheapness of raw materials, with finished-product prices still hardly reduced. Only when, after some time, the fall in raw-material prices was followed by a fall in finished-product prices did the financial crisis spread to Europe and the USA.

2. Let us imagine a system made up of two countries, *A* and *B*, with *A* indebted to *B*. Let us assume that a sharp fall in prices has occurred in country *A*. Two phenomena will then take place there: (1) production will become less profitable or will bring losses; (2) besides these 'real' losses there will also be 'book' losses, i.e. a fall in the value of stocks.

The first phenomenon, i.e. the reduction of current profits, will impede payment both of instalments and of interest on loans incurred in country *B*. Relief could occur if country *B* gave country *A* new

credits; but difficulties in serving the former's loans do not encourage the granting of new long-term credits, and, as regards short-term credits, not only will there be no tendency for their inflow but, quite the contrary, their outflow is more likely. For a fall in the value of stocks will reduce the 'liquidity' of short-term credits, which, generally and schematically speaking, are invested mainly in commodity stocks. For example, if the indebtedness of commodity stocks were initially 75% of their value and commodity prices subsequently fell by 25%, then the level of indebtedness of stocks would amount to 100% of their value; and with a further decline in prices the indebtedness would exceed their total value. The sums due to the banks of country *A* would become questionable, thus undermining confidence in those banks on the part of short-term creditors from country *B*, who as a result would begin to withdraw their capital.

Difficulties in servicing foreign loans, together with the outflow of short-term foreign capital, must cause an increased demand for credits from the bank of issue in country *A*. These credits finance the purchase of foreign exchange or gold necessary to pay both instalments and interest on loans or short-term credits to country *B*. Thereby the reserves of foreign exchange and gold in the assets of the bank of issue of country *A* melt away, while the portfolio of bills increases; the ratio of foreign exchange and gold reserves against total money circulation rapidly declines.

How can this outflow of foreign exchange and gold from country *A* to country *B* be checked? Country *A*'s bank of issue, in order to defend its currency, introduces credit restrictions (deflation), thereby impeding investments and encouraging the running down of stocks. Production and market in country *A* shrink, and so do imports from country *B* to country *A*. Contrariwise, in country *B*, supplied with an inflow of gold and foreign exchange from country *A*, there is an expansion of credit (inflation), output and market increase, and so do imports from country *A*. Hence the foreign trade balance improves in favour of country *A*, the more so as, owing to credit deflation in *A*, prices in that country fall a little, and owing to credit inflation in *B* they rise a little there. As a result, gold and foreign exchange begin to flow back to country *A* from country *B*.

3. The course of the financial crash in Germany[2] corresponds almost exactly with the above pattern, except for the serious reservation that the adjustment process, i.e. the process of return to normal conditions,

shows considerable deviations there. Above all, credit restrictions alone could not check the avalanche of frantically withdrawn short-term credits. An agreement had to be signed with a consortium of foreign bankers to leave their deposits in Germany until February 1932. Next, credit restrictions in Germany were not followed by the expansion of credit in those countries to which capital flowed from Germany. Lack of confidence in banks involved in Germany stimulated the withdrawal of deposits from them, thereby forcing them to keep large cash reserves. Consequently, the shrinkage of production in Germany was not accompanied by an increase in production and markets in other countries. Hence the export of German products encountered difficulties, also caused by high tariff barriers, and could increase only as a result of considerable price reductions, exclusively at the expense of exports from other countries. Therefore the adjustment process could not develop properly, and the world economic crisis deepened still further.

In contrast to Germany, England was not a debtor country but an intermediary in the allocation of capital. The outflow of deposits from England occurred mainly in connection with the involvement of English banks in central European and overseas countries. Even more than in Germany, the adjustment process deviated from the theoretical model. The suspension of the gold standard was followed by the devaluation of sterling, which obviously considerably increased the competitive advantage of English exports. They increased entirely at the expense of a reduction of output in other countries, since the inflow of deposits withdrawn from England, like the inflow of deposits withdrawn from Germany, did not expand credit in the creditor countries and hence did not increase their markets. When after a certain time English domestic prices rise, consumption in Great Britain will shrink and the world crisis will deepen. Devaluation in England influences the world economy like deflation in Germany.

After the collapse of sterling the financial crisis spread in ever wider circles. The position of American banks began to give rise to the same doubts as had those of Germany and England. Besides this, after the losses incurred from the fall of sterling many European banks of issue decided to shift gradually from the gold and foreign-exchange standard to the gold standard, and as a result began to convert dollar reserves into gold. Hence a considerable amount of gold began to flow out of the USA. This process was checked by an agreement by which France consented not to withdraw her deposits. However, France

demanded a guarantee from American banks that they would pursue a conservative credit policy, and the US discount rate was raised. Hoarding of money spread world-wide (from fear of keeping deposits in now suspect banks), often turning into hoarding of gold or of goods out of fear that the value of individual currencies might fall.

4. Shortly before the outbreak of financial perturbations in Europe, international capitalism attempted to carry out a co-ordinated operation to relieve the world crisis. This was the aim of the trips of the governor of the Bank of England, Montagu Norman, and Hoover's declaration on debts. The German crash, which occurred soon after the latter, was a signal, so to speak, of a shift from international attempts to co-ordinate and organize capitalism to a policy of bickering imperialisms. In all countries a war cry was heard: to save the 'national economy' from the ruins of the world. While some leaders call for sacrifices in order to maintain the stability of exchange rates, others point to their fall as an instrument for conquering the world.

The development of Hitlerism in Germany in recent months is, unquestionably, closely connected with the financial crisis. The present economic situation there could easily be presented as the work of foreign hands, and the masses have been persuaded to expect salvation through a 'national' revolution. It is possible that when the agreement on the non-withdrawal of short-term deposits expires, in February 1932, the 'Hitlerite folk' will enter the scene and supersede the German capitalists in declaring a moratorium on foreign debts.

France's policy is entirely directed towards not harming her financial capital, which, with the lowered level of prices, means a very considerable increase of her share in world assets. Apprehensive about the integrity of her investments, France is forcing the USA and, to some extent, the entire world to deflate, though this deepens the world crisis and undermines the foundations of her exports. But what else can be done? For France it is a question of safety first, then disarmament.

In England, by contrast, the industrialist has triumphed over the banker. While devaluation threatens the role of the City as the banker of the world, industry dreams of conquering the markets of the British empire and the Far East through a depreciated currency. These dreams will be dissipated when English retail prices start rising and the struggle for wage increases heats up.

We are now living through times which in many respects resemble a great war. They will be no less pregnant with consequences.

Reduction of Wages during Crisis[1]

(1932)

1. While the 'doctors' of capitalism, faced with the ever-deepening economic crisis, are losing heart, the 'quacks' continue to prescribe a universal remedy for all the ailments of the sick system—reductions in workers' wages. The counsel of the quacks is gaining ground. Individual leaders of industry are ardently remedying the economic situation in their own businesses by terminating collective agreements and perfecting the art of tacit wage reductions. What is the real effect of these measures on economic developments during the crisis?

2. For simplicity's sake we shall consider here a society made up of capitalists and workers only. Let us assume that total social output amounts to 100 units of some goods per month, 60 units of which are the share of consumer goods for workers; 20 units, consumer goods for capitalists; and 20 units, depreciation of capital and investments, i.e. means of production (buildings, machines, etc.). A total of 80 units of consumer articles and 20 units of means of production are produced.

At the same time, let workers' wages amount to 60 and capitalists' profits to 40 money units. Then workers can purchase the 60 units of consumer goods intended for them, and capitalists the remaining 40 units (20 units of consumer goods and 20 of the means of production). Hence the distribution of social output corresponds to the distribution of the money income (or purchasing power) of the population; output and sales are in equilibrium.

We now assume that at a certain moment workers' wages are reduced by 20%. This means that the income (purchasing power) of workers declines by 20%, and that for their work they will now be able to purchase, instead of 60, only 48 units of consumer goods. At the same time, what the workers have lost is gained by the capitalists, who now pay workers less; and hence the income of capitalists will be: $40+12=52$ money units.

Let us assume, as before, that half of this income, i.e. 26 money units, will be spent by the capitalists on consumer goods and half will be saved. A new equilibrium between the distribution of output and the distribution of income could now be established if the output of

consumer goods were 48 + 26 = 74 units, and the output of means of production were 26 units. For only then will *all* goods, both consumer goods and the means of production, find purchasers: 48 units of consumer goods would be purchased by workers (who now have 48 money units) and 26 units of consumer goods plus 26 units of the means of production would be purchased by capitalists (who now have 52 money units).

We can easily see, however, that such adjustment of output to the new distribution of income *does not occur*. Were it to occur, output of consumer goods would have to be *reduced*, as follows from the above, from 80 to 74 units, and the output of means of production would have to *rise* from 20 to 26 units. But: (i) producers of consumer goods have no reason to reduce their output, since for the time being the profits of each of them—thanks to the reduction in workers' wages—have increased; (ii) during crisis, when plants are working below capacity, even with increased profits from wage reductions capitalists will not immediately increase their demand for new means of production. Thus a disproportion between the distribution of output and the distribution of income, and hence between output and sales, will ensue, which will be followed by an increase in stocks of unsold consumer goods by 6 units, in which part of the capitalists' profits will be tied up.

What happens next? Theoretically, owing to the increase in stocks of consumer goods, their prices decline, and workers for their 48 money units will be able to purchase the entire 54 units of consumer goods intended for them. In this way, with the new prices for workers' consumer goods, equilibrium will be restored between the distribution of output and the distribution of social income.

3. However, if a reduction of wages were to have only such effects, a basic question would obviously suggest itself; in the final analysis, has the reduction of wages really not harmed the workers?[2] The development of our argument will give us a clear answer to this question.

First, the decline in the prices for workers' consumer goods, owing to the increase in unsold stocks, requires a certain period of time. During this transition period, workers for their new, reduced wages will be able to purchase a smaller part of social output than before the wage reduction. The fact that part of the capitalists' profits will be tied up in an unattractive increase in stocks is hardly any consolation to the workers.

Second, if the capitalists are not strongly opposed by the workers over the reduction of wages, this transition period will change into a

permanent condition. An individual enterpreneur, even if growing stocks in his warehouses become a serious problem for him, does not understand that a reduction in prices is the result of the previous reduction in wages, to which he also contributed. He regards the 'market' on which the reduction in prices took place as an external force, independent of him. So from the fall in prices he eagerly draws the conclusion that he should reduce wages still further. Consequently, the stocks of unsold workers' consumer goods increase once again, prices once again fall, etc. An ever greater part of the social income will be tied up in stocks, the crisis will continue to deepen, and workers with their shrinking wages will be unable to take advantage of price reductions to restore their previous standard of living.

Third, one should remember that our simplified model does not give a true picture of society, since it identifies only capitalists and workers. Besides these, however, there are intermediate strata, and a reduction of prices in the factory warehouse hardly means reductions in retail prices for the consumer-worker. A fall in prices may be partially exploited by the middle and petty business bourgeoisie, whose income and hence also consumption will increase at the cost of workers' consumption.

Finally, and in passing, one should note that our line of argument—that after a reduction of wages there is a return to the previous equilibrium between output and sales through price reductions of workers' consumer goods—can only apply to the period of *crisis* when capital equipment is underemployed. During a phase of economic prosperity, a reduction of wages is followed by an entirely different course of events. With full employment of capital equipment the increase in capitalist profits, caused by a reduction of wages, encourages them to place orders for means of production. The increased activity of the industry manufacturing these means of production in turn raises the total number of employed so that, despite reductions of wages, the total output of consumer goods for workers is wholly purchased by them and there are no further price reductions. During economic prosperity for industry, therefore, even countries with starvation wages can show a sustained development of output, since profits are then reinvested. It is beside the point that this prosperity, as we know, has its limits. Boom years are inexorably followed by crisis.

4. We can say, therefore, that during a crisis—such as we are now experiencing—a reduction of wages causes a reduction of prices, but the interval between these events does not permit workers to benefit

immediately, while further reductions of wages eliminate altogether the possibility of their being able to do so. As a result, the standard of living of the working class and its share in the social income fall, but at the same time the increased share of the capitalists in the social income flows more and more into unsold stocks. This in turn further shrinks output and intensifies the crisis.

Mr Keynes's Predictions[1]

(1932)

In recent speeches J. M. Keynes, possibly the leading bourgeois economist, has attempted to explain the principles of the present international financial system, or rather those of the disconnected parts of the once efficiently operating mechanism which still remain usable. Here we shall summarize only Keynes's most important ideas, which—besides illuminating purely financial problems—simultaneously cast light on shifts in the balance of power among leading capitalist countries.

According to Keynes, the financial crisis was prevented from worsening by England abandoning the gold standard, followed by nearly all the countries of the British empire and by Scandinavia. This simultaneously initiated 'the setting into motion of natural forces which are certain in course of time to undermine . . . the creditor position of the United States and France'.[2] Keynes emphasizes, not so much the increased export capacity of the 'non-gold' countries as a result of devaluation, against which the 'gold' countries must defend and are in fact defending themselves with tariff barriers, as the reduced competitiveness of the creditor countries' exports.

> The undermining of the competitive position of the export industries of these creditor countries will be, in truth, in response to their own request . . . . The rest of the world owes them money. They will not take payment in goods; they will not take it in bonds; they have already received all the gold there is. The puzzle which they have set to the rest of the world admits logically of only one solution, namely that some way must be found of doing without their exports.[3]

This argument can be extended as follows. The creditor countries, in exchange for their exports, imported certain commodities, especially raw materials, from the other countries. Also, in future they will not be able to get along without these imports. The remaining countries, on the other hand—or, strictly speaking, the British empire —will be able to suspend imports from the creditor countries of finished products, and to some extent also of raw materials, many of which it produces in abundance.

Despite appearances of abstraction, therefore, Keynes's argument is closely connected with the actual economic position and potential of the British empire. Moreover, Keynes points out still another specific factor making possible the meeting of obligations to the 'gold' creditor countries: the sale of gold by the Indian upper classes which began after the devaluation of sterling. Keynes regards this outflow of gold from Indian strong-rooms (which we shall return to below) as a lasting phenomenon. This Indian gold—together with gold from mines in the British empire—is supposed to accelerate the payment of debts. According to Keynes, this process in detail presents itself as follows:

> The process will be seen most rapidly in the case of France, whose creditor position is likely to be completely undermined before the end of 1932. The cessation of reparation receipts, the loss of tourist traffic, the competitive disadvantage of her export trade, the reduction of income from foreign investments (which are withdrawn in the form of gold brought to France) will, between them, do the work.[4]. . .
>
> In the case of the United States, the process may be a slower one, largely because the reduction of tourist traffic, which costs France so dear, means for the United States a large saving. But the tendency will be the same. A point will surely come when the current release of gold from India and from the mines will extend the favourable balance of the gold countries.[5]

Keynes also 'invites' the countries of central Europe and Holland to join the group of 'non-gold' countries, and claims that the process described above will bring the world financial crisis to an end. But the operation of many of the factors which Keynes considers to be improving the financial situation must be regarded as doubtful.

Above all, it is unknown whether the inflow of gold from India, which was the main factor enabling the Bank of England easily to pay dollar credits incurred before the devaluation of sterling, is a lasting phenomenon. So far, gold in India has been exchanged for silver and paper money, both because of the increased demand for money in transactions arising from an increase in prices (after the devaluation of sterling and the rupee) and because hoarding of gold has been replaced by hoarding of this silver and paper money, apparently in expectation of a future improvement of its exchange rate in relation to gold. On the other hand, until now no increase in the purchase of goods has occurred in India, which would indicate that their cheapness in relation to gold has caused an increased demand for the means of production or consumption. Only against such a background could the outflow of gold be regarded as lasting. Otherwise, the payment of

debts with Indian gold may come to a halt and, along with it, the process of improving English finances.

Despite this, the basic tendencies discussed by Keynes seem probable in their general outline, especially as regards the British empire. In particular, imports to the empire will be even further reduced following the imposition of a general *ad valorem* 10% duty for imports to Great Britain and her colonies (the tariff will be extended to imports from the dominions if, at the British empire conference this July, they do not agree to introduce a similar customs barrier in their countries).

However, will the processes discussed here lead to an improvement of the entire international financial system? In particular, will Keynes's hopes that this improvement will also pave the way for overcoming the economic cricis be realized? Today there are still no signs of the latter. As we have pointed out, despite attempts at an 'international' approach, Keynes in fact speaks as a representative of British imperialism, which at this point sees a good chance for itself. But the chances which feed hopes for an improvement in Britain's financial position are at the same time the chances of worsening the crisis in other countries, i.e. in the 'gold' countries. Moreover, with a further deepening of the world crisis, the British 'chance' will itself turn out to be short-lived and illusory.

Is a 'Capitalist' Overcoming of the Crisis Possible?[1]

(1932)

1. As not only months but years of the world economic crisis pass by, as it continues to deepen and the signs of improvement temporarily appearing here and there quickly fade, erased by new waves of ever deeper depression, the question, When will the crisis end? increasingly gives way to a different question, whose very formulation in 1930, or even at the beginning of 1931, caused bourgeois economists merely to shrug their shoulders impatiently: Is the overcoming of the present crisis *altogether possible* for the capitalist system?

A few English economists and socialist politicians have responded to this question in a rather general way in the leftist English press. A politically moderate professor of economics of Oxford University, G. D. H. Cole, believes that so far there are no signs of improvement; that in fact the world crisis is intensifying:

> It is quite clear that the capitalist system can collapse at any moment and that it is now closer to catastrophe than at any other point in past history, not excluding 1919 . . . . However, some 'patching up' [of the present system] is possible—and even a temporary return to capitalist 'prosperity', which means prosperity for capitalists . . . . I would not assert with certainty that the capitalists will not apply some measures which will temporarily improve the situation. Everything would seem to indicate, though, that they will be unable to do this in time; this is not out of the question, however . . . . But I am convinced that the basic causes of the crisis are rooted deeply in the capitalist system, and that with this system no lasting improvement is possible.[2]

According to another economist, J. A. Hobson, author of a well-known study on imperialism,[3] because of the intensity, persistence, and universality of the present crisis, together with the general instability of the monetary system, measures of exceptional scope and boldness are required to overcome it. To prevent a catastrophe in the system, and to extend its life for some time, Hobson believes that internationally co-ordinated credit assistance to debtor countries and world price stability are required.

An extensive analysis of the world economic situation and a discussion of possibilities for overcoming the crisis was recently put forward by the eminent Soviet economist E. S. Varga (*Intern. Presse-Koresp.* of this July).[4] His study concerns the last quarter of 1931, but its general conclusions and forecast are still most timely. Here is the summary of Varga's main arguments on the question which interests us, i.e. the 'capitalist' overcoming of the crisis.

First, he describes in detail its past course. He indicates the generality of crisis phenomena and links them with the chronic crisis in agriculture. He points out the depth of the depression (expressed in the volume of the fall in output) and its acuteness (the great—though irregular—fall in prices, and the shrinkage of entrepreneurial profits). He emphasizes the exceptionally strong set-back to investment activity and the persistent accumulation of stocks, as well as the special role of the financial crisis. He also shows the massive and widespread decline in the working classes' standard of living (affecting not only the unemployed but also, in view of the fall in real wages, the employed), and the contradictions in the capitalist world, which have aggravated the crisis and have led already to the first war in the East. Finally, having shown the importance of social changes in the USSR, Varga moves on to discuss the further prospects for the crisis.

He observes that, as yet, there are no signs of an upturn in the business cycle. The financial crisis is deepening; world output, and in particular investment activity, continue to fall. The depreciation of currencies, which Varga identifies with inflation, does nothing to mitigate the crisis even in individual countries, since depreciation has already spread to such a considerable part of the world that none of those countries which have implemented it has thereby significantly increased its competitive position. Besides this, the few States which have been able to maintain the gold standard are isolating themselves from the others with tariff barriers. Consequently, Varga believes that this year at least—1932—will be a year of crisis for the whole world economy.

At the same time, he vigorously argues against the fatalistic theory which holds that a 'capitalist' overcoming of the crisis is impossible. Here one should distinguish between the *structural crisis of capitalism*, going on for years now, and the present *crisis phase of the business cycle*, whose intensity can be explained by this background, but which—if the social rule of the bourgeois is not toppled—can be overcome within the framework of the capitalist system. For in the

present business crisis—as in previous ones—there are factors operating which both contain the seeds of the system's downfall and prepare the ground for a future business upswing.

The reduction of output deepens the crisis, but at the same time is a factor in overcoming it, since it leads to the liquidation of commodity stocks. The sharp fall in prices causes great losses for capitalist enterprises, but at the same time cheapens elements of fixed capital[5] and thereby stimulates its utilization, and hence investments. The credit crisis, resulting in numerous bankruptcies, also deepens the economic crisis; but at the same time a process of concentration occurs (a transfer of failing companies into the hands of creditors), combined with large write-offs of the book value of capital, so that the same amount of profit is now obtained from a smaller capital value, thereby increasing the profit rate. Finally, the reduction of workers' wages deepens the crisis by reducing still further the domestic market, while at the same time providing one of the strongest incentives to a renewed employment of capital and hence also to the replacement, investment, and the expansion of capital equipment.

Obviously, during the structural crisis of capitalism, overcoming the crisis phase of the business cycle produces even greater difficulties than before. During the structural crisis, the monopolistic nature of capitalism and the permanent excess of fixed capital counteract tendencies towards the renewal and expansion of fixed capital. The conquest of new markets and the greater penetration of colonial markets meet with difficulties. The aggravation of imperialist contradictions and the constant threat of war check the tendency to overcome the crisis. Nonetheless, Varga believes that the above-mentioned factors, though in a changed and weakened form, together make up an automatic mechanism which determines the course of capitalist economic developments. Thanks to this mechanism the capitalist system is capable of overcoming the present phase of the business cycle.

It would be wrong to deny this possibility, but it is equally wrong to forget that the overcoming of the crisis by capitalism is inseparably linked to the position taken, and the political actions pursued, by the working class.

2. Varga's arguments, summarized above, concerning the specific factors involved in overcoming the crisis within the framework of the present capitalist system provoke some doubts and questions.

Above all, Varga's identification of depreciation with inflation may lead to serious misunderstandings. Inflation consists in the creation of

purchasing power not based on a share in the current social income (e.g. through expansion of credit by the bank of issue or commercial banks). Inflation in a non-isolated economy generally causes devaluation, i.e. depreciation of the currency (a fall in its value in relation to other currencies). However, this depreciation can take place without previous inflation and—as has now happened in Great Britain—can even be combined with restriction of credits, i.e. with deflation. Among the countries which have recently devalued, typically inflationary signs are observed only in Japan, which has financed military operations through credit expansion by the bank of issue.

As regards the effects of devaluation itself, though it does not contribute significantly to a direct mitigation of the economic crisis, it does have a certain balancing influence on the financial perturbations (i.e. the financial crisis) that intensify it. The countries which have retained the gold standard are mainly the creditor countries. Owing to the fall in the exchange rates of their debtors, imports from the creditor to the debtor countries have declined considerably, which will contribute to a gradual payment of debts. In one of the recent numbers of *Socialist Review* we described in more detail those balancing processes,[6] which appeared first and foremost in the form of payments of French credits by England. Owing to the increased confidence of France in the English capital market, such processes even caused a return of the earlier withdrawn French capital to England. This tendency has weakened recently as a result of financial perturbations caused by the Kreuger collapse.[7] The international financial system is already in such a state that as fast as holes begin to be patched up in one place, new holes appear in another. However, if a complete breakdown of international finances does not occur in the mean time, one should expect devaluation to contribute to a certain extent to ending the financial crisis (which obviously still forms no basis for overcoming the economic crisis, but only ameliorates the factors intensifying it).

Next it should be noted that the depletion of stocks due to the shrinkage of output during the crisis is neither the only, nor even the main, reason for the eventual upturn. As Varga himself mentions several times, during a crisis investment activity in particular shrinks, and therefore—in my opinion—it is precisely here that one should seek the starting-point of processes that will bring an upswing of the business cycle. Owing to the fact that during a crisis investment activity is on a lower level than that required for simple reproduction (maintenance) of the existing capital equipment, this equipment is also

gradually depleted. Unused and outdated machines are sold for scrap, and new ones are not purchased to replace them. Besides, a considerable number of machines—and equipment in general—still kept in factories has not been reconditioned nor maintained properly, and may have become obsolete as well (due to technological progress), and is therefore only partially usable. On the other hand, since in a certain phase of the crisis the output of consumer goods generally starts declining more slowly than the rate of this contraction of capital equipment, there is a real need to employ the existing equipment more fully, which in turn requires investment. There is then a better chance of intensifying investment activity, which is the basic foundation for overcoming the crisis.

We also have reservations about the other factors of automatic improvement enumerated by Varga. Capital equipment becoming cheaper because of the fall in prices does not, as a rule, occur more rapidly than the average fall in profits. Therefore the hypothetical rate of profit in a new firm would be no higher than in preceding stages of the crisis. Hence, in my opinion, this factor cannot be an independent stimulus to undertaking investments. As regards the reduction in the book value of capital because of write-offs—while it does indeed increase the nominal rate of profits, this is not a sufficient reason for expanding an existing firm or starting up a new one as long as the crisis lasts.

As regards the reduction in workers' wages owing to the domestic market shrinking, which Varga mentions, this either causes a fall in prices or an accumulation of stocks (or both). In other words, profits either do not rise at all, or are realized in the form of stocks.[1] In these conditions the cheapening of labour cannot stimulate the establishment of new firms.

In the final analysis, therefore, we believe that, of those components of the mechanism of the capitalist economy which could form a foundation for overcoming the crisis, the contraction of capital equipment caused by the decline of investments (and also by the running down of stocks) should be put in first place.

However, all these factors which affect the course of the crisis do so only after a long time. Former crises as a rule have ended sooner—on account of the intervention of some 'external' factors, such as the conquest of new markets, or a wave of technological innovations.

[1] See 'Reduction of Wages during Crisis', [pp. 42–3].

Today—since the colonial countries have also been drawn into the orbit of capitalism—expansion of markets in the geographical sense is almost impossible. The only possibility would be a demand for new goods, which would create new markets. The scope and depth of the present crisis, however, make this way of overcoming it highly unlikely. The same can be said of possible innovations.

Hence today, of the possible 'external' factors which might contribute to overcoming the crisis, the only one left is a 'wartime boom', which, as the war expands, for obvious reasons would greatly undermine the *social viability* of the present system and make the possibility of a capitalist overcoming of the crisis highly doubtful.

Finally, we should mention yet another possibility, namely a certain form of inflation consisting of individual states, or groups of states, starting up major public-investment schemes, such as construction of canals or roads, and financing them with government loans floated on the financial market, or with special government credits drawn on their banks of issue. This kind of operation could temporarily increase employment, though on the other hand it would retard automatic 'natural' adjustment processes which might lead to overcoming the crisis. Besides this, if it were to be carried out on a large scale, it would have to be co-ordinated by an international agreement of the individual capitalist governments, which, given today's quarrelling imperialisms, is almost out of the question.

3. There seems to be almost universal agreement that at the present moment there are no signs of the world crisis being overcome. Hence the above arguments are of rather a theoretical nature. They point to ways of overcoming the crisis which are still open to the capitalist system. If and when that system will embark on such measures, and whether they will indeed lead it out of the crisis, is another matter. The decisive factor here is obviously not the economic but the social one—the position taken by the working class.

'New' Industries and the Overcoming of a Crisis[1]

(1932)

There is no doubt that the appearance during a depression of branches of industry which meet new needs can accelerate the overcoming of the crisis and will also influence the course of the subsequent boom. The overcoming of the crisis in the USA in 1921 was unquestionably accelerated by developing the production of inexpensive cars, radio sets, electrical household equipment, rayon, etc.

How does an 'additional' market for these articles appear? For if incomes remain at the same level, the purchase of 'new' articles must result in reduced consumption of other goods, and thus there would be no change in total output; new branches of industry would arise, but simultaneously old ones would decline.

However, as in business fluctuations in general, a major role is played here by the time taken to construct industrial plants. While factories that are to produce new articles are under construction, such articles have not yet appeared on the market, whereas investments have already caused an overall increase in employment and an expansion of the domestic market. Hence, for the moment, 'old' branches of industry gain from the construction of factories for new articles. Obviously, once factories for 'new' branches of industry have been completed and begun to deliver their goods to the market, the situation of 'old' branches will deteriorate; though even then they will still be much better off than during the crisis, since the strong stimulus from investments in new branches of production has in the mean time generated an economic boom. Even so, in the business upswing accelerated in this way the 'old' branches of industry will not be as prosperous as the 'new' ones. This indeed could be seen during the period of American prosperity which followed the crisis of 1921.

It should be noted, however, that the competition between 'old' and 'new' branches of industry was weakened at that time by the complete destruction of one of the old ones, namely by the introduction of prohibition at the beginning of 1921. During the present presidential election campaign, the 'wets' are once again recommending the lifting

of prohibition as a way of overcoming the present crisis, asserting that the reconstruction of the alcohol industry can have the same effects as did the construction, on that industry's ruins in 1921, of factories for cheap automobiles, radio sets, etc.

However, the situation is somewhat different in this case. The point is that many distilleries and breweries which were closed down earlier are still in existence, and hence would not require such great investment as the construction of entirely new branches of industry. Will the production, in this case, of spirits and beer cause a corresponding fall in the consumption of other articles? Probably not. Consumers generally will in fact now spend less on other articles, but this will be offset by demand for those same articles by workers employed in the processing of beer and spirits, and by capitalists deriving profits from these industries. It is an open question whether those capitalists *will* in fact spend their profits, whether on consumption or on investments; but it seems likely. For even if new distilleries and breweries need not be built, they will in any case require major overhauls, which will absorb the profits of their owners for a long time.

In this way, the production of alcohol will be brought on to the market without reducing the sales of other goods. Hence the market for these goods will not shrink, though neither will it expand, as was the case in 1921 with the construction of factories for new branches of industry. Consequently, not all the symptoms of a boom—such as rising prices and ever-increasing investments—will appear. There will be only a single reduction in unemployment to mitigate the crisis, rather than a continuous upward movement towards a boom. All of this obviously rests on the assumption that the distilleries, long since closed, can be reopened, which surely will not always be the case. There would, therefore, be some construction of new plants and all that that entails; but it would probably be insufficient to accelerate business upswing.

The Influence of Cartelization on the Business Cycle[1]

(1932)

Cartels have been said more than once to have a mitigating influence on the course of the business cycle; in this context the stability of prices of cartelized articles—actual or at least theoretically possible—is emphasized. In Poland in particular, the regulatory role of cartels has numerous supporters who would like to overcome the chaos of economic life through cartelization. Hence a careful examination of the influence of cartelization upon the business cycle is of major importance.

Let us begin by noting that a *universal* cartelization of any national economy (leaving aside the matter of its advisability) encounters almost insurmountable difficulties. Cartels 'succeed' only in those industries which show a considerable degree of concentration and produce standardized articles on a mass scale. In industries that are highly decentralized or where individual factories produce a wide variety of products, the fixing of prices and quotas is almost impossible. Thus cartels in such industries either cannot be organized at all, or do not achieve adequate integrity.

Therefore, to gain an idea of the possibilities of mitigating business fluctuations by cartels we shall examine a system in which only a considerable part of industry is cartelized, while free competition continues to rule in other parts. Indeed, we further assume that absolute stability of cartel prices—e.g. through government controls—will be maintained through all phases of the business cycle, which is supposed to have a stabilizing influence on its course. The basic problem is therefore as follows: how will stabilization of prices in the cartelized part of industry affect the amplitude of business fluctuations?

To begin with, it is easy to show that there are no grounds to suppose that business fluctuations will be *mitigated* by such partial stabilization of prices. Indeed, in the non-cartelized part of industry prices will still fluctuate, and hence also profit margins, and—as a result—the level of employment. However, fluctuations in employment in the non-cartelized part of industry must cause more or less proportional changes in employment in the cartelized part, since

industries belonging to the latter are either suppliers of non-cartelized industries, or produce articles consumed by workers employed in these industries and by capitalists deriving profits from them. Cartelized industries are thereby drawn into the general orbit of fluctuations of output, which therefore will be no less intense than in a system based on free competition.

Let us now examine how our partially cartelized system, *B*, works when fluctuations of output in it are of *the same dimensions* as in system *A*, based entirely on free competition. Cartelized industries enjoy constant profit margins (i.e. constant profit per unit of output) and thus their total profits fluctuate less than in the case of the same industries in system *A*. While in system *B* fluctuations of total profits depend only on fluctuations of output, in system *A* they depend also on fluctuations of prices. We are assuming that this greater stability of profits of cartelized industries will be accompanied by correspondingly smaller fluctuations in investments. During a boom, industries in system *B* will make lower investments than will those in system *A*; during a depression, they will make higher.

Moreover, the non-cartelized part of system *B* has exactly the same profits and makes the same investments as in system *A*. Because of the identical profit margins in the two systems, output in system *B* will always go through the same fluctuations as in system *A*. In view of the aforementioned interdependence of the cartelized and non-cartelized parts of industry, the fluctuations of total output will also be the same in both systems, which accords with our assumption. However, since investment activity in the partially cartelized system *B* fluctuates less than in the free-competition system *A* (on account of the greater stability of investments in cartels), the remaining part of output, representing consumer goods, will fluctuate more severely. The counterpart of this is a mitigation of profit fluctuations but a strengthening of workers' income fluctuations in system *B*.

From our argument so far it would follow that partial cartelization neither mitigates nor increases fluctuations in output, but only causes certain shifts in capacity utilization in particular industries, or in the incomes of particular classes of the population. However, this argument is based on an assumption which will not always be realized, namely, that in cartels smaller fluctuations in profits correspond to more stable investment policies. It turns out that if this assumption is not met, fluctuations in output will be *greater* in the partially cartelized system *B* than in the free-competition system *A*.

Indeed, let us assume that during a boom the cartelized industries in system *B*, having lower profits than the same industries in the free-competition system *A*, nevertheless make the same investments (the difference being covered, for example, by the issue of loans). 'Additional' demand is thereby created, prices in the non-cartelized industries of system *B* rise, the output of these industries rises on account of increased profit margins, and along with it total output also increases. During a depression the situation is reversed. Cartelized industries, having greater profits than the same industries in system *A*, nevertheless make the same investments. Hence total demand declines, prices in the non-cartelized industries of system *B* fall, the output of these branches decreases under the influence of reduced profit margins, and total output also declines.

Hence we see that fluctuations in output are, in this case, greater in the partially cartelized system than in the system of completely free competition. Why? Because if a more stable investment policy is not pursued in the cartels, fluctuations of investment activity, hence also of capital accumulation, are no smaller in system *B* than in system *A*, and there is a different distribution of this accumulation. On account of the greater stability of profits in cartelized industries, the non-cartelized ones show greater profits during a boom in the partially cartelized system *B* than in the free-competition system *A*. During a depression it is the opposite—the profits of non-cartelized industries are smaller in system *B* than in system *A*. These greater fluctuations of profits in non-cartelized industries are accompanied by greater fluctuations in their output, hence also in total output.

The question now remains of how this works in reality. Do cartels adjust their investment activity for greater stability in profits, or are fluctuations of investments in cartelized industries no less severe than in the others? The latter would seem to be the case. The fight for sales, which in the free market takes place through competition, does not cease after a cartel has been organized, appearing in the form of bargaining over quota. The latter are usually set on the basis of the productive capacity of individual members of the cartel, who, with total sales of the cartel rising during a boom, engage in an 'investment race' in order to capture the largest possible share of the market. Consequently, since all members of the cartel often do this simultaneously, the division of quotas may remain unchanged while the total productive capacity of the cartel increases excessively. As a result, cartels usually enter a depression with greatly increased productive

capacity, and restrict investments during this period no less, or perhaps even more, than other branches of industry. With a low level of capacity utilization the 'investment race' obviously ceases to be profitable: the investment quota obtained by a cartel member, instead of being used for technical rationalization of its own plants, is then often surrendered to the cartel member whose plant is technically superior.

Thus we see that, in a partially cartelized system, cyclical fluctuations of output will be greater than in a system of completely free competition. In particular, cartels intensify the course of the crisis—not primarily because they have 'rigid' prices, but because greater profits during this period are not followed by correspondingly greater investment activity.

On the Papen Plan[1]

(1932)

1. The assertion often made by 'economic spheres' that a reduction in tax burdens is the best means for overcoming the crisis does not withstand careful economic analysis. A reduction of direct taxes must be combined either with a reduction of government expenditure or with an increase of taxes on the working classes. In both cases the demand for industrial goods will shrink, and hence their prices will begin to fall. What 'economic spheres' gain by 'loosening the tax screw' they soon lose as a result of a fall in prices. Only a certain *redistribution* of profits will follow; their total volume will remain about the same. An improvement in profitability, which was supposed to be the starting-point for a business upswing, will not occur.

The first part of the Papen plan[1] concerns the effects of granting privileges to industry. The gift from present taxes would be, as we see, minimal. The idea of the plan is to remit *future* taxes. With the payment of current taxes, tax remission certificates would be issued for a certain part of those payments which can be used to pay taxes for the years 1934–9. Though every industrialist unquestionably prefers to be relieved of taxes now and not in the future, for industry as a whole the main advantage of relief—paradoxically—is that it is not effective. Certificates of exemption from taxes in future years will be entered in the books by industrialists as profit, but there will be no fall in prices caused by a reduction of government expenditure or by greater tax burdens on the working classes. Profitability will thereby be increased—or rather it will appear that it has been increased. A real increase in total profitability will occur only when total output and the share of profit in it increase. But this increase of profitability on paper is quite *real* for every entrepreneur, and hence will be an incentive to establish new firms or to expand, or at least to renovate, existing plants. These processes form the basis for a natural transition to a business upswing.

[1] We discuss here only the first part of the Papen plan concerning tax allowances. This is the most important, most original, and most matter-of-fact idea of the plan. The awarding of bonuses for employment also contained in the plan may be regarded rather as a distortion of this idea.

Discussions of the Papen plan have often stressed the importance of funds for investment gained by industrialists in the form of tax remission certificates, since these certificates can be pledged, sold in the money market, etc. However, this advantage is of rather a secondary nature. The basic factors necessary for undertaking investments are the will of businessmen to do so and an adequate capacity in the capital market. If this market is sufficiently receptive, inexpensive credit may be obtained, holding the tax remission certificates in reserve. However, with all the facilities for trading in these certificates, credit inflation is unavoidable; among other things, an increase in credits from the bank of issue and of money in circulation will follow.

We come here to the currency problem. The Papen plan, like every other plan for stimulating the business upswing, must jeopardize the currency position, unless there is a simultaneous inflow of capital from abroad. For, on the one hand, with the increase of output—which is the aim of the plan—there is an increase of money in circulation and, on the other, there is an outflow of gold or foreign exchange on account of a 'worsening' of the trade balance. The latter will occur even if prices, with an improvement in the economic situation, rise only slightly, thus leaving *export capacity* unchanged. For with an expansion of output, imports of a number of raw materials and semi-finished products that are indispensable to production and not produced domestically must increase.

2. The Papen plan differs considerably from the Nazi economic programme, which included the financing of large public works by the issuing of money, i.e. it planned the stimulation of the business upswing by means of a certain type of monetary inflation. The fight between Papen and Hitler is largely a clash between these two ideas for overcoming the crisis. It will be interesting to compare both programmes, the more so as such a comparison will clearly show what the Papen plan is and what it is not.

What processes take place with the financing of public works through monetary inflation? Let us assume that the government is constructing public works, financing them by raising loans from the bank of issue. Prices, output, and hence profits increase with the overall growth in demand. The increase in profits will be equivalent to the accumulation of capital tied up in the completed public works. In what form do the profits reach the hands of the industrialists? They will reach them either in the form of an increased number of banknotes in

their possession or in the form of repayments of their obligations to the bank of issue. This process is reflected in the latter's balance sheet in an increase in the portfolio of treasury bills, an increase of money in circulation, and a decrease in the portfolio of private bills. Yet another shift in the balance sheet takes place. Since the increase in output is accompanied by increased imports of foreign raw materials and semi-finished products, part of the money put into circulation will be exchanged for gold or foreign currency to pay for this increase.

In turn, the increased profits of industrialists will encourage the latter to undertake investments; private investments will begin to grow around public investments and the business upswing will be stimulated. The main difference between the Papen plan and the programme of inflationary financing of public works is that the core of the former plan, around which industrial investments are concentrated, is the 'tax gift', and that of the latter, profits made by industrialists from undertaking public works. These profits are associated with increased employment, which also increases later on account of private investments. This initial increase of employment is absent from the Papen plan: there is *only* secondary growth, resulting from more intensified investment activity by industrialists on account of increased profitability. The outflow of gold or foreign exchange starts with the Papen plan only when the investment activity of industrialists rises; with the programme of inflationary financing of public works it starts immediately after they are initiated. For these reasons, and also because the inflationary elements of the Papen plan are more latent, it will give rise to less fear about devaluation than will the inflationary financing of public works. The latter could easily cause a flight from domestic currency and soon result in a real devaluation.

In fact, Papen's and Hitler's programmes are different only in their nuances. The slogan of Papen's plan, 'Through profitability to employment', corresponds to Hitler's slogan, 'Through employment to profitability'. The transposition of phrasing comes from the fact that Papen and Hitler each have different followings.

PART 3

OUTLINE OF THE BUSINESS CYCLE THEORY

Essay on the Business Cycle Theory[1]

(1933)

Contents

Preface

The aim of this study is to provide an explanation, indeed one of several possible explanations, of the automatic mechanism of business fluctuations in a closed economy. Thus we ignore various exogenous factors such as growth in population, technical innovations, the policies of central banks—i.e. those factors whose operation is not strictly determined by the mechanism of the business cycle.

Moreover, the automatic mechanism of business fluctuations is defined here much more strictly than usual. We do not, for instance, seek to examine an automatic restoration of equilibrium which has been distorted by disproportions of development. Instead, we want to set out a mechanism which would explain the relative *regularity* of business fluctuations.

The basic components of this mechanism are real magnitudes directly related to profitability and investment activity: real profits, fixed capital, investment. The fluctuations of other magnitudes, such as total output, price levels,[2] and the rate of discount, are all determined—in this approach—by circular changes of the basic components.

The essay is divided into three parts. Part I presents a general outline of the theory of the business cycle. Part II contains a mathematical elaboration of this theory. With the help of some statistical data, the argument of Part II enables us also to estimate the period of the cycle. The results obtained are relatively close to the actually observed periods of the cycle. Finally, in Part III, some of the topics which were treated rather summarily in Part I are dealt with more extensively. Part II, the understanding of which requires some advanced mathematics, may be omitted without detriment to an understanding of the essence of our theory.

I. Outline of a General Theory

1. Introduction

The business cycle theory presented here is one which starts from investment processes and pays special attention to the time of construction of capital equipment. The leading exponent of this type of theory, A. Aftalion, summarizes his own theory as follows:

> During prosperity, price rises encourage increased production, which requires expansion of capital equipment. The construction of capital equipment, however, requires a longer period of time, during which demand is not adequately met; hence prices remain high, which encourages further investment and leads to over-capitalization. This appears as new plants are completed and put into operation. Over-production then takes place. Prices fall. A crisis breaks out.
>
> During the depression which follows, declining prices tend to limit production. Only investment activity is directly affected, however. The excessive productive capacity, which continues to expand with the delivery of previously ordered capital equipment, leads to the over-production of consumer goods, since businessmen do not wish to let costly equipment stand idle. Prices continue to fall and discourage further investments. A state of under-capitalization prevails, which in time results in under-production and subsequently a return to prosperity.[1]

This explanation of the trade cycle contradicts its actual course on one point: the production of consumer goods here reaches its highest point during depression. This conclusion, which is inconsistent with reality, results from the false assumption that productive capacity remains constantly fully employed,[2] and indeed reaches its peak during depression. In fact, despite the high costs of capital equipment, i.e. despite high overheads, this equipment will stand idle during depression if prices fall below variable costs. In this way fluctuations in the degree of utilization run in an opposite direction to fluctuations in productive capacity; since the former are much stronger than the latter,

[1] A. Aftalion, *Les Crises périodiques de surproduction* (Paris, Rivière, 1913), p. 401 (in free translation).

[2] In other places in this book Aftalion does speak about possible changes in the degree of utilization of the production capacity, but he considers them as factors of secondary importance.

the production of consumer goods during depression is minimized, not maximized.

These critical comments hardly undermine the foundations of Aftalion's theory, which requires only a little modification. During prosperity not only prices but also capacity utilization rise. *Both* these factors contribute to the improvement of profitability, which stimulates increased investment activity. After a certain time the completion of investment orders causes an expansion of the productive capacity, which contributes to a fall in profitability; prices and employment fall simultaneously. Reduced profitability discourages investment activity, which again only after a certain time manifests itself in the shrinking of productive capacity, once again leading to an increase in profitability expressed in a rise in prices and in employment.

In this mechanism of the business cycle it is not the level of prices but the level of profitability that stimulates the desire to invest. This is entirely consistent with reality, since the incentive to invest is expected profitability, which is estimated on the basis of the profitability of existing plants.

As we shall see below, consideration of the interdependency of profitability and investment will enable us to present the mechanism of the business cycle in terms of components of the social income. A mathematical elaboration of business fluctuations is thereby possible, using methods developed in J. Tinbergen's beautiful study of the shipbuilding cycle.[3]

2. Assumptions

We shall consider a closed economic system, devoid of trends, i.e. one which returns to its original state after each cycle. In addition we shall make the following assumptions:

Gross real profits

By gross real profits, P, we understand the aggregate real income of capitalists including depreciation per unit of time, consisting of their consumption and saving

$$P = C + A \tag{1}$$

[3] 'Ein Schiffbauzyklus?', *Weltwirtschaftliches Archiv*, 34/1 (1937).

Thus C denotes all goods which are consumed by capitalists and A includes—since we abstract from workers' savings[4] or their 'capitalist' incomes—all goods which are used in the reproduction and expansion of fixed capital as well as the increase in inventories. In the future A will be referred to as gross accumulation.[4]

The personal consumption of capitalists is relatively inelastic. Let us assume that C consists of a constant part B_0 and a part which is proportionate to gross profits:

$$C = B_0 + \lambda P \tag{2}$$

where λ is a small constant fraction.

From equations (1) and (2) we obtain:

$$P = B_0 + \lambda P + A$$

$$P = \frac{B_0 + A}{1 - \lambda} \tag{3}$$

i.e. the gross real profits P are proportional to the sum $B_0 + A$ of the constant part of capitalists' consumption B_0 and the gross accumulation A.

The gross accumulation A is, according to the above, equal to the sum of the production of investment goods and the increase in inventories.[5] We assume that aggregate inventories remain constant throughout the trade cycle.[5] This is justified in so far as, in existing economic systems totally or approximately isolated (the world, the USA), the total volume of stocks shows no distinct cyclical variations.[6] Indeed, while business is falling off, stocks of finished goods decrease but those of raw materials and semi-manufactured goods rise; during recovery there is a reversal of these tendencies. From the above we may conclude that in our economic system the gross accumulation A is equal to the production of capital goods.

Aggregate gross profits first enter industry and agriculture (which we assume to operate, in our economic system, along capitalist principles), as well as transport firms and trading companies, where

[4] For simplicity, by workers we mean here both manual workers and salary earners.[3]

[5] We do not include capital under construction in inventories; a change in the volume of such capital is covered by 'production of investment goods'; however, this item does not cover changes in inventories of other investment goods (e.g. in inventories of rolled steel or cement). Changes in this type of inventory must thus be included in the 'increases in inventories'.

one part of profits is retained and another part is paid out in the form of interest, dividends, etc. We assume that this stream of total profits is redistributed in a constant proportion between the trading companies and the rest of the firms. The latter, which operate fixed capital, we will, for brevity, call 'plants'. Thus, according to the above, gross profits of plants are proportional to total gross profits.

The results of these assumptions can be summarized as follows. Gross profits of plants are proportional to total real gross profits P. These, in turn, are proportional to $B_0 + A$, where B_0 denotes the constant part of capitalist consumption, and A the gross accumulation which is equal to the production of investment goods.

Investment

We assume that the period of construction υ is the same for any investment project. This of course is not in fact the case. υ should be considered as the average construction period, and our assumption that the construction period is the same for all types of investment must be considered as one of the simplifications introduced in our model.

Three stages should be distinguished in the investment activity: (i) investment orders, i.e. all types of order for investment goods for the sake of reproduction and expansion of the capital equipment, the volume of which per unit of time will be denoted by I; (ii) production of investment goods A which, according to the above, is equal to the gross accumulation; (iii) deliveries of finished equipment per unit of time D.[6] [7]

The relation between I and D is simple: deliveries D at the time t are equal to the investment orders I placed at the time $t-\upsilon$; thus the curve D is the curve I shifted by the time-lag υ (see Fig. 1).

The relation between the production of investment goods A and investment orders I is somewhat more complicated. The shaded area of the trapezium (Fig. 1) is equal to the value of orders placed during a period of the length υ ending at the time t, and thus equal to the portfolio of orders at the time t which we shall denote by W. Indeed, since the completing of each order takes time υ, all orders which come within the shaded area have not yet been completed, while all

[6] A and D differ in that A is the production of investment goods in general and D is the production of finished investment goods. It follows that the difference $A-D$ is equal to the increment of capital under construction per unit of time.

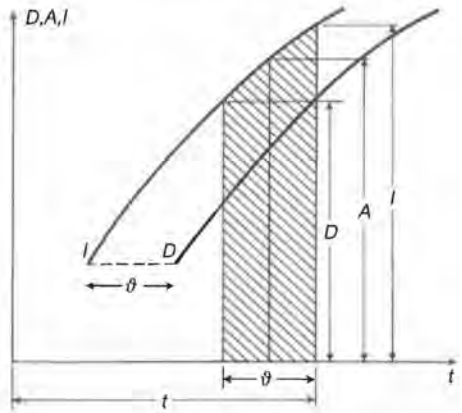


FIG. 1

equipment previously ordered has already been installed. Next, production of investment goods is equal to the portfolio of orders W divided by the period of construction:

$$A = \frac{W}{\upsilon} \tag{4}$$

Indeed, if each order is to be completed during the time υ then $1/\upsilon$ of its volume must be completed per unit of time; thus to the portfolio of orders W, there corresponds the production of investment goods W/υ.

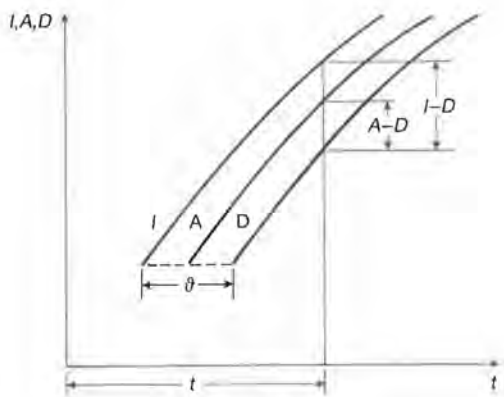


FIG. 2

It follows that A is equal to the shaded area of the trapezium divided by υ. If the upper side of the trapezium were rectilinear, the production of investment goods A would, at the time t, be equal to the median of the trapezium and thus to the investment orders at the time $t-\frac{1}{2}\upsilon$. If the upper side of the trapezium is curvilinear, this will be only approximately true. The production of investment goods at the time t is thus approximately equal to the investment orders at the time $t-\frac{1}{2}\upsilon$. Thus the curve A is approximately identical with the curve I shifted by $\frac{1}{2}\upsilon$ (see Fig. 2).

It should be noticed that the difference $I-D$ is equal to the increase of the portfolio of orders per unit of time, while the difference $A-D$ is equal to the increase of capital under construction per unit of time. (This has already been pointed out in n. 6 above.)

Changes in the volume of capital equipment

Let the volume of capital equipment at a given time be denoted by K.[8] Its change during a given period is equal to the difference between deliveries of new equipment and the volume of productive assets going out of use. Denoting the change of the capital equipment K per unit of time by K',[9] deliveries of new equipment per unit of time—as above—by D, and the replacement requirements due to particular productive assets going out of use per unit of time by U, we obtain:

$$K'=D-U \tag{5}$$

We may assume that replacement requirements remain at a constant level in the course of the business cycle. It is true that the volume of capital equipment K shows in fact small fluctuations, and it might

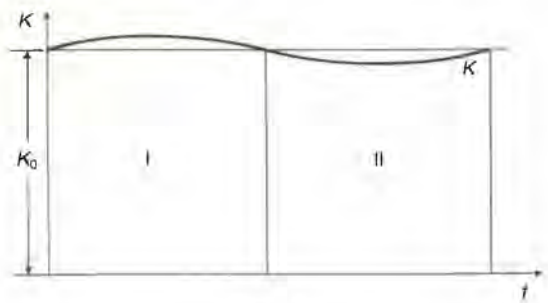


FIG. 3

seem therefore that in part I of the cycle (see Fig. 3), when K is greater than the average, the required replacements are higher than the average as well. However, it should be noticed that in part I the increase in the capital equipment consists of 'young' assets of low 'mortality', because the life of these assets is known to be considerably longer than the length of one cycle (15–30 years as compared with 8–12). Thus fluctuations of the replacement requirements can be considered negligible.[10]

The constant level of replacement requirements U is equal to the average D_0 of deliveries of new equipment D over one cycle, because we assumed that our system is devoid of trends and the volume of capital equipment returns at the end of the cycle to its original size. Furthermore, for the same reason the average over one cycle of investment orders I_0, of production of investment goods A_0 and of deliveries of new equipment D_0 are all equal. We thus obtain:

$$U=I_0=A_0=D_0 \tag{6}$$

Investment orders as a function of gross profitability and of the rate of interest[11]

The volume of investment orders D at a given time depends on the anticipated net profitability. Thus if entrepreneurs consider investing a capital k in the construction of capital equipment, they will estimate in the first place the anticipated gross profit p. From this we must deduct: (i) the depreciation βk (β being the depreciation rate); (ii) the interest on capital k amounting to ik (i being the rate of interest); (iii) the interest on the future circulating capital which, if its relation to fixed capital k is denoted by γ, amounts to $i\gamma k$. The anticipated profitability of investment in fixed capital k will thus be

$$\frac{p-\beta k-ik-i\gamma k}{k}=\frac{p}{k}-\beta-i(1+\gamma)$$

The coefficients β and γ may be considered to remain constant throughout the trade cycle; i is the rate of interest at a given time. The anticipated gross profitability p/k may be estimated from the actual gross profitability of existing plants. We have already denoted the volume of capital equipment of plants existing at a given time by K.

According to our earlier assumptions, total gross profits of these plants are proportional to aggregate real gross profits P. Consequently

the profitability of existing plants is proportional to P/K (henceforth we shall call this ratio 'gross profitability P/K').[12] Thus we may conclude that p/k is estimated on the basis of P/K, and that the investment orders at a given time depend on the gross profitability P/K and on the rate of interest i.

It should be added that it is not the investment orders I that should be considered a function of P/K and i, but rather the ratio of I to the volume of capital equipment K, i.e. I/K; indeed, if P and K increase in the same proportion, P/K will remain unchanged, while I is likely to increase in the same proportion as P and K. Thus we arrive finally at the relation:

$$\frac{I}{K}=f\left(\frac{P}{K}, i\right) \tag{7}$$

where f is an increasing function of P/K and a diminishing function of i. Moreover, as was shown above, since the gross profit P is proportional to B_0+A, where B_0 is the constant part of capitalist consumption and the gross accumulation A is equal to the production of investment goods, P/K is proportional to $(B_0+A)/K$, and equation (7) may be written as follows:[13]

$$\frac{I}{K}=f\left(\frac{B_0+A}{K}, i\right) \tag{8}$$

The rate of interest

It is known that in the course of the trade cycle the rate of interest rises in the upswing and falls in the downswing. When we come to develop our theory, we shall try to explain this connection (see 'The Money Market', pp. 93–8 below). At the moment we shall accept it a priori, and on this basis we shall make the following simplifying assumption: the rate of interest i is an increasing function of the gross profitability P/K. This assumption, however, even as an approximation, may be maintained only so long as (i) i is a 'market' rate, i.e. we leave aside interventions of the central bank; and (ii) there is no crisis of confidence when, during the depression, the rate of interest rises.[14]

From this assumption and equation (7) it follows[15] that I/K is an increasing function of P/K, or—since P is proportional to B_0+A—that I/K is an increasing function of $(B_0+A)/K$:

$$\frac{I}{K}=\psi\left(\frac{B_0+A}{K}\right). \tag{9}$$

Equation (9) holds so long as there is no intervention of the central bank and no crisis of confidence.

The function ψ

We assume that ψ is a linear function, i.e.

$$\frac{I}{K}=m\frac{B_0+A}{K}-n, \tag{10}$$

where the constant m must be positive since ψ is an increasing function. Equation (10) may be written in the form:

$$I=m(B_0+A)-nK \tag{10a}$$

We shall now show that n must be positive. From equation (10a) it follows that

$$n=\frac{m(B_0+A)-I}{K}$$

where I represents orders for goods used for the reproduction and expansion of capital equipment and remains always positive; it may, however, possibly approach the zero level. Let us imagine that I falls below the positive value mB_0.[7] For values of I less than mB_0 the expression $[m(B_0+A)-I]/K$ is greater than mA/K, i.e. mA/K will then be less than n. Since, however, the coefficient m is positive, as shown above, and since A (production of investment goods) and K (volume of capital equipment) are also positive, it follows that the coefficient n must be positive.[17]

According to equation (10a), in which the coefficients m and n are positive, the volume of investment orders I is an increasing function of the gross accumulation A and a diminishing function of the volume of capital equipment K.

3. The Mechanism of the Business Cycle

The main conclusions of the preceding argument may be stated as follows:

1. The time-lag between the placing of investment orders and deliveries of new equipment is υ; the curve of deliveries D is shifted from

[7] The coefficient m and the constant part of capitalists' consumption B_0 are both positive.[16]

the curve of investment orders I by the time υ. The curve of the production of investment goods A is shifted from the curve of investment orders approximately by $\frac{1}{2}\upsilon$.

2. In our system the production of investment goods A is equal to the gross accumulation (since inventories remain at a constant level).

3. Deliveries of new fixed assets D lead to an increase in the volume of the capital equipment by $D-U$, where U denotes the replacement requirements. U remains constant throughout the trade cycle and its value is equal to the average D_0 of deliveries D over a full cycle. D_0 is also equal to the average of investment orders I_0 and the average production of investment goods A_0.

4. Investment orders I are an increasing function of the gross accumulation A and a decreasing function of the volume of capital equipment:

$$I=m(B_0+A)-nK$$

where m and n are positive coefficients, and B_0 is the constant part of capitalist consumption.

These points already enable us to say something about the mechanism of the business cycle. An increase in investment orders calls forth an increase in the production of investment goods which is equal to the gross accumulation. This in turn causes a further increase in investment activity, as indicated by equation (10a). However, after an interval of time υ has elapsed from the time when investment orders have exceeded the level of replacement requirements, the volume of capital equipment starts to increase. Initially this restrains the rate at which investment activity is increasing, and at a later stage causes a decline in investment orders.

In particular it is impossible to stabilize investment activity at a level exceeding the replacement requirements. Indeed, if investment orders remain at a constant level the production of investment goods, which is equal to the gross accumulation, will remain unchanged as well, while capital equipment expands, investment being greater than replacement requirements. Under such conditions, however, investment orders will begin to decrease as indicated by the equation $I=m(B_0+A)-nK$, and the stability of investment activity will be disturbed.

During depression the process described here is reversed. Investment orders are not sufficient to cover the replacement requirements; this leads to a decrease in the volume of capital equipment and

eventually to a resumption of the increase in investment orders. To stabilize investment activity at a level lower than that which provides adequate replacement is as impossible as to stabilize it at a level which exceeds the replacement requirements.

We shall now make a detailed examination of the way in which the mechanism of the business cycle functions. Fig. 4 shows deviations from the average for: investment orders I, the production of investment goods equal to the gross accumulation A, deliveries of new equipment D, i.e. the values: $I-I_0$, $A-A_0$, $D-D_0$. It should be remembered that the averages I_0, A_0, and D_0 are all equal, and that they are also equal to the replacement requirements U.

Conclusion (i) at the beginning of this section shows that the curve A is shifted approximately by $\frac{1}{2}\upsilon$ and the curve D by υ from the curve I.

The ordinate of the curve D is equal to $D-D_0$ which, as shown by conclusion (iii), is also equal to the change per unit of time in the volume of capital equipment K. On this basis the curve K can be drawn. The curve K will rise during the period when the ordinate of the curve D is positive and it will decline when the ordinate of the curve D is negative. (Also in this case the abscissa axis is taken to correspond to the average value of K which is denoted by K_0, i.e. deviations from the average $K-K_0$ are again presented here.)

By *recovery* we understand here the phase of the cycle of the length υ during which investment orders exceed the level of replacement requirements; capital equipment, however, has not yet begun to

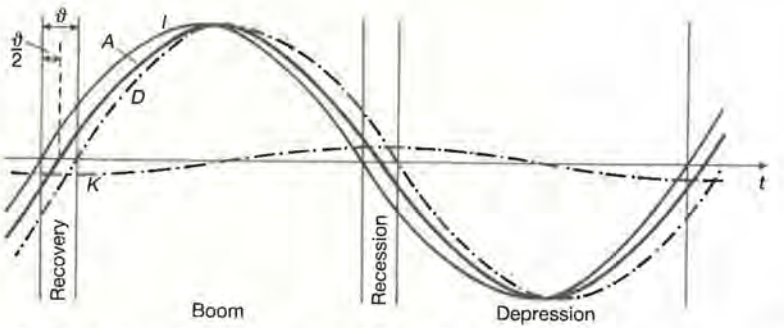


FIG. 4. Deviations from averages of I, A, D, and K respectively in terms of these averages, i.e. the values $(I-I_0)/I_0$, $(A-A_0)/A_0$, $(D-D_0)/D_0$, and $(K-K_0)/K_0$. These were estimated in the 'mathematical development' of our theory on the basis of statistical data (see pp. 88–90 below).

expand because deliveries of new equipment are as yet lower than the replacement requirements.

The production of investment goods A, which is equal to the gross accumulation, increases; but the volume of equipment K is still shrinking, as a result of which investment orders I, which are equal to $m(B_0 - A) - nK$, rise steeply.

During *boom*, deliveries of new equipment already exceed replacement requirements and consequently capital equipment K begins to expand. The increase of K initially restrains the rate of growth of investment orders and subsequently causes their decline. This is followed in the second half of the boom by a decline in the production of investment goods.

During *recession*, investment orders are below the level of replacement requirements. The volume of capital equipment, however, is still expanding because deliveries of new equipment are higher than this level.

The production of investment goods which is equal to the gross accumulation A continues to fall, and this, together with the increase of K, produces a steep fall in investment orders.

During *depression*, deliveries of new equipment are already below the level of replacement requirements, and consequently the volume of capital equipment K shrinks. This decrease in K initially slows down the fall in investment orders and subsequently causes their increase. This is followed by a rise in the production of investment goods in the second half of the depression.

We have considered here the interrelated changes of investment orders, the gross accumulation, and the volume of capital equipment which produce the business cycle. The fluctuations of the gross accumulation which result from this mechanism must also be reflected in the fluctuations of prices[18] and the aggregate production. The gross real profits P are, on the one hand, an increasing function of the gross accumulation A (P is proportional to $B_0 + A$, where B_0 is the constant part of capitalist consumption), and, on the other hand, can be expressed as the product of the volume of the aggregate production and of the profit per unit of output. Thus aggregate production and prices (or indeed the ratio of prices to wages which determines unit profits) rise or fall together with gross accumulation in the course of the cycle.[8] [19]

[8] We assume here that aggregate production and profit per unit of output rise or fall together, which is actually the case. We shall examine this assumption in detail on pp. 98–100.

The relation between changes in gross accumulation, which is equal to the production of investment goods, and those of aggregate production and prices materializes in the following way. When production of investment goods rises, aggregate production increases directly *pro tanto*, but in addition there is an increase due to the demand for consumer goods on the part of the workers newly engaged in the investment goods industries.[20] The consequent increase in employment in the consumer goods industries leads to a further rise in the demand for consumer goods. Since at the same time prices rise, new demand is met only in part by new production, and in part at the expense of incomes of the earlier employed workers whose real wages now decline.[21] The levels of aggregate production and of prices[22] will ultimately rise to such an extent that the increment in real profits balances the increment of the production of investment goods.

The account of the process is not yet complete because changes in capitalist consumption have not been taken into consideration. This consumption, C, depends to a certain degree on aggregate profits, P, and will increase together with the gross accumulation, A, since from equations (2) and (3) it follows that $C = (B_0 + \lambda A)/(1 - \lambda)$. The increase in capitalist consumption exerts the same influence as that in the production of investment goods: the production of consumer goods for capitalists expands; this leads to an increase in employment; and this raises again the demand for consumer goods for the workers, which causes a further rise in production and prices.[23] The aggregate production and prices[24] will ultimately rise to such an extent as to assure an increment in real profits equal to that of production of investment goods and capitalist consumption.

Some doubts may be raised by the final part of the preceding paragraph. The conclusion that the increase in capitalist consumption in turn increases their profits contradicts the common conviction that the more is consumed the less is saved. This approach, which is correct with regard to a single capitalist, does not apply to the capitalist class as a whole. If some capitalists spend money, either on investment or on consumer goods, their money passes to other capitalists in the form of profits. Investment or consumption of some capitalists creates profits for others. Capitalists as a class gain exactly as much as they invest or consume, and if—in a closed system—they ceased to construct and consume they could not make any money at all.

Thus capitalists, as a whole, determine their own profits by the extent of their investment and personal consumption. In a way they are

masters of their fate; but how they master it is determined by objective factors, so that fluctuations of profits appear after all to be unavoidable. Capitalist consumption is a function of the gross accumulation. The gross accumulation, which is equal to the production of investment goods, is determined by investment orders which in turn were undertaken in a past period on the basis of the profitability in that period, i.e. on the basis of the gross accumulation and the volume of capital equipment in that period.

The question may still arise of where capitalists find the means to increase the production of investment goods or their personal consumption. If we abstract from the 'technical' elements of the money market, we may say that capitalists as a whole do not need money in order to achieve this since, as shown above, the expenditure of some capitalists is converted into profits for others; the outlay on construction of a fixed asset is by no means frozen, as some people think, and released only as the capital invested is gradually written off—but it is already returned in the course of construction in the form of profits accruing to the firms whose sales (either of investment or consumer goods) are directly or indirectly connected with this construction. If during a particular period more money is spent, e.g. out of bank deposits, then *pro tanto* more money flows back into the banks in the form of realized profits, so that the sum of deposits remains unchanged.[25] In actual fact, however, credit inflation is inevitable for two reasons, owing to the technical elements of the money market which were mentioned above and which constitute its essence.[26]

The first reason for credit inflation is the fact that the curve I of investment orders does not coincide with the curve A of the production of capital goods or gross accumulation (see Fig. 4 above). When placing investment orders businessmen ensure for themselves corresponding sums of money, with the help of which they subsequently finance deliveries of the ordered investment goods. These funds we shall call investment reserves. At any given moment the accounts of investment reserves increase (per unit of time) by the value of the placed investment orders, and at the same time they are reduced by the sums spent on the newly produced capital goods A.[9]

Thus at any given moment investment activity (per unit of time) requires an amount I, out of which $I-A$ is required for creating new

[9] By the sums I and A we mean here, of course, not their respective real values, but their equivalent money values at current prices.

investment reserves, and A is required to meet current expenses related to the production of capital goods. Now, the effective expenditure A 'finances itself', i.e. it soon returns to the bank in the form of realized profits.[27] On the other hand, the increment in investment reserves $I-A$ must be created by credit inflation.

The second reason for credit inflation is connected with the fact, discussed above, that the increase in production of investment goods or in capitalist consumption, i.e. in real profits, must be reflected in the increase in aggregate production and prices. This increase engenders a higher demand for money in circulation, i.e. cash and current accounts, which is met by credit inflation.[28]

We shall discuss the impact of business fluctuations on the money market at some length in a separate chapter (see pp. 93–8).

II. Mathematical Development

1. The Basic Equation

Our first task is to formulate a differential equation[10] for investment orders, I, as a function of time, t. We found above that investment orders I, gross accumulation A (equal to the production of capital goods), and the volume of capital equipment K are linked by the interrelationship:

$$I = m(B_0 + A) - nK \tag{10a}$$

Differentiating this equation with respect to t we get:

$$I' = mA' - nK' \tag{11}$$

From equation (5) K', the derivative of K (increase of K per unit of time) equals the difference between supplies of capital equipment D and replacement needs U:

$$K' = D - U \tag{5}$$

Since from (6) U equals average supplies during one cycle D_0, and average investment orders I_0, we obtain:

$$K' = D - D_0 = D - I_0 \tag{5a}$$

and we can write (11) in the form:

$$I' = mA' - n(D - I_0) \tag{12}$$

On p. 71 we found that:

$$A = W/\upsilon \tag{4}$$

where W stands for investment orders at a given time. Increase of W per unit of time, i.e. the derivative W', equals the difference between the volume of investment orders and supplies of completed capital equipment D at a given time:

$$W' = I - D \tag{13}$$

[10] In fact, a 'differential and functional' equation.

Differentiating now equation (4) with respect to t and substituting the value W' from equation (13) we get:

$$A' = (I - D)/\upsilon \tag{14}$$

Putting this value of A' into equation (12) we obtain:

$$I' = \frac{m}{\upsilon}(I - D) - n(D - I_0) \tag{15}$$

Let us further note that supplies at time t equal orders at time $t - \upsilon$:

$$D(t) = I(t - \upsilon) \tag{16}$$

(where $I(t)$ and $D(t)$ represent investment orders and supplies of capital respectively, at time t). From equation (15) we then obtain:

$$I'(t) = \frac{m}{\upsilon}[I(t) - I(t - \upsilon)] - n[I(t - \upsilon) - I_0] \tag{17}$$

Let us denote the deviation $I(t)$ from the average I_0 by $J(t)$:

$$J(t) = I(t) - I_0 \tag{18}$$

We can now present equation (17) in the form:

$$J'(t) = \frac{m}{\upsilon}[J(t) - J(t - \upsilon)] - nJ(t - \upsilon)$$

or

$$(m + \upsilon n)\, J(t - \upsilon) = mJ(t) - \upsilon \partial'(t) \tag{19}$$[29]

2. Solution of the Basic Equation[11]

We can easily see that a special solution of equation (19) will be function $Ce^{\alpha t}$, where C is an arbitrary constant value, and α is a definite value to be determined. Putting $Ce^{\alpha t}$ instead of $J(t)$ into equation (19), we get:

$$C(m + \upsilon n)e^{\alpha(t - \upsilon)} = Cme^{\alpha t} - C\alpha\upsilon e^{\alpha t}$$

from which, dividing by $Ce^{\alpha t}$, we get an equation from which we can find α:

$$(m + \upsilon n)e^{-\alpha\upsilon} = m - \alpha\upsilon$$

[11] Solution of our equations is based on Tinbergen, 'Ein Schiffbauzyklus'.

By simple transformations we have further:

$$e^{-m}(m+\upsilon n)e^{m-\alpha\upsilon}=m-\alpha\upsilon$$

and denoting:

$$m-\alpha\upsilon=v \tag{20}$$

and

$$e^{-m}(m+\upsilon n)=b \tag{21}$$

we get:

$$be^{v}=v \tag{22}$$

where v is a complex number:

$$v=x+iy \tag{23}$$

Hence we can present equation (20) as:

$$\alpha=\frac{m-x}{\upsilon}-i\frac{y}{\upsilon} \tag{24}$$

and equation (22) changes into:

$$x+iy=be^{x}\ (\cos y+i\sin y) \tag{25}$$

Following Tinbergen,[12] we distinguish two cases here: Case 1—when $b>1/e$, and Case 2—when $b\leqslant 1/e$.

Case 1. As Tinbergen shows, all equations here will be complex and of an indefinite number. We arrange them with respect to the value y_k:

$$\ldots x_k-iy_k,\ldots x_2-iy_2,\ x_1-iy_1,\ x_1+iy_1,\ x_2+iy_2,\ldots x_k+iy_k,\ldots$$

(we can easily see that if x_k+iy_k is a root of equation (25), then x_k-iy_k will also satisfy this equation).

From equation (24) we get the values of α:

$$\alpha_k=\frac{m-x_k}{\upsilon}-i\frac{y_k}{\upsilon}$$

and

$$\alpha_{-k}=\frac{m-x_k}{\upsilon}+i\frac{y_k}{\upsilon}$$

[12] Ibid., p. 159.

and the special solution $J(t)$ will be as follows:

$$J(t)=C_ke^{\alpha_kt}=C_ke^{(m-x_k)t/\upsilon}\left(\cos y_k\frac{t}{\upsilon}-i\sin y_k\frac{t}{\upsilon}\right)$$

and

$$J(t)=C_{-k}e^{\alpha_{-k}t}=C_{-k}e^{(m-x_{-k})t/\upsilon}\left(\cos y_k\frac{t}{\upsilon}+i\sin y_k\frac{t}{\upsilon}\right)$$

The general solution of (18) is equal to the sum of special solutions; for this solution to be real, C_k and C_{-k} must be complex conjugate numbers.

The general solution for $J(t)$ in this case will be as follows:

$$J(t)=e^{(m-x_1)t/\upsilon}\left(F_1\sin y_1\frac{t}{\upsilon}+G_1\cos y_1\frac{t}{\upsilon}\right)+e^{(m-x_2)t/\upsilon}\left(F_2\sin y_2\frac{t}{\upsilon}+G_2\cos y_2\frac{t}{\upsilon}\right) \tag{26}$$

From Tinbergen's analysis it follows that $y_1<\pi$, whereas y_2, y_3 are greater than 2π, which means that the root $x_1\pm iy_1$ corresponds to a cycle longer than 2π, and the roots $x_2\pm iy_2$, $x_3\pm iy_3,\ldots$ correspond to cycles shorter than υ. Terms of equation (26) corresponding with the latter cycles can be dropped, since it would be difficult to give economic significance to business fluctuations in the interval $(0,\ \upsilon)$. Thus we get:

$$J(t)=e^{(m-x_1)t/\upsilon}\left(F_1\sin y_1\frac{t}{\upsilon}+G_1\cos y_1\frac{t}{\upsilon}\right) \tag{26a}$$

If we now select the zero moment of time so that $J(t)=0$, i.e. $I(t)=I_0$, we get:

$$G=J(0)=0$$

and

$$J(t)=F_1e^{(m-x_1)t/\upsilon}\sin y_1\frac{t}{\upsilon}$$

or

$$I-I_0=F_1e^{(m-x_1)t/\upsilon}\sin y_1\frac{t}{\upsilon} \tag{27}$$

This equation represents harmonic vibrations with a decreasing, constant, or increasing amplitude, depending on whether $x_1 \gtrless m$.

Case 2. In this case equation (25) has two real roots, v_1' and v_1''; $x_1 \pm iy_1$ is missing among the conjugate roots; $y_2, y_3 \ldots$ are all greater than 2π, and the respective cycles are shorter than υ, and thus can be ignored. So we get:

$$J(t) = C_1' e^{(m-v_1')t/\upsilon} + C_1'' e^{(m-v_k'')t/\upsilon}$$

Hence cyclical vibrations do not take place here.

We can formulate the following conclusions from our analysis.

Business fluctuations occur in our economic system only when the following inequality is met:

$$b > 1/e$$

which, after substituting the value of b from (21), takes the form:

$$\frac{e^m}{m+\upsilon n} < e \tag{28}$$

Fluctuations of I will then be represented by the equation:

$$I - I_0 = F_1 e^{(m-x_1)t/\upsilon} \sin y_1 \, {}^{t/\upsilon} \tag{27}$$

The amplitude of fluctuations decreases, remains constant, or increases, according as $x_1 \gtrless m$.

The period is equal to:

$$T = \frac{2\pi}{y_1}\upsilon \tag{29}$$

On the basis of equations (16), (5a), and (14) we can also represent D, K, and A as functions of t; we shall do this for the special case which we examine below.

3. An Important Special Case

Let us now examine more carefully the case when, with $x_1 = m$, the amplitude of fluctuations remains constant; equation (27) then takes the form:

$$I - I_0 = a \sin y_1 \frac{t}{\upsilon} \tag{30}$$

where a is a constant amplitude.

This case is especially important because it corresponds roughly to the real course of the business cycle. In reality we do not observe a clear *regular* progression or digression in the amplitude of fluctuations. (We mean, of course, the *relative* amplitude of fluctuations, i.e. the relation of amplitude to average I during the course of one cycle; both of these values in reality increase on account of the trend, but their relation shows no regular progression or digression. In our economic system, with I_0 constant, the constancy of a must also be assumed.) [30]

From (25) and (21) for $x = m$ we get:

$$\cos y_1 = \frac{m}{m+\upsilon n} \tag{31}$$

and

$$\frac{y_1}{\operatorname{tg} y_1} = m \tag{32}$$

These equations allow us to find y and, of course, to determine the dependency between m and n.

Between m and n there is, however, still another dependency. They are both coefficients in the equation:

$$I = m(B_0 + A) - nK \tag{10a}$$

which must also be true for the average values of I, A, and K, that is, for I_0, A_0, and K_0:

$$I_0 = m(B_0 + A_0) - nK_0 \tag{33}$$

since, according to (6), $I_0 = A_0$, we have:

$$n = (m-1)\frac{I_0}{K_0} + m\frac{B_0}{K_0} \tag{33a}$$

Hence if the values I_0/K_0 and B_0/K_0 were given, from equations (31), (32), and (33a) we could find m and n. I_0/K_0 is nothing else but the rate of depreciation, as I_0 is equal to the demand for restoration of equipment, and K_0 is the average volume of this equipment. B_0 is the constant part of capitalist consumption. I_0/K_0 and B_0/K_0 may be roughly evaluated on the basis of the statistical data, which would make it possible to calculate y_1 and hence, if we knew the average construction period υ, to calculate also the duration of the cycle $T = 2\pi\upsilon/y_1$. We shall make this calculation in section 4 below. If the duration of the cycle calculated in this way does not deviate very much

from reality, this may be regarded as a certain confirmation of the theory presented here.

Putting the value of I from (30) into (16), (5a), and (14), we get:

$$D-D_0=a\sin y_1\frac{t-\upsilon}{\upsilon}=K' \tag{34}$$

and

$$\upsilon A'=a\left(\sin y_1\frac{t}{\upsilon}-\sin y_1\frac{t-\upsilon}{\upsilon}\right)$$

Integrating these equations and considering the condition that the average A in one cycle is A_0 and the average K is equal to K_0, we get:

$$A-A_0=a\frac{\sin\frac{y_1}{2}}{y_1}\sin y_1\frac{t-\frac{\upsilon}{2}}{\upsilon} \tag{35}$$

$$K-K_0=a\frac{\upsilon}{y_1}\cos y_1\frac{t-\upsilon}{\upsilon} \tag{36}$$

4. Calculation of the Duration of the Cycle

As we stated in the previous section, in order to calculate the duration of the cycle T, we need the numerical values of constants υ, I_0/K_0, and B_0/K_0.

The gestation of investment orders υ is estimated from data of the German Institut für Konjunkturforschung. The lag between the curves of beginning and termination of building schemes (dwellings and industrial and public buildings) can be fixed at 8 months; the lag between orders and deliveries in the engineering industry can be fixed at 6 months. We assume that the average duration of υ is 0.6 years.

The rate of depreciation I_0/K_0 is evaluated on the basis of combined German and American data. On the German data, the ratio of depreciation to national income can be fixed at 0.08. With a certain approximation, the same is true for the USA. Further, according to official estimates of the wealth of the USA in 1922, we set the amount of fixed capital at \$120 milliards (land excepted). The national income is estimated to average \$70 milliards for 5 years around 1922. Hence the rate of depreciation can be estimated at $(0.08\times 70)/120$, which we round off to 0.05.

Most difficult is the evaluation of B_0/K_0. K_0 was fixed above at \$120 milliards. B_0 is, as we know, the constant part of capitalist consumption. Let us first evaluate the average capitalist consumption in the USA in the period 1909–18. According to W. I. King, the average net profit in that period averaged \$16 milliards deflated to the purchasing power of 1913.[13] The average increment of total capital in that period is estimated by King at \$5 milliards in 1913 prices. The figure also includes workers' savings. On the other hand, \$16 milliards of profits also cover 'capitalistic' incomes of working people (use of own houses, etc.); so the difference, $16-5=11$ milliards of 1913 dollars, represents with a sufficient degree of accuracy the consumption of capitalists (farmers included). The average national income in the period 1909–18 amounted to \$36 milliards in 1913 prices (King). The ratio of capitalist consumption to the national income would thus be 0.3. Since, further, the average income during 5 years around 1922 was, as mentioned, \$70 milliards (current purchasing power), capitalist consumption in those years may be estimated at \$21 milliards.

Now, we have to determine the constant part of that consumption. In order to do that, we assume that when the volume of capitalist gross profits deviates from the average by, say $\pm 20\%$, the corresponding change in their consumption is but 5%, i.e. 4 times smaller. That assumption is confirmed by the statistical evidence. Accordingly, the constant part, B_0, of capitalist consumption, equal to $B_0+\lambda P$, (see p. 69, λ is a constant fraction and P, the total gross profit), amounts to 75% of the total average capitalist consumption, i.e. \$16 billions. The ratio B_0/K_0 would then be 16/120 or around 0.13.

After putting the values: $\upsilon=0.6$, $I_0/K_0=0.05$, $B_0/K_0=0.13$, equations (31), (32), and (33a) become:

$$\cos y_1=\frac{m}{m+0.6n}$$

$$\frac{y_1}{\operatorname{tg} y_1}=m$$

$$n=0.05\,(m-1)+0.13\,m$$

The solution of these equations gives:

$$m=0.95 \qquad n=0.121 \qquad y_1=0.378$$

[13] This includes the volume of clothing, household equipment, etc., which should not be included for our purposes, but the estimate of rents is too low.

Thus the duration of the cycle is

$$T=\frac{2\pi}{y_1}\upsilon=\frac{2\pi}{0.378}\times 0.6=10$$

From equations (30), (35), (34), and (36) we get:

$$I-I_0=a\sin 0.63t$$

$$A-A_0=0.98a\sin 0.63\left(t-\frac{\upsilon}{2}\right)=0.98a\sin 0.63\,(t-0.3)$$

$$D-D_0=a\sin 0.63\,(t-\upsilon)=a\sin 0.63\,(t-0.6)$$

$$K-K_0=-1.59\,a\cos 0.63\,(t-\upsilon)=-1.59\,a\cos 0.63\,(t-0.6)$$

In accordance with our assumptions (p. 72) curve A roughly coincides with curve I shifted by $\upsilon/2$. Curve D is obviously identical with curve I shifted by υ.

We now assume that the amplitude a of fluctuations I is equal to $I_0/2$, and hence that I fluctuates from $I_0/2$ to $3I_0/2$. With a depreciation rate $I_0/K_0=0.05$ and taking into consideration equation (6): $I_0=A_0=D_0$, the above equations become:

$$(I-I_0)/I_0=0.5\sin 0.63\,t$$

$$(A-A_0)/A_0=0.49\sin 0.63(t-0.3)$$

$$(D-D_0)/D_0=0.5\sin 0.63\,(t-0.6)$$

$$(K-K_0)/K_0=-0.04\cos 0.63(t-0.6)$$

Deviations from the average in units of the average values of I, A, D, and K, i.e. $(I-I_0)/I_0$, $(A-A_0)/A_0$, $(D-D_0)/D_0$, and $(K-K_0)/K_0$, are shown in Fig. 4 above.

The 10-year cycle derived theoretically agrees exactly with the 8–12-year period of the cycle observed in reality. However, an objection may be raised that the values I_0/K_0 and B_0/K_0, on which the duration of the cycle were calculated were only roughly estimated, and hence that the agreement of the theory with facts may be accidental. Therefore we have calculated T for values of υ, I_0/K_0, and B_0/K_0 considerably different from those taken above (see Table 4).

We see that the value of I_0/K_0 has no effect on the results. We see further that when values of B_0/K_0 and υ differ by almost 50% from $B_0/K_0=0.13$ and $\upsilon=0.6$ adopted above, solutions for T lie between 7 and 13 years. The actual duration of the business cycle being, as

Table 4. *Dependence of the Duration of the Cycle on Changes of* υ, I_0/K_0, *and* B_0/K_0

υ	I_0/K_0	B_0/K_0	T
0.6	0,05	0.13	10.0
0.6	0.03	0.13	10.0
0.6	0.07	0.13	10.0
0.6	0.05	0.07	13.2
0.6	0.05	0.19	8.5
0.3	0.05	0.13	7.1
0.9	0.05	0.13	12.5

already mentioned, 8–12 years, one can safely say that, irrespective of the accuracy in estimating υ, I_0/K_0, and B_0/K_0, the conclusions from our theory do not differ very much from reality.

There is one more question which we must consider. Over the whole period, as stated at the beginning, we considered an economic system free of secular trend, i.e. one returning in each case to its original position. But a case when the trend is steady, and when the values of I, A, B_0, and K show the same rate of development, can easily be reduced to a state free of trend by dividing all these values by the denominator of the trend. Interrelationships stated in 'Assumptions' will remain true for these quotients, with the following changes:

1. The value $I_0=A_0=D$ will no longer be equal to the demand for restoration of the used-up equipment, but it will also cover the steady demand for the expansion of the existing equipment as a result of the uniform secular trend. Thus I_0/K_0 will be equal, not to the rate of depreciation, 0.05, but, assuming the rate of net accumulation equal, say, to 3%, to 0.08.

2. Also stocks of goods, previously considered constant, will increase in the same proportion under the influence of the trend. That steady increment of stocks per unit of time—let us call it B_1—will be a component of the gross profit P, now equal to $C+B_1+A$, where C is personal capitalist consumption, B_1 the steady increment of stocks, and A the production of capital goods. If we now consider that, according to equation (2), capitalist consumption C is equal to $B_0+\lambda P$, we see that P is proportional to B_0+B_1+A. The constant B_0+B_1 will play in our considerations the same role as B_0 previously did.

According to the official estimate of the national wealth of the USA, the volume of stocks of goods amounts to 0.3 of the volume of the industrial equipment, i.e. to 0.3 K_0. If the rate of net accumulation is 3%, B_1 will be $0.03 \times 0.3\ K_0 = 0.009\ K_0$. Hence, instead of $B_0/K_0 = 0.13$, we must take $(B_0 + B_1)/K_0 = 0.14$ in our calculations.

From Table 4 we can easily see that both modifications—0.08 instead of 0.05 for I_0/K_0, and 0.14 instead of 0.13 for $(B_0 + B_1)/K_0$—will have little effect on the result of the calculation of T.

III. Applications

1. The Money Market

In the section entitled 'The Mechanism of the Business Cycle' we outlined the interdependence between the course of the business cycle and credit inflation (see pp. 80–1). The factors determining this interdependency turned out to be: (i) the fact that curve I of investment orders does not coincide with curve A of the production of capital goods or gross accumulation; (ii) an increased demand for money in circulation in connection with the rise in production and prices.[31] we now proceed to a more thorough investigation of the influence of these factors on the money market during the cycle.

Let us consider the consolidated balance sheet of all banks, including the bank of issue, and let us assume for now that the balance sheet value remains constant during the entire business cycle. We divide the liabilities of the consolidated balance sheet into the following three categories: (i) 'unattached' deposits, i.e. deposits without a specific designation; (ii) investment reserves, i.e. funds used for the immediate financing of the production of capital goods; and (iii) money in circulation, i.e. cash balances and banknotes in circulation. 'Unattached' deposits are used in only one way, to counterbalance credits registered as assets; on the other hand, investment reserves and money in circulation are used in two ways: they too counterbalance credits on the side of the balance sheet assets, but in addition they serve their original purposes as investment or cash balance funds.

The financing of investment projects takes place—at a constant balance sheet value—as follows. At any given moment businessmen ensure for themselves (for a unit of time) sums corresponding to investment orders I by issuing bonds and notes which are acquired by the owners of 'unattached' accounts, and deposit the receipts as an investment reserve. As a result sum I[14] is shifted (per unit of time) from 'unattached' deposits to investment reserves.

At the same time, however, a sum is spent each time from investment reserves that corresponds to the production of capital goods A, which,

[14] 'Sum I', 'sum A', 'sum $I - A$', which represent real values, are understood here as equivalent money values at current prices.

being realized before long as gross accumulation, returns to unattached deposits (see Fig. 5). As a result, sum $I-A$ flows (per unit of time) from 'unattached' deposits to investment reserves. Hence in time QR (see Fig. 6) unattached deposits will be reduced by a sum equal to the shaded area, and investment reserves will increase by the same sum. During the rising half of the cycle, in which $I>A$, a sum equal to the area $MNOP$ will be shifted from unattached deposits to investment

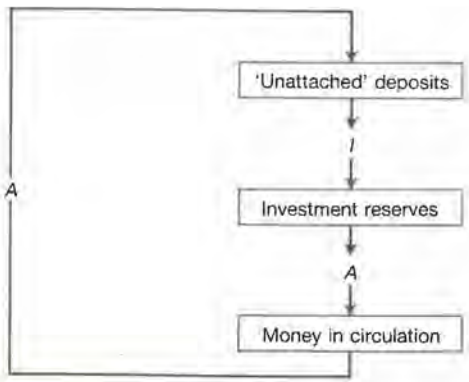


FIG. 5

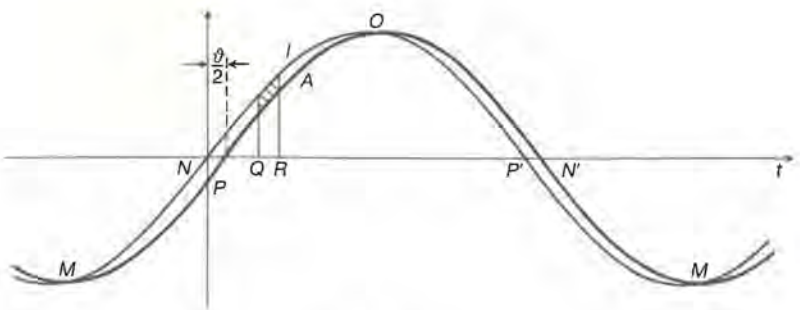


FIG. 6

reserves; in the second half of the cycle, in which $I<A$, the same sum—equal to the area $OP'MN'$—will be shifted in the opposite direction.

The increase of money in circulation to meet the greater demand resulting from the increase of production and prices takes place—in the case of the constant balance sheet value examined here—in the same way as the replenishment of investment reserves. Some of the unattached deposits are changed into money in circulation; the relevant sums are transferred from the account of 'unattached' deposits to the account of cash balances (exchange for cash balances), or are withdrawn from unattached deposits and discounted by the bank of issue (exchange for cash).

It follows that, during the rising half of the cycle, the accounts of investment reserves and money in circulation increase at the expense of 'unattached' deposits. In the second half of the cycle, opposite transfers take place between accounts of the consolidated balance sheet. The creation of investment reserves and money in circulation takes place here—in keeping with the assumption of a constant balance sheet value—without an increase in bank credits, just by means of a change in the composition of bank liabilities: credit inflation consists in the fact that unattached deposits are transformed into investment reserves or money in circulation which have double use.

In order to emphasize the importance of changes in the composition of bank liabilities, we have up until now assumed that the consolidated balance sheet value remained constant. In reality, the increased demand for investment reserves and money in circulation is met not only by a change of unattached deposits to deposits of specific designation but also by an expansion of the credit operations of banks, i.e. by credit inflation in the strict sense, when the assets and liabilities of banks increase. In other words, the increase of credits is matched on the side of assets by an increase in investment reserves, and on the side of liabilities by an increase of money in circulation. We shall not make a detailed analysis here of the mechanism of credit inflation in the strict sense, for this matter has been thoroughly discussed in the economic literature[32]—unlike credit inflation, which takes place by a change of unattached accounts into investment reserves and money in circulation, which is why we have discussed these processes at some length above.

These remarks should now be supplemented by taking into account credit inflation in the strict sense: the accounts of investment reserves and money in circulation are simultaneously replenished by a change

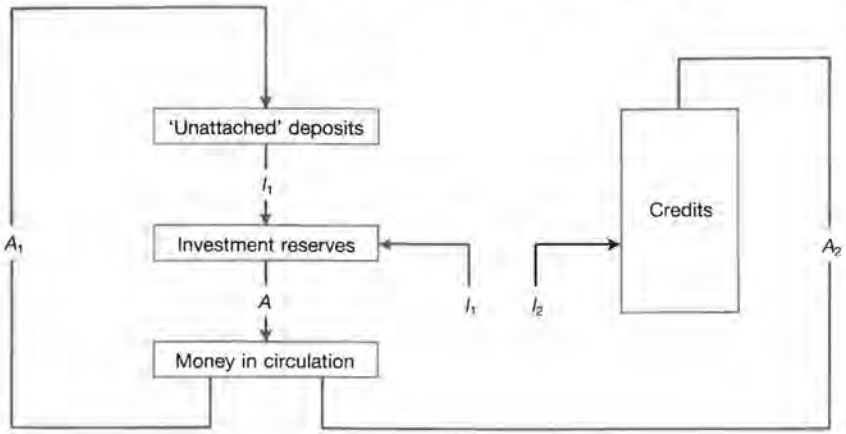


FIG. 7

of unattached deposits into deposits of specific designation and the advancement of credits. The schema of the creation of investment reserves will now look different (see Fig. 7).

At a given moment businessmen ensure for themselves (for a unit of time) the sum I_1 from unattached accounts (e.g. by the sale of bonds and notes to the owners of these accounts), and the sum I_2 by raising bank credits—together $I_1+I_2=I$, which flows into their investment reserves. At the same time the sum $A=A_1+A_2$ is spent for investment goods, and the sum A_1 returns to unattached deposits, while A_2 is used to repay bank credits. As a result, investment reserves (for a unit of time) increase by $I-A=(I_1-A_1)+(I_2-A_2)$. The sum I_1-A_1 corresponds to reduced unattached deposits, while I_2-A_2 is equal to the increased credits; that is, the increase in investment reserves by $I-A$ takes place in I_1-A_1 at the expense of unattached deposits and in I_2-A_2 through credit 'creation'.

During the upswing in the cycle, investment reserves and money in circulation increase in part at the expense of unattached deposits and in part through the 'creation' of credit. In the downswing these processes are reversed.

Fluctuations in the demand for investment reserves and money in circulation are tightly linked with changes in the rate of interest. For a

partial conversion of unattached deposits into 'attached' accounts to take place, the spread between the 'credit' rate (the discount rate, interest on stocks and bonds, etc.) and the bank rate on deposits must increase. Only then will it pay owners of unattached deposits to invest in stocks and bonds, thereby providing funds for conversion to attached accounts. This greater spread between the credit rate and the bank rate on deposits is also required to stimulate the expansion of banks' credit operations, i.e. for credit inflation in the strict sense.

The bank rate on deposits rises simultaneously, since the liquidity of banks diminishes on account both of conversions of unattached deposits into attached accounts and of credit inflation in the strict sense. Consequently, banks attempt to improve their liquidity by offering higher interest rates on deposits.

Thus not only does the spread between the credit rate and the bank rate on deposits increase, but the bank rate on deposits rises, and both these factors contribute to an increase in the credit rate.

It follows that in the upswing the rate of interest rises (with the increased demand for investment reserves and money in circulation) and it falls in the downswing.[33]

Thus changes in the rate of interest are determined by the mechanism of the business cycle. On the other hand, the interest rate i affects this mechanism, which is reflected in equations (7) and (8) of 'Assumptions' above:

$$\frac{I}{K}=f\left(\frac{P}{K},i\right)=F\left(\frac{B_0+A}{K},i\right)$$

From these equations we derived equation (9):

$$\frac{I}{K}=\psi\left(\frac{B_0+A}{K}\right)$$

which served as a base for our further argument, assuming a priori that the interest rate will rise and fall in tune with the business cycle; in particular we assumed that i is a function of gross profitability, P/K. Now, our analysis of the money market, carried out in terms of the basic concepts of our theory, has shown that the rate of interest does indeed rise during the upswing and falls during the downswing. Expressing i as a function of P/K, in order to show the link between the interest rate and the business cycle, is only a crude approximation, of course. Nevertheless, the arbitrariness involved has little effect on our earlier argument, since the rate of interest is of secondary importance

for the will to invest, the factor of prime importance being unquestionably the gross profitability of existing plants.

Finally, in the analysis of the money market we must still consider a 'crisis of confidence' which can break out during the depression in the context of a sudden fall in prices, making it difficult or impossible to service debts and pay interest. In this case, the rise in the interest rate is combined with a deepening of the depression. Thus leaving out crises of confidence is essential to our theory. For when such a crisis occurs, the assumption that the rate of interest i is a function of gross profitability P/K ceases to hold even as a crude approximation, which makes it impossible to pass from the equation

$$\frac{I}{K}=f\left(\frac{P}{K}, i\right)=F\left(\frac{B_0+A}{K}, i\right)$$

to the equation

$$\frac{I}{K}=\psi\left(\frac{B_0+A}{K}\right)$$

Thus the crisis of confidence must be regarded as a factor disturbing the regular functioning of our mechanism of the business cycle.

2. Production, Prices, and Wages

Profit margins and employment

Fluctuations in gross accumulation A, which, together with fluctuations in investment orders I and in capital equipment K, constitute the mechanism of the business cycle, are simultaneously reflected in fluctuations of aggregate production and prices (or rather in the relation of prices to wages). Gross profit P is proportional to B_0+A, where B_0 is the constant part of capitalist consumption. If gross accumulation rises, aggregate production and prices must rise accordingly so that this additional gross profit can be realized. We discussed these matters in broad outline earlier (pp. 78–80); we shall now investigate them in some detail.

Gross profitability P/K (the relation of gross profit P to capital equipment K) can be broken down into two factors:

$$\frac{P}{K}=\frac{P}{Y}\times\frac{Y}{K} \qquad (37)$$

where Y denotes aggregate production. We call the first factor, P/Y, the gross profit margin, since it represents the gross profit per unit of output; the second factor, Y/K, represents the degree of utilization of capital equipment.[15]

One can show[34] that the gross profit margin and the degree of utilization rise or fall together. We single out 'marginal plants' working with a very small gross profit margin, i.e. earning only small sums for depreciation and interest charges (those items are included in the *gross* profit margin). With a fall in capacity utilization, competition sharpens through reductions in gross profit margins, shifting the fall in utilization to marginal plants. These plants, however, will not be completely closed if the fall in total demand is less than their previous supplies. Even if they do not reduce prices along with other plants, which would result in effective losses, they can maintain part of their sales, since: (i) various brands of most commodities are not exactly comparable, and there is a margin between their prices which can vary (e.g. the prices of Polish and English coal); (ii) owing to a shrinkage of the market of marginal plants, their competitive advantage increases due to a reduction of 'additional costs', e.g. costs of delivery to the customer.[16] This explains the fact that, during depression, partially employed plants exist alongside completely idle ones.

Thus the average gross profit margin falls with a decline in capacity employment, which is shifted to marginal plants, making them partially or completely idle.

Since, according to the above argument, the gross profit margin P/Y and capacity utilization Y/K rise or decline simultaneously, it is clear that these values always move in the same direction as their product — gross profitability P/K — i.e. that they are increasing functions of gross

[15] Y contains not only industrial and agricultural output, but also all private services. We assume here that the share of trade in Y remains constant. Since in 'Assumptions' we also assumed a constant share of profits of the trade sector in total profits, the magnitudes P/K, P/Y, and Y/K can be regarded as applying only to enterprises outside trade sector, that is, to plants with fixed capital.

[16] The question may still arise whether, even if marginal plants do not lower their prices, their gross profit margin will not fall below zero on account of the fall in their employment, which will in turn increase their overhead costs. We must not forget, however, that the *gross* profit margin is determined by 'effective' costs (i.e. other than depreciation and interest charges), which can be largely regarded as proportional to the volume of output. The main items of overhead costs—depreciation and interest charges—are important only for the theoretical calculation of costs, since in practice they can and do fall nearly to zero. For it is better to earn at least something to meet these charges than to earn nothing at all.

profitability. Gross profitability, gross profit margin, and capacity employment rise together during the upswing and fall during the downswing.

Wages and the distribution of social income

The relation P/Y can be considered not only as the gross profit margin (gross profit per unit of output) but also as the share of real capitalist income, i.e. gross profit P, in the aggregate production Y. From the fact that[35] P/Y is a function of gross profitability P/K one can draw a paradoxical conclusion. Gross profitability P/K is at each moment determined by the mechanism of the business cycle; the same can be said of P/Y. It follows that fluctuations of the share of gross profit in aggregate output[36] during the trade cycle are independent of the wage struggle. Capitalists are unable to increase their share of social income[17] during the downswing by reducing workers' wage rates, and workers are unable to increase their share of social income during the upswing by raising them.

Let us consider how this independence of social-income distribution from changes in the wage rates is possible. If capitalists lower wages during depression, real gross profits are not increased, because gross accumulation A is determined by earlier investment orders, while real gross profits P are proportional to B_0+A (B_0 is the constant part of capitalist consumption). Workers' demand shrinks because of wage reductions. Thus the prices of consumer goods must fall, completely erasing advantages gained by capitalists as a whole from reductions in workers' wages. Obviously, it is only *total* gross profits which remain constant following wage reductions; however, there will unquestionably be shifts in the share of profits between individual groups of capitalists. With wage reductions in one branch, the profits of capitalists in that branch increase; at the same time, however, other capitalists lose an amount equal to the sum earned by those who lowered wages.[37]

We now see why changes in wages do not affect real gross profits. Real gross profits P, together with the volume of fixed capital K,[38] determine aggregate production Y, since the rate of capacity employment Y/K is a function of gross profitability P/K. This also determines,

[17] It should be mentioned here than Y is not completely identical with social income in the usual sense, since it also includes replacement of fixed capital but does not include government services.

therefore, the real income of workers, which is equal to $Y-P$ and which, like real gross profits, is not affected by changes in money wages.

It should be noted that the relationship between the degree of capacity employment and gross profitability was derived in the previous section from the tacit assumption of free competition. Real gross profits P, which are entirely determined by earlier investment orders, are also not affected by changes in wage rates in a partially cartelized system. This cannot be said, however, of aggregate output Y, nor, therefore, of the real income of workers $Y-P$. We examine these questions in some detail in the section: 'The Business Cycle and Cartels' below.

Finally, we should stress again that we are always considering a closed economy. In an open economy (as in one branch of industry of a closed economy), wage reductions or increases will unquestionably cause a shift in the distribution of social income between capitalists and workers. The accumulation of capital can be realized in that case not only in the form of production of investment goods, as in our closed system, but also as a foreign-trade surplus. If wage reductions affect only workers' consumption of foreign goods, the entire sum of the reduction will be appropriated by capitalists.

Price changes

We demonstrated above that the respective shares of capitalists and workers in the social income, i.e. the relations P/Y and $(Y-P)/Y$,[39] are entirely determined by the mechanism of the business cycle. $(Y-P)/Y$ can also be regarded as the average real income of workers per unit of output, which we shall call the average real piece wage. It again follows that $(Y-P)/Y$ is proportional to the ratio of the index of money piece wage and the index of prices for finished consumer goods. In other words, the ratio of the index of prices for finished consumer goods and the index of money piece wage is proportional to $Y/(Y-P)$. Thus, at constant wages the price index of finished consumer goods would show the same fluctuations as $Y/(Y-P)$; the latter, which can be presented as $1/(1-P/Y)$, increases or declines together with P/Y; thus, like P/Y, it rises during the upswing and falls during the downswing of the cycle. In fact money wages fluctuate in the same direction, and hence the price index of finished consumer goods fluctuates more

strongly than $Y/(Y-P)$, i.e. in the same way as the product of the money piece wage index and the value $Y/(Y-P)$.[40]

The prices of consumer goods are directly linked to the distribution of social income between capitalists and workers. From the above argument it follows, therefore, that fluctuations in these prices depend on the course of the business cycle and changes of overall wage levels. On the other hand, the prices of investment goods have no direct influence on the distribution of social income between these two classes, but only on the division of profits between the investment goods and consumer goods industries. The output of investment goods amounts to A, and the output of consumer goods to $Y-A$. We denote the volumes of capital in the capital goods industry and in the consumer goods industry by K_1 and K_2 respectively. Now the prices of investment goods must reach a level at which total profits P were divided into P_1 and P_2 so that gross profitability P_1/K_1 and P_2/K_2 would correspond to capacity employment, rendering outputs A or $Y-A$. (As follows from the argument on pp. 98–100, the gross profitability of a given branch of industry determines its capacity utilization.) Here we should mention that at any given moment our mechanism of the business cycle determines only the volume of capital equipment K; it does not divide K into K_1 and K_2 producing investment and consumer goods. That is why the course of this mechanism *as a whole* does not suffice to determine the price changes of capital goods, which depend on business conditions in the individual investment goods and consumer goods industries. Thus there is a basic difference here from the price changes of consumer goods, which are dependent (see above) on the mechanism of the business cycle as a whole.

The curve of aggregate production

We presented gross profitability P/K as the product of the gross profit margin P/Y and capacity employment Y/K, and showed that P/Y and Y/K are both increasing functions of P/K. Each change in P/K is divided between both factors in such a way that Y/K always changes by a smaller percentage than P/K. Let us assume that the dependence between Y/K and P/K is linear, and recall that P is proportional to B_0+A (where B_0 is the constant part of capitalist consumption and A is gross accumulation); we then obtain:

$$\frac{Y}{K}=q\frac{B_0+A}{K}+r \tag{38}$$

or

$$Y=q(B_0+A)+rK \tag{38a}$$

The constants q and r are positive: q since Y/K is an increasing function of P/K, r since Y/K rises or falls more slowly than P/K. Equations (38) or (38a) will also be satisfied for the average values from one cycle of Y, A, and K, and thus for Y_0, A_0, K_0:

$$\frac{Y_0}{K_0}=q\frac{B_0+A_0}{K_0}+r \tag{39}$$

$$Y_0=q(B_0+A_0)+rK_0 \tag{39a}$$

We shall now draw curve Y from curves A and K, which were calculated on p. 90 and drawn in Fig. 4 above. Since we draw curve Y (like the other curves above) in the form of deviations from the average in terms of this average, in order to represent the value $(Y-Y_0)/Y_0$, we still need to find only the ratio between q and r. We estimate this ratio as follows. We assume that to the deviation of $\pm 15\%$ of gross profitability P/K, or the value $(B_0+A)/K$, from the average, there corresponds $\frac{2}{3}$ of this, hence 10%, of the deviation in the capacity employment Y/K. This assumption seems to be broadly supported by the statistical data on social income. From this assumption it follows that the proportion between q and r is 2:1. Moreover, since to calculate the curves presented in Fig. 4 it was assumed, on the basis of statistical data, that $B_0/K_0=0.13$ and $I_0/K_0=0.05$, (see p. 88), we obtain $r=\frac{1}{2}q\times 0.18=0.09\,q$, which allows us to draw curve Y.

Fluctuations in aggregate production are less severe than fluctuations in gross profits P and lag behind them. Gross profits P, which are proportional to B_0+A, obviously fluctuate in tune with gross accumulation A, but less intensely than the latter.

Since the real profits of capitalists P fluctuate more sharply than aggregate production Y, fluctuations in the real income of workers $Y-P$ are weaker than fluctuations in aggregate production. This is entirely normal. As we have shown, the share of capitalists in social income P/Y reaches its peak during the upswing and its lowest level during depression. Thus its fluctuations coincide with the fluctuations in aggregate production Y; the share of workers $(Y-P)/Y$, on the other hand, fluctuates in the opposite direction.

The production of consumer goods is equal to the difference between aggregate production and the production of investment goods $Y-A$. It consists of the consumption of workers $Y-P$ (which is identical with their real income, since we abstract from workers'

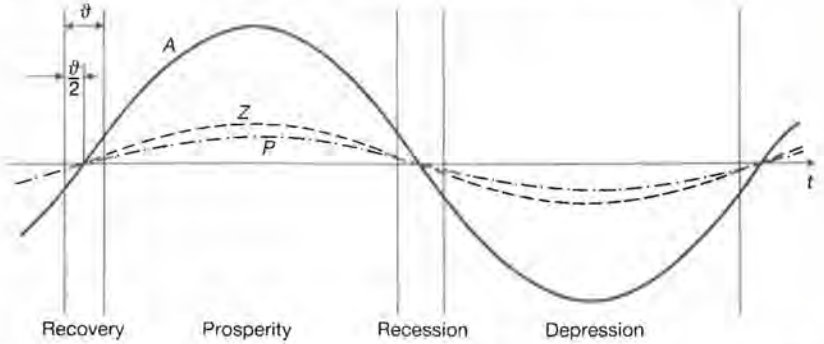


FIG. 8. A: gross accumulation equal to the production of investment goods; P: real gross profits proportional to B_0+A; Y: aggregate production. The figure shows deviations from averages in terms of these averages, hence the values: $\frac{A-A_0}{A_0}; \frac{P-P_0}{P_0}=\frac{(B_0+A)-(B_0+A_0)}{B_0+A_0}=\frac{A-A_0}{B_0+A_0}; \frac{Y-Y_0}{Y_0}$.

savings) and the consumption of capitalists P—A. Since the production of investment goods A fluctuates more sharply than aggregate production, the production of consumer goods $Y-A$ fluctuates less intensely than aggregate production Y and even less so than the production of investment goods A. [See Fig. 8.]

Aftalion in the work cited earlier[18] arrives at the same conclusion, that the production of investment goods fluctuates more intensely than the production of consumer goods, but he uses entirely different arguments, which can be summarized as follows.

Let us assume that the consumer goods industry has capital equipment of an average volume of 100 000 units and that its replacement requirements are 10 000 units annually. At the beginning of the period of prosperity, let the volume of this equipment equal 90 000 units and the index of production of consumer goods be 90.

During 5 years of prosperity, capital equipment is increased to 110 000 units and the index of production of consumer goods will reach 110. Thus, over these 5 years the expansion of capital equipment will require additional production of investment goods of 20 000 units or 4000 units annually. The total production of investment goods for replacement and expansion in the years of prosperity amounts to $10\,000+4000=14\,000$ units annually. During the second half of the cycle, when capital equipment shrinks from 110 000 to 90 000 units, the

[18] *Les Crises périodiques de surproduction*, p. 372.

production of investment goods will be $10\,000-4000=6000$ units. Thus the production of consumer goods fluctuates between 90 and 110, and the production of investment goods between 60 and 140.

This ingenious argument is based on the same false assumption of constancy of capital employment which runs through all Aftalion's theory. In fact, an increase in the production of consumer goods can take place without any expansion of capital equipment, merely through increasing its employment. Our argument that the production of investment goods fluctuates more sharply than the production of consumer goods was based on entirely different premisses. We assume that capitalist consumption $C=P-A$ fluctuates less severely than gross accumulation A, equal to the production of investment goods. It follows that gross profits $P=C+A$ also fluctuate less sharply than A. Aggregate production Y fluctuates even less than gross profits P, since the share of capitalists in social income P/Y as well as aggregate production Y, attain their peak during the boom and their lowest level during the depression. Thus relative deviations of P are greater than Y. Hence the production of investment goods A fluctuates more intensely than aggregate production, and even more so than the production of consumer goods $Y-A$.

The role of the government in the distribution of social income

We have not yet considered the role of the government in the distribution of social income. If we denote (as above) aggregate production by Y and real gross profits by P, then, in addition to the real income of workers (employed in private firms), $Y-P$ will also contain the real income of the government (or government employees) in the form of consumer goods for government employees, armaments, etc. The conclusion that $Y-P$ consists of the total real income of workers and of the government is true only if the government's budget is balanced. If treasury revenue is greater than expenditure, i.e. if the government 'saves', creating reserves, its income also includes part of the profits of capitalists, $P=C+A$ (C is capitalist consumption and A is gross accumulation equal to the production of investment goods for replacement and expansion of capital equipment); then capitalists become indebted to the government. On the other hand, if government expenditure is greater than its revenue, i.e. if it becomes indebted to capitalists, then, in addition to $P=C+A$, the capitalists also earn the sum which the government owns to them. Here we assume a balanced

budget, which is analogous to our fundamental assumption that workers always spend everything they earn.

With a balanced budget, neither its size nor the way taxes are distributed among individual classes of the population—similarly to workers' wages (see p. 100)—have any influence on the course of the business cycle. Real gross profits P, aggregate production Y, and the aggregate real income of government and of workers $Y-P$ are all determined by the mechanism of the business cycle. An increase in taxes, no matter what kind, increases the share of government in $Y-P$ at the expense of workers, whereas the real income of capitalists P remains unchanged.

For example, if the government increases taxes on capitalists and raises its expenditure accordingly, then prices will rise by an amount that will compensate capitalists for this tightening of the tax screw. As we showed above, under a balanced budget, real gross profit P equals the sum $C+A$ of capitalist consumption C and gross accumulation A. Gross accumulation A, equal to the production of investment goods, is determined by earlier investment orders, while real gross profits P are proportional to B_0+A (where B_0 is the constant part of capitalist consumption). Thus in the final analysis P is determined by earlier investment orders and therefore cannot be reduced by the increased taxing of capitalists. Real gross profits P in turn determine aggregate production Y (due to the identity $\frac{P}{K}=\frac{P}{Y}\times\frac{Y}{K}$ and the functional relationship between the profit margin P/Y and capacity employment Y/K), and hence also the aggregate real income of workers and the government $Y-P$. Shifts take place only in the distribution of this part of social income between workers and government. When prices rise, the workers' share declines and the government's share increases accordingly. Thus the influence of increased or reduced taxes on the distribution of social income is independent of the kind of taxation, for instance whether direct or indirect taxes are involved. As with the independence of social-income distribution from changes in wage rates, this will hold only for a closed economic system under free competition.

3. The Business Cycle and Cartels

We have so far tacitly assumed that free competition rules unhindered in our economic system. We shall now examine how cartels affect the

business cycle. We assume that, throughout the entire cycle, cartels maintain a constant profit margin.

All our basic assumptions are approximately valid also for this 'mixed' system. The profitability of existing plants (which, despite constant profit margins in the cartelized industries, may change because of fluctuations in capacity utilization) will also determine investment activity in the 'organized' part of the mixed system, made up of many independent cartels. With increasing sales, individual cartel members expand their plants in order to capture as great a share as possible of the increased market. Like the previously discussed system based on free competition, the partially or even wholly cartelized system is subject to regular business fluctuations.

An important difference between the free competition system and the partially cartelized system consists in the constant profit margin in the organized part of the latter.

We presented gross profitability P/K above (see p. 98) as the product of the gross profit margin P/Y and the degree of capacity utilization Y/K. Later, we saw that both these factors always move in the same direction as P/K. If it rises, this increase is divided between P/Y and Y/K. The profit margin P/Y remains constant in the cartelized part of the economy, and hence fluctuations in gross profitability appear here only in the capacity utilization ratio Y/K. Hence in the partially cartelized system the same fluctuations in gross profitability P/K are accompanied by weaker fluctuations in the average profit margin P/Y and stronger fluctuations in capacity utilization Y/K, and hence also in total output Y.

To highlight this point, let us compare fluctuations in output in the 'free' system and the wholly cartelized system. In a free-competition economy, the profit margin P/Y rises during the upswing and falls during the downswing. Hence fluctuations in output Y are weaker than fluctuations in real gross profits P; i.e. the consumption of workers $Y-P$ does not fluctuate as strongly as the sum of capitalist consumption and gross accumulation $P=C+A$ (see p. 104).

According to our assumption, in a wholly cartelized system the profit margin P/Y remains constant, i.e. output is proportional to real gross profits P, and thus the former fluctuates as much as the latter. In a mixed system, output fluctuates less than real gross profits, but this difference in fluctuation is greater in the wholly free system.

It is still worth investigating the effects of price rises or wage reductions in the wholly cartelized system. Interestingly enough, no

increase in total profits can take place in this case either, for, as in the free-competition system, profits are ultimately determined by earlier investment orders. The *share* of real gross profits in aggregate production will of course increase, on account of a wider spread between consumer goods prices and wage rates; however, since the absolute value of real gross profits P will remain unchanged, this will only mean a contraction in workers' real income $Y-P$. Neither can capitalists increase their real gross profits in a wholly cartelized system by increasing prices or lowering wages.[19] However, in this case, unlike that of a free economy, workers' real incomes are reduced.

Similar processes will also take place in a partially cartelized system. If wages are reduced in the cartelized part, this will not affect total real profits. There will only be a shift in the distribution of profits to the disadvantage of the free part, in which the average profit margin and capacity employment must decline. Capacity employment will also fall in the cartelized part, since it is integrated with the free part (the increase in the share of cartels in total profits takes place through an increase in their profit margins and a fall of profit margins of the free part). Thus aggregate production Y contracts. Since total gross profits do not change, this contraction affects only workers' real income $Y-P$.

[19] This point is valid only for the closed system examined here. In an open system, increasing profits by raising prices or reducing wage rates is unquestionably possible, since increased profits can be realized then as an export surplus (see pp. 000–00).

'Critical Remarks on one of the Mathematical Theories of the Business Cycle' by Aleksander Rajchman: A Rejoinder[1]

(1933)

A respected author has subjected my *Essay on the Business Cycle Theory* to a severe and impassioned critique.[1] Incidentally, I do not believe that such loaded phraseology as 'an inflation of mathematical equations', 'sensational assumptions', 'poor gibes at determinism', and picturesque comparisons with 'sledging pupils' could serve the objectivity of the discussion. Below I attempt to respond to the author's charges, using this opportunity to explain some points of my theory in more detail.

I

1. The author begins his 'deflationary operation', i.e. clearing away the 'inflation of mathematical equations', by stating 'that one of Kalecki's sensational theses at the end of his work [p. 100] follows directly from essentially no less sensational assumptions on pp. 68–75'. He has in mind the statement that fluctuations in the share of capitalists' profits in the social income in the course of the business cycle are independent of the struggle for wages (an assertion regarding which I listed serious qualifications, which I explain in more detail below). First of all, it is difficult to understand what this clearing away of the 'inflation of mathematical equations' involves. I introduce this assertion on pp. [98–100] (entirely independently of 'Mathematical Development'[2]) from the conclusions in the 'Outline of a General Theory' (and the assertion on the functional dependency between the gross profit margin and the rate of employment of capital equipment).

[1] See *Kwartalnik Statystyczny*, 10/2–3 (1933), pp. 325–37.

[2] In the preface I clearly state that 'Mathematical Development' may be omitted without detriment to an understanding of the whole.

Hence the 'deflationary operation' boils down to repeating my line of reasoning together with its basic assumptions.

2. Rajchman quite correctly concludes from my assumptions that 'the real profit of capitalists in the unit of time t is unequivocally determined by investment orders in previous periods', an assertion which he regards as 'sensational'. The argument leading to this assertion runs as follows.

Real gross profits P, i.e. total real income of capitalists plus depreciation, consists of the part consumed, C, and the part saved, A, which is called gross accumulation:

$$P = C + A \tag{1}$$

Since we examine an isolated system and ignore workers' savings, A includes aggregate production of investment goods and an increase in inventories. We assume that inventories remain constant throughout the business cycle, and hence that gross accumulation A is equal to the production of investment goods. We further assume that capitalist consumption C increases or declines together with total real profits P, i.e. it is a function of P. Expressing C in terms of P in equation (1), we find that total real profits P are a function of the production of investment goods A. Since the value of the latter is determined by previous investment orders, whose completion requires time υ, capitalists' real profits P at a given moment are also determined by investment orders from previous periods.

I would like to know which of these assumptions can be regarded as 'sensational'. I doubt whether there can be objections to leaving out workers' savings. The assumptions that inventories remain constant during the business cycle is obviously not precise; however, if we examine—as all serious theories of the business cycle do—business fluctuations which are caused by processes of the reproduction and accumulation of fixed capital, it may be regarded as an admissible simplification, the more so as the empirical data show that inventories in approximately isolated systems do not undergo marked cyclical fluctuation. That capitalists' consumption is a function of their total real profits (I assume that it fluctuates less than total gross profits: see p. [69] of my work) also does not seem unusual. Finally, the production of investment goods at a given time no doubt depends on previous investment orders, whose completion requires a longer period.

What can we say about the results of wage reductions in the context of our assumptions? If capitalists reduce workers' wage rates, this hardly ends the process of their appropriation of workers' income. For this appropriation to be effected, capitalists as a whole must increase their consumption and the production of investment goods by an amount equal to the sum of wage reductions. For capitalists as a whole do not earn 'money', but the sum of goods which they consume or which they accumulate in the form of production of investment goods. Since the production of investment goods A is determined by previous investment orders, it cannot change. Further, as indicated by our assumptions, the sum of capitalist consumption and the production of investment goods $C + A$ is a function of A, from which it follows that capitalist consumption C also does not change. The real profits of capitalists do not increase when wages are lowered. Reduced demand by workers which is not offset by a corresponding increase in capitalist demand causes such a fall in prices and sales[3] that it cancels out the effect of wage reduction on total profits.[4]

From our previous assumptions (whose 'unsensational' character we stressed above) it only follows that wage reductions do not have an *immediate* effect on increasing capitalist profits. There is still the possibility of influencing the volume of investment orders at a given time and thereby increasing real profits in the future. We examine this question in the next section.

3. On what does the volume of investment orders placed at a given time depend? Our assumption (which seems entirely realistic) is that it depends on expected net profitability. We also assume (which again seems plausible) that this future net profitability is estimated on the basis of the gross profitability of existing plants and the rate of interest at a given time. If we denote the volume of aggregate capital equipment at a given time by K, real gross profits (as above) by P, and the interest rate by i, we can state that investment activity will be an increasing function of current gross profitability P/K (since entrepreneurs estimate future gross profitability on the basis of current gross profitability) and a decreasing function of the rate of interest i (since the

[3] As we shall see below, under free competition there is only a fall in prices; under 'pure' monopoly, only a fall in sales, and in a mixed system, both.

[4] Obviously, we speak the whole time about the profits of capitalists as a *whole*. A reduction of wages in one industry, with no reductions in other industries, increases the profits of capitalists of *that industry* at the expense of the other capitalists.

higher the interest the entrepreneur pays on invested capital, the lower the future net profitability of his enterprise will be). If we denote the volume of investment orders at a given time by I, then we can take I/K as a measure of intensity of investment activity, i.e. the volume of investment orders per unit of existing capital. Hence we obtain:

$$\frac{I}{K}=f\left(\frac{P}{K}, i\right)$$

where f is an increasing function of P/K and a declining function of i. Assuming that i is an increasing function of gross profitability P/K (and ignoring the so-called 'crises of confidence'), we find that I/K is a function of gross profitability P/K. In my *Essay* I said that I/K is an increasing function of P/K. Mr Rajchman quite unnecessarily tries to convince me with a 'trivial counter-example' that this is not a logical conclusion from my previous assumptions, since I am well aware of that. But the new assumption which I have tacitly introduced is as follows: if investment activity I/K is solely a function of gross profitability P/K, then I/K must be an increasing function of P/K. This assumption is so obvious, however, that it need not have been stated formally at all.

Hence from the previous argument it follows that the ratio of the volume of investment orders I at a given time to the volume of capital equipment K is an increasing function of gross profitability P/K. Real gross profits P (as indicated in the previous paragraph) are determined by investment orders from previous periods. If we assume that replacement requirements remain constant throughout the business cycle, we can show that the volume of capital equipment at a given time is also determined by investment orders in previous periods (and by the volume of capital equipment at some given time in the past). We see that the volume of investment orders at a given time is determined by the volume of investment orders in the previous period. Hence it does not depend on the struggle for wages, which means that neither can the latter affect the future production of investment goods and thus real profits.

4. Thus it ultimately follows from our assumptions that wage reductions cannot increase the real profits of capitalists, either in the present or in the future. I fail to understand why my critic claims that 'therefore we have no right to consider wage reductions as contradictory to assumptions previously made'. Such a formulation may confuse the reader, since in fact we did examine a wage reduction here,

and showed that its influence on capitalist profits is cancelled by the fall in prices and sales which follows a contraction in workers' demand that is not offset by an increase in capitalist demand. Whether, and under what conditions, workers' total income is reduced on account of wage reduction will be discussed in section 6.

5. I fail to understand why any of the above arguments are 'poor gibes at determinism'. The picturesque comparison with a 'sledging pupil' is supposed to explain this. A poor creature, having studied mechanics, arrives at the conclusion that, since the path of a sledge is determined by its initial position and speed, then if a chum kicks his sledge from the side, this will not change its route or speed. This comparison tells me nothing expect that Mr Rajchman did not understand the relation of wage reduction to my assumptions. To the assumption of a 'sledging pupil' case one should add: 'if no external force acts on it'. It is not necessary to add: 'if wage reduction does not take place' to my assumptions, since it follows from them that this reduction in wages does not affect real profits. If a student of mechanics riding in a cab concluded that it would be useless to kick the front panel to speed it up, he would be right, since the assumption that the course of the cab is completely determined by its initial position, initial speed, and the influence of outside forces excludes the possibility of internal forces affecting this course.

Then it 'persistently occurs' to the author to compare my arguments with the reasoning of an 'inconsistent sledging pupil', because I 'correctly argue' that the 'crisis of confidence must be regarded as a factor disturbing the regular functioning of our mechanism of the business cycle' (p. 90), but do not consider wage reductions or increases as similar disturbing factors. This is the same misunderstanding. In my assumptions I clearly state (see section 3 above as well as p. [74] of my work) that I *abstract* from crises of confidence. Without this abstraction one cannot assume that the interest rate i is a function (an increasing function) of gross profitability P/K, and consequently one cannot conclude from the equation

$$\frac{I}{K}=f\left(\frac{P}{K}, i\right),$$

that I is a function of P/K.

On the other hand, in my theory I do *not* abstract from wage reductions or increases. I assume them, and demonstrate that from these assumptions it follows that the total real profit of capitalists is

independent of wage reductions or increases, whose influence on capitalists' total profits must be offset by changes in prices and production in the opposite direction. The abstraction from crises of confidence is an *assumption* independent of other assumptions. The influence of wage reductions or increases on capitalists' real profit is a *conclusion* from other assumptions. The appearance of a crisis of confidence *undermines* one of the basic assumptions, and is thus a disturbing factor in relation to the 'mechanism of the business cycle'. Wage increases and reductions *are not inconsistent* with the basic assumptions. On the contrary, the influence these factors have on the real profits of capitalists follows from these assumptions.

6. So far we have considered only the influence of wage reductions and increases on capitalists' real profits, but we have not discussed their effect on workers' real income. 'The obligation of objectivity demands another addition here', Mr Rajchman writes, following which he quotes from my work: 'Real gross profits P, together with the volume of fixed capital K, determine aggregate production Y, since the rate of capacity employment Y/K is a function of gross profitability P/K'.' If Y is aggregate production and P capitalists' real profits, then $Y-P$ is workers' real income. Since Y and thus also $Y-P$ is determined by P and K, which, as indicated above, are independent of wage increases or reductions, it would follow that the real income of workers $Y-P$ is also independent of them. It is a pity that the 'sense of objectivity' did not oblige my critic to cite the following qualification from my work (p. 101):

> It should be noted that the relationship between the degree of capacity employment and gross profitability was derived in the previous section from the tacit assumption of free competition. Real gross profits P, which are entirely determined by earlier investment orders, are also not affected by changes in wage rates in a partially cartelized system. This cannot be said, however, of aggregate output Y, nor, therefore, of the real income of workers $Y-P$. We examine these questions in some detail in the section 'The business cycle and cartels'.

— and further from that Section [p. 108]:

> Neither can capitalists increase their real gross profits in a wholly cartelized system by increasing prices or lowering wages. However, in this case, unlike that of a free economy, workers' real incomes are reduced.
>
> Similar processes will also take place in a partially cartelized system.

It turns out that only under completely free competition does a wage reduction not affect workers' real income. In completely or partially monopolistic systems, capitalists cannot increase their total real gross profits by reducing workers' wages, but despite this they reduce workers' real income. Under free competition the effect of a wage reduction on capitalists' profits is offset by a fall in prices, with aggregate production Y and workers' income $Y-P$ unchanged. Under a 'pure monopoly', prices do not fall, and the effect of wage reductions on real profits is offset by a fall in turnover, i.e. in production Y. Since Y falls while P remains constant, workers' real income $Y-P$ is reduced. Under a 'partial monopoly' prices and aggregate production both fall. Workers' real income $Y-P$ also contracts here, but less than under a 'pure monopoly'.

In this light the statement of my critic: 'In this business cycle determinism there is no room for an effective . . . struggle for wages' ceases to be valid as soon as the condition of free competition is abandoned.

II

1. We now move on to the mathematical part of 'Critical Remarks'. Mr Rajchman first works out the basic equation of my 'theory' and on the whole is not critical of it. Only in one place, where he discusses the dependence of the volume of investment orders I on the production of investment goods A and capital equipment K, expressed in equation (10a),

$$I = m(B_0 + A) - nK$$

where m, n, and B_0 are constants, does my critic state:

> From the fact that ψ is an increasing function of $(B_0 + A)/K$, Kalecki correctly concludes that m is positive; on the other hand, I am unable to understand the alleged proof for the positive value of n. We shall treat it as an additional assumption.

Not to understand does not yet mean to refute. I shall try to explain my reasoning in more detail. The variability area of I, which represents the volume of investment orders, extends downward all the way to zero. Let us consider values of I smaller than positive values of mB_0. For these values we find, from equation (10a), that:

$$n > (mA/K)$$

i.e. for them n is positive, since m, A, and K are positive, and since n is a constant, it is always positive.[2] For the sake of clarification I should mention that I need the condition $m>0$, $n>0$ only to present the mechanism of the business cycle without recourse to the higher mathematics in part I, chapter 3, but I do not use it when formulating and solving the basic equation in part II.

2. Mr Rajchman then moves on to a criticism of the solution of the 'basic equation', i.e. to my deriving from it investment orders I as a function of time t. My solution is based on Tinbergen's solution, in his *Ein Schiffbauzyklus?*, of the equation:

$$f'(t)=-af(t-\upsilon) \qquad \text{(T)}$$

Hence Rajchman's criticism is directed against Tinbergen's method of solution.

Using the development in the Fourier series, Rajchman first of all shows that this equation has a periodic characteristic solution for $f(t)$ only when a particular relationship exists between constants a and υ, and that then it is simple harmonic, i.e. it has the form: $C\sin(\beta t-\gamma)$.

Emphasizing the 'special character' of this solution, Rajchman correctly shows that we obtain a general solution if in the initial interval $(0, \upsilon)$ we assume an arbitrary function for $f(t)$, after which from the (T) equation we can determine function $f(t)$ in the interval $(\upsilon, 2\upsilon)$. Then, on the basis of the shape of this function in that interval, and by this same equation, we can determine function f in the interval $(2\upsilon, 3\upsilon)$, etc.

Mr Rajchman further shows that if $a\upsilon>1$, then the curve obtained in this way intersects the axis at an infinite number of points separated from each other by less than 3υ.

Rajchman contrasts his procedure with the method used by Tinbergen to solve the equation $f'(t)=af(t-v)$, which he criticizes as follows:

> Instead of this he [Tinbergen] thoroughly analyses a characteristic solution of a special type:
>
> $$e^{\alpha t}\sin(\beta t-\gamma)$$
>
> (where α, β, γ, are constants, and t is an independent variable), and says that a general solution can be developed in a series of special solutions of this type.
>
> This result tells us nothing about the distribution of roots $t_1, t_2, \ldots t_n$, since—apart from the case of one and the same root for all components, which has no application here—there is no simple relationship between the roots of component particular solutions and the root of the sum.[5]

I shall try to show that this objection is only apparently justified. Tinbergen's solution is as follows:

$$f(t)=C_1e^{\alpha_1 t}\sin(\beta_1 t-\gamma_1)+C_2e^{\alpha_2 t}\sin(\beta_2 t-\gamma_2)+$$
$$C_3e^{\alpha_3 t}\sin(\beta_3 t-\gamma_3)\ldots$$

$\alpha_1, \alpha_2, \alpha_3 \ldots$ and $\beta_1, \beta_2, \beta_3$ are constants which Tinbergen obtains from the equation $z/\alpha\beta=e^z$, where $z=\alpha+i\beta$, by the graphic method on p. 157 of his *Schiffbauzyklus*,[6] $C_1, C_2, C_3, \ldots$ and $\gamma_1, \gamma_2, \gamma_3, \ldots$ are constants following from the condition that the above expression for $f(t)$ in the interval $(0, \upsilon)$ is to be a development of the function arbitrarily given there. From the aforementioned solution of the equation $z/\alpha\beta=e^z$ one can easily deduce that $\alpha_2<\alpha_1$; $\alpha_3<\alpha_1$; etc. In order to find the roots of function $f(t)$ we now make it equal to zero and divide by $C_1e^{\alpha_1 t}$, we then obtain:

$$\sin(\beta_1 t-\gamma_1)+\frac{C_2}{C_1}e^{(\alpha_2-\alpha_1)t}\sin(\beta_2 t-\gamma_2)+$$
$$\frac{C_3}{C_1}e^{(\alpha_3-\alpha_1)t}\sin(\beta_3 t-\gamma_3)+\ldots=0$$

Since, as follows from the above, $\alpha_2-\alpha_1<0$; $\alpha_3-\alpha_1<0$ etc., then for a sufficiently large t the sum of all components except the first one will be equal to any arbitrary small value ω:

$$\sin(\beta_1 t-\gamma_1)+\omega=0$$

from which it follows that roots of $f(t)$ for a sufficiently large t will be arbitrarily close to the roots of $\sin(\beta_1 t-\gamma_1)$.

In the same way we can demonstrate that the relative deviation of $f(t)$ from $C_1e^{\alpha_1 t}\sin(\beta_1 t-\gamma_1)$, i.e.

$$\frac{f(t)-C_1e^{\alpha_1 t}\sin(\beta_1 t-\gamma_1)}{C_1e^{\alpha_1 t}\sin(\beta_1 t-\gamma_1)}$$

for sufficiently large values of t is arbitrarily small if $\sin(\beta_1 t-\gamma_1)\neq 0$. Hence in conclusion we can state:

[5] In Rajchman's article u is used instead of t, which is due to his transformation of equation (T).

[6] Tinbergen, *Ein Schiffbauzyklus?*. The values which we have denoted by α and β Tinbergen denotes by x and y.

At a time distant enough from the interval $(0, \upsilon)$ the function $f(t)$ with an arbitrary exactitude simulates function $C_1 e^{\alpha_1 t} \sin(\beta_1 t - \gamma_1)$, whose period of fluctuations is completely independent of initial conditions.[7]

This result seems more important to me than the results obtained by Mr Rajchman's method.

3. All these points can be applied to the solution of my basic equation. Thus we can state that, at a time distant enough from the interval $(0, \upsilon)$, the function $I(t) - I_0$ (deviation of the volume of investment orders from the position of equilibrium) coincides with arbitrary closeness with the function $C_1 e^{\alpha_1 t} \sin(\beta_1 t - \gamma_1)$, where constants α_1 and β_1 depend on parameters m, n, υ, and constants C_1 and γ_1 on the initial conditions:

$$I(t) - I_0 = C_1 e^{\alpha_1 t} \sin(\beta_1 t - \gamma_1)$$

At the same time my assumptions do not at all require $\alpha_1 = 0$, as Rajchman seems to assume. Only a broader interpretation of the concept of a 'trendless' system is then required, regarding as 'trendless' not only a system that returns exactly to the initial state, but also one in which all basic elements oscillate around a fixed position of equilibrium.[8]

If subsequently, in calculating the length of the business cycle, I assume $\alpha_1 = 0$, however, it is only to fall in line with reality, which does not show a clear, regular regression or progression in the amplitude of fluctuations (see pp. 86–7 above).

Thus I hardly have to suppose that the condition

$$\cos \sqrt{n\upsilon(2m + n\upsilon)} = \frac{m}{m + \upsilon n}, \qquad (N_1)$$

indispensable for $\alpha_1 = 0$, is exactly satisfied in reality. It can be satisfied only in crude approximation, such that fluctuations in the business

[7] I checked this proposition on an example in the following way. I assumed that in the initial period $(0, \upsilon)$ the function $f(t) = \text{const}$ and calculated it for the case of $\alpha\upsilon = \pi/2$ on the basis of the equations given by Rajchman for the subsequent intervals. It turned out that very quickly the curve of $f(t)$ coincided with the sine curve of a period equal to 4υ, corresponding to 'Tinbergen's solution'.

[8] With such an interpretation I_0, A_0, D_0, and K_0, corresponding to the positions of equilibrium of individual elements, are no longer averages from any cycle, but averages from cycles with a suitably selected phase (and a different one for each element). From the dependencies on which derivation of the basic equation was based, it follows that even in this interpretation $I_0 = A_0 = D_0 = U$.

cycle intensify or damp very slowly. Obviously, the calculation of the period is only approximate in these cases. The imprecision of the statistical data and the approximate nature of our basic assumptions, as well as the influence of exogenous factors, however, make such a calculation only a very rough estimate anyway. What is important is not that from my calculations I obtained a period of the cycle equal to 10 years, which happens to correspond exactly with reality, but that I did not obtain a period equal to 100 years.[3]

I must admit, though, that there is one very important gap in this part of my argument. One should not be satisfied with merely *stating* that no clear, regular progression or damping in the amplitude of business fluctuations can be observed in reality; one should *explain* this constancy in the intensity of fluctuations.

On the other hand, Rajchman's objection that satisfying condition (N_1) still does not prejudge the periodicity of function $I(t) - I_0$ on account of the influence of initial conditions can be rejected in the light of the above argument with respect to a time sufficiently distant from the initial interval $(0, \upsilon)$. Function $C_1 e^{\alpha_1 t} \sin(\beta_1 t - \gamma_1)$, which in the special case examined here transforms into $C_1 \sin(\beta_1 t - \gamma_1)$, gives us an approximate general solution for function $I(t) - I_0$ for the time sufficiently distant from the interval $(0, \upsilon)$.

In conclusion, Rajchman mentions that he has not undertaken criticism of the substance of my economic assumptions. I believe, however, that only such a critique could eventually reveal any substantial flaws of my theory, while Rajchman's formal-logical and mathematical objections are wide of the mark.

A Macro-dynamic Theory of Business Cycles[1] [1]

(1935)

I

In the following all our considerations concern an economic system *isolated and free of secular trend*. Moreover, we make with respect to that system the following assumptions.

1. We call real gross profit B the total real income of capitalists (businessmen and private capitalists), depreciation included, per unit of time. That income consists of two parts, that consumed and that accumulated:

$$B = C + A \tag{1}$$

Thus, C is the total volume of consumer goods consumed by capitalists, while A—if we disregard savings of workers, and their 'capitalistic' incomes—covers goods of all kinds serving the purpose of reproduction and expansion of fixed capital, as well as increment of stocks. We shall call A 'gross accumulation'.

The personal consumption of capitalists, C, is not very elastic. We assume that C is composed of a constant part, C_1, and a variable part proportional to the real gross profit λB:

$$C = C_1 + \lambda B \tag{2}$$

where λ is a small constant fraction.

From equations (1) and (2) we get:

$$B = C_1 + \lambda B + A$$

and

$$B = \frac{C_1 + A}{1 - \lambda} \tag{3}$$

[1] The term 'macro-dynamic' was first applied by Professor Frisch in his work 'Propagation Problems and Impulse Problems in Dynamics' (*Economic Essays in Honour of Gustav Cassel* (London, Cass, 1933)), to determine processes connected with the functioning of the economic system as a whole, disregarding the details of disproportionate development of special parts of that system.

i.e. the real gross profit B is proportional to the sum $C_1 + A$ of the constant part of the consumption of capitalists C_1 and of the gross accumulation A.

The gross accumulation A is equal to the sum of the production of capital goods and of the increment of stocks of all kinds.[2] We assume that the total volume of stocks remains constant all through the cycle. This is justified in so far as in existing economic systems which are totally or approximately isolated (the world, the USA) the total volume of stocks does not show any distinct cyclical variations. Indeed, while business is falling off, stocks of finished goods decrease, but those of raw materials and semi-manufactures rise; during recovery there is a reversal of these tendencies. From the above we may conclude that in our economic system the gross accumulation A is equal to the production of capital goods.

2. We assume further that the 'gestation period' of any investment is υ. Of course, this by no means corresponds to the reality; υ is merely the average of various actual durations of 'gestation periods', and our system in which υ is a constant value is to be considered as a simplified model of reality.

Whenever an investment is made, three stages can be discerned: (i) investment orders, i.e. all the orders for capital goods to serve the purpose of reproduction or expansion of industrial equipment; the total volume of such orders allocated per unit of time will be called I; (ii) production of capital goods; the volume of that production per unit of time, equal, as said above, to the gross accumulation, is called A; (iii) deliveries of finished industrial equipment; the volume of such deliveries per unit of time will be called L.[3]

The relation of L and I is simple. Deliveries L at the time t are equal to investment orders I at the time $t - \upsilon$:

$$L(t) = I(t - \upsilon) \tag{4}$$

($I(t)$ and $L(t)$ are investment orders and deliveries of industrial equipment at time t.)

[2] Industrial equipment in the course of construction is not included in 'stocks of all kinds'; thus change in the volume of industrial equipment in the course of construction is involved in the 'production of capital goods'.

[3] While A is the production of *all* capital goods, L is only that of *finished* capital goods. Thus, the difference $A - L$ represents the volume of industrial equipment in the course of construction, per unit of time.

The interrelationship of A and I is more complicated. Let us call W the total volume of unfilled investment orders at time t. As each investment needs the period υ to be filled, $1/\upsilon$ of its volume must be executed in a unit of time. Thus the production of capital goods must be equal to $1/\upsilon . W$:

$$A=\frac{W}{\upsilon} \tag{5}$$

As regards W, it is equal to the total of orders allocated during the period $(t-\upsilon, t)$. Indeed, since the gestation period of any investment is υ, no order allocated during the period $(t-\upsilon, t)$ is yet finished at the time t, while all the orders allocated before that period are filled. We thus obtain the equation:

$$W(t)=\int_{t-\upsilon}^{t} I(\tau)d\tau \tag{6}$$

According to equations (4) and (5) we get:

$$A(t)=\frac{1}{\upsilon}\int_{t-\upsilon}^{t} I(\tau)d\tau \tag{7}$$

($A(t)$ is the production of capital goods at the time t.)

Thus A at time t is equal to the average of investment orders $I(t)$ allocated during the period $(t-\upsilon, t)$.

3. Let us call K the volume of the existing industrial equipment. The increment of that volume within the given period is equal to the difference between the volume of deliveries of finished equipment and that of equipment coming out of use. If we denote by $K'(t)$ the derivative of K with respect to time, by $L(t)$ the volume of deliveries of industrial equipment per unit of time (as above), and by U the demand for restoration of equipment used up per unit of time, we get:

$$K'(t)=L(t)-U \tag{8}$$

We can assume that the demand for restoration of industrial equipment—U—remains constant all through the cycle. The volume of existing industrial equipment K shows, it is true, certain fluctuations: e.g. in the first part of the cycle K is above average (see Fig. 9), and one might think that the demand for restoration of equipment ought also to be above average. Yet it should be borne in mind that the new equipment is 'young' and its 'rate of mortality' very low, as the

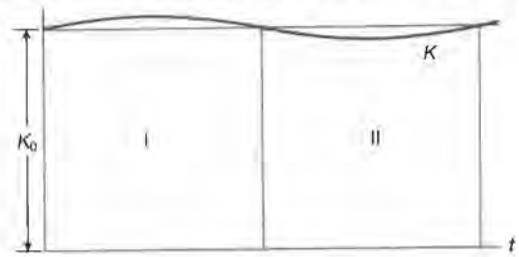


FIG. 9

average lifetime of industrial equipment is much longer than the duration of a cycle (15–30 years as against 8–12 years). Thus the fluctuations of the demand for restoration of equipment are of no importance, and may safely be disregarded.

4. The proportions of the investment activity at any time depend on the expected net yield. When the businessman invests capital k in the construction of industrial equipment, he will first evaluate the probable gross profit b, while deducting (i) the depreciation of the capital k, i.e. βk(β – the rate of depreciation); (ii) the interest on the capital k, i.e. pk (p – the interest rate); (iii) the interest on the future working capital, the ratio of which to the invested capital k will be denoted by $\gamma - p\gamma k$. The probable yield of the investment will thus be:

$$\frac{b-\beta k-pk-p\gamma k}{k}=\frac{b}{k}-\beta-p(1+\gamma)$$

The coefficients β and γ may be considered constant all through the cycle. p is the money rate at any given moment, b/k is the probable future yield evaluated after that of the existing enterprises. The volume of the existing industrial equipment is K, the total real gross profit is B. Thus the average real gross profit per unit of the existing fixed capital is B/K (that quotient will be called further gross yield B/K).

We may conclude that b/k is evaluated after B/K, and that investment activity is controlled by the gross yield B/K and the money rate p. As a matter of fact, the function of B/K and p is not the volume of investment orders I, but the ratio of that volume to that of industrial equipment K, i.e. I/K. In fact, when B and K rise in the same proportion, B/K remains unchanged, while I rises (probably) as did B

and K. Thus, we arrive at the equation:

$$\frac{I}{K}=f\left(\frac{B}{K'}p\right) \tag{9}$$

where f is an increasing function of B/K and a decreasing function of p.

It is commonly known that, except for financial panic (the so-called 'crises of confidence'), the market money rate rises and falls according to general business conditions. We make on that basis the following simplified assumption: the money rate p is an increasing function of the gross yield B/K.

From the assumption concerning the dependence of the money rate p on the gross yield B/K, and from (8), it follows that I/K is a function of B/K. As B is proportionate to C_1+A, where C_1 is the constant part of capitalist consumption and A the gross accumulation equal to the production of capital goods, we thus obtain:

$$\frac{I}{K}=\phi\left(\frac{C_1+A}{K}\right) \tag{10}$$

ϕ being, of course, an increasing function. We further assume that ϕ is a linear function, i.e. that:

$$\frac{I}{K}=m\frac{C_1+A}{K}-n$$

where the constant m is positive, ϕ being an increasing function. Multiplying both sides of the equation by K we get:

$$I=m(C_1+A)-nK \tag{11}$$

We have seen that between I (investment orders), A (gross accumulation equal to the production of capital goods), L (deliveries of industrial equipment), K (volume of existing industrial equipment), and time t, there are interrelationships:

$$L(t)=I(t-\upsilon) \tag{4}$$

$$A(t)=\frac{1}{\upsilon}\int_{t-\upsilon}^{t} I(\tau)d\tau \tag{7}$$

$$K'(t)=L(t)-U \tag{8}$$

resulting from techniques of capitalist production, and the relation

$$I=m(C_1+A)-nK \tag{11}$$

resulting from the interdependence between investments and yield of existing enterprises. From these equations the relation of I and t may be easily determined.

Let us differentiate (11) with respect to t:

$$I'(t)=mA'(t)-nK'(t) \tag{12}$$

Differentiating equation (7) with respect to t, we get:

$$A'(t)=\frac{I(t)-I(t-\upsilon)}{\upsilon} \tag{13}$$

and from (4) and (8):

$$K'(t)=I(t-\upsilon)-U \tag{14}$$

Putting into (12) values of $A'(t)$ and $K'(t)$ from (13) and (14), we have:

$$I'(t)=\frac{m}{\upsilon}[I(t)-I(t-\upsilon)]-n[(t-\upsilon)-U] \tag{15}$$

Denoting the deviation of $I(t)$ from the constant demand for restoration of industrial equipment U by $J(t)$:

$$J(t)=I(t)-U \tag{16}$$

we can transform (15) as follows:

$$J'(t)=\frac{m}{\upsilon}[J(t)-J(t-\upsilon)]-nJ(t-\upsilon)$$

or

$$(m+\upsilon n)J(t-\upsilon)=mJ(t)-\upsilon J'(t) \tag{17}$$

The solution of that equation will enable us to express $J(t)$ as a function of t and to find out which, if any, are the endogenous cyclical fluctuations in our economic system.

II

It may be easily seen that equation (17) is satisfied by the function $De^{\alpha t}$, where D is an arbitrary constant value and α a definite value which has to be determined. Replacing $J(t)$ by $De^{\alpha t}$, we get:

$$D(m+\upsilon n)e^{\alpha(t-\upsilon)}=Dme^{\alpha t}-D\alpha\upsilon e^{\alpha t}$$

and, dividing by $De^{\alpha t}$, we obtain an equation from which α can be

determined:

$$(m+\upsilon n)e^{-\alpha\upsilon}=m-\alpha\upsilon \tag{18}$$

By simple transformations we get further:

$$e^{-m}(m+\upsilon n)e^{m-\alpha\upsilon}m-\alpha\upsilon$$

and setting

$$m-\alpha\upsilon=z \tag{19}$$

$$e^{-m}(m+\upsilon n)=l \tag{20}$$

we have

$$le^{z}=z \tag{21}$$

where z is to be considered as a complex number:

$$z=x+iy \tag{22}$$

Thus (19) can be given the following form:

$$\alpha=\frac{m-x}{\upsilon}-i\frac{y}{\upsilon} \tag{23}$$

and (21) can be transformed into:

$$x+iy=le^{x}(\cos\ y+i\ \sin\ y). \tag{24}$$

Adopting the method of Tinbergen,[4] we discern two cases: Case I, when $l>1/e$, and Case II, when $l\leqq 1/e$.

Case I. As Tinbergen has shown, in this case all the solutions will be complex numbers, and they will be infinite in number. Let us arrange them by increasing y_k:

$$\cdots x_k-iy_k,\ \cdots x_2-iy_2,\ x_1-iy_1,\ x_1+iy_1,\ x_2+iy_2\ \cdots x_k+iy_k\ \cdots$$

(It is easy to see that when x_k+iy_k is a root of (24), that equation is also satisfied by x_k-iy_k).

From equation (23) we get values of α:

$$\alpha_k=\frac{m-x_k}{\upsilon}-i\frac{y_k}{\upsilon}$$

and

$$\alpha_{-k}=\frac{m-x_k}{\upsilon}+i\frac{y_k}{\upsilon}$$

[4] 'Ein Schiffbauzyklus?', *Weltwirtschaftliches Archiv*, 34/1.

Functions:

$$D_ke^{\alpha_kt}=D_ke^{(m-x_k)t/\upsilon}\left(\cos\ y_k\frac{t}{\upsilon}-i\ \sin\ y_k\frac{t}{\upsilon}\right)$$

and

$$D_{-k}e^{\alpha_{-k}t}=D_{-k}e^{(m-x-k)t/\upsilon}\left(\cos\ y_k\frac{t}{\upsilon}+i\ \sin\ y_k\frac{t}{\upsilon}\right)$$

satisfy (17).

The general solution of (17), which is at the same time a differential and a functional equation, depends upon the form of the function $J(t)$ in the initial interval $(0, \upsilon)$; that form is quite arbitrary. Yet we can develop (with sufficient approximation) the function $J(t)$ in the initial interval into the series $\Sigma D_ke^{\alpha_kt}$ where the constants D_k depend upon the form of the function $J(t)$ in the initial interval.[5] As functions $D_ke^{\alpha_kt}$ satisfy (17), the function $\Sigma D_ke^{\alpha_kt}$, which represents with sufficient approximation $J(t)$ in the initial interval, will be a general solution of (17).[6] That solution is, of course, a real one, and thus D_k and D_{-k} must be complex conjugate numbers, and $J(t)$ can be represented as follows:

$$J(t)=e^{(m-x_1)t/\upsilon}\left(F_1\ \sin\ y_1\frac{t}{\upsilon}+G_1\ \cos\ y_1\frac{t}{\upsilon}\right)$$

$$+e^{(m-x_2)t/\upsilon}\left(F_2\ \sin\ y_2\frac{t}{\upsilon}+G_2\ \cos\ y_2\frac{t}{\upsilon}\right)\cdots \tag{25}$$

On the basis of that solution we cannot yet say anything definite about the character of fluctuations of $J(t)$, as the constants F_k and G_k depend upon the form—unknown to us—of the function $J(t)$ in the initial interval. But here we can take advantage of the following circumstance. It may be inferred from Tinbergen's argument when he solves equation (24) that

$$x_1<x_2,\ x_1<x_3\ \cdots \tag{26}$$

Let us divide $J(t)$ by:

$$e^{(m-x_1)t/\upsilon}\left(F_1\ \sin\ y_1\frac{t}{\upsilon}+G_1\ \cos\ y_1\frac{t}{\upsilon}\right)$$

According to inequality (26), for a sufficiently great t the sum of all the

[5] Ibid., p. 158. [6] Ibid., p. 157.

expressions other than the first one will be equal to an arbitrarily small value ω:

$$\frac{J(t)}{e^{(m-x_1)t/\upsilon}\left(F_1 \sin y_1\frac{t}{\upsilon}+G_1\cos y_1\frac{t}{\upsilon}\right)}=1+\omega$$

At a time sufficiently distant from the initial interval, the following equation will be true with an arbitrarily small relative error:

$$J(t)=e^{(m-x_1)t/\upsilon}\left(F_1 \sin y_1\frac{t}{\upsilon}+G_1\cos y_1\frac{t}{\upsilon}\right) \tag{27}$$

That equation represents harmonic vibrations with an amplitude decreasing, constant, or increasing, according as $x_1 \gtreqless m$. Their period, and the degree of progression or degression they show, do not depend on the form of the function $J(t)$ in the initial interval. (It is worth mentioning that, as follows from Tinbergen's analysis, vibrations represented by (27) have a period longer than 2υ, while vibrations represented by the expressions on the right side of equation (25), which we dropped, have a period shorter than υ.)

If now we fix the origin of the time axis so as to equate $J(t)$ from (27) to zero for $t=0$, that equation will assume the form:

$$J(t)=F_1 e^{(m-x_1)t/\upsilon}\sin y_1\frac{t}{\upsilon}$$

or, taking into consideration (16):

$$I(t)-U=F_1 e^{(m-x_1)t/\upsilon}\sin y_1\frac{t}{\upsilon} \tag{28}$$

Case II. In that case (24) has two real roots, z_1' and z_1'', among complex roots like $x_1 \pm iy$. As in the first case, we get here, for a time sufficiently distant from the initial interval:

$$J(t)=D_1' e^{(m-z_1')t/\upsilon}+D_1'' e^{(m-z_1'')t/\upsilon}$$

It follows from that equation that there are no cyclical vibrations.

The results of the above analysis can be summarized as follows. Cyclical variations occur in our economic system only when the following inequality is satisfied:

$$l>\frac{1}{e}$$

transformed by putting the value of l from (20) into:

$$m+\upsilon n>e^{m-1} \tag{29}$$

As we know, m is positive (see p. [124]). We can easily prove that a necessary, though insufficient, condition at which (29) is satisfied, i.e. there are cyclical variations, is that n be positive too.

Fluctuations of I at a time sufficiently distant from the initial interval $(0, \upsilon)$ will be represented by the equation:

$$I(t)-U=F_1 e^{(m-x_1)t/\upsilon}\sin y_1\frac{t}{\upsilon} \tag{28}$$

The amplitude of fluctuations is decreasing, remains constant, or rises, according as $x_1 \gtreqless m$.

The period is equal to

$$T=\frac{2\pi}{y_1}\upsilon. \tag{30}$$

On the basis of equations

$$A(t)=\frac{1}{\upsilon}\int_{t-\upsilon}^{t} I(\tau)d\tau \tag{7}$$

and

$$L(t)=I(t-\upsilon) \tag{4}$$

we can show L and A as functions of t, and see that these values are fluctuating, like I, around the value U. K is obtained by integration of:

$$K'(t)=L(t)-U \tag{8}$$

It also fluctuates around a certain constant value, which we denote by K_0. The whole calculation will be given in section III below with respect to a particular case when the amplitude of fluctuations is constant.

III

If, while $x_1=m$, the amplitude of fluctuations remains constant, (28) assumes the form:

$$I(t)-U=a\sin y_1\frac{t}{\upsilon} \tag{31}$$

where a is the constant amplitude.

That case is of particular importance as its appears to be nearest to actual conditions. Indeed, in reality we do not observe any *regular* progression or regression in the intensity of cyclical fluctuations.

Putting the value of I from (31) into (7) and (4), we get

$$A-U=\frac{1}{\upsilon}\int_{t-\upsilon}^{t}\left(a\sin y_1\frac{\tau}{\upsilon}+U\right)d\tau-U$$

$$=a\frac{\sin\frac{y_1}{2}}{\frac{y_1}{2}}\sin y_1\frac{t-\frac{\upsilon}{2}}{\upsilon} \tag{32}$$

and

$$L-U=a\sin y_1\frac{t-\upsilon}{\upsilon} \tag{33}$$

From (8) and (33)

$$K'(t)=a\sin y_1\frac{t-\upsilon}{\upsilon}$$

Integrating:

$$K-K_0=a\frac{\upsilon}{y_1}\cos y_1\frac{t-\upsilon}{\upsilon} \tag{34}$$

where K_0 is the constant around which K is fluctuating, equal here to the average volume of the industrial equipment K during a cycle.

In a similar way, the average values of I, A, and L during a cycle will be equal, in our case of constant amplitude, to the constant U around which I, A, and L are fluctuating.

Taking into consideration the condition of a constant amplitude $x_1=m$, we shall now get from (20) and (24):

$$\cos y_1=\frac{m}{m+\upsilon n} \tag{35}$$

and

$$\frac{y_1}{\operatorname{tg} y_1}=m \tag{36}$$

These equations allow us to determine y_1; moreover, they define the interrelationship of m and n.

Between m and n there is yet another dependency. They are both coefficients in the equation:

$$I=m(C_1+A)-nK \tag{11}$$

which must be true for one-cycle averages of I and A equal to U, and for the average value of K equal to K_0:

$$U=m(C_1+U)-nK_0$$

Hence:

$$n=(m-1)\frac{U}{K_0}+m\frac{C_1}{K_0} \tag{37}$$

Thus, if values of U/K_0 and C_1/K_0 were given, we could determine m and n from (35), (36), and (37). U/K_0 is nothing else but the rate of depreciation, as U is equal to the demand for restoration of equipment, and K_0 is the average volume of that equipment. C_1 is the constant part of capitalist consumption. U/K_0 and C_1/K_0 may be roughly evaluated on the basis of statistical data. If we also knew the average gestation period of investments υ, we could determine y_1 and the duration of the cycle $T=2\pi\upsilon/y$.

We evaluate the gestation period of investments υ on the basis of data of the German Institut für Konjunkturforschung. The lag between the curves of beginning and termination of building schemes (dwellings, industrial and public buildings) can be fixed at 8 months; the lag between orders and deliveries in the machinery-making industry can be fixed at 6 months. We assume that the average duration of υ is 0.6 years.

The rate of depreciation U/K_0 is evaluated on the basis of combined German and American data. On that of the German data, the ratio of depreciation to the national income can be fixed at 0.08. With a certain approximation, the same is true for the USA. Further, according to official estimates of the wealth of the USA in 1922, we set the amount of fixed capital in the USA at \$120 milliards (land excepted). The national income is evaluated at \$70 milliards for 5 years about 1922. The rate of depreciation would thus be 0.08 . 70/120, i.e. *c.* 0.05.

Most difficult is the *evaluation of* C_1/K_0. K_0 was fixed at \$120 milliards; C_1 is, as we know, the constant part of capitalist consumption. Let us evaluate first the average capitalist consumption in the USA in the period 1909–18. The total net profit in that period averaged, according to King, \$16 milliards deflated to the purchasing power of 1913. The average increment of total capital in that period is

estimated by King at \$5 milliards. That figure includes workers' savings, but, on the other hand, \$16 milliards of profits also covers 'capitalistic' incomes of workers (use of own houses, etc.). Thus the difference, $16-5=11$ milliards of 1913 dollars, represents sufficiently accurately the consumption of capitalists (farmers included). The average national income in the period 1909–18 amounted to \$36 milliards at the purchasing power of 1913 (King). The ratio of capitalist consumption to the national income would thus be 0.3. As, further, the average income during 5 years around 1922 amounted, as mentioned, to \$70 milliards at current prices, capitalist consumption in these years may be estimated at \$21 milliards. Now, we have to determine the constant part of that consumption. In order to do that, we assume that when the volume of capitalists' gross profits deviates from the average by, say, $\pm 20\%$, the corresponding relative change in their consumption is but 5%, i.e. 4 times smaller. That assumption is confirmed by statistical evidence. Accordingly, the constant part of the consumption of capitalists, equal to $C_1+\lambda B$ (see above; λ is a constant fraction, $B-$ the total gross profit), amounts to $\frac{3}{4}$ of \$21 milliards, i.e. \$16 milliards. The ratio C_1/K_0 would then be 16/120 or *c.* 0.13.

Equations (35), (36), and (37), if we put:

$$\upsilon = 0.6 \quad \frac{U}{K_0} = 0.05 \quad \frac{C_1}{K_0} = 0.13$$

give:

$$\cos y_1 = \frac{m}{m+0.6n}$$

$$\frac{y_1}{\operatorname{tg} y_1} = m$$

$$n = 0.05(m-1) + 0.13m$$

The solution of these equations gives

$$m = 0.95 \quad n = 0.121 \quad y_1 = 0.378$$

Thus, the duration of the cycle is

$$T = \frac{2\pi}{y_1}\upsilon = \frac{2\pi}{0.378}0.6 = 10.0$$

The figure of 10 years thus obtained as the duration of a cycle is supported by statistical evidence: 8 to 12 years.[7] It may be objected

[7] Shorter cycles can be considered as 'short-wave' fluctuations.

Table 5. *Dependence of the Duration of the Cycle on Changes of* υ, I_0/K_0, *and* C_0/K_0

υ	U_0/K_0	C_1/K_0	T
0.6	0.05	0.13	10.0
0.6	0.03	0.13	10.0
0.6	0.07	0.13	10.0
0.6	0.05	0.07	13.2
0.6	0.05	0.19	8.5
0.3	0.05	0.13	7.1
0.9	0.05	0.13	12.5

that values υ_1, U/K_0, C_1/K_0, on which our calculation was based, were but roughly estimated, and that the conformity between facts and theory can be merely a coincidence. Let us calculate T for such values of υ_1, U/K_0, C_1/K_0 as would be quite different from those previously taken (see Table 5).

We see that the value of U/K_0 plays no great role with respect to the result of our calculation. We see further that when values of C_1/K_0 and υ differ by almost 50% from those adopted before ($C_1/K_0=0.13$ and $U/K_0=0.05$), solutions for T move between 7 and 13 years. The actual duration of the cycle being, as already mentioned, 8 to 12 years, we can safely say that, irrespective of the degree of accuracy in estimating υ, U/K_0, C_1/K_0, there is no flagrant incongruity between the consequences of our theory and reality.

There is one more question to be dealt with. During the whole time we have considered, as stated at the very beginning of the study, an economic system free of secular trend. But a case when the trend is uniform, and when gross accumulation, capitalist consumption, and the volume of industrial equipment show the same rate of development, can be easily reduced to a state 'free of trend' simply by dividing all these values by the denominator of the trend. Interrelationships stated in our section I will remain true for these quotients, with the following changes.

1. The value U will be no longer equal to the demand for restoration of the used-up equipment, but it will cover as well the steady demand for the expansion of the existing equipment as a result of the uniform secular trend. Thus U/K_0 will be equal, not to the rate of depreciation, 0.05, but, assuming the rate of net accumulation equal, say, to 3%, to 0.08.

2. Also stocks of goods, previously considered constant, will increase in the same proportion under the influence of the trend. That steady increment of stocks per unit of time—let us call it C_2—will be a component of the gross profit B, now equal to $C + C_2 + A$, where C is personal capitalist consumption, C_1 the steady increment of stocks, and A the production of capital goods. If we now consider that, according to equation (2), capitalist consumption C is equal to $C_1 + \lambda B$, we see that B is proportional to $C_1 + C_2 + A$. The constant $C_1 + C_2$ will play in our considerations the same role as C_1 previously did. According to the official estimate of the national wealth of the USA, the volume of stocks of goods amounts to 0.3 of the volume of the industrial equipment, i.e. to $0.3 \,.\, K_0$. If the rate of net accumulation is 3%, C_2 will be $0.03 \,.\, 0.3 \,.\, K_0$. Hence, instead of $C_1/K_0 = 0.13$ we must take $(C_1 + C_2)/K_0 = 0.14$. From Table 5 we may easily see that both modifications—0.08 instead of 0.05 for U/K_0 and 0.14 instead of 0.13 for C_1/K_0—will have little effect on the result of the calculation of T.

We shall now determine, on the basis of (31), (32), (33), and (34), equations of curves I, A, L, and K, with $\upsilon = 0.6$ and $T = 10.0$:

$$\begin{aligned} I - U &= a \sin 0.63t \\ A - U &= 0.98a \sin 0.63\,(t - 0.3) \\ L - U &= a \sin 0.63\,(t - 0.6) \\ K - K_0 &= -1.59a \cos 0.63\,(t - 0.6) \end{aligned}$$

Assuming, in conformity with the above estimate, $U/K_0 = 0.05$, we find the following formulae for the relative deviations from the state of equilibrium:

$$\frac{I - U}{U} = \frac{a}{U} \sin 0.63t \tag{38}$$

$$\frac{A - U}{U} = \frac{a}{U} 0.98 \,.\, \sin 0.63\,(t - 0.3) \tag{39}$$

$$\frac{L - U}{U} = \frac{a}{U} \sin 0.63(t - 0.6) \tag{40}$$

$$\frac{K - K_0}{K_0} = -\frac{a}{U} 0.08 \cos 0.63(t - 0.6) \tag{41}$$

IV

Figure 10 represents the curves of investment orders I, of production of capital goods A, of deliveries of industrial equipment L, and of the

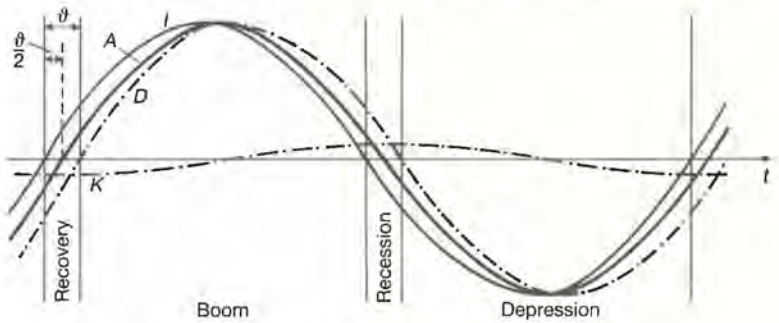


FIG. 10

volume of industrial equipment K, which correspond to formulae (38), (39), (40), and (41). Let us recall dependence (11), $I = m(C_1 + A) - nK$, whence it follows, if m and n are positive (see p. [129]), that the volume of investment orders is an increasing function of the gross accumulation equal to the production of capital goods, and a decreasing function of the volume of existing industrial equipment. Having these in mind, we can, on the basis of Fig. 10, explain the mechanism of the business cycle.

Recovery is the phase of the cycle of a length υ during which investment orders begin to exceed the demand for renewal of industrial equipment. But the actual volume of existing industrial equipment is not yet increasing, as deliveries of new equipment still remain below the demand for renewal of equipment.

The output of capital goods A, equal to the gross accumulation, is on the increase. Meanwhile, the volume of existing industrial equipment K is still on the decrease, and, as a result, investment orders rise rapidly.

During *prosperity* also, deliveries of equipment exceed the demand for renewal of the equipment, and thus the volume of the existing equipment is increasing. The rise of K at first hampers the rise of investment orders, and at last causes their drop. The output of capital goods follows suit, and begins to fall off in the second part of prosperity.

During *recession*, investment orders are below the level of the demand for renewal of the industrial equipment, but the volume of the existing industrial equipment K is still on the increase, since deliveries are still below the demand for renewal. As the volume of production of

capital goods, equal to the gross accumulation A, continues to fall off, the volume of investment orders I, decreases rapidly.

During *depression*, deliveries of equipment are below the level of the demand for renewal of the equipment, and the volume of the existing equipment is dropping. The drop in K at first smoothes the downward tendency in investment orders, and then stimulates their rise. In the second part of depression the production of capital goods also begins to increase.

We have plotted investment orders, gross accumulation, and existing industrial equipment. But the fluctuations in the volume of the gross accumulation, which appear as a result of the functioning of the business cycle mechanism, must necessarily affect the movement of prices and the total volume of production. Indeed, the real gross profit B is, on the one hand, an increasing function of the gross accumulation A (B being proportional to $C_1 + A$, where C_1 is the constant part of capitalist consumption—see above) and, on the other hand, can be represented as a product of the general volume of production and of the profit per unit of production. In that way, the general volume of production and prices (or rather the ratio of prices to wages, determining the profit per unit of output) rises in the upward part of the cycle as the gross accumulation increases.

The interdependence of gross accumulation, equal to the production of capital goods, and the general movement of production and prices is realized in the following way. While the output of capital goods increases by a certain amount, in the general volume of production, beside that increment, there is another increment because of the increased demand for consumer goods on the part of workers recently hired by industries making capital goods.[8] The consequent increase in employment in industries making consumer goods results, in its turn, in an increase in the demand for consumer goods on the part of workers. As there is simultaneously a rise in prices, the new demand is but partly met by the new production. The remaining part of that demand is satisfied at the expense of the 'old' workers, whose real earnings suffer a reduction. The general level of production and prices must eventually rise, so as to provide for an increment of the real profit equal to the increment of the production of capital goods.

That description is incomplete in so far as it does not reckon with changes in the personal consumption of capitalists. That consumption, C, is dependent, to a certain extent, on the proportions of the total profit B, and increases in accordance with the gross accumulation A (from equations (2) and (3) it follows that $C = (C_1 + \lambda A)/(1+\lambda)$, where λ is a constant fraction). The increase in capitalist consumption has the same effect as the increase in production of capital goods: there is an increase in the volume of production of consumer goods for the use of capitalists; as a result, employment increases, stimulating an additional demand for consumer goods for the use of workers and, eventually, a further rise in production and prices.

The general level of production and prices must rise, eventually, so as to provide for an increment of the real profit equal to the increment of the production of capital goods and of the consumption of capitalists.

The question may still arise of where capitalists find the means to increase at the same time the production of capital goods and their own consumption. Disregarding the technical side of the money market, e.g. the variable demand for means of payment, we may say that these outlays are 'financing themselves'. Imagine, for instance, that some capitalists withdraw during a year a certain amount from their savings deposits, or borrow that amount at the central bank, in order to invest it in the construction of some additional equipment. In the course of the same year that amount will be received by other capitalists in the form of profits (since, according to our assumptions, workers do not save), and again put into a bank as a savings deposit or used to pay off a debt to the central bank. Thus the circle will close itself.

Yet in reality, just because of the technical side of the money market, which, as a matter of fact, forms its very nature, a credit inflation becomes necessary for two reasons.

The first is the fact that the curve I of investment orders does not coincide exactly with that of production of capital goods A, equal to the gross accumulation. When giving an investment order, the entrepreneur has to provide first some corresponding fund, out of which he will finance the filling of that order. At any time the corresponding bank account will be increased (per unit of time) by the amount I equal to the volume of orders allocated, and simultaneously decrease by an amount A spent on the production of capital goods.[9]

[8] We take for granted that there is a reserve army of unemployed.

[9] The values concerned are not exactly the real values of I and A but corresponding amounts of money, calculated at current prices.

In that way, at any time investment activities require an amount I (per unit of time), namely: $I - A$ to form new investment reserves, and A to be spent on the production of capital goods. The amount actually spent, A, 'finances itself', i.e. returns to the bank in the form of realized profits, while the increment of investment reserves $I - A$ is to be created by means of a credit inflation.

Another reason for the inflation of credit is the circumstance that the increase in the production of capital goods or in capitalist consumption, i.e. increased profits, stimulates a rise in the general level of production and prices. This has the effect of increasing the demand for means of payment in the form of cash or current accounts, and to meet that increased demand a credit inflation becomes necessary.

Comments on the Macro-dynamic Theory of Business Cycles[1]

(1936)

Certain questions have arisen[1] concerning my macro-dynamic theory of business cycles[2] which I consider of sufficient importance to warrant a detailed answer. I also wish to complete some parts of my original study which I think were presented too briefly.

1. Tinbergen makes the statement concerning my original article that, 'prices, remarkably enough, do not appear at all in the theory'.[3] It can be easily shown that in reality my basic equation implies the dependence of investment activity on the ratio of prices to wages. My basic equation was[4]

$$I/K = f(B/K,p) \tag{1}$$

where I = the volume of investment orders per unit of time, K = the volume of existing industrial equipment, B = the total real income of capitalists, including depreciation, p = the interest rate, and f is an increasing function of B/K and a decreasing function of p. Let P equal the real national income; it will also be a measure of the total volume of production. We can then write an identity

$$\frac{B}{K} = \frac{B}{P} \cdot \frac{P}{K}$$

where the ratio B/P is the capitalist share of the national income, while P/K is proportional to the degree of use of industrial equipment. Both of these factors are an increasing function of the ratio of prices to wages, for as this ratio increases so does the capitalist share; also, the use of industrial equipment will increase as it becomes remunerative to employ that part of the equipment previously standing by and to

[1] See R. Frisch and H. Holme, 'The Characteristic Solutions of a Mixed Difference and Differential Equation Occurring in Economic Dynamics' [Annex 1]; J. Tinbergen, 'Annual Survey: Suggestions on Quantitative Business Cycle Theory' [Annex 2].

[2] 'A Macro-dynamic Theory of Business Cycles', this volume.

[3] 'Annual Survey' [see Annex 2, p. 462].

[4] See p. 74 above, eq. (7).

attract labourers from the reserve of unemployment. The ratio B/K, therefore, will be an increasing function of the ratio of prices to wages, and equation (1) shows that the intensity of investment activity, I/K, is an increasing function of the price–wage ratio and a decreasing function of the interest rate, p.

2. It may be asked why equation (1) does not contain the ratio of prices to wages directly. The reason is that only by using the ratio B/K was it possible to base the system on a very small number of variables.

By making certain assumptions concerning the components of the real income of capitalists, we obtain[5] from equation (1)

$$\frac{I}{K} = f\left(\frac{1}{1-\lambda} \cdot \frac{C_1 + A}{K}, p\right) \tag{2}$$

where C_1 and λ are constants such that $C_1 > 0$ and $1 > \lambda > 0$ and A is the output of investment goods. We have, in this equation, three functions of the time, namely, I, K, and A, between which there exist two interrelations which result from the technique of production. Equation (2) also includes the rate of interest, p. In the next section it will be shown how p may be eliminated.

A study of equation (2) shows that it directly involves the cumulative character of business ups and downs. Let us suppose, for instance, that at a certain moment we get from equation (2) a value of I greater than A, i.e. that there are more investment orders than investment goods produced. It is clear that after a certain time the output of investment goods will increase, but, according to equation (2), I will again increase, this in turn entailing a further increase of A. In other words, if at a certain moment $I > A$, we have a 'self-winding' process of expansion of investment activity.

Of course, the mere fact that the process is here described by means of only two variables does not mean that the process itself is going on somewhere outside the range of price movements and changes in total production. If at a certain moment I is greater than A, and as a result the output of investment goods begins to grow over the preceding level L, that growth must be financed by creating purchasing power. We have then the so-called 'forced saving', that is to say, prices rise so much in respect to wages, and with them the total volume of production, that capitalists additionally 'save' from their increased

[5] See pp. 73–75 above.

profits a money equivalent of increment in output of investment goods. In that way, during the above process of cumulation of investment activities, the ratio of prices to wages is steadily increasing, and so is the total volume of production. The rise in prices is the very link uniting the increase of A to that of I; while increased investment orders lead directly to an increased output of investment goods, the increased output of investment goods, accompanied by forced saving, stimulates investment activities indirectly through the advance in prices which it calls forth. During a business recession these processes are reversed.

3. In the above description of the cumulative process, changes in interest rate were left out of consideration. As prices and production increase, the demand for means of payment becomes greater as well, and, as a result, the interest rate must rise. Thus, during the upward cumulation in equation (2), both arguments are simultaneously rising, and the rise of each of these factors affects the intensity of investment activity, I/K, in an opposite direction. If both these influences were exactly equal, there could of course be no cumulative rise of investment activity and its intensity would remain stable; we would then have to deal with the case of so-called 'neutral money', when any creation of purchasing power is impossible and there are no cyclical fluctuations. But in real life the credit system is elastic enough to prevent such a rise in p as would offset the stimulating influence of the higher ratio of prices to wages on investment activity. We can then say

$$\frac{I}{K} = \phi\left(\frac{C_1 + A}{K}\right) \tag{3}$$

where ϕ is an *increasing* function. The last condition, as may be seen from the above argument, means only that we have to deal with an economic system with 'non-neutral' money, i.e. a system under which purchasing power may be created.[2] The more elastic the credit system, the greater the rate of growth of the function ϕ, *ceteris paribus*. That statement will be of importance when I come to considering the questions of Frisch and Holme.

4. From the fact that the output of investment goods, A, comes in the numerator of the right-hand side of the equation, it follows that business cycles must have a cumulative character. But the presence of K, representing the volume of industrial equipment, in the denominator indicates the source of hampering influences, putting a brake on cumulative processes. Indeed, when investment activity crosses the

level required by replacement of worn-out equipment, K begins to rise, and this hampers the growth of the expression $(C_1 + A)/K$ and, subsequently, also the rise of I/K. It follows from the above that $(C_1 + A)/K$ is an increasing function of the ratio of prices to wages. The fact of the above fraction slowing the rate of growth because of the rise of K actually means that creation of purchasing power calls forth a stronger rise of prices in respect to wages in the case where the volume of industrial equipment is constant than in the case where it is expanding. In the first instance the demand is met only by employing those parts of existing industrial equipment which are producing at higher cost; in the second, new plants are also constructed. The hampering influence of the rise of K may[6] lead to a state when investment orders I, after crossing their high point, begin to fall, and thus start a downward cumulation. In an analogous way, under my business cycle theory, the end of the cyclical drop (and the following rise) occurs as a result of contraction of industrial equipment.

Tinbergen is rather sceptical about the part attributed in my theory to changes in volume of industrial equipment. I think that the process, described above, of hampering the upward cumulative movement, and the eventual slump, may well be regarded as a more precise definition of what common sense denotes as over-investment during business prosperity.

5. Assuming that ϕ is a linear function, we may say

$$I = m(C_1 + A) - nK \tag{4}$$

We have shown in section 3 that the rate of growth of the function ϕ is more rapid the greater the elasticity of the credit system, i.e. the smaller the rise in the interest rate stimulated by the given rise of prices and production; thus the coefficient, m, is larger the greater the elasticity of the credit system in the above sense.

Equation (4), together with the interdependence of the variables I, A, and K, resulting from the technique of production,[7] make it possible to state a mixed difference and differential equation for I as a function of t. The solution of that equation shows that I exhibits harmonic oscillations with a constant, increasing, or decreasing amplitude. The period of oscillation, and the rate of progression and regression of

[6] 'May' but not 'must', unless there are some definite conditions fulfilled, by the function. See 'A Macro-dynamic Theory', p. 124, this volume.

[7] See eqs. (4), (7), and (8), pp. 121–2, this volume.

amplitude depend on the empirical coefficients m and n and on the duration of the gestation period of investments.

I have obtained for m and n the numerical values: $m = 0.95, n = 0.12$, and 10 years as the duration of the cycle, assuming constant amplitude of fluctuations. This assumption was based on the fact that in real life this amplitude does not exhibit any steady progression or regression.

Frisch and Holme object to the above assumption of constant amplitude. They are right, for it is by no means sufficient to say that an assumption is correct just because it is confirmed by the conditions of real life. It must be made clear why real life is like that, otherwise the particular predilection it shows for a constant amplitude might appear metaphysical. I shall try to give, in a summary way, a hypothetical explanation of that state of affairs without pretending to have found a definite solution of that very complex problem.

Let us suppose that m has a slightly smaller value than that given above; it is easily seen that this results in damped oscillations, and that in a short time the business cycle will practically disappear. But the requirements of liquidity of banks and enterprises will become less stringent and the disappearance of cyclical fluctuations will have the effect of an increase in reserves. The credit system will become more elastic and a given rise of price and production will call forth a less marked advance in the rate of interest.

As we have just shown, the more elastic the credit system, the greater m will become, and, therefore, the damping of oscillations will lead to an increase in m and thus create a tendency towards return to fluctuations with a constant amplitude.

PART 4

THE MECHANISM OF THE BUSINESS UPSWING

The Business Cycle and Inflation[1]
(1932)

1. No serious theory of the business cycle any longer doubts the fact that fluctuations in investment activity have a decisive influence on the course of the business cycle. During an upswing, an increase in investment has a direct and indirect influence on the rise of employment, while during a crisis, a fall in investment activity considerably below replacement needs leads to the spread of unemployment and under-utilization of capital equipment. If it were not for these sharp fluctuations in investments, there would be no business fluctuations, or in any case they would not be of such scope, nor extend so far to all areas of economic life, as is the case today.

We shall now attempt to prove the following proposition. If the value of investments made at a given moment always equalled the total sum of saved profits including depreciation charges, i.e. if it equalled gross capital accumulation, the investment activity would remain at a constant level and hence there would be no business fluctuation.

In a closed economy, the total profit of capitalists, including depreciation charges, at any given moment equals the value of the personal consumption of capitalists and the value of replacement and expansion of capital equipment.[1] An individual capitalist may earn 'money'; the income of capitalists as a whole, in which mutual debits and credits cancel each other, must equal the value of consumer goods for capitalists and capital goods. From this it follows that the saved income of capitalists as a whole corresponds to the output of capital goods. The sum of profits which flowed to capitalists and were not consumed equals the cost of replacement and expansion of capital equipment. Hence, if at any given moment capitalists undertake investments of the same value as their savings at that moment, then in the next period, when their investment decisions are executed, the output of capital goods will be the same as at the present moment—the investment activity will be constantly maintained at the same level.

[1] For simplicity, throughout this paper we ignore savings of workers and salary-earners.

Reality differs entirely from the course described above, however. Capitalists as a whole do not undertake investments of exactly the same value as their savings from their profits at a given period. For an increase in the investment activity is not determined by previous profits, but by expectations of the future profitability of enterprises. However, how can capitalists invest more than remains from their current profits after spending part of them for personal consumption? This is made possible by the banking system in various forms of credit inflation. Hence, in accordance with the above proposition, without credit inflation there would be no fluctuations in investment activity, and consequently there would be no major business fluctuations. *Business fluctuations are strictly connected with credit inflation.*

2. What is inflation? *Inflation in the broadest sense of the term is the creation of purchasing power not based on a contribution to current social income.* We shall explain this by a number of examples illustrating various forms of inflation.

Let us imagine that someone has a chest of gold and at a certain moment begins to spend it for the construction of some factory. The increased demand for various goods generated by this contributes to the increase of total output and a rise in prices to levels at which the profits of capitalists increases by a sum equal to the sum spent on the construction of that factory. (The construction of every new factory increases profits by an amount equal to the costs of its construction.) Gold passes from the hands of the original owner—who obviously earns nothing on the construction of the factory and will begin to earn money only after putting it into operation—to the hands of other capitalists. It would obviously be wrong to assume that all of this gold will remain in their strong-boxes as money in circulation. The demand for money will certainly increase on account of an increase in output and prices, but not necessarily by as much as the sum spent. Usually only part of this sum serves to increase money in circulation, i.e. cash in hand, while part of it will be deposited in banks, which will correspondingly reduce those other capitalists' rediscount in the central bank by paying the gold received into this institution.

The question arises here of what this new factory was really built from, as the gold passed from hand to hand, along the way, however, stimulating the production necessary to build it. Obviously the production of capital goods increased above all. This results in additional demand—by newly employed workers—for consumer goods. The prices of the latter rise, and output expands. Hence there is an increase in total output with a simultaneous fall in real wages, which leads to an increase in profits equal to the cost of the newly built factory.[2] The factory comes into existence in part on account of the general increase in output, in part at the cost of limiting the consumption of the previously employed workers. If capital equipment producing consumer goods was fully utilized before the construction of the factory was begun, then the prices of such goods will rise sharply, since the same volume of consumer goods will have to suffice for a considerably increased number of workers. The workers' 'forced savings' will then play a greater role than when capital equipment producing consumer goods is under-utilized, and when a rise in prices is accompanied by increased output of consumer goods.

One might suppose that when the stock of gold has been exhausted and the construction of the factory financed by this gold completed, the temporary upswing caused by this operation will subside and everything will return to its previous state. This is not the case, however, since during this temporary upswing the profitability of existing plants has increased, which stimulated further investments. Hence the upswing will last longer than the direct influence of the original cause, i.e. longer than the construction of the factory financed by the chest of gold.

We have discussed this simplest example of inflation in some detail in order to point out the basic elements of its course. The pattern of this course is as follows: A certain sum is additionally spent, i.e. on top of the sums obtained from current social income. The profit of capitalists increases by precisely this sum, in part on account of the rise in total output, in part at the cost of limiting the consumption of previously employed workers. Part of these profits remains on hand owing to the greater demand for money, part of it can be used freely, e.g. deposited in the bank. The upswing caused by expenditure of the 'additional' sum lasts longer than the process of its expenditure.

Exactly the same effects as of the gold inflation described above will come from spending hoarded banknotes or funds received from a foreign loan. A similar type of inflation is the financing of investments from bank deposits, a process usually not classified as inflation but one which perhaps has the greatest importance in the inflationary financing of investments during an upswing in the business cycle. Let us imagine that someone has a bank deposit. Let this be a time deposit, hence not a demand deposit serving to meet daily withdrawals. Let us

further assume that someone who wishes to build a factory borrows the money from the owner of the deposit, giving him securities (stocks or bonds) instead. It would appear (and many economists so believe) that a rise in investment activity cannot be financed in this way. For, losing its deposits, the bank begins to restrict credit accordingly, and other investments are thereby reduced in favour of ones financed from bank deposits. This is not the case, however, or in any event is only partially true. For, as we have already seen, as the construction of the new factory proceeds, profits will increase equal to the costs of this construction. The greater part of these profits will return to banks—either as time or as demand deposits. Only a relatively small part will remain in circulation,[2] and banks will have to reduce credits or increase their rediscount in the central bank by only this amount. Hence a certain credit expansion of the latter will be unavoidable if the new investment is not to affect other investments.

In this way we come to the role of the central bank in credit inflation. As we see, in financing investments from deposits this role is supplementary. However, one can also imagine an inflationary operation of which the central bank is also the starting-point—which indeed often happens in reality. Let us assume that the central bank grants someone credit, giving him banknotes which it prints. The borrower builds, let us say, an industrial plant. Other capitalists thereby earn profits equal to the cost of construction. The greater part of these profits returns as deposits to banks, which correspondingly reduce their rediscount in the central bank. One may doubt whether investments can be financed from short-term credit which the central bank gives in the form of discounting bills of exchange. We should not forget, however, that entrepreneurs to a greater extent than before can then finance their liquid assets, e.g. inventories, by credits from the central bank and thereby disengage their own funds, which they again allocate for financing investments.

'Credit creation' may be affected not only by the central bank but also by private banks. This form of credit inflation appears often, especially in Anglo-Saxon countries. A private bank opens credit and debit accounts for its client at the same time. Now the client can draw cheques on the bank and use them to make payments. An individual

[2] This increase in circulation contains, *inter alia*, an increase in the cash reserves of banks in connection with the shift of certain sums from time to demand deposits (see above), which also takes place on account of an increase in turnover.

bank cannot carry out such operations without restraint, but must moderate the rate of its credit inflation in line with the rate of this inflation in other banks, for otherwise its settlements with other banks, to which its cheques go, will be unfavourable for it, and balancing processes will set in. Its rate of credit inflation will be checked, and that of other banks will be raised. The effects of credit inflation of private banks are exactly the same as the inflationary effects of the central bank.

3. We have thus far discussed a mechanism by which investments can be made above the volume of saved profits. Besides the existence of this mechanism, a condition for undertaking investments was obviously the willingness of the entrepreneur to make use of this mechanism. The entrepreneur spent his gold, made use of a foreign loan, borrowed bank deposits from their owner, raised credits in the central bank or in a private bank. The question arises here whether the inflationary mechanism—concerning the creation of credits by the central bank or a private bank—can be more than a passive instrument in the hands of the entrepreneur, and can become an active factor encouraging him to make use of its services. The answer to this question is affirmative, though with some serious reservations.

To be sure, banks can increase the demand for credit by lowering the rate of interest. Its reduction encourages investments, since it increases the profitability of future enterprises by a reduction in charges for interest payments. The rise in investment activity is financed from bank credits, and by lowering the rate of interest banks can thereby grant more credits than before. Indeed, this is the typical method of intervention of the banking system aimed at improving business conditions.

However, to a large extent this influence is illusory. The rate of interest is not a decisive factor in undertaking investments. More important is the expected gross profitability of the enterprise, estimated on the basis of profitability of existing enterprises. During crisis, when this profitability falls considerably below its average level, with very slack employment of existing plants, a reduction in the rate of interest has only a weak influence on the desire to invest and, in any case, takes a long time to produce perceptible effects. This method of intervention is deceptive because it acts through the entrepreneur, only attempting to exert a certain influence on his will. Reliable measures of intervention are those which afford certainty that the scope of invest-

ments will in fact be increased. We have in mind investments undertaken by the government and aimed at mitigating the crisis or accelerating a business upswing.

The government can obviously make use of all methods of credit inflation available for private entrepreneurs: it can contract foreign debts, it can issue its obligations at home, which will be bought by owners of bank deposits, and finally it can raise credits at the central bank. In all of these cases the business upswing will have much wider effects than those directly resulting from government investments in public works.

Just as other capitalists make money on the construction of a factory by some entrepreneur, so capitalists as a whole, after the completion of a number of public works, make a profit equal to the cost of those works. For example, if the government issues its bonds and they are purchased by owners of bank deposits, as these borrowed sums are spent they will return to the hands of capitalists, who will thus get back all of the borrowed money and will still own the bonds issued by the government, and thus their profit will increase by the costs of the public works. This, however, will in turn make their enterprises more profitable and thereby encourage them to increase their investments. If public works are conceived on a sufficiently large scale, therefore, they will stimulate a business upswing that will also continue after completion of the public works which activated this improvement. Moreover, it seems possible that through suitable administering of public works during crisis, i.e. through proper control of their volume and timing, one can achieve relative stabilization of the business cycle: passing from the bottom of the business cycle not to its top but to a straight line, from which there would be only minor deviations.[3]

In our argument so far we have assumed a closed economic system. Thus we did not speak of the influence of inflation on foreign trade, on the currency position, etc., while it is precisely these factors which will prevent the successful intervention described above in non-isolated systems such as individual states. Whichever way an increase in output were to be achieved by inflationary measures, a worsening of the currency position would always follow, since the amount of money in circulation would increase along with the shrinkage of stocks of gold or foreign exchange. Indeed, an increase in output and prices must cause an increase in demand for money, which would have to be met by the central bank, unless it wished to choke the operation to stimulate a boom by applying credit restrictions.

Moreover, the increase in prices reduces the competitive position of domestic industry by comparison with overseas, and thus there is a fall in exports and an increase in imports. Even if we leave aside this rise in prices, however, which on account of the very slack employment of plants during crisis must take place very slowly at first—especially if we imagine tariff barriers as a protection against increased imports and the dumping of cartels as a preventive measure against a fall in exports—the trade balance all the same must worsen. Why? Because increased output will require an increase in the import of a whole range of inputs not produced at home, especially foreign raw-materials.

Thus, for one reason or another, there will be an outflow of gold or foreign exchange in connection with a worsening of the trade balance, and, as we have said, their reserves will shrink with a simultaneous rise of money in circulation. With a development of these tendencies the currency will collapse—unless even before this a currency panic, against the background of a declining ratio of currency in circulation to gold reserves, does not cause a run on the central bank. Continued inflation after the collapse of the currency must lead to a further decline in its exchange rate, and after a certain time inflation will turn into hyper-inflation, which happened in Poland and Germany in the early 1930s. Thus, as we see, intervention to improve business conditions in a given country can be carried out without concern for the position of the currency only to a very limited extent. This extent is determined by the reserves of gold or foreign exchange in the possession of a given country.[4]

4. If in an open system inflationary intervention is made difficult for currency reasons, on the other hand its advantage over the closed system is usually that a crisis there is automatically mitigated by an improvement in the trade balance. For if a crisis takes place only in this one country, or in any case does not extend to a large part of the world, then a reduction of prices in the country suffering an economic depression increases its export capacity, while the reduced demand for foreign raw materials simultaneously restrains imports. In this way there is an inflow of gold to this country, or it pays its foreign debts, or increases its foreign investments. As a result the fall in the profitability of enterprises will be slowed, since profits will rise by the amount of improvement in the trade balance.

The close analogy with public works is obvious. While capitalists earned there the same amount as the cost of public works, here they

earn the amount by which the surplus of exports over imports increases.[5] Instead of the government running public works, here we have foreign countries purchasing goods; instead of government bonds remaining in the hands of capitalists after the completion of public works, we have gold, foreign exchange, or foreign stocks and bonds which have flowed in from overseas in exchange for the achieved surplus of exports over imports.

5. During the present crisis this mechanism for easing the depression in a given country does not function. The crisis has extended to all countries at the same time. This synchronism results in a shrinkage of imports with a simultaneous decline in imports in all countries. Improvement in the trade balance does not take place, and hence economic activity is not stimulated from this side.

The world economy, however, though afflicted by the crisis in its entirety, has hardly transformed into a closed system. Individual central banks continue their struggle to maintain their gold standards, and for the most part this makes impossible any inflationary measures which could lead to an improvement in business conditions. Public works, as we have seen above, would cause an increase of money in circulation and a shrinkage in the stocks of gold or foreign exchange, to which the central bank would have to respond by tightening the deflationary screw, thus aborting the business upswing stimulated by undertaking public works.

In these conditions the only possible way to accelerate the overcoming of the crisis on a wider scale would be an international inflationary operation based on a central bank of issue. The creation of such a bank must be regarded as utopian, however, for the same reason that international disarmament cannot be achieved. The analogy is not a loose one, for these problems are very closely connected.[6]

Consequently, it appears that the present world crisis will only be overcome slowly, mainly through automatic mechanisms of a purely internal nature, and especially by the gradual decay of non-renovated plants in whose place, with the present almost complete suspension of investments, new ones are not being built. The only country in which inflationary measures undertaken on a rather wide scale may accelerate the overcoming of the crisis is the USA, which has a considerable supply of precious metals along with a rather small foreign trade turnover in relation to total output. Because of this, the fear of currency perturbations in connection with inflation is less intense

there. But precisely because of the fact that the US economy is relatively 'closed', the influence of an eventual improvement in business conditions there on business conditions in other countries via foreign trade will be relatively slight. The effect we may expect here will be a rise in optimism on European stock exchanges, which will result in the return of hoarded capital, perhaps becoming the basis for undertaking an inflationary operation without concern for the position of the currency.

Stimulating the World Business Upswing[1]
(1933)

1. Analysing the world economic situation at the turn of 1932, we expressed the opinion that 'we are entering . . . the second half of the depression, during which world output, though slowly and with the numerous disturbances, will nevertheless rise', and that 'the improvement. . . may arrive more quickly if individual governments pursue a policy of economic intervention.'[1] The events which occurred in the first half of this year fully substantiated this forecast. During the first quarter, when government intervention still had not taken place, world output, despite the banking crash in the USA, stayed on a higher level than the 'bottom' of 1932, corresponding to the average of that year. The course of the business cycle in the second quarter took place under the banner of stimulating business upswings in the USA and Germany, with a continuing 'automatic' business recovery in France and Great Britain. Even in these countries, though, American events were reflected in a rise in the world prices of raw materials, followed by an increase in the stocks of required manufactured products, which unquestionably accelerated the growth rate of output, especially in France.

2. Theoretically, the most rational form of government intervention is the inflationary financing of public works. The government raises credits in the central bank and uses them, e.g., to construct public services units. If we abstract from workers' savings, the entire sum spent passes to the hands of capitalists in the form of profits, through a rise in prices and turnover of enterprises which supply materials for the construction of a given unit, consumer goods for workers employed in this construction, etc. This increase in the profitability of enterprises stimulates investments and leads to an upswing similar to the one which comes automatically.

The inflationary financing of public works should not be identified with 'inflation'. Not all funds spent for these works remain in circulation. Money circulation generally rises insignificantly here—and

[1] 'The Present Phase of the World Crisis', *Polska Gospodarcza*, 1 (1933), p. 9 (in Polish).

may not increase at all—since the sums spent return to the central bank in the form of direct and indirect payment of credits by capitalists who have earned these sums. Hence, with a largely unchanged volume of money in circulation, a shift occurs in the structure in the securities portfolio of the central bank: there is an increase in treasury bills and a corresponding fall in the share of private bills.

Such government intervention unquestionably undermines the currency situation of the country in question. Not—as is usually believed—because the volume of money in circulation is increased, since (as mentioned above) this will generally be insignificant, but because of a deterioration in the foreign-trade balance. The rise in production, which is indeed the goal of intervention, makes it necessary to increase imports of foreign components of this production, while simultaneously the rise of domestic prices restrains exports. Hence there follows an outflow of gold or foreign exchange and, after a shorter or longer time—depending on the reserves of precious metals and foreign exchange of the country in question—a collapse of its currency will occur.

We must note, however, that these currency complications would not limit the USA in carrying out intervention of this kind. First and foremost, the USA—by comparison with other economies—constitutes a relatively autarkical system, with foreign trade playing only a minor role in relation to turnover. Furthermore, the USA has considerable gold reserves; more importantly, however, large war debts are owed to it by other countries which it cannot collect, since it does not admit exports from these countries. Hence, if the USA needed greater imports on account of an increase in output, they could easily combine this with collecting their debts, so that their currency position would in no way be jeopardized.

The question arises why in the USA the business upswing was not stimulated by public works but by devaluation of the dollar (which, in line with the above argument, would not have been necessary), beset, as we show below, with numerous difficulties. We must surmise that two reasons were most important here: the need for rapid intervention and the desire to raise prices considerably, especially of agricultural products. Both of these reasons resulted from the financial crisis, whose most drastic manifestation was the banking crash, experienced just before intervention. A rapid intervention could not have been achieved through public works; for the latter require long preparation, if only in drawing up suitable plans.

Obviously, this intervention could have been simplified, namely, through the inflationary financing, not of public works, but of unemployment benefits. The economic effect would have been exactly the same, since what is important is not what the government spends the money on, but the very fact that it spends it, collecting it, not from taxes, but from the central bank. However, in America unemployment benefits are too revolutionary an idea even for the 'brains trust'.[2]

Moreover, an upswing caused by expansion of public works or unemployment benefits would have led to an increase in output and prices; and yet, as regards the latter—especially prices of agricultural products—their increase might turn out to be relatively small. This would not radically reduce the burden of debts, hence overcoming the financial crisis would require special conversion measures. As for the prices of agricultural products, Roosevelt was also intent on their rapid and considerable increase for purely political reasons, namely to keep election promises to farmers and stave off the revolts that broke out from time to time against the background of the agricultural crisis.

3. We shall now attempt to examine carefully how devaluation of the dollar caused an upswing and whether this upswing will be lasting. The devaluation of the dollar released demand of a speculative nature which manifested itself, as we mentioned at the beginning, both in accumulation of supplies of raw materials and finished products and in anticipatory purchases by consumers of clothes, automobiles, houses, etc. The profits of capitalists increased by an amount equal to these additional speculative purchases in which previously saved capital was invested. The effect was exactly the same as if the government had drawn funds from the central bank and spent them for, e.g., public works. Here these funds for speculative purchases either came from wherever banknotes were hoarded or were withdrawn from bank deposits, returning to banks as the realized profits of entrepreneurs. The increase in profits from speculative demand had to be realized through an increase in turnover and prices. An overall and quick upswing takes place in that case, as we have indeed observed in the second quarter of 1932. In July the production index reached the average level of 1930.

So far this mechanism works in exactly the same way as the inflationary financing of public works. At that point, however, these two ways of intervention begin to part. In the case of the inflationary financing of public works or unemployment benefits, any lapse is out of the question. At a certain moment, when the expansion of public works

or unemployment benefits have already fanned investment processes through increased profitability, they can be suspended, leaving business life to its fate. It is out of the question that after these investment processes are suspended they can in any way depress the economy.

This is not the case with devaluation. After it is completed, not only will the accumulation of speculative reserves or additional purchases of consumer goods stop, but quite the opposite—the mechanism will reverse itself and begin to work in the opposite direction. Reserves will be run down, and a 'bottom' will open up in consumption corresponding to the previously accrued 'top'.

In order to counteract this eventuality, the 'brains trust' has advanced the idea of raising the purchasing power of the masses by increasing workers' wages. This is believed to absorb speculative inventories in the event of their running down, or to fill the gap in consumption that has arisen on account of increased purchases during devaluation. This reasoning, like many other ideas of the 'brains trust', is rather naïve. Running down of stocks—regardless of the purchasing power of the working masses—causes a fall in profits, just as an increase in these stocks resulted in a rise in profits. If running down of stocks took place at the existing wage rates, this fall in profits would be reflected in a decline of prices. However, if wages are raised simultaneously with the liquidation of inventories, the fall in profits would appear in an increase in wage rates with unchanged prices. In both cases the reduction in profits would have to lead to a fall in output and a slowing down of investment activity, hence to a collapse of the boom. It is quite another matter than this collapse would be less severe in the case of an increase in wages than with a decline in prices: a fall in prices would encourage the running down of stocks, and hence would reduce profits all the more, which would be followed by an even greater fall of output.

The increase in wages had already begun during the devaluation process of the dollar, before stocks were run down, and so it contributes to the rise of prices, which in turn checks the liquidation of speculative inventories. Thus it may turn out that this liquidation will take place when the boom advances even more, when turnover is higher than at present, and when investment activity is in full swing. Then the running down of stocks will not take place on a wide scale, for with greater turnover larger stocks will also be necessary and, on the other hand, investments will reach a level at which the running down of stocks will only be able to slow down the growth rate of the upswing; it will not bring output down to its low pre-intervention level.

An important role in consolidating the upswing in the USA could be played by public works proposed by the government. It seems, however, that also in this case—as in others—the 'brains trust' shows poor understanding of the business cycle mechanism. It turns out that public works are to be financed largely from taxes and not through inflation, which deprives them of any importance in stimulating a business upswing. For, as we have often emphasized, what is important is not what the government spends the money on in intervention, but where it gets the money from. Only the creation of additional purchasing power increases the profitability of industry, leads to an increase in output, and stimulates investments. When public works are financed from taxes, profits are reduced with one hand by the same amount as they are increased with the other.

We should also note that stimulation of the business upswing through devaluation of the dollar only postponed for a certain time the appearance—with an increase in output—of a passive foreign-trade balance. American wholesale prices will very shortly reach the gold parity of prices before devaluation. Hence the currency premium will disappear and the spur to exports vanish, while imports will continue to grow along with output, supplying indispensable inputs from abroad. As we explained previously, a passive balance of trade will not cause any difficulties for the US economy, since it can be co-ordinated with repayment of European debts. This absorption of the exports of other countries will be a channel through which the upswing in the USA can to some extent be passed on to the rest of the world.

4. The 'brains trust' has the ambition not only of stimulating a business upswing but also of initiating a new 'capitalist-planned' era in the history of the USA. These ideas are also striking in their over-simplicity and lack of understanding of the mainsprings of the capitalist economy. 'Planning' here boils down mainly to forming cartels to combat 'ruinous competition' and prevent 'over-investment'. It is easy to show that this primitive idea of planning will not stand up to analysis. Cartels warding off ruinous competition will earn profits, but for these profits to be realized, investments must be made, since the total profits of capitalists equal the sum of their consumption plus their investments. If cartels can achieve profits while not investing, the only reason is the existence of non-cartelized industry, part of whose assets cartels directly or indirectly appropriate. However, if the entire economy were made up of cartels, then obviously they could not

achieve large profits without making large investments. The suspension of investments should lead to a shrinkage of profits, which with inflexible prices would be reflected in reduced sales.[3]

We very often encounter the argument against building new factories while the old ones are still unemployed. This simple truth shares the fate of many of its companions—it is false. In order for existing capital equipment to be fully employed, it must be continually expanded, since then retained profits are invested. If these investments are not made, profits fall, and along with them the employment of existing plants.

Let us assume, as often happens in the USA, that two competing railway lines run between two cities. Traffic on both lines is weak. How does one deal with this? Paradoxically, one should build a third railway line, for then materials and people for construction of the third will be transported on the first two. What should be done when the third one is finished? Then one should build a fourth one and a fifth one . . . . This example, as we warned, is paradoxical, since unquestionably it would be better to undertake some other investment near the first two railway lines rather than to build a third one; nevertheless, it perfectly illustrates the laws of development of the capitalist system as a whole.

5. In contrast to the USA, in Germany a typical stimulation of the business upswing was achieved through the inflationary financing of public works. The nature of this financing is not altered by the fact that it is provided not only by the Reichsbank, but also by the private banking system, most of which is under the control of the government as a result of the banking crash in 1931. Also of little importance—from the point of view of stimulating the business upswing—is the fact that in 'public works' one should include armaments, uniforms for storm units, etc.

The weak point of government intervention in Germany is the balance of foreign trade. The USA, as a creditor country, can afford a passive trade balance. It is not so in Germany, which is burdened with foreign debts and the interest payments on them. So far the increase of output in Germany (not exceeding 20% over its lowest level) has not caused an increase in imports only because of increasing autarkization in agricultural products. This autarkization has already gone so far that its future progress will be unable to meet the demand, growing along with industrial output, for necessary foreign raw materials. Import restrictions on agricultural products have not been without

influence on the volume of exports, which has shrunk on account of reciprocal restrictions by countries exporting agricultural products to Germany.

In this situation the Germans had to take the first step to give themselves a longer breathing-space in increasing production—they suspended transfers. But even this measure will allow only a relatively moderate increase in imports, and hence will not remove the barrier to further expansion of industrial output, which will continue to suffer from the lack of indispensable foreign raw-materials.

It should be emphasized that the eventual increase in the volume of international trade in connection with an improvement in world business conditions does not promise Germans relief in the near future, since simultaneously, as with every upswing, prices of raw materials in relation to those of manufactured goods will unavoidably rise, which again will have an unfavourable effect on the trade balance of Germany, which imports raw materials and exports manufactured goods. Consequently, further success in stimulating the business upswing in Germany depends on an export campaign, which—as one can gather from the latest news—is now just beginning.

The measures which will be used here will unquestionably focus on general and special export bonuses. Recently it was even suggested that a foreign-trade bank should be established which would purchase foreign exchange from exporters, paying 20 marks for a British pound, i.e. at its gold standard rate, and sell foreign exchange to importers at the same price. To counteract the resulting price rises of imported goods, tariffs would be reduced accordingly.

This operation would therefore consist of paying a general export premium, since the government will have to add to this business the sum of the tariffs which it forgoes. The economic significance of this dumping, as with ordinary currency dumping, boils down to the fact that one's own goods are exchanged for others at an unfavourable exchange rate; thanks to this the sales of one's own goods increase by so much that, despite the unfavourable exchange ratio, a greater number of foreign goods is nevertheless acquired. This will enable the Germans to further stimulate the business upswing but, like the present autarkical tendencies, will reduce real wages. These are typical difficulties with intervention faced by a debtor country. Besides, one cannot say to what extent Germany, most of whose exports sell at European markets, will succeed in her dumping campaign, since the countries concerned will unquestionably react with new tariff barriers.

6. We have not yet discussed a third country which is stimulating the business upswing and which started doing so earlier, in 1931—Japan. To be sure, what was involved here was not intervention in the business cycle but the conduct of the Manchurian war and armaments, the final effect of which was none the less the same.[4] For the inflationary financing of armaments has the same consequences as the inflationary financing of public works. Incidentally, most of the public works in Germany are also connected with armaments. The building of highways as the basis for the so-called 'motorization' of the country, the construction of a zinc works, supporting the manufacture of automobiles and aeroplanes—all of this goes in a well-defined direction. In fact, the planned public works in the USA have, to a certain extent, similar objectives. The stimulation of the world business upswing is connected in a characteristic way here with increasing political tensions.

Just as in Germany, the 'artificial' improvement in business conditions in Japan is taking place without the inflow of foreign capital. The increase in imports is balanced by a corresponding increase in exports, which was accomplished by a 60% devaluation of the yen. In this expansion of exports, Japan was in a better position than Germany, since her main outlets are exotic countries, in many cases not protected by tariff barriers as high as those of the European markets. The latter were previously insignificant sales outlets for Japanese goods. Now, however, Japanese exports, stimulated by the deep devaluation of the yen and by the fact that the low quality of Japanese goods makes them attractive for impoverished Europe, have a wide field for expansion. As a result, the trade balance did not prevent Japan from attaining a level of production 30% higher than in 1931. On account of the unfavourable rate of exchange of her goods for foreign ones, this had to be combined—as we have mentioned in the case of Germany—with a considerable reduction in real wages.[5]

7. We have examined government intervention in the USA, Germany, and Japan, and we conclude that the title of this article is in fact misleading: there is no stimulation of the world business upswing, there is only stimulation of upswings in three large centres, which has hardly any effects in other countries. This is because the increase in production achieved through intervention takes place without a passive balance of foreign trade, i.e. without the import of foreign capital: in the USA because—so far at least—they do not want to import capital; in

Germany and Japan because they cannot import it. Stimulation of the business upswing so far is taking place in autarkical-dumping form, and that is why the part of the world lying outside the centres of intervention remains at the mercy of the purely automatic forces of the mechanism of business upswing. These automatic forces have already led, in especially favourable circumstances, such as in France, to a greater increase in output than in Germany, one of the countries stimulating the upswing. It seems that for a long time yet we shall be able to speak, not of a world business upswing, but only of the sum of more or less separate upswings in individual countries. The concept of autarky, formerly advanced in order to replace 'unnecessary' imports with one's own production, is transforming itself today into the attempt by individual countries separately to disengage themselves from the world crisis.

On Foreign Trade and 'Domestic Exports' [1]

(1933)

1. Capturing a new foreign market is frequently mentioned as a way out of depression. But it is usually not added that what is essential in this context is an increase in the export surplus rather than in absolute exports.

In fact, aggregate profits are equal to capitalist consumption *plus* investment *plus* the balance of foreign trade.[1] Profits of a given year were either consumed, invested in construction of capital equipment and in increase in inventories, or, finally, used for repayment of foreign debts or granting of foreign credits.[2] In the course of a 'normal' upswing the increase in profits is due to the rise of the component 'investment'. Let us suppose that eight factories are built each year instead of five. The real income of the capitalists—if other components of profits remain constant—increases by the value of these three 'additional' factories.[3] The expansion of investment activity must therefore lead to such a rise in aggregate production and in the profit per unit of output[2] that this increase in aggregate profits would materialize. The consequent higher profitability of existing establishments induces a further rise in investment activity which thus enhances the upswing.

In order to stimulate the upswing by means of foreign trade, the balance of trade component of profits must increase, i.e. new surplus of exports over imports must be achieved.

This surplus, like a boom in investment activity, leads to such a general increase in production and in the profit per unit of output that aggregate profits rise by an amount equal to the increment of the balance of trade. The higher profitability of existing establishments, which results from this, acts as a stimulus to investment activity; the

[1] We leave aside workers' savings here.

[2] In addition to the increase of foreign claims or the payments of foreign debts the inflow of gold may also be an equivalent of the surplus of exports over imports. Gold influx, however, may be treated in the same way as that of foreign currency, i.e. as an increase in foreign claims.

[3] We assume—as is actually the case—that increased investment is carried out by means of creation of purchasing power rather than at the expense of capitalist consumption.

upswing resulting from a new surplus in foreign trade thus leads to a 'normal' boom.

But if exports increase and at the same time there is an equal increase in imports, overall profits remain unchanged; international trade is boosted, but production in the country considered does not increase, nor will there be any inducement for expansion of investment activity. If, e.g., Great Britain increases its exports to China, this would lead to an improvement in the British economic situation if China pays for these imports in gold, or if she receives a loan from British capitalists which will be ultimately used for the purchase of British goods. The profits of British capitalists will then be increased by the amount equal to the new surplus in trade with China. But if more machines were exported to China, and *pro tanto* more cotton cloth were imported from China, then the situation in the British machine industry would improve, and the situation in the British cotton industry would deteriorate, while the general economic situation would remain unchanged since the aggregate profits would not have increased.[3]

2. Let us assume that increased exports from a given country do involve a rise in the surplus of foreign trade. The condition for stimulating the upswing is thus fulfilled—an increase in the balance of trade is followed by a rise in production. The latter, however, leads, *inter alia*, to a greater demand for foreign commodities, especially raw materials, which are an indispensable element of domestic production—and thus to an increase in imports.[4]

Let us denote the increase in the balance of trade by s, the corresponding increase in imports and exports by i and e respectively. Thus we obtain:

$$e = i + s \tag{1}$$

This means that exports must increase not only by the increment of the balance of trade but also by an additional amount which would warrant a rise in imports, indispensable for the expansion of production. In other words: only a part of the total increase in exports contributes to the increase in the balance of trade and consequently in

[4] As a result of the price increase accompanying the upswing, imports will increase and exports will slacken, owing to a weakening in the competitive position of the country's products. This factor plays a considerably lesser role than the increased demand for foreign goods resulting from the rise in production. Thus, for the sake of simplicity, we shall not take it into account here.

aggregate profits. The remainder is used for additional imports necessary for the higher output.

We shall now establish the relation between the increments i and s. As was shown above, the increase in the balance of trade by s raises aggregate profits *pro tanto*. Let the relative share of profits in the aggregate value of production be α:[5] thus production will increase by s/α. Moreover, let the ratio of imports to the value of aggregate production be β;[6] then the increase in imports will be $i = \beta(s/\alpha)$; thus we obtain:

$$\frac{s}{i} = \frac{e-i}{i} = \frac{\alpha}{\beta} \tag{2}$$

We shall illustrate this process by an example. If some country manages to increase the balance of trade and its total exports increase by zl 70 million, only a part of this sum raises the balance of trade, while another part is used to cover the imports of goods indispensable for the expansion of production. The proportion between these two parts is the same as that between the relative share of profits in the value of aggregate production (equal, say, to 0.5), and the ratio of imports to this value (equal, say, to 0.2). It follows that the increase of the balance of trade amounts to

$$\frac{0.5}{0.5+0.2}\,70 = \text{zl } 50 \text{ million}$$

Exports rise additionally to zl 20 million but imports increase by the same amount, or exports increase by zl 70 million, imports by zl 20 million, and the balance rises by zl 50 million, and the aggregate profits by just as much.

3. If a government borrows from the capitalists at home, spending the proceeds of the loan, e.g. on armaments, payment of unemployment benefits, or public works, the result is very similar to that of securing a surplus in foreign trade. To the surplus of exports over imports there corresponds here the sale of commodities, used for the

[5] This relative share changes in the course of the business cycle, increasing during the upswing and declining during the downswing. However, the changes are rather small, and for the sake of simplicity it will be treated as constant here.

[6] This ratio is, of course, subject to changes which, however, are not of great importance, and for the sake of simplicity it will be treated as constant here.

purposes mentioned above: armaments, consumer goods for the unemployed; construction materials for public works, and consumer goods for the workers employed in these works. The equivalent of these sales of commodities is the increase in the claims of the capitalists on their government, just as the equivalent of the surplus achieved in foreign trade was the increase of foreign claims or the reduction of foreign debts. And obviously this increase in government debts may absorb profits in the same way as an increase in foreign claims (or a fall in foreign debts). Consequently the formula for profits must be modified: in addition to capitalist consumption, investment and the balance of trade, they also include 'domestic exports', equal to the increase of government indebtedness to capitalists. The starting of 'domestic' exports thus stimulates the upswing in the same way as a surplus secured in foreign trade. It is followed by such an increase in production and in the profit per unit of output that a rise in aggregate profits takes place which is equal to these 'exports'. This in turn acts as a stimulus for the expansion of investment activity. Financial processes connected with securing a surplus in foreign trade and with 'domestic exports' are also very similar in character.

The analogy is obvious in the case when the capitalists of a given country grant a foreign loan or a loan to their government which is used for purchase of commodities in that country. The capitalists lend money abroad or to their government in return for bonds. Funds obtained by a foreign country or by the government flow back through the purchases of commodities to the capitalists, if we leave aside workers' savings (though, of course, not necessarily to the same capitalists). As a result, the profits of the capitalist class in a given period increase by an amount equal to the value of the government or foreign bonds received, which is equal in turn to the surplus secured in foreign trade or to 'domestic exports' respectively.

A surplus in foreign trade may also be covered by the inflow to the country considered of foreign currency or gold rather than by its granting foreign loans. In the case of 'domestic exports' the analogous process is, as will be shown below, the financing of government expenditure by the central bank.

Gold and foreign currency which are the equivalent of the surplus in foreign trade will be ultimately exchanged by capitalists for national currency at the central bank, or used to repay credits extended to them by this bank. The profits of capitalists will rise in a given period by the amount of the increase in the circulation of notes and of the

repayment of credits to the central bank which is equal to the surplus secured in foreign trade.

If 'domestic exports' are financed by discounting treasury bills in the central bank, the notes acquired by the government pass into the hands of capitalists. These notes either remain in circulation or are ultimately used for repayment of credits to the central bank. The profits of capitalists increase in a given period by the sum of the increase in the quantity of money in circulation and of the repayment of credits to the central bank, which sum is equal to the 'domestic exports'.

In either case the profits of capitalists are raised by the sum of the increase in the quantity of money in circulation and of the reduction in the central bank credits.

The foreign claims of the central bank in the form of gold or foreign currency, or its claims on the government in the form of treasury bills, increase by the same amount. In this way foreign countries or the government become indebted to the capitalists of a given country through the medium of the central bank, to the extent of the surplus secured in foreign trade or of the 'domestic exports'.

4. As a result of the stimulation of the upswing through 'domestic exports'—just as in the case of the application of any other device for this purpose—a rise in imports will take place due to the increased demand for foreign goods which are indispensable for home production (see section 2 above). Since there was no reason for a simultaneous increase in exports, 'domestic exports' are accompanied by a decrease of the balance of trade. Let us examine the problem in detail with reference to the argument of section 2.

We shall denote the increase in imports by i, as above, and the increase in the balance of trade by s. Since exports are assumed to be unchanged

$$i = -s \tag{3}$$

which means that the rise in imports equals the decrease in the balance of trade. We shall denote 'domestic exports' per unit of time by e_1. It was shown in the preceding section that, as a result of stimulating the upswing by means of 'domestic exports', the profits of capitalists increase by e_1. However, we did not take into account how this affects the balance of foreign trade. If this balance changes by s, then, according to the argument in section 1, profits change by s as well.

Thus the total increase in profits is $e_1 + s$. And since $s = -i$ here, the increase in profits will amount to $e_1 - i$, i.e. they will be equal to the difference between 'domestic exports' and the rise in imports as a result of the stimulating effect of 'domestic exports' upon aggregate production.

As in section 2, we shall now denote the share of profits in the value of aggregate production by α; thus the value of production will increase by $(e_1 - i)/\alpha$. If, moreover, we denote the ratio of imports to the value of aggregate production by β, the corresponding rise in imports will amount to $i = [(e_1 - i)/\alpha]\beta$. It follows that

$$\frac{e_1 - i}{i} = \frac{\alpha}{\beta} \tag{4}$$

This equation is identical with equation (2) except that, instead of the increase in exports e, we have here the 'domestic exports' e_1. Like equation (2), equation (4) indicates that 'domestic exports' are divided into two parts, $e_1 - i$ and i, bearing the same relation as α to β (where α is the relative share of profits in the value of aggregate production, and β the ratio of imports to the value of aggregate production). The part $e_1 - i$ is equal to the increase in profits and the part i to the rise in imports. But it is here that a fundamental difference arises: both the increase in 'foreign exports' and the increase in 'domestic exports' lead to a rise in aggregate profits by $e - i$ or $e_1 - i$; but, while part i of the increase in 'foreign exports' actually *covers* the growth of imports by means of international trade, the part i of 'domestic exports' is equal to the increase in imports only in an *arithmetical* sense and, of course, is not *convertible* into imports. This brings out the fact that 'domestic exports' lead to a deterioration in the balance of trade.

We can illustrate these processes by an example. Let us assume that the government borrowed in the free market or from the central bank zl 70 million and spent it on public works. As a result of the increase in production, imports increase by i, which—the level of exports remaining unchanged—means a reduction in the balance of trade by the same amount. Profits rise by $70 - i$. This item bears the same proportion to i as the relative share of profits in the value of aggregate production (say 0.5) to the ratio of imports to the aggregate production (say 0.2). It follows that the rise in imports, and thus the fall in the balance of trade, amounts to zl 20 million. This rise in imports will have two results: (i) profits will increase, not by zl 70 million, but only by zl 50 million; (ii) there will be a deterioration of zl 20 million in the balance of trade.

5. It was shown in the preceding section that the starting of 'domestic exports' leads to a fall in the balance of trade. In the balance of payments this can be covered by: (i) the inflow of foreign capital; (ii) the suspension of the servicing of foreign debts; (iii) outflow of gold and foreign currency. Since 'domestic exports' raise the average profitability, there will be a tendency for the inflow of foreign capital into the country which, however, is usually offset by the anxieties as to the solvency of the country raised among foreign capitalists by the deterioration of the balance of trade. As foreign investment is not forthcoming, gold and foreign currency begin in fact to flow out of the country.

This can still be prevented (in the case of a debtor's country) by suspending the servicing of foreign debts. If however, 'domestic exports' exceed a certain level, the balance of foreign trade—as a result of a substantial rise in production and imports—becomes never the less negative, and gold or foreign currency start again to flow out of the country. Finally, reserves of foreign currency and gold decline to such an extent that the only way to maintain imports is to try to increase exports through currency devaluation.

As a result of devaluation, the prices of domestic products in terms of foreign exchange are reduced, which leads to such an increase in their exports that, despite the unfavourable terms of trade, it is possible to purchase with the proceeds from exports a higher volume of foreign goods. In this way the imports required for the production, increased as a result of starting the 'domestic exports', are secured. There is, however, a limit to securing imports in this way. First of all, the reduction of domestic prices in terms of foreign currency is limited, both as to the magnitude and as to the time it lasts, by a tendency of these prices to rise in terms of the domestic currency. But even if we leave aside this tendency—which can be prevented, e.g. in such a way that no formal devaluation of currency is undertaken but only a general export premium is established—the capacity to secure imports is, nevertheless, limited.

Let us suppose that the prices for the products of a given country are reduced n times by currency devaluation, and that, as a result, the volume of exports increases m times: the imports of foreign goods, acquired in exchange for these exports, will thus change in the proportion m/n. It is obvious that for sufficiently large values of n the ratio m/n will become less than one, i.e. for a larger quantity of domestic products a smaller quantity of foreign goods than before the

currency devaluation will be obtained. Thus there is a certain maximum level of imports which can be secured through devaluation. The devaluation of currency beyond this point will lead, not to a rise, but to a fall in the capacity of a given country to import.

This also shows that stimulating the upswing by means of 'domestic exports' has a limit: the aggregate production cannot reach such a level that indispensable imports would be greater than the maximum imports obtainable through devaluation. This may, and often will, result in a situation in which the upswing caused by 'domestic exports' will not lead to the full utilization of idle capital equipment because of the deficiency of foreign goods (especially raw materials) which are an indispensable complementary factor. The more a given economy depends on imports, and the more difficult it is for this economy to expand its exports through devaluation (e.g. in view of the raising of custom duties by other countries), the sooner will the upswing engendered by 'domestic exports' reach its peak.

It should be added that with progressing devaluation the real income reaches its maximum at an earlier point than production; for a decreasing amount of real income is yielded by a unit of aggregate production, a part of this production being exchanged for foreign goods at deteriorating terms of trade.

6. We concentrated above on the phase of stimulating the upswing by a surplus secured in foreign trade or by 'domestic exports'. The resulting increase in profits induces an expansion of investment activity and in this way the phase of the natural boom is reached.

Thus it is possible, then, to reduce gradually the 'domestic exports', slowing down the progress of the upswing without, however, causing a collapse of the boom. If the upswing is stimulated through a rise in the balance of trade, this influence is automatically halted in the period of increasing investment. Indeed, the latter leads to an expansion of production and thus to a rise in imports which is not counterbalanced by an increase in exports (investment activity has much the same effect here as 'domestic exports'). This leads to a deterioration in the balance of trade whose increase had previously stimulated the upswing, and at a certain level of production the difficulties which were discussed in the preceding section may appear. By means of calculations similar to those in sections 2 and 4 above, it is possible to estimate the level of investment at which a tension in the balance of trade may arise.

Let us denote by s the increase in the balance of trade which caused the upswing. Let us suppose that in the next phase of the upswing

investment increased by k, and the previous increase in the balance of trade got 'lost' owing to the increase in imports, i.e. it dropped by s, thus returning to its initial level. Therefore, in the period of expansion of investment, aggregate profits increased because of the rise in the item 'investment' by k, but fell by s as a result of the decline in the item 'balance of trade'. On balance the increase in profits amounted to $k-s$. As in sections 2 and 4, le us denote the relative share of profits in the value of aggregate production by α and the ratio of imports to this value by β. The increase in the value of production corresponding to the increase in profits by $k-s$ is equal to $(k-s)/\alpha$, and the corresponding rise in imports to $[(k-s)/\alpha]\beta$. Since imports increased by the same amount as the decline in the balance of trade, i.e. by s, we obtain $[(k-s)/\alpha]\beta = s$. It follows directly that:

$$k = s\left(1+\frac{\alpha}{\beta}\right) \tag{5}$$

As in sections 2 and 4, let $\alpha = 0.5$ and $\beta = 0.2$; k will then amount to 3.5 s. It will be seen that the tension in the balance of payments, which accompanied 'domestic exports' from the start, in the case of an upswing stimulated by securing a surplus in foreign trade arises only at the point when investment has reached a level several times greater than this surplus, i.e. at an advanced stage of the boom. Moreover, it is probable that prior to this a considerable improvement in the economic situation which does not involve balance of payment difficulties will lead to an inflow of foreign capital. If this flow of foreign capital is lasting in character there may be no tension in the balance of payments at a later stage as well. It is now clear what are the advantages of an upswing stimulated by means of securing a surplus in foreign trade. It is worth mentioning that the 'natural' upswing based on the automatic increase in investment activity does not enjoy these advantages, and if there is no inflow of foreign capital, it will be confronted with the same balance of payments difficulties as the upswing based on 'domestic exports'.

The Business Cycle and Welfare[1]

(1934)

1. For nearly a year and a half now, world production has oscillated around 90, if the level of manufacturing in 1928 is taken as 100. This level is about 20% higher than the bottom of the crisis reached in 1932, when the world manufacturing index was 75. However, if we consider that the maximum achieved in 1929 was 110, we can see that nearly half of the catastrophic drop in output during the world crisis has been already made up. Hence we arrive at the conclusion that the world is now in a fairly advanced stage of the business upswing; and that, though there are no immediate prospects that world output will continue to grow at the same rate as hitherto, neither does it show any signs of a breakdown. Rather, one may now expect a longer period of stabilization with a slight rising trend.

This statistical evidence of a considerable business recovery is indeed necessary, for it seems that throughout the world the fact of that recovery has hardly reached the broad mass of the population. A problem of considerable importance appears in this context. Does the present upswing in the business cycle also mean an increase in prosperity? Has the consumption of the broad mass of the population increased during this period and, if so, by how much?

2. Above all, we must realize that an increase in the consumption of the working masses is never the basis for a business upswing, but merely its side-effect. The creation of purchasing power for investment purposes always lies at the heart of a business upswing: with a 'natural' upswing this additional purchasing power is generated by private entrepreneurs, who build new industrial plants; with a 'synthetic' upswing it is generated by the government, which runs public works of one kind or another.

With increased output of investment goods, more workers are employed; they receive part of the additional purchasing power and use it to purchase consumer goods. Increased demand for the latter causes the employment of new workers for their production. A new market for consumer goods is thereby created. Their increased output

is now purchased by workers newly employed in investment and consumer branches of industry.

It must be emphasized, however, that while overall supplies for workers rise, the volume of consumer goods obtained for each unit of labour input declines. Indeed, the ratio of consumer goods prices to wages must rise in order to make it profitable to put into operation hitherto idle plants in the consumer goods industry. Thus increased demand for consumer goods causes an increase in their output and, at the same time, a rise in their prices in relation to wages. In other words: a business upswing causes an expansion in workers' consumption, but at a lower rate than the increase in employment.

In the theoretical model outlined above we have implicitly assumed a closed economic system, a division of society exclusively into capitalists and workers, with no workers' savings. Examining below the influence of the business upswing on the consumption of the broad mass of the population in the largest industrial centres of the world—the USA, Germany, Japan, and England—we shall see that these conditions are not always met, and hence the actual processes often deviate in various ways from the simplified model outlined above.

3. If we compare the real value of the wage bill of industrial workers in the USA in the first half of this and last year, we find that it increased by 30%. Moreover, it turns out that only a part of this rise can be attributed to increased employment, and another part is due to a rise of real wages by 10%. True, for the working population as a whole this situation is not less favourable, since the real wages of white-collar workers and shop assistants have not been raised and their employment has also increased much less. None the less, the real purchasing power of the working population as a whole, has increased considerably, while real wages per hour have not fallen but even increased somewhat. Finally, with respect to the increase of total purchasing power, it should be noted that the statistics of earnings in industry do not cover the earnings of the workers employed in great numbers on public works in the first half of 1934, i.e. at the time when public works financed by inflation stimulated the business upswing in the USA.

Two problems must be explained. First is the contradiction with our theoretical model, since in this case with the business upswing the overall real purchasing power of the working masses increased, not less, but indeed more than employment. The second problem which needs explanation is the striking fact that none of the data available on

consumption, e.g. sales of department stores, shows any increase in real consumption. We shall attempt to explain both these questions here.

The lack of unemployment benefits in the USA gave rise to a phenomenon which did not appear—at least to this extent—in any other country: the huge debt of the unemployed to retail trade. Hence putting someone back to work in the USA has the effect that—first—what he previously bought on credit he now buys for cash and—second—he also begins to pay his debts. In this situation the increase in demand by the newly employed workers for consumer goods may be very insignificant. Thus both of our problems are solved simultaneously: since demand for consumer goods does not increase at all (or, increases only slightly), there is neither an increase of real consumption nor a rise in the ratio of prices to wages, i.e. a fall in real wages. This would also explain the difficulties of stimulating the business upswing in the USA. When workers draw no more credits and begin paying their debts, this obviously damps the effects of additional purchasing power.

If the above explanation is consistent with reality, then a slackening by the US government of the rate of stimulating the business upswing (i.e. reducing expenditures on public works), in the hope that once in motion the mechanism will function automatically, would be a grave mistake. As a result of precisely those factors mentioned above, stimulation of the business upswing in the USA must be a long and persistent process. Only when the additionally created purchasing power, via workers' expenditure, begins to flow to consumer branches of industry can there appear an investment boom strong enough to take over the role of public works.

To summarize: the stimulation of the business upswing so far has not led to any significant increase in consumption in the USA. However, if it is systematically and patiently continued, the phenomena which accompany every business upswing will no doubt appear there too: an increase in consumption by the working masses will go hand in hand with a decline (though small) in real wages. It could be mentioned in passing that if the business upswing in the USA was generated, not synthetically, but naturally, i.e. under the influence of private investments, the burden of workers' debts incurred during the crisis would be no lighter, and therefore the business upswing would be limited to the sector in which new investments started, without spreading to the economy as a whole.

4. In Germany, after stimulating the business upswing for a year and a half, the wage bill increased over 1932 (when it reached its lowest level) by 15%. However, the sum of unemployment benefits simultaneously shrank, and the savings gained in this way again were used to finance employment. The part of total earnings previously paid to the unemployed, who are now back in employment, does not increase the total purchasing power of the working masses. It follows from the reduction in the sum total of unemployment benefits that this part is one third of the increase in the wage bill: for each two workers employed as a result of the business upswing, there is one employed at the cost of the unemployment benefits of all three of them when hitherto unemployed.

In the final analysis, therefore, the increase in the money wage bill of the working masses only amounted to 10%. To assess the increase in their real purchasing power, one must still consider the rise in costs of living. According to official statistics, this increase was only 2% over 1932. However, one must remember that the mere fact of price controls must cause difficulties in collecting relevant data, and thus the official index of living costs does not properly reflect the big wave of price rises now affecting Germany. So it hardly seems any exaggeration to assume that present living costs are, not 2%, but 5% higher than in 1932. Consequently, the increase in real purchasing power of the working masses would be only 5%, and even this estimate may be too optimistic. The data on retail trade turnover entirely confirm this assessment, since they indicate no significant increase over 1932, despite considerable anticipatory purchases in recent months of textile goods, at the expense of reduced savings.

Employment in Germany fell during the crisis by 5 million; from 1932 to the present moment it has increased by 2.5 million; hence half of the fall in employment has been made up. The real purchasing power of total wages and salaries[1] has declined during the crisis by about 20%, while during the present upswing it has increased by at most 5%. How can this discrepancy be explained?

One reason has already been mentioned. The sums saved on unemployment benefits, thanks to increasing employment, are not used to increase benefits for those still out of work or to increase social services but are used to finance output expansion. In this way

[1] Including unemployment benefits.

employment increases without corresponding increase in financial outlays. However, the aim of this operation is to increase, not consumption, but government supplies of a very specific character.

The second reason is the increase in the cost of living, which offsets a considerable part of the increase in money purchasing power. In essence there is nothing special about this. In our theoretical model it was shown that prices should rise in relation to money wages. The point is, however, that in the early phase of a business upswing, when capital equipment is still far from fully utilized, this fall in real wages should be rather small: the increase in the money wage bill by 10% should not have caused a rise in the cost of living by 5% or more.

What is decisive here is the general framework within which stimulation of the business upswing in Germany is taking place: there is no inflow of foreign capital which would make it possible to increase the imports of food and raw materials necessary for the expansion of output and consumption. This explains foreign-exchange difficulties, import restrictions, and finally the drive for autarkization by the production of synthetic raw materials and their admixture to natural raw materials. These tendencies alone must increase manufacturing costs, which are reflected in price rises. Moreover, they also caused speculative purchases of goods made from the 'good old' raw materials by merchants and, as we mentioned, by final consumers too. In this way, even greater demand was generated for goods whose production had to be limited owing to a shortage of raw materials.

Part of the purchasing power lost by the urban population on account of the rise in the cost of living was appropriated by the agricultural producers. To what extent this purchasing power was directed to consumption is hard to say, since it could have been used for payment of debts or purchase of means of production.

Comparison of the stimulation of business upswing in Germany and the USA shows basic differences in the situation of these two countries. In the USA there are still huge possibilities for expanding the supply of consumer goods. The demand is not rising fast enough, however, because workers pay their debts. In Germany, owing to the absence of an agricultural and raw-materials base similar to that at the disposal of the USA, even a relatively small increase in demand was enough to render the supplies of consumer goods inadequate. From being a country of 'over-production', Germany became, in a year and a half, a country of 'under-production'. The situation of the USA is obviously less tragic then Germany's: the Americans will learn to spend money

sooner than the Germans will produce cheap agricultural products and synthetic raw materials.

5. The influence of the sharp business upswing in Japan on the purchasing power of the broad mass of the population is similar to the German case. The increase in the real purchasing power of the total wage bill was only 10% as compared with 1931, when the inflationary financing of armaments and devaluation of the yen initiated the stimulation of the business upswing; employment increased in this period by 23%. But even this increase in the real wage bill could take place only on account of a relatively small rise in the prices of agricultural products, owing to which—despite the nearly threefold devaluation of the yen—the costs of living increased by only 11%. The terms of trade between industry and agriculture sharply worsened for the latter: the ratio of prices of industrial goods to agricultural prices increased by 20%. Hence total urban and rural consumption during this *sui generis* boom has probably fallen considerably; a comparison of indices of production and export of textile fabrics seems to suggest that their domestic sales have declined considerably. How can this be explained?

Unquestionably a very important role was played here by devaluation. If one compares the fall in Japanese and world wholesale prices (expressing the former and the latter in terms of gold) since 1931, it turns out that the exchange ratio between the Japanese goods and the imported goods worsened by one and a half times. The share of exports in Japanese production in 1931 can be estimated at 25%. To obtain the same volume of foreign goods which were then obtained for this export, the volume of exports would have to be increased by 50%, i.e. some additional 12% of 1931 production would be exported. The index of production at present is 135 (1931 = 100). However, as follows from the above, of this 35-point increase, 12 points go to pay for more expensive imports. This part of production is lost to the Japanese social income. But that is not all.

Japan's capital equipment even before the last recovery was close to fully employed. In 1931 industrial output declined only a few per cent as compared with the highest previously attained level in 1929. Stimulating the business upswing was not really intended: it was a side-effect of the inflationary financing of armaments. With stimulation of the upswing, capital equipment became employed to capacity level, the more so as the volume of exports increased considerably due to the

worsening of the Japanese terms of trade mentioned above. But full employment of capital equipment simply means putting into operation its most expensively producing parts, and this can only take place at the expense of a considerable rise of prices in relation to wages. Owing to this turn of events, the expansion of Japanese production went to increase either exports or output of investment goods and armaments. Consumption, as we mentioned, shrank.

6. Studies of the social income of Great Britain show that total consumption there has not changed much during the crisis. The fall of employment was relatively slight; it amounted to merely 8%. Until 1931 it was compensated for by a decline in the cost of living, which reflected the exchange ratio of English goods for foreign ones. After the devaluation of the pound in 1931, these terms of trade remained approximately constant, while employment stopped falling, and in 1933 even began to rise. The money wage bill increased together with this increase in employment; money wage rates remained unchanged. Since the cost of living also did not rise, contrary to our theoretical model, real wages did not fall, which perhaps can be explained by the fact that production costs were reduced by an easing of the tax screw. This, in turn, was possible owing to a certain reduction in outlay on unemployment benefits and, above all, a reduction in interest paid on government debts. Hence in Great Britain an increase in consumption took place during the business upswing, though it was small, since the current increase in employment—like its previous fall—was also small.

The increase in production in Great Britain did not cause difficulties in the British balance of payments, which might have led either to autarkization (as in the case of Germany), or to a worsening of the terms of trade (as in the case of Japan). This does not follow from the fact that the business upswing in the latter countries was synthetic whereas it was natural in Great Britain, but follow above all from the relatively favourable development of British exports, mainly on account of closer links between the metropolis and its dominions.

7. We have examined the trend of consumption by the broad mass of the population during the present business upswing in four large industrial centres, which account for about 70% of world output. Their share in the increase of production, which started in 1932, is even greater, since the fifth centre, France, shows the same level of output now as in 1932. Hence we may conclude with a high degree of certainty that the increase in world consumption during the present business

upswing was completely out of proportion to the increase in production. While this lack of increase in consumption in the USA is of a rather temporary nature, in Germany and Japan we have to do with phenomena which are leaving a permanent mark on the economic development of the world—namely, with the structural shrinking of international trade and capital circulation.

The Business Cycle and Armaments[1]

(1935)

The close link between stimulation of the business upswing in recent years and armaments is unquestionable. The sharp increase in industrial production since 1932 in Japan has been caused by the inflationary financing of armaments and the Manchurian expedition. Armaments here were a goal in themselves, while the business upswing in large part was only a secondary, unintended side-effect.

The situation is quite different in Germany. Here stimulation of the upswing, with the aim of a general improvement of the economic situation, was the only social promise kept by Hitlerism, and undeniably was and still is the foundation on which Hitler's government rests. This is hardly contradicted by the long shadow cast by armaments in the present German business upswing.

With stimulation of a business upswing by the inflationary financing of public investments, the nature of these investments is—from the standpoint of their immediate economic effect—largely a matter of indifference. What is important is that the additional purchasing power created by banks be used by the government to purchase investment goods of one kind or another, which increases employment in the plants involved and hence also increases demand for consumer goods. Stimulation of the upswing by public investments is like an 'essay on a subject of choice', and in Germany this subject was determined in agreement with the Reichswehr.

Everyone today says that the public works conducted for past two years in Germany are, directly or indirectly (e.g. the network of strategically important highways), military in nature; it is even surmised that Germany cannot stop arming herself, lest the boom collapse. In this way armaments are surrounded by an air of economic mysticism: allegedly only they can stimulate the business upswing.

This is obviously one of many myths frequenting economic journalism. Armaments do not stimulate industrial activity because they are armaments, but only if they are financed by inflation; the creation of additional purchasing power intended for any other purposes would have, as we emphasized above, the same short-run economic effect. From the point of view of this effect, it does not matter whether or not

one day military transports or buses move along the roads now being built; and it also makes no difference whether steel is used to make cannons or for sheet metal to cover a hospital building.

But let us return to German armaments. They are not financed only by the creation of additional purchasing power which, flowing through them, stimulates a general business upswing; they also feed on the effects of this upswing. Increased employment caused a fall in total payments of unemployment benefits. These savings were not used to increase benefits for the remaining unemployed or to reduce insurance premiums; they were used to put more of the unemployed to work on public investments similar to those by which the upswing was stimulated. This is one of the reasons for the relatively slight increase in consumption by the broad mass of the population with the rise in employment. For the purchasing power of this population increases, not by the total amount of wages received by newly employed workers, but by the difference between this sum and their previous unemployment benefits.

Further, a general business upswing causes an increase in tax revenues. This increase also can be allocated to armaments. Thus, as we have said before, armaments absorb not only a considerable part of the sums stimulating the upswing, but also a considerable part of the increase in social income indirectly generated by this stimulation.

Stimulation of the business upswing had yet another negative effect on the German economy, connected in a special way with the increase in Germany's combat readiness. We have in mind here the question of raw materials. The expansion of production obviously increases the demand for foreign goods, especially raw materials. There is no mechanism, however, which would make the increase in production go hand in hand with an increase in exports. On the contrary, prices rise during a business upswing, which obviously reduces the competitive position of German products on foreign markets.

Thus with no inflow of foreign capital Germany experienced typical difficulties in her balance of payments, which were a symptom of the inability to acquire adequate supplies of foreign raw materials. Obviously these difficulties were not eased by forced purchases overseas, especially for military purposes. The only radical way out of this situation could be partial autarkization—forcing the exploitation of domestic natural resources and production of synthetic raw materials (mainly as admixtures to natural resources). Naturally, there is no talk

here of the complete suspension of raw-material imports, but only of adjusting them to the volume of exports.

The Germans, understandably, did not take this path voluntarily, but necessity quickly became a virtue, at least from the military point of view. For could the Reichswehr ever have dreamed of experiments in self-sufficiency on such a wide scale in the event of war? And the matter does not end with experiments, since Germany's capital equipment is already now being expanded in the direction of manufacturing substitutes, thereby saving investments during an eventual war; hence this expansion of the output of synthetic raw materials entirely resembles that generated by armaments in the strict sense.

One should not think, though, that stimulation of the upswing brought the Germans nothing but benefits from the military point of view. The foreign-currency difficulties (a symptom of short supplies of raw materials) which the Reich is experiencing in connection with stimulating the upswing can be overcome by autarkization only in the long term. For the present, the demand for foreign raw materials had to be covered at the cost of total outflow of gold and foreign exchange reserves, and also by the no less complete suspension of transfer payments of debts and interest on them. Germany thereby completely stripped herself of the possibility of making purchases overseas except in barter exchange for her own goods; not only does she have no gold or foreign currency, but she cannot make use of foreign credit, having totally lost the confidence of international capital owing to her insolvency. And since complete autarkization is out of the question even during wartime—because some imports are indispensable, even on a large scale, while exports are impeded both by the full employment of factors of production for the war effort and by possible disruptions in transport capacity to handle world trade—the impossibility of acquiring foreign goods for gold or foreign exchange during wartime, or of raising foreign credits, is a very serious weakness in Germany's military complex.

Besides this, however, difficulties in supplies of raw materials threaten German armaments from another angle, namely, the possibility of their further expansion. Will Germany be able to arm in the next few years at an even faster rate than now? It seems not, and in the final analysis this is connected with the raw-materials situation.

By stimulating a business upswing, Germany expanded her domestic market and overcame the crisis in sales. But she soon faced another

crisis—the raw-materials supply crisis, which can be overcome by partial autarkization only in the longer term. Expansion in the home market has thereby become limited for the present. This explains the fact that the German production index, following a sharp increase from the middle of 1933 to the middle of 1934, for nearly a year now has remained on more or less the same level. No significant increase in the German social income can be expected in the immediate future; an increase in the rate of armaments would therefore take place at the expense of two other items of this income, consumption or investments, and a reduction of either of these is very unlikely.

The increase in consumption in Germany during the present upswing is insignificant by comparison with the rise in employment. The reason for this, as mentioned before, is that unemployment benefits saved by the increase in employment were again allocated to public works; and, moreover, production on the whole became more expensive on account of partial autarkization. If attempts are made to gain funds for investment at the cost of consumption, reducing the latter below its present relatively low level by the imposition of new taxes, reducing civil servants' salaries, unemployment benefits, etc., all the social advantages of stimulating the business upswing would then vanish, and the masses, already disappointed by the failure to implement the entire social programme of the National Socialists, will become completely disheartened.

Neither can armaments be increased at the expense of investments; the opposite is rather the case. Profitability and private investments have increased owing to stimulation of the business upswing, as was intended; for the synthetic upswing is supposed to change into a natural one, with public investments 'relieved' by private ones. So now, when this private investment activity—the construction of new industrial plants and the renovation of old ones—has finally got under way, is it to be stopped (e.g. by raising the rate of interest) and are public investments to be continued instead, causing ever greater indebtedness of the treasury? This is obviously out of the question, the more so as a considerable part of private investment is going in the direction mentioned earlier, to create new industries producing substitutes for raw materials, which again is an important part of the economic and armaments plan as a whole.

We have examined the essence of the impossibility of a further intensification of German armaments. We shall now see how this looks

from the financial side. With increasing private investments, which also have a stimulating effect on the upswing, the sums allocated to stimulating public investments have to be reduced, for otherwise total production would have to increase further, which would cause difficulties in supplying particular industries with raw-materials and would lead to a breakdown of the entire system. Moreover, since production cannot increase, neither can one count on an increase in tax revenues or on new savings in unemployment benefits, unless taxes are raised, or social services or civil servants' salaries reduced, which—as we have said earlier—seems improbable.

It obviously does not follow from the above that the stocks of armaments of the Reich will not continue to increase; it only means that the annual increase in these stocks in the next few years will probably not be greater, and may even be smaller, than at present. Besides, all of this applies to the relatively near future. In the longer run, efforts to produce synthetic raw materials may make it possible to increase social income, and the eventually more favourable position of Germany in international markets may also contribute to this. But one may expect only a rather slow improvement of the situation.

Disclosure of the tremendous armaments amassed by Germany in the last two years will unquestionably encourage other powers, especially France and England, to increase their defence effort. If these countries wished to stimulate business upswing in this way, they would not encounter the same difficulties as Germany now has. To be sure, in Germany capital equipment and the labour force are not yet fully employed, but the absence of the complementary factor of foreign raw materials makes further expansion of output impossible. France, on the other hand, has tremendous reserves of gold and hence could afford to increase imports for a long time without increasing exports. England's position in this respect is even better on account of close ties with her dominions, which have adequate supplies of almost all raw materials.

As we see, an increase in English and French armaments by inflationary financing, which would simultaneously stimulate a general business upswing in those countries, is possible without serious difficulties. Will events in fact go in this direction? It is difficult to answer this question; however, since an increase in armaments would swell budgets, and it is rather doubtful whether taxes would be increased, the sums required would come from loans. Moreover, it is unlikely that France and England would permit a contraction of the

private capital market; rather, in one form or another, additional purchasing power would be created by banks. So perhaps we are approaching a moment when it will turn out that Germany has stimulated, not only her own business upswing, but also—on a labyrinthine path, via the arms race—a world business upswing.

The Essence of the Business Upswing[1]
(1935)

1. Mass unemployment seems to be the most obvious symptom of depression. Is this unemployment due to the shortage of capital equipment, i.e. to inadequate accumulation of fixed capital in relation to the increase of population? Certainly not. The position is rather the reverse. During the depression the existing capital equipment is utilized to a small degree: the idle capital equipment is the counterpart of the unemployed labour force. To what should be attributed the fact that the owner of unutilized equipment who encounters a lasting supply of idle labour does not embark upon production? Any single entrepreneur would certainly answer that this would be an unprofitable proposition: the prices at which he could sell would not even cover his current costs, i.e. the outlay on raw materials, labour, taxes, etc. Thus a reduction of wages is being recommended as a way to overcome the depression. Now, one of the main features of the capitalist system is the fact that what is to the advantage of a single entrepreneur does not necessarily benefit all entrepreneurs as a class. If one entrepreneur reduces wages he is able *ceteris paribus* to expand production; but once all entrepreneurs do the same thing, the result will be entirely different.

Let us assume that wages have been in fact generally reduced, and likewise taxes as a counterpart of cuts in civil servants' salaries. Now the entrepreneurs, owing to the 'improved' price–wage relation, utilize their equipment up to capacity level and in consequence unemployment vanishes. Has depression thus been overcome? By no means, as the goods produced have still to be sold. Now, production has risen considerably and as a result of an increase in the price–wage relation the part of production equivalent to profits (including depreciation) of the capitalists (entrepreneurs and rentiers) has grown even more. A precondition for an equilibrium at this new higher level is that this part of production which is not consumed by workers or by civil servants should be acquired by capitalists for their increased profits; in other words, the capitalists must spend immediately all their additional profits on consumption or investment. It is, however, most unlikely that this should in fact happen.[2]

Capitalist consumption changes in general but little in the course of

the business cycle. It is true that increased profitabilty stimulates investment but this stimulus will not work right away, since the entrepreneurs will temporize until they are convinced that the higher profitability is going to last. Therefore the immediate effect of increased profits will be an accumulation of money reserves in the hands of entrepreneurs and in the banks. Then, however, the goods which are the equivalent of the increased profits will remain unsold. The accumulating stocks will sound the alarm for a new price reduction of goods which do not find any outlet. Thus the effect of the cost reduction will be cancelled. On balance only a price reduction will have occurred, offsetting the advantage of the cost reduction to the entrepreneurs, since unemployment going hand in hand with under-utilization of equipment will reappear.

In fact wage reduction does not, as a rule, result even in the temporary increase in production described above. Indeed, not only investment but even utilization of existing equipment will not respond immediately to an improvement in profitability. For immediately after the reduction of wages, and before the entrepreneurs manage to increase production within the existing capital equipment, a fall in prices makes its appearance. As the entrepreneurs do not at once make use of the means taken away from the workers for buying consumer or investment goods, the revenue of industry is reduced *pro tanto*. What the entrepreneurs gain on wage reductions is soon dissipated through price declines. All this could be noticed in all countries during the world depression of 1931–2, when the wave of wage reductions brought about a rapid fall in prices rather than an increase in production:

2. The doctrine of wage cuts as the way out of depression is sometimes supplemented by a remedy against the price fall. Creation of cartels is recommended to stop the 'cut-throat competition'. Let us assume that in all industries cartels have been formed, that wages have been duly reduced, but that the diminished demand of the workers could not have any repercussions on prices since they are maintained by cartels at a stable level. Will the 'improved' price–wage relation be of any help in overcoming the depression? Now, it is rather unlikely that cartels would invest profits derived by wage reductions more promptly than the entrepreneurs under conditions of free competition. The opposite is rather the case. Thus in a totally cartelized system, just as under free competition, the proceeds of industry will diminish as

much as their costs, and as prices remain unchanged the sales of goods will drop in the same proportion as the proceeds have shrunk. Thus, while wage reductions do not cause any increase in production in the case of a competitive economy, in a fully cartelized system they lead, as a result of rigidity of prices, to a shrinkage of production and a rise in unemployment.

In a 'mixed' system, consisting of a cartelized and a competitive sector, the result of wage cuts will be something intermediate: a fall of production will ensue, but it will be weaker than in a fully cartelized system.

3. It follows from the above argument that a reduction of wages does not constitute a way out of depression, because the gains are not used immediately by the capitalists for purchase of investment goods. Now we shall try to prove that the opposite is the case: the increase in investment *per se* unaccompanied by a wage reduction causes a rise in output.[3]

Let us assume that as a result of some important invention there is an increase in investment associated with its spreading. Now, is it possible for the capitalists to step up their investment, even though their profits have not increased (there was no reduction in wages) and they have not curtailed their consumption *ad hoc* (this, indeed, is most unlikely)? The financing of additional investment is effected by the so-called creation of purchasing power. The demand for bank credits increases, and these are granted by the banks.[4] The financial means used by entrepreneurs for the construction of new investments reach the investment goods industries. This additional demand makes for setting to work idle equipment and unemployed labour.[5] The increased employment is a source of additional demand for consumer goods and thus results in turn in higher employment[6] in the respective industries. Finally, the additional investment outlay finds its way, directly and through the workers' spending, into the pockets of capitalists (we assume that workers do not save). The additional profits flow back as deposits to the banks.[7] Bank credits increase by the amount additionally invested and deposits by the amount of additional profits. The entrepreneurs who engage in additional investment are 'propelling' into the pockets of other capitalists profits which are equal to their investment, and they are becoming indebted to these capitalists to the same extent via banks.

In the preceding sections we were faced with the problem whether the profits resulting from the reduction of costs are invested. In the case

presently considered, the profits, to put it paradoxically, are invested even before they come into being. Profts that are not invested cannot be retained, because they are annihilated by the ensuing fall in production and prices. The creation of the purchasing power for financing additional investment increases the output from the low level reached in the depression and thus creates profits equal to this investment.

It should be pointed out that the increase in output[8] will result in an increased demand for money in circulation, and thus will call for a rise in credits from the central bank. Should the bank respond to it by raising the rate of interest to a level at which total investment would decline by the amount equal to the additional investment caused by the new invention, no increase in investment would ensue and the economic situation would not improve. Therefore the precondition for the upswing is that the rate of interest should not increase too much in response to an increased demand for cash.

What will happen, however, when the new invention has been spread and the original source of the business upswing has dried up and thus the stimulus for investment vanishes? Is the downswing unavoidable then? No, because in the mean time the increased profitability prevailing in the economy as a whole will have resulted in a rise in investment. It is this investment caused by higher profitability which will step in when the effect of the new invention has petered out.

4. We described in the preceding section a business upswing resulting from the investment stimulated by an important invention, which to some extent is a matter of chance. Without such an external stimulus, would the depression last for ever? Is it not inherent in the depression to breed forces that put an end to it by causing an increase in investment?

Let us assume that the economy became stabilized at the bottom of the depression at a very low level of economic activity; that investment in particular has shrunk to such a degree that it does not cover the necessary replacement of the ageing capital equipment. Let us suppose that this equipment consists of 2000 establishments and that every year 100 of them go out of use, while only 60 establishments are constructed. Thus the capital equipment shrinks every year by 40 establishments. However, it is this destruction of equipment that, after a rather prolonged period, initiates a business upswing. For owing to the shrinkage of capital equipment the same demand is met by a declining number of existing establishments, which as a result improve their

degree of utilization.[9] Once the profitability of the existing capital equipment has thus increased, the level of investment will increase as well. The finance for it will be provided—as described in the preceding section—by creation of additional purchasing power. This will result in an increase of the output of investment goods and of employment in the respective branches of industry. Moreover, the rise in demand on the part of the newly employed workers for consumer goods will cause fuller employment in the consumer goods industries. This general increase in production brings about a further rise in profitability, followed by a new expansion of investment activity, a new creation of purchasing power, etc.

This is, indeed, a cumulative process causing a steady upswing. However, once investment starts to exceed the level of necessary replacement of fixed capital, i.e. once more establishments are constructed per year than the 100 establishments which are scrapped—then the factors hampering the upswing make their appearance. Just as, during the depression, the shrinkage of capital equipment was the inception of the upswing, so now the expansion of this equipment finally brings the boom to a stop and starts the downswing.

The process of collapse of the boom is the reverse of that starting the upswing from the bottom of depression. Let us assume that, at the top of the boom, investment is stabilized at the level of 140 establishments and, as 100 establishments are scrapped each year, the capital equipment is expanding by 40 establishments a year. Now the demand will be met by an increasing number of establishments, and as a result the degree of utilization of each will diminish.[10] The resulting lower profitability will be followed by a decline in investment. And just as the increase in investment at the bottom of depression meant the start of the upswing of production and of a decline in unemployment, a fall in production and an increase in unemployment[11] will ensue here. And this downward movement will gather momentum as in the period of the upswing the upward tendencies were cumulative in character.

It is not, of course, the purpose of this essay to present a complete theory of business fluctuations. An attempt is made to give a general idea of the mechanism of a 'natural' upswing, and in particular to clarify one of its aspects. It now becomes apparent that investment has a favourable effect upon the economic situation only at the time when it is executed and provides an outlet for additional purchasing power. On the other hand, the productive character of investment contributes

to the slackening of the upswing and finally brings it to an end. For it is the expansion of capital equipment that, in the light of the above analysis, causes the collapse of the boom. We face here one of the most remarkable paradoxes of the capitalist system. The expansion of capital equipment, i.e. the increase in national wealth, contains the seed of a depression in the course of which the additional wealth proves to be only potential in character. For a considerable part of capital equipment is idle then, and becomes useful only in the next upswing.

This statement sheds some light on the problem of government anti-slump intervention by means of public investment, with which we shall deal now.

5. After we have studied the mechanism of the business cycle, let us turn again to the case where the upswing is started by a new invention which stimulates some entrepreneurs to embark upon 'extra investment'. By making use, for this purpose, of additional purchasing power, they set in motion the mechanism of the upswing. This case is very close to that of government anti-slump intervention. In order to pass from the former to the latter, it suffices to substitute for the entrepreneurs induced to invest by the new invention the government taking up investment, which is financed likewise by means of additional purchasing power, in order to break the deadlock of the slump.

Let us assume that the government issues treasury bills and sells them to the banks.[12] The government spends the money, e.g. on construction of railways. As in the cases described above, employment in investment goods industries increases and subsequently, as a result of the higher purchasing power of the workers, in consumer goods industries as well. The amounts spent by the government flow as profits directly or through spending of the workers into the pockets of capitalists, and return to the banks as their deposits.[13] On the side of bank assets, the government debt accrues in the form of discounted bills; on the side of liabilities, there is an increase in deposits equal to the additional profits. Thus the government becomes indebted, via banks, to the private capitalists by an amount equal to the value of the investment effected. It will be seen that a complete analogy exists between the case now being considered and that of an upswing resulting from a new invention. And, in both instances, increased profitability of the industry as a whole will stimulate investment and thus enhance the upswing, which as a result will continue even if the

government gradually reduces its investment activity. Thus an upswing started by a new invention continues after the impact of that invention has spent itself.

It should be emphasized that the pattern of public investment taken up is not essential for the effect of government intervention; what matters is that investment should be financed by additional purchasing power. The creation of purchasing power for the sake of financing the budget deficit, whatever its reason, renders a similar effect. The divergence consists only in that the additional purchasing power flows initially into different industries. Let us assume, for instance, that the amount derived from discounting treasury bills is used for the payment of unemployment benefits. In this case, the direct effect of government intervention will be felt in consumer goods industries. Only after some time, when their increased profitability will induce them to invest, will prosperity be shared by investment goods industries as well. This increased investment activity financed by the creation of purchasing power will enhance the upswing, so that the latter will continue even after the budget deficits will have vanished—owing to the increase in tax revenues resulting from the rise in incomes and sales.

Thus, after some time private investment takes over from public investment: the 'artificial' prosperity is replaced by a 'natural' one—which, by the way, will sooner or later (as was proved in the preceding section) come to a stop as a result of expansion of capital equipment.

It must be added that the precondition of successful government intervention—and of the natural upswing as well—is the possibility of meeting the increased demand for credits by the banking system without increasing the rate of interest too much. Should the rate of interest increase to such an extent that private investment is curtailed by exactly the amount of government borrowing, then obviously no purchasing power would be created: only a shift in its structure would take place.[14]

The Business Upswing and the Balance of Payments[1]

(1935)

1. It is fairly obvious that the upswing tends to affect the balance of trade unfavourably. This results mainly from increasing demand for imports of goods which are not produced in the country considered. In Poland, for instance, the rise in industrial production is accompanied by an increase in imports of raw materials such as wool, cotton, hides and skins, and iron ore; next, the expansion of investment calls for higher imports of machinery, and that of consumption for higher imports of tea, coffee, and fruit.

Another factor that affects the balance of trade adversely is the increase in domestic prices in the course of upswing. This makes for an increase in imports of goods competing with the corresponding home-produced commodities, and also affects adversely the competitive position of the latter in the foreign markets. It should be noticed that the influence of this increase in prices on the balance of trade is in general not so important as the rise in demand for foreign goods which are not produced at home. Indeed, in view of the existing high tariffs, the rise of domestic prices—as long as it does not exceed a certain limit—does not encourage imports of competitive goods. The adverse effect of higher home prices upon exports is more serious, but even this will not arise in the fairly frequent cases of dumping.

It is clear that should the upswing in a given country be accompanied by an improvement in the situation in the world market, the balance of trade might not deteriorate, because of an increase in exports. Let us, however, ignore such a possibility.

In this case, would not the boom which causes the deterioration in the balance of trade—mainly, as stated above, through higher demand for foreign raw-materials, etc.—generate forces that would tend to correct the resulting disturbance in the balance of payments? Such is no doubt the case under the conditions of free international circulation of capital. In the country where an upswing takes place, the profitability of industry increases, and this tends to attract foreign capital. However, the functioning of the international capital market is in

general by no means perfect. As a matter of fact, in only one instance is it very likely that the deterioration of the balance of trade in the course of an upswing will be automatically offset by the inflow of capital. We have in mind here an upswing occurring in a country exporting capital; the higher profitability resulting from the upswing in such a country is most likely to cause a decline in the export of capital in favour of home investment. In other cases a deterioration in the foreign-exchange position is rather to be expected. The decline in the balance of trade in the course of the upswing is followed by an outflow of gold and foreign exchange. If the central bank will not respond by raising the rate of interest, which discourages investment and thus hampers the upswing, the fall in gold and foreign exchange reserves will continue and, with the progressing upswing, will even gather momentum.

2. The repercussions of the upswing upon the balance of trade described above will not be affected by the upswing's being 'natural' or 'artificial', i.e. caused by government intervention. Whatever the reasons for the increase in production, it will be followed by a rise in demand for foreign raw materials, etc.: an 'automatic' upswing, as well as a boom resulting e.g. from government expenditure, leads as a rule to an increase in imports.

There exists a widespread theory about a direct connection between the budget deficit and the deterioration in the foreign-exchange position. It is difficult to grasp what kind of connection this might be: the foreign-exchange position depends on the balance of trade, and there is no direct relation between the latter and the budget deficit. There is, however, no doubt an indirect connection. If the budget deficit is covered by the creation of purchasing power, it induces an increase in production, and in this way contributes to a rise in imports and thus to the deterioration in the foreign-exchange position. If, however, the budget deficit were financed by credits without any creation of purchasing power being involved, i.e. at the expense of credits to private entrepreneurs, then no increase in production would follow and consequently the foreign-exchange position would not deteriorate: the budget deficit will affect the foreign-exchange position adversely only in the case where it affects production favourably.

There is, however, one exception to this rule. If the public subscribe to the theory of a direct connection between the budget deficit and the foreign-exchange position, then the appearance of the deficit in the budget encourages them to hoard gold or foreign exchange, which

indeed may upset the foreign-exhange position even more seriously than the effect of the budget deficit causing an increase in production.

3. What is going to happen in a country in the course of a 'natural' or 'artificial' upswing if no inflow of foreign capital is forthcoming? If the central bank, in order to prevent the outflow of gold and foreign exchange, acts according to the classical rules, i.e. if it raises the rate of interest or introduces some credit restrictions, it may—as mentioned above—re-establish the equilibrium in the balance of payments, putting a brake on the upswing, as this will tend to restrain the demand for imports. What will happen, however, if the central bank does not act in this way? Now, if it is the case that the country is in possession of large gold and foreign-exchange reserves, it is possible to disburse them until the situation in international trade or in the international capital market should improve. The position may, however, be often complicated by the fact that the continuing gold outflow might raise doubts as to the stability of the currency, and thus lead to hoarding of gold or foreign exchange unless this is prevented by exchange restrictions.

The question arises whether a currency depreciation, which is frequently resorted to in such a state of affairs, re-establishes the equilibrium in the balance of payments. The immediate effect of the depreciation is the return of capital that left the country just because of the anticipation that the currency might be depreciated. This is, however, a once-only effect. We are concerned here with a different problem: whether the currency depreciation might stimulate exports to such an extent that they could cover the increased demand for foreign imports of raw materials, etc. resulting from the upswing.

Let us assume that, as a consequence of currency depreciation, the export prices of a given country in terms of gold decreased by 20%. This means that pre-depreciation exports are exchanged now for only 0.8 of 'old' imports. In order to obtain the same volume of imports as before the currency depreciation, $1/0.8 = 1.25$ times more has to be exported. Therefore, should exports increase by less than 25% it will be impossible even to maintain the old level of imports.

Should exports increase by not much more than 25%, it would be possible to increase imports somewhat, but the volume of goods at the disposal of the country would decline, since production can only be increased a little (because the increase in the imports of raw materials is small) and many more goods (over 25%) would have to be exported.

The shift in the structue of sales will be effected as follows: the

increase in domestic prices caused by the rise in costs of imported raw-materials will result in the shrinkage of home consumption.

Thus currency depreciation can solve the difficulties in foreign trade encountered in the course of the upswing only if the foreign demand for the goods of a given country is very elastic; for instance, if depreciation of currency by 20% is accompanied by an increase much higher than 25% in the volume of exports. With a high tariff system in existence, however, this demand is fairly rigid.

In a free-trade world, the exports of the country which depreciated its currency would flood all the markets previously inaccessible to them because of the high cost of transportation and other sales costs (commissions, advertisement, etc.). In a high-tariff system, depreciation does not work in this way, because a moderate depreciation may not be sufficient for exports to 'jump' the tariff barriers, and a drastic one may induce the countries affected to retaliate by raising tariffs. To illustrate the rigidity of demand for goods of a given country, it is useful to consider some data concerning Japan. In the period 1932–4 the Japanese terms of trade fell by 18%. Although at that time the volume of world trade was already tending to rise slowly, the quantity of goods exported from Japan increased only by 31%. Thus Japan's purchasing power for foreign goods increased in the proportion $0.82 \times 1.31 = 1.07$, i.e. only by 7%.

4. Does the above argument apply to the case where the reduction of prices of a given country in terms of gold is achieved by so-called 'cost deflation' rather than by currency depreciation? Let us assume that in the country considered wages and taxes (at the expense of the salaries of civil servants) are reduced, and that as a result the general level of prices declines. The effect is much the same as that of currency depreciation. The competitive position of exports of that country in the foreign markets is improved, but this does not ensure that the means for an expansion of imports can be secured. There arise here the same problems we mentioned in the discussion of the effects of depreciation. If a country sells its goods at reduced prices, it receives in exchange a much greater volume of imports only if the increase in the volume of exports exceeds considerably this price reduction, i.e. if the foreign demand for the goods of a given country is elastic. The volume of exports would be highest if they were given away without charge, but no imports at all would be secured in this way. Thus, with the prevailing high-tariff system, cost deflation—very much like currency depreciation—cannot solve the foreign-exchange problem resulting from a business upswing.

5. The difficulties in the balance of payments accompanying the upswing—if no inflow of foreign capital is forthcoming—are sometimes met in the debtor countries by a suspension of the servicing of foreign debts. In this way some surplus of foreign exchange is secured which may be used to cover the increased imports. Thus the level of the servicing of foreign debts just before its suspension circumscribes the volume of additional imports of raw materials, etc. required for the expansion of production which can be secured in this way.

It must be noticed, however, that should a debtor country have a positive balance of trade with its creditor country, the latter might take hold of the surplus of the debtor country in order to cover the servicing of the debts and thus at this point no effect will be achieved.

6. What happens, however, to a country where the boom results, for instance, from government loan-financed expenditure, if no inflow of foreign capital is forthcoming, and the country does not suspend the servicing of foreign debts, or, having done so, cannot secure an adequate amount of foreign exchange to cover the increase in imports? The country will soon face the exhaustion of its gold and foreign exchange and will be forced to resort to restrictions of imports of raw materials, etc. Let us analyse the consequences of such a state of affairs.[2]

The allocation of limited quantities of imported raw materials to their users results, of course, in an insufficient supply of the corresponding goods, and thus in a price increase of the latter. Consequently, import restrictions have much the same effect as the emergence of cartels that would limit production in industries manufacturing imported raw materials. This is why, in the course of an upswing accompanied by import restrictions, a considerable rise in prices in relation to wages would take place as a result of the increase in prices of goods produced from imported raw materials. It may thus happen also that, despite the higher production, the workers' real income does not increase at all, because the effect of higher employment on the purchasing power of the working class is offset by a fall in real wages. Therefore, in the course of such a lop-sided boom the consumption of the broad mass of the population may show no increase.

It should be added that the price increase of goods with a high content of imported raw materials encourages the exploitation of

inferior domestic natural resources, the utilization of salvage and by-products, and the production of all kinds of substitutes that do not require any, or only small quantities, of imported raw materials (artificial silk replacing cotton, aluminium replacing copper, and so on). All this mitigates to some extent the shortage of imported raw materials. This semi-autarky cannot, however, prevent the increase in the prices of goods produced from imported raw-materials, for it is just the rise in these prices that fosters the application of the new, normally unprofitable methods of production.

Three Systems[1]

(1934)

Introduction

In this essay we take up the problems of how equilibrium is established within the *already existing* capital equipment, with special emphasis on the production of investment goods and the rate of interest. We distinguish three types of economic system, differing in their essential characteristics. In System I, the principle of preservation of purchasing power is pushed to the extreme: all income must be spent immediately on consumer or investment goods. This model in fact is accepted by all classical economists.

In System II, however, which corresponds better to reality, we shall show that, in the circulation of money, whose velocity may change, there is 'creation' and 'destruction' of purchasing power, even if there is no credit inflation *sensu stricto*. However, the creation and destruction of purchasing power is responsible only for a different course of perturbations from that in System I, while the final position arrived at is the same as under the principle of preservation of purchasing power, even when credit inflation *sensu stricto* takes place in System II.

By introducing friction to System II, made possible by the existence of a reserve army of the unemployed, we obtain System III. For this system, which no longer tends toward full equilibrium, we define the concept of a *quasi-equilibrium*. The creation and destruction of purchasing power (in contrast to System II) not only influences the course of perturbations, but also the final position—causing a shift from one quasi-equilibrium to another.

Assumptions

We make a number of assumptions here concerning the economic processes to be examined. These assumptions do not change, regardless of whether the processes being examined take place against the preservation of purchasing power, or against the possibility of creating and destroying it.

1. We assume that only workers and capitalists (entrepreneurs and rentiers) exist; workers consume all their incomes. As regards the consumption of capitalists, we assume that its volume S depends neither on changes in their income nor on the rate of interest. Hence capitalist consumption can change only with saving habits; except for this we treat it as a constant.

The equivalent of the remaining part of the total income of capitalists, including depreciation charges, is the production of capital goods and increase in stocks. We assume here that stocks are small in relation to existing fixed capital and hence we ignore their changes. As a result, the equivalent of the saved income of capitalists, including depreciation charges, is the output of investment goods. The sum of capitalist consumption S and the output of investment goods i (understood as aggregated values of these goods calculated at constant prices) can be called real gross profits, since $S + i$ is the equivalent of the total income of capitalists including depreciation charges.

Among our assumptions, only the absence of workers' savings must be regarded as fundamental, whereas the stability of capitalist consumption with changes in their income and the rate of interest, as well as omission of the influence of changes in stocks on the course of economic processes, are only simplifications to allow a clearer presentation of the gist of the problems considered. Rejection of these assumptions would not have essentially changed our results, but would have complicated the basic line of argument exceedingly, often obscuring it.

2. We assume that existing capital equipment produces with increasing marginal costs, i.e. the more fully employed it is, the greater the additional costs of producing the final unit of output. Obviously in these conditions prices equal the respective marginal costs.

It seems that, in reality, marginal costs are generally increasing. In many industrial plants the additional outlays connected with producing the final unit already begin to increase at a rather low level of utilization, while the night shift is almost universally subject to progression of costs. But even when there is a degression of marginal costs of each plant of a given branch, the branch as a whole has a rising curve of marginal costs on account of differences in manufacturing costs in individual plants. (In each branch there is always a number of 'generations' of plants that differ in their technique of production.)[2]

With the assumption of increasing marginal costs, the capital equipment of individual industries will not generally be fully utilized.

The rate of this utilization depends on the ratio of price of the output of a given industry to prices of its respective inputs. Hence in capital equipment with increasing marginal costs, which we constantly have in mind here, there will be production reserves. These make it possible to carry out restructuring of output or—where there is an additional supply of labour—to increase total output without prior reconstruction or expansion of fixed capital. These changes in the structure and volume of output against the background of the *existing capital equipment* characterized by rising marginal costs—which occur either under conditions of the preservation of purchasing power, or when its creation or destruction is possible—are the main subject of this essay.

3. We divide the stock of capital equipment into two departments: production of consumer goods and production of investments goods; in each, production of the required raw materials is also included. Since we leave out changes in stocks, the output of the consumer goods department is always fully consumed.

With our assumptions, the rate of employment of each of these departments depends only on their respective relations of prices to wages. Obviously, the relation of prices of consumer goods to prices of investment goods has no influence on the rate of employment of the *existing* capital equipment. Neither does the rate of interest have any effect on the rate of employment. The interest on existing fixed capital is naturally irrelevant to its employment. On the other hand, the influence of changes in interest on working capital can be ignored in accordance with our assumption that stocks are an insignificant fraction of the total fixed capital.

System I

1. This is a system in which the principle of preservation of purchasing power rules without exception. We can best imagine it as follows. Let us assume that all payments take place through the participation of all economic agents in one huge cheque-clearing centre. All participants are required to keep their balances unchanged: if someone at any given time has received more, he must also pay more into other accounts. Naturally, in this system all income is immediately spent—directly or indirectly—for the purchase of consumer or investment goods.

2. Let us first examine the process of absorption of labour supply in System I, i.e. under conditions of the preservation of purchasing power.

We assume that there are no changes in saving habits, and hence, in accordance with our assumptions, that capitalist consumption will remain constants.

Let us imagine that an excess supply of labour appears in the market. Wages fall, and capitalists—in accordance with the principle of preservation of purchasing power—immediately spend the additional sums on investment goods.

Immediately after the wage reduction, the prices of consumer goods will fall in the same proportion as wages. In fact, the purchasing power of workers has been reduced, while the supply of consumer goods for them will remain unchanged in accordance with the assumption of the stability of capitalist consumption. With this equal fall in prices and wages, the production of consumer goods for the present will stay on the same level; however, on account of the increased demand for investment goods, the relation between their prices and wages will increase. Along with this, employment in consumer goods and investment goods industries respectively will also increase by utilization of previously idle capital equipment, which absorbs the excess supply of labour.

However, the hiring of new workers for the investment goods industry now increases purchasing power directed towards consumer goods, which causes an increase in their prices above the previously lowered level, and hence an increase in the relation between these prices and wages. As a result there is also increased employment of capital equipment in the consumer goods industry, which also absorbs part of the excess supply of labour.

Thus we see that with the reduction in money wages, real wage rates also fall, since the relation of consumer goods prices to wages has increased. On the other hand, real gross profits (i.e. the total aggregate of goods consumed by capitalists and goods invested) have increased, on account both of the fall in real wages and of expansion of total output. With capitalist consumption constant, this increase in real profits consists in expansion in output of investment goods.

One can conclude that, given the saving habits (which, in line with our assumptions, means unchanged capitalist consumption), output of investment goods increases along with the supply of labour.

3. In accordance with our assumptions, any given saving habits correspond to a certain constant level of capitalist consumption S. So far we have considered the case of constant S. Now we shall examine

the effect of a change in saving habits at a given supply of labour. Let us assume that capitalists begin to consume less, so that S is reduced. Then, in accordance with the principle of preservation of purchasing power, they must spend correspondingly more for the purchase of investment goods.

Increased demand for investment goods and reduced demand for consumer goods causes a rise in prices of the former and a fall in prices of the latter. As a result, the most expensively producing part of the capital equipment (i.e. that part where the unit cost of production is highest), which turns out consumer goods, comes to a halt, while equipment producing investment goods is more fully utilized, hiring workers dismissed from the consumer goods industry. Hence a reduction—on account of a change in saving habits—in capitalist consumption S, with a given supply of labour R, causes an increase in the output of investment goods i.

Connecting this with the argument of the preceding section, for the production of investment goods we obtain:

$$i = f(R,S) \tag{1}$$

where f is an increasing function of the supply of labour R and a decreasing function of capitalist consumption S, which in turn depends on saving habits. The function f obviously depends on the volume and composition of existing capital equipment in which the processes examined here take place.

4. Investments are generally made, not by the rentier, who saves, but by the entrepreneur, who borrows the rentier's purchasing power at a certain rate of interest. None the less, the output of investments goods in System I is determined, not by entrepreneurs, but by rentiers. If entrepreneurs wish to increase their investments, demand increases for purchasing power lent by rentiers (there are no other sources of purchasing power for investment goods in System I) and the rate of interest rises. But since the rate of saving does not depend—in accordance with our assumptions—on the rate of interest, the amount of savings cannot change; hence neither can purchasing power allocated to the output of investment goods increase, and so there is no reason to expand this output. The rate of interest will rise by so much as to make a number of projects no longer profitable, thereby causing the volume of investment plans to be reduced to the existing output of capital goods.

Thus the volume and structure of output here do not depend at all on the investment decisions of entrepreneurs. These decisions only influence the rate of interest. The formula which we now introduce, and which expresses equality between the volume of investment decisions and accumulation of capital, will therefore determine the level of the rate of interest p, while the output of investment goods i is already determined by equation (1).

The number of investment projects which pass the profitability test depends on the mutual relation at a given moment between prices of consumer goods, prices of investment goods, and wages (which are determinants of the expected gross profitability), and on the rate of interest p. Since from the previous argument it follows that the supply of labour R and capitalist consumption S entirely determine the relation of prices and wages, the volume of investment projects can be presented as the function $\psi(R, S, p)$. This function will naturally depend on 'new production combinations' (e.g. technological inventions), since they have a decisive influence on expected profitability. If, for instance, a great invention is made, the function ψ changes in such a manner that a greater number of projects will correspond to the same values of R, S, p.

Making the volume of investment projects, $\psi(R, S, p)$ equal the output of investment goods i we get:

$$\psi(R, S, p) = i \qquad (2)$$

enabling us to determine the rate of interest p at a given supply of labour R and capitalist consumption S, since the output of investment goods is already determined by these two factors through equation (1).

ψ is naturally a declining function of the rate of interest p, which simply means that an increase in the rate of interest *ceteris paribus* reduces the volume of investment projects.

If, under the influence of new production combinations, function ψ changes into function ψ_1, such that:

$$\psi_1(R, S, p) > \psi(R, S, p)$$

i.e. a greater volume of investment projects now corresponds to the same values R, S, p, then the rate of interest rises to the level at which the equation $\psi_1(R, S, p) = i$ is satisfied. The rising rate of interest eliminates a number of old projects in favour of new production combinations, thereby adjusting the volume of investment projects to

the output of investment goods, which is entirely determined by the supply of labour R and capitalist consumption S.

The interest rate p, determined by equations (1) and (2), we call the equilibrium rate of interest. The essence of this rate, adjustment of the demand by entrepreneurs for purchasing power to its supply by rentiers, is strictly connected with System I, in which the principle of preservation of purchasing power rules.

System II

1. We now examine a system with normal circulation of money issued by the central bank. For simplicity's sake we ignore money created by other banks (e.g. their cheques and endorsements), which in no way reduces the generality of our argument. We initially consider a case in which the central bank maintains a constant volume of money in circulation during the entire course of the processes examined here, in order to show that the typical behaviour of System II does not at all consist in credit inflation *sensu stricto*. Only in the final section of this chapter do we come closer to reality, assuming that the central bank increases money in circulation when the demand for money increases and reduces it in the opposite case (all of this is naturally effected by the bank's properly manipulating its rate of interest).

In contrast to System I, individual economic agents in System II hold cash reserves which can be increased or decreased. A cash reserve is necessary to run an enterprise at a given turnover smoothly. The volume of this reserve depends not only on the turnover of the enterprise, but also on the rate of interest. The higher the rate of interest, the smaller the cash reserve held by an enterprise at a given turnover. Hence if sales increase while the volume of money in circulation remains constant, that is, if the velocity of money circulation increases, the rate of interest rises, since there will be a tendency to increase reserves in the same relation, which must be counteracted by an increase in the rate of interest. The rate of interest in System II is determined in this way by the velocity of money circulation.

2. The rate of interest of System II, dependent on velocity of circulation—which we shall henceforth call the money rate—is naturally not the same as the equilibrium rate of interest, i.e. the rate which would be set if the principle of preservation of purchasing power were in force in this economic system. We must still explain whether and

how the money rate deviates from the equilibrium rate, and whether this deviation is permanent.

Let us assume that at a certain moment the money rate equals the equilibrium rate. Let us further imagine that the demand for purchasing power directed towards investment goods increases on account of new production combinations. In System I this would cause an increase in the rate of interest to a level at which this demand would be reduced to the former level, i.e. the equilibrium rate would rise.

Let us now examine whether the money rate will immediately follow the equilibrium rate. As soon as the money rate rises somewhat, the owners of money reserves offer small parts of these reserves to entrepreneurs making investments. We now assume, not to get lost in side issues, that entrepreneurs finance their investments continuously, i.e. they do not accumulate reserve funds but raise credits in small instalments as their respective investment projects advance, and spend the sums received. Money borrowed by the entrepreneur from the reserves of money-owners thereby immediately returns to the latter, who can offer entrepreneurs the next instalment of credit.

Hence a more rapid circulation of money creates additional purchasing power, making it possible to increase investment activity. This is naturally combined with an increase in the money rate of interest, which is an increasing function of velocity of circulation. However, if this function increases at a sufficiently low rate (i.e. if a sufficiently small rise in the money rate corresponds to a given change in the velocity of circulation), the money rate will still not reach equilibrium rate, and investment activity will remain at a higher level than before. But—as we shall show below—this increase in investments through the creation of additional purchasing power must cause a cumulative increase in prices and wages, owing to which the velocity of circulation in the end will increase by so much as to make the money rate equal the equilibrium rate. Then the system will reach the same final position as it would have achieved directly under the preservation of purchasing power.

3. We shall now examine more thoroughly the process which we outlined in section 2 above. Let us again assume that demand for purchasing power for investment purposes increases in connection with new production combinations, and that this purchasing power is created by increasing the velocity of money circulation. Apart from the old stream of purchasing power, an additional stream now flows

through money reserves, financing increased investment activity. The detailed course of this process is as follows:

Increased demand for investment goods causes an increase in their prices and there appears an increased demand for labour in the respective branches of industry. Wages go up and some workers are 'poached' from the production of consumer goods to the production of investment goods. (There is no reserve army of the unemployed here; this factor is only introduced in System III.) Since the production of consumer goods has now declined, their prices must rise to a level at which their smaller volume will suffice for the same number of workers now receiving higher money wages. The profits of capitalists increase here by the sum of additional purchasing power. Part is earned directly by the investment goods industry, part falls to capitalists from the consumer goods industry, whose incomes increase by the volume of increase in the wage bill in investment industries. (Indeed, the revenues of the consumer goods industry rise by the increase in the total wage bill, while its costs rise only by the increase in the wage bill of workers employed in it.) Thus the more is taken from money reserves for investments, the more returns in the form of realized profits.

This state of affairs does not last, however. On account of the increase in prices of consumer goods, there is now increased demand for labour in the consumer goods industry. Wages go up, and a number of workers now return to this industry from the investment goods sector. Production of the latter falls. In this way we return to the initial position, except that the general level of prices and wages has risen.

If investment activity had remained unchanged, these processes would have repeated themselves continuously, with successive 'poaching' of workers by the consumer and investment branches of industry endlessly pushing up the level of wages and prices. This does not happen, however, since velocity of money circulation increases on account of the rise in money value of sales, and, together with velocity, the money rate of interest also rises, sooner of later reaching the equilibrium rate. Then the volume of investment projects is reduced to the initial level (and naturally new production combinations are realized by cancelling other projects which are unprofitable at a higher rate of interest). The production of investment and consumer goods correspondingly establish themselves at their former levels.

System II—by the creation of purchasing power, a cumulative increase in prices and wages, and an increase in the velocity of money circulation and with it the money rate of interest—reaches the same

final equilibrium as is directly determined in System I as a consequence of an increase in the equilibrium rate of interest. We should note that in System II a definite overall level of prices corresponds to a given amount of money in circulation in the final position. This price level is determined by the condition that the velocity of money circulation must attain a level at which the money rate equals the equilibrium rate of interest.

4. Now we shall examine processes taking place in System II following a change in saving habits. Let us assume that at a given moment capitalists begin to consume less. In System I, as follows from its definition, the entire purchasing power thereby freed must immediately be allocated to the purchase of investment goods. In System II, on the other hand, processes opposite to those described in the last two sections take place, i.e. there is a destruction of purchasing power. If capitalists begin to consume less and do not immediately purchase more investment goods but temporarily retain these money reserves to subsequently offer them on the money market, it turns out that in the next moment they no longer have anything to offer, since the less they spend on consumption, the less flows to their money reserves.

The detailed course of this process is as follows. The consumer goods industry does not find customers for articles previously consumed by capitalists, and hence the prices of consumer goods must fall to a level at which workers will also be able to purchase this remainder from their wages. As a result, profits in the consumer goods industry fall by an amount previously obtained for part of capitalist consumption, from which the latter have now resigned. Hence the total profits of capitalists decline by the sum of their additional savings. The less capitalists spend on consumption, the less profit also flows to them.

This is not all, however. The fall in the prices of consumer goods with temporarily unchanged money wages leads to a reduction of employment in the consumer goods industry. The cut in wages against this background makes possible the hiring of workers dismissed from the consumer goods industry by the investment goods industry. Now, however, the production of the latter does not find customers and the prices of these goods fall. This causes workers to be dismissed from the investment goods industry, a further reduction in wages, a fall in the prices of consumer goods, renewed hiring of workers in the investment goods industry, a fall in prices of these products, etc. In short, there is a cumulative fall in prices and wages, which would last

without end if increased demand for investment goods did not supervene.

This does, indeed, happen: falling sales on account of the cumulative drop in prices and wages causes a fall in the velocity of circulation of money and, together with this, in the money rate of interest. This encourages entrepreneurs to make investments.[3] When the creation of purchasing power now necessary for this equals its 'destruction' which took place in previous processes, System II attains a position which would have been established immediately in System I. In this way equilibrium is reached with respect to the division of the labour force between the consumer goods industry and the investment goods industry corresponding to changed saving habits—the only equilibrium possible, since any other division of the labour force would cause perturbations similar to those described above. The money rate here equals the equilibrium rate in this final position. Indeed, the money rate is now at a level at which entrepreneurs make investments on a scale corresponding to the aforementioned equilibrium in the division of the labour force, and this is the level of the equilibrium rate, which is determined by equations (1) and (2). The first of these equations gives the volume of production of investment goods i with equilibrium in the division of the labour force between the consumer goods and investment goods industries, and the second determines the rate of interest at which entrepreneurs make investments at this level i.

5. We now move on to examine the process of absorption of labour in System II. Let us assume that an excess supply of labour appears in the market. Wages fall. In System I the purchasing power appropriated by capitalists must be spent immediately on investment goods. In System II, on the other hand, a process of destruction of purchasing power takes place similar to that described in section 4, except that the purchasing power previously directed to consumption, not by capitalists, but by workers is not lost. Just as in the case of increased savings, the sums appropriated from workers and not immediately spent on the purchase of investment goods reduce the inflow of money reserves by the amount not spent on workers' wages.

The detailed course of this process will be as follows. The prices of consumer goods fall in the same relation as wages, for the purchasing power of workers has been reduced in this proportion, while the consumption of capitalists has remained unchanged. The total revenues of the consumer goods industry fall by the total sum of

reductions in workers' wages, its costs are reduced by the sum of wage reductions of the workers it employs, and hence profits are reduced by the sum of wage cuts in the investment goods industry. Since profits in the latter industry rise by the same amount, and as a result the total profits of capitalists remain unchanged as a consequence of wage cuts, the gross revenues of capitalists fall by the same amount equal to the reduction of wages.

What happens in the meantime with the excess labour? Employment has remained unchanged in the consumer goods industry, since prices there have fallen in the same proportion as wages. The investment goods industry, on the other hand, whose prices for the time being remained at the former level with reduced wages, begins to hire new workers. But increased production is not sold; hence the prices of investment goods also drop, which leads to the dismissal of the newly hired workers. Now there is another reduction in wages, a fall in prices of consumer goods, rehiring of workers in the investment goods industry, a fall in the price of its products, etc. This cumulative fall in prices and wages could go on endlessly were it not for the fact that, on account of the falling money value of sales, the velocity of money circulation declines and with it also the money rate of interest, which encourages entrepreneurs to make investments. When the purchasing power necessary for investment purposes equals the 'loss' of workers' purchasing power, System II attains a position which would have been established immediately in System I. In this way the excess supply of labour is completely absorbed. One can show, as at the end of the preceding section, that the money rate here reaches the level of the equilibrium rate of interest in this final position.

6. As we see, System II reacts to a change of parameter values with much more complicated perturbations than System I, reaching in the end, however, the same position of new equilibrium. Hence the output of investment goods i in this final position is determined by equation (1), and the money rate of interest p by equation (2). This is the essential meaning of the proposition that the money rate in this final position equals the equilibrium rate of interest.

It follows from the above that, at a given volume of money in circulation, to this position of equilibrium in System II there corresponds a definite general level of prices. This must be a level at which the relation of the money value of sales to the volume of money in circulation (and hence velocity of circulation) is sufficiently high for the money rate of interest to satisfy equations (1) and (2).

We shall now outline the differences between the course of perturbations in System I and II. System I reacts to a change in the value of parameters either by a shift in purchasing power from consumption to investments (with a cut in wage rates or a change in saving habits), or only by adjusting the volume of investment decisions to the existing division of labour (a rise in the equilibrium rate of interest with the appearance of new production combinations).

In System II a change of parameter values mainly causes creation or destruction of purchasing power. As a result, there is a shortage or excess of labour, which leads to the cumulative rise or fall of prices and wages, hence also of the money value of sales and velocity of money circulation. But the money rate of interest—which is its rising function—moves in the same direction as velocity of money circulation, and this movement restores equilibrium. In the creation of purchasing power for investment purposes an increase in the money rate to the level of the equilibrium rate of interest reduces the volume of investment projects to the former level. In cases of the destruction of purchasing power with increased savings or a cut in wages, a fall in the money rate encourages entrepreneurs to invest, creating purchasing power in the amount previously 'lost'; in this way purchasing power is ultimately shifted from consumption to investments.

7. So far we have assumed that the amount of money in circulation does not change, i.e. that the central bank, always adjusting its rate to the market money rate, neither increases nor reduces its credits. We now abandon this assumption and consider the possibility of expansion and contraction of credits by the central bank. First of all, we must note that this changes nothing in the dependence of the money rate of interest on the velocity of circulation of money. In fact, we introduced this dependence with the following argument: when sales increase, there is a tendency to increase cash reserves in the same proportion, and hence with a constant volume of money in circulation the money rate must rise sufficiently to balance this tendency. But the same argument can be applied when reserves increase, but more slowly than sales; the money rate must rise then also.

Hence, if the central bank keeps its rate constant with increasing overall volume of sales, money in circulation, i.e. bank credits, must increase in the same proportion. If the bank expands its credits more slowly, however, it must increase its rate, but less than the rate would rise when credits, and hence money in circulation, remain constant. One can assume that the central bank indeed pursues such a policy:

with an increase in sales it will increase the amount of credits, simultaneously increasing its rate of interest.

Then, however, the expansion and contraction of credits changes nothing in our previous argument, since the basic premiss—increasing the money rate of interest with an increase in money volume of sales—still holds. Let us examine, for example, the creation of purchasing power for investment purposes. This is now effected by increasing both the velocity and volume of money in circulation. There follows a cumulative increase in prices and wages, hence also in the money volume of sales, accompanied by an ever greater expansion of credits by the central bank, as well as an increase in its rate of interest. Hence in the end it must reach the level of the equilibrium rate.

But what would happen if the central bank persisted in keeping its rate of interest unchanged? Then the cumulative increase of prices, wages, and money value of sales would last indefinitely, and together with this credits would also increase without end: credit inflation would turn into hyper-inflation.

However, if we leave out this case, which is inconsistent with our assumption concerning the policy of the central bank, we can say that credit inflation in System II does not essentially change either the course of perturbations or their final result. The latter must still satisfy the equations:

$$i=f(R, S) \tag{1}$$

$$\psi(R, S, p)=i \tag{2}$$

which say that the money rate p (naturally coincident with the rate of the central bank) then equals the equilibrium rate of interest.

If the policy of the central bank is known, i.e. if we know how it raises its interest rate with the increase in money volume of sales, then a strictly determined general level of prices will correspond to this position of equilibrium. This must be a level for the money volume of sales to reach the value at which the rate of interest of the central bank equals the equilibrium rate of interest.

System III

1. Every excess supply of labour in System II causes a fall in money wages and thereby touches off a mechanism eliminating unemployment. The main transmission gear here is the money rate of interest, which falls along with the money volume of sales. This is the essence of

arriving at equilibrium identical with the one which would be established in System I. In reality, however, we observe that, as long as it remains unchanged, existing unemployment does not 'pressure' the market. Without going into the reasons for this, we shall continue to study System II, except that now it permits the existence of some reserve army of the unemployed. This we call System III.

2. As before, we denote the total available supply of labour by R. Let us assume that the actual employment is r, while $R-r$ will be unemployment *not* pressuring the market. We call quasi-equilibrium that position of System III which is identical with the position of equilibrium in System II at a level of available labour force equal to r. Hence for a position of quasi-equilibrium the following equations are satisfied:

$$i=f(r, S) \tag{1a}$$

$$\psi(r, S, p)=i \tag{2a}$$

where i is the production of investment goods, S the constant consumption of capitalists, and p the money rate of interest. From the fact that p satisfies equation (2a), in which the production of investment goods i has a value determined by equation (1a), it follows that there is no creation or destruction of purchasing power here. We can describe this state of affairs by saying that the money rate here equals the quasi-equilibrium rate of interest, i.e. the rate satisfying equations (1a) and (2a).

Quasi-equilibrium is determined only when the actual employment r is given. Hence in System III an infinite number of quasi-equilibria may correspond to any given supply of labour R. This indeterminateness can be eliminated by introducing an additional assumption corresponding to reality. We assume that, when moving from one possible quasi-equilibrium to another at which unemployment will be smaller, money wage rates rise in a particular way. Namely, while the *existing* unemployment does not exert any pressure on the market, we postulate that *changes* in unemployment cause a definite increase or fall in money wages, depending on the direction and volume of these changes.

It follows from this assumption that a strictly determined level of money wages corresponds to every level of employment r at a given total supply of labour R. However, since any given set of values r, S will determine the relation of prices of consumer and investment goods to wages as well as the respective volumes of output of these goods, the

money volume of sales is a function of R, r, S. But, given the policy of the central bank, the money rate of interest is again a function of the volume of these sales, so that one can write the equation:

$$p = \eta\,(R, r, S) \qquad (3)$$

where η is an increasing function of employment r, since with its increase the level of money wages, the relation of prices to wages, and the money volume of sales all simultaneously rise.

Equation (3), together with equations (1a) and (2a), enables us to determine employment r, the production of capital goods i, and the rate of interest p, if we know the total supply of available labour R and the consumption of capitalists S—i.e. with its help quasi-equilibrium is strictly determined.[4]

3. Let us imagine that new production combinations appear, leading to the tendency to undertake a greater number of investment projects. Just as in System II, purchasing power will be created in System III for investment purposes by increasing the velocity and volume of money in circulation. A detailed course of this process is as follows.

The increased demand for investment goods leads to their prices rising in relation to wages. Consequently, demand for labour appears in the investment industries, which is met, not, as in System II, by 'poaching' workers from the consumer goods industry, but from the reserve of the unemployed. Demand for consumer goods rises due to increased employment, their prices rise in relation to wages (i.e. real wage rates fall), and the consumer goods industry increases its output, drawing from the reserve of the unemployed. Money wages—in line with our assumptions—also increase during these processes in connection with the reduction in unemployment. This naturally affects the movement of prices: besides the initial increase, which caused a rise in the relation of prices to wages, making the increase in employment possible, prices must now rise additionally in the same proportion as wages.

The profit of capitalists increases on account of these processes by the sum of purchasing power created for investment purposes: part of it is earned directly by the investment goods industry, the rest—equal to the sum of wages in this industry—by the consumer goods industry. (Indeed, the revenues of the consumer goods industry increase by the same amount as the increase in the total sum of wages, but its cost only by the sum of wages of workers employed by it.) In this way the greater

the flow of purchasing power to output, the more returns in the form of earned profits.

Together with the execution of a greater number of projects than before, i.e. with an increase in the production of investment goods, a factor appears, however, which restrains this increase. With the rise in prices and volume of total output, the money rate also increases, and this inhibits the completion of some projects. A new quasi-equilibrium is established when the production of investment goods reaches a level i_1, that is 'permitted' by the corresponding (through the money value of sales) money rate p_1. If the output of investment goods i were less than i_1, then the money value of sales would also be less. Thus the money rate p would be lower than p_1 and would permit a volume of investment projects greater than i_1, and therefore still greater than i, and so expansion would continue. In other words, the expansion will last as long as the money rate does not reach the new quasi-equilibrium rate of interest.

This outline of the mechanism of quasi-equilibrium is not precise owing to omission of one important factor: the increased output and rise in prices in relation to wages in turn increase profitability, which additionally stimulates investment activity (on top of 'new production combinations'). Therefore, quasi-equilibrium will be established at a higher level of output of investment goods i and interest rate p than that which follows from the earlier argument.

We see that—in contrast to System II—the appearance of new production combinations causes a permanent increase in the output of investment goods in System III. This takes place with an increase of employment and simultaneous rise in the output of consumer goods. The real profit of capitalists increases on account both of the expansion of total output and of the fall in real wage rates (prices of consumer goods rise more than money wages). With constant capitalist consumption, this increase in real profits is equal to the increase in the output of investment goods.

4. Let us now examine the effects of increased saving in System III. Just as in System II, reduced capitalist consumption, S, generates a loss in purchasing power. The prices of consumer goods decline to a level at which workers can purchase goods not consumed by capitalists. As a result, capitalist profits fall by the amount previously spent by them on consumption which they have now relinquished. The less capitalists spend on consumption, the smaller profits they earn.

The fall in prices of consumer goods in relation to wages causes a reduction of employment in the consumer goods industry. Unemployment rises and money wages fall accordingly, thus giving rise to an additional reduction in the prices of consumer goods (which hence fall still more than wages). But this fall in prices, wages, and output, and thus in the money value of sales, is followed by a reduction in the money rate of interest, which encourages expansion of investment activity. A new quasi-equilibrium is established as follows: such a number of workers dismissed in the consumer goods industry enter the reserve of the unemployed that the accompanying reduction of the money rate of interest (together with a fall in the money volume of sales) suffices to increase the output of investment goods to a level allowing absorption of the rest of those dismissed.

One should also note that profitability will decline along with the reduced volume of output and with a sharper fall in prices than wages. This restrains the expansion of investment activity and hence works in the direction of establishing quasi-equilibrium at a lower level of output of investment goods i, employment r, and the rate of interest p than follows from the above argument. The output of investment goods may even establish itself at a level lower than before the change in saving habits.

As we can see, on account of increased savings System III moves to a new quasi-equilibrium which is characterized by a lower aggregate employment and output. In some cases output of investment goods may also decline. Even in the case of an increase in the output of investment goods i, however, this increase does not compensate in real profit $S+i$ for the fall in capitalist consumption S: the fall in total output and the increase in real wage rates (due to a sharper decline in the prices of consumer goods than wages) means that real profit is less than in the former quasi-equilibrium.

Conclusion

In accordance with the aim of the present essay, we have only examined the formation of equilibrium (or quasi-equilibrium) within the *already existing capital equipment of definite but essentially arbitrary volume and structure.* The level and direction of investment activity which follow the establishment of equilibrium in general will not support the previous volume and structure of this capital equipment: investments in individual industries on the whole will not be

equal to the wear and tear of fixed capital in these industries. But the resulting change in the volume and structure of capital equipment transforms the functions f, ψ, and η, which appear in our basic equilibrium (or quasi-equilibrium) equations, and hence it affects the new position of equilibrium. Thus there will be a continual movement through a series of equilibria (or quasi-equilibria) until the final equilibrium is attained, i.e. a position in which investment activity no longer changes the volume and structure of capital equipment.[1] Indeed, this is not the only possibility, if we still consider the *time of construction* of new investment goods. Then it may also turn out that the movement through a series of successive quasi-equilibria will be cyclical, and hence the position of final equilibrium will never be attained. In my opinion these are proper business fluctuations.[2] A detailed analysis of all these questions is beyond the scope of this essay.[5]

[1] If growth in population and technical progress are taken into account, then this definition should be modified accordingly.

[2] See M. Kalecki, *Essay on the Business Cycle Theory* [this volume].

PART 5

CONFRONTATION WITH THE KEYNESIAN THEORY

Some Remarks on Keynes's Theory[1]
(1936)

1. Mr Keynes's book *The General Theory of Employment, Interest and Money* is, without any doubt, a turning-point in the history of economics. It can be roughly divided into two fundamental parts:

(1) the determination of short-period equilibrium with a given production apparatus, once the level of investment (per unit of time) is given;
(2) the determination of the volume of investment.

It seems that the first problem has been satisfactorily solved in Keynes's theory, even if some reticences and inexactitudes of exposition could give rise to some doubts. In this article I present my own interpretation of this part of Keynes's theory, arriving at his basic conclusions, following a slightly different route.

The matter is quite different as far as the second fundamental problem is concerned, namely, the analysis of the factors determining the level of investment. It is not only the exposition, but the construction itself, that reveals serious deficiencies, so that the problem remains, as we shall see, at least partly unsolved.

Before dealing with the key questions one should say a few words about the basic concepts and assumptions of Keynes's theory. Furthermore, some supplementary assumptions should be added to ease the task of presenting his theory.

The notion of a 'given production apparatus', which we have previously used, gives rise to some doubts, which should be cleared up. It has often been argued that we cannot assume a given production apparatus in the period of time under consideration because, if we do not deal with a stationary state, investments change the volume and structure of this production apparatus. The answer to this objection is simple. The analysis should concern a period short enough for the change of production apparatus to be small enough to allow us to ignore its influence on output, income, and so on. These magnitudes are actually measured at a point in time, and hence they do not depend on the length of the period of time which we take as given, while the increment in the production apparatus is, *ceteris paribus*, proportional to this length.

Next we have to take into account that Keynes considers all the time a closed system, thus omitting the influence of foreign trade. We furthermore presume that workers do not save and that they do not live beyond their means. The saving of workers surely does not play any important role in economic processes, whereas if we take this saving into account it will obscure some typical characteristics of the functioning of the capitalist economy in general, and above all will make Keynes's theory less clear.

Keynes uses as *numéraire* the so-called wage unit, that is, the wage rate per man-hour, and he assumes for the sake of simplicity that the wage rates for various kinds of labour remain in a constant relation to one another. Thus if the wage rate is, say, zl 0.5, and the price of a kilogram of one commodity is zl 2, it means that the price of this commodity is 4 wage units. This way of accounting for the value of commodities has a deeper significance, because Keynes, in a subsequent part of his theory, shows that a movement of wages induces a proportional movement of prices. By expressing everything in wage units, therefore, Keynes eliminates one of the most important factors in the general movement of prices. We shall return to this matter later. For the time being the reader can consider the wage unit as constant, that is to say, assume that money wages do not vary. Only later shall we consider the effect of a change in the wage unit.

A fundamental aspect of Keynes's theory is the assumption of the existence of a reserve of unemployed workers, which is in strict relation to the previous considerations. If a fall in money wages due to unemployment leads to an equi-proportional fall in prices, there is no tendency to absorb unemployment. However, for the time being, as we have just pointed out, we assume money wages to be constant, 'until further notice'; therefore we can assume the existence of a reserve army of unemployed workers without any further consideration.

2. Let us take the production apparatus as given. The level of production with this apparatus depends on the amount of employment and on the allocation of the labour force in the particular sectors of this apparatus. In every firm the level of production is determined by the intersection of the curve of marginal prime costs and the curve of marginal revenue (in the case of free competition the curve of marginal revenue will be a horizontal line with its abscissa equal to the price; here we will deal with a more general case, which includes also imperfect competition).

We show the intersection point between the marginal revenue curve and the marginal cost curve as follows. From both prices and costs we deduct raw-material costs and the value of the apparatus which is used up in production:[1] in this way, we get the curves of marginal value-added[2] and of labour costs. It can now be said that the production of the firm is determined by the intersection of the marginal value-added curve and the curve of marginal labour cost. Both value-added and labour cost are expressed in wage units.

Let us now define the short-term equilibrium as the state in which the curves of marginal value-added and of marginal labour cost do not shift. Given the production apparatus, the position of the marginal labour cost curve is settled. Therefore, given the production apparatus, the short-term equilibrium is reached through the shifting of the marginal value-added curves, and equilibrium is reached when these curves do not tend to move any further.

In Fig. 11 the area $0ABC$ will be equal, as one can easily see, to the total value added (in wage units) obtained by the firm producing $0C$. The shaded area is the income of the capitalists (entrepreneurs and rentiers) of this firm, whereas the non-shaded area is the income of the workers. Therefore the sum of the areas $0ABC$ of all the firms of the economic system we have considered gives us the social income, expressed in wage units; while the sum of all shaded areas is the global income of the capitalists, and the sum of the unshaded areas is the global income of the workers. At the same time, social income is equal to the value of consumption plus investment; and, because we have assumed that workers do not save, the sum of all non-shaded areas coincides with the value of workers' consumption, while the sum of the shaded areas coincides with the value of capitalist consumption and investment.[3]

We are already able to show the crucial role of capitalist expenditure on consumption and investment in the determination of the short-period equilibrium. In this equilibrium the curve of marginal value-added remains, *ex definitione*, in a given position. As we have just

[1] But not the obsolescence which is independent of use.
[2] It is not the term used by Keynes.
[3] Capitalist income and investment are both gross. Therefore, in order to calculate both the income of capitalists and net investment, one must deduct that part of amortization which does not depend on the utilization of the productive equipment, but depends on its ageing, both 'physical' and 'moral' (i.e. as a result of technical progress).

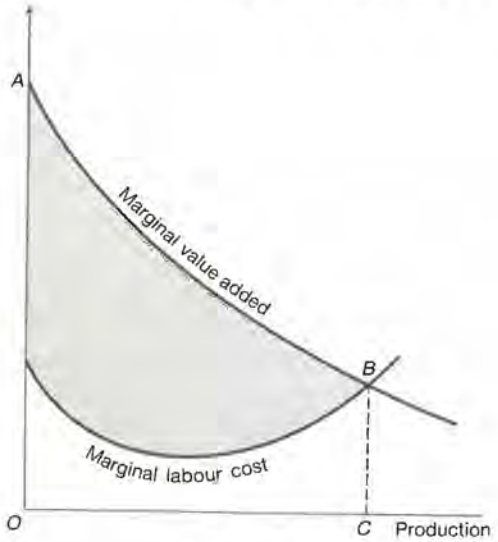


FIG. 11

shown, the sum of shaded areas amounts to capitalist expenditures for consumption and investment, while that of the non-shaded areas amounts to workers' expenditure on consumption. A spontaneous change in workers' expenditure cannot happen because (as we have assumed) they spend exactly as much as they have earned. But when capitalists are considered, a spontaneous change in expenditure is highly probable, either by means of spending reserves or by contracting new debts. Let us suppose that they raise their expenditure by a certain amount at a given moment. Then the marginal value-added curves will shift up to the point where the sum of the shaded areas matches the higher value of capitalist expenditure for consumption and investment. And since the sum of the shaded areas is at the same time the total income of capitalists, their higher expenditure 'will force' a higher income of the same amount for them.

Naturally, in the new short-period equilibrium, the employment and income of workers, and therefore the value of their consumption (measured in wage units), are higher than before. It follows that the demand for every kind of goods, both for investment as well as for consumption by capitalists and workers, has grown; therefore the shift of the curves of marginal value-added has had to take place in all branches of industry.

Therefore we see that the sum of capitalist expenditure determines the position of the value-added curves in such a way that the sum of the shaded areas—that is, of capitalist income—is equal to their expenditure. Thus the level of expenditure (expressed in wage units) is the crucial factor in determining the short-period equilibrium.

3. We have shown earlier that capitalist expenditure forces an income equal to the amount of this expenditure. Because this expenditure is formed by consumption and investment, and income is formed by consumption and savings, we can say also that investment forces savings whose value is equal to the value of this investment. It is clear that, generally, the capitalists who invest are not the ones who save. The investment of the former creates equal savings of the latter.

Now let us assume that the capitalists have a given saving habit; this means that to each level of capitalist global income, expressed in wage units, there will correspond a precisely determined distribution of this income between consumption and savings. As a result, each level of global savings corresponds also to a definite level of capitalist consumption. And, furthermore, it is easy to show that the total value of investment, expressed in wage units, determines the total amount of capitalist expenditure. In fact, the level of investment I forces an equal level of savings, and if capitalist consumption is, let us say, smaller than the level C corresponding to savings I, the capitalists will consume more; in this way they push their income up to the level $C+I$, at which the proportion between their consumption C and their savings I will correspond to their saving habit.

4. Now we see that investment I, expressed in wage units, determines *grosso modo* the short-period equilibrium once the production apparatus is given. In fact, given their saving habits, investment, strictly speaking, determines the capitalist consumption, C. We have therefore the sum of capitalist expenditures $C+I$ and its distribution between consumption and investment. To determine the short-period equilibrium in all its details we should also know the structure of investment (not just its total value) and the 'tastes' of capitalists and workers. If we take the 'tastes' as given, the only element not yet determined by the short-period equilibrium, corresponding to a given amount of investment expenditure I (expressed in wage units) in the unit of time, will be the distribution of these expenditures among the various kinds of investment. However, it seems to us that the change in the structure of investment expenditure will be of relatively minor importance in

relation to the global employment and social income Y, expressed in wage units. That is to say, we do not make a serious mistake in writing:

$$Y=f(I)$$

where f is an increasing function and its shape is determined by the volume and the structure of the production apparatus, by the capitalist saving habit, and by the tastes of capitalists and workers. The derivative of this function:

$$dY/dI=f'(I)$$

is the so-called Keynesian multiplier. If investment changes from the given level I to $I+\Delta I$, where ΔI is a small increase, income will change to the level $Y+\Delta If'(I)$.

5. Now let us see what Keynes's theory as expounded above (even if in a slightly different way from the original) offers. First of all, we can see that investment is the factor which decides the short-period equilibrium, and hence, at a certain moment, the size of employment and of social income. In fact the volume of investment will decide the amount of the labour force which will be absorbed by the existing production apparatus.[4] So we must look for the answer to the question why we have high or low levels of employment and output in the analysis of factors governing the volume of investment. The second part of Keynes's theory, which we will discuss later, is devoted to this analysis.

For the time being we must stress that, following the previous reasoning, saving does not determine investment but, on the contrary, it is precisely investment which creates savings. The equilibrium between the demand for capital and the supply of capital always exists, whatever the rate of interest, because investment always forces savings of the same amount.[5] Hence the rate of interest cannot be determined by the demand for and the supply of capital. Its level, according to Keynes's theory, must therefore be determined by other factors, namely the supply of and the demand for means of payment. If, for instance, a given amount of money is in circulation and social income grows, the demand for the means of payment will increase, and the rate of interest will rise as much as necessary to bring about the use of the

[4] The proposition that investment decides the global volume of production has been proved in a similar way to Keynes's in my *Eassy on the Business Cycle Theory* [see pp. 78–9 above].

[5] An analogous idea about the demand for and supply of capital has been put forward in my *Essay on the Business Cycle Theory*.

same quantity of money despite the higher level of turnover. This is a very general sketch of Keynes's theory of the money rate of interest, which we do not want to deal with in detail here.

Before turning to the analysis of factors determining the volume of investment, the problem of money wages still remains to be considered. We will do this also in a very general way. Hitherto we have assumed that the wage unit is a constant magnitude. What changes will the short-period equilibrium depicted above undergo if, for instance, this unit decreases because of a fall in the money wage? If we assume that the value of investment, expressed in wage units, does not change, it is obvious that nothing will change either in the short-period equilibrium as a whole, which, as we have previously shown, is completely determined by investment. Employment and production will remain unchanged; prices only, if expressed in money terms, will be reduced proportionally to the wage unit.

But is it really likely that investment, expressed in wage units, will not change if money wages, for instance, decrease? Keynes argues that this is what actually happens, but his arguments on this point are not sufficiently convincing. The most important counter-argument that can be put forward here is that a decrease in wages raises profitability, and may induce a rise in the volume of investment. Keynes, however, as we shall see later on, does not take sufficient account of the influence of *current* profitability on investment, and therefore he does not analyse this problem at all, which is here, beyond any doubt, the most crucial one. But, despite these deficiencies in his arguments, Keynes's statement that money wages do not influence, at least not directly, the determination of short-period equilibrium, seems correct. In order to show the likelihood of this, it is enough to assume that entrepreneurs do not infer *immediately* the consequences of an increase in profitability due to a decrease in wages in their investment activity. For if they do not raise investment immediately, short-period equilibrium remains unchanged in the mean time, and prices will drop in the same proportion as wages. Therefore the improvement in profitability will turn out to be illusory, and the basis for the growth of investment vanishes. If, after the wage reduction, entrepreneurs do not increase immediately the volume of investment, they will not increase it later either. In this way the changes of money wages cannot be a factor having any influence on the short-period equilibrium.[6]

[6] I have also shown the independence of production from the changes in money wages in my *Essay on the Business Cycle Theory*.

6. The fundamental concept of Keynes's theory of investment is the marginal efficiency of a given object of investment. Keynes defines it as that discount rate of the future expected gross income (the difference between proceeds and expenditures) of this object over its 'life' which makes the present value of those expected receipts equal to its actual market price. If, for instance, we buy machinery worth zl 1000 and we expect that it will be used for 5 years and that, during these years, it will probably produce for us an income of zl 300, zl 320, zl 350, zl 350, and zl 300, its marginal efficiency will be the discount rate, by means of which one gets zl 1000 as the actual value of the income of these 5 years. Naturally, the bigger the expected income and the lower the price of investment goods the higher will be this marginal efficiency of investment, which we will call the expected profitability. The volume of investment, then, is determined in Keynes's analysis by the equalization of the expected profitability and the rate of interest. If the expected profitability is at a certain moment greater than the rate of interest, investment is attractive and its level will rise. But owing to the greater demand for investment goods their prices will rise, and hence expected profitability will fall. Investment finally reaches the level at which prices of investment goods equalize the expected profitability and the rate of interest.

This simple concept has two serious deficiencies. First, it does not say anything about the sphere of investment *decisions* of the entrepreneur, who makes his calculations in 'disequilibrium' on the basis of *existing* market prices of investment goods. It shows only that, if the expected profitablity, calculated on the basis of this price level, is not equal to the rate of interest, a change in the level of investment will occur. This will transform the existing situation into one in which expected profitability *is equal to* the rate of interest. Using the terminology of Swedish economists, one can say that Keynes's theory determines only the *ex post* level of investment, but that it does not say anything about its *ex ante* level.

But this is not the end. In the subsequent analysis new difficulties emerge. Let us suppose that in the original situation the expected profitability was higher than the rate of interest and that investment increases. This generates such a rise in the prices of investment goods that the expected profitability, calculated on the basis of these new prices and of the expected incomes in the *initial situation*, is equal to the rate of interest. Now we must take into account the fact that the growth of investment not only generates an increase in the prices of investment goods but also, according to the first part of Keynes's theory which we have explained above, stimulates a general recovery, producing a rise in prices and output in all sectors. However, because, as Keynes holds in another part of his book, 'the facts of the existing situation enter, in a sense disproportionately, into the formation of our long-term expectations',[2] the expectations will become more optimistic and a difference between the marginal efficiency of investment and the rate of interest will arise again. 'Equilibrium', then, is not reached, and the growth of investment will still persist (we are dealing here, as may easily be seen, with a cumulative Wicksellian process).

We see, therefore, that Keynes's concept, which tells us only how high investment should be in order that a certain disequilibrium may turn into equilibrium, meets a serious difficulty along this path also. In fact, the growth of investment in no way results in a process leading the system toward equilibrium.

Thus it is difficult to consider Keynes's solution of the investment problem to be satisfactory. The reason for this failure lies in an approach which is basically static to a matter which is by its nature dynamic. Keynes takes as given the state of the expectations of returns, and from this he derives a certain definite level of investment, overlooking the effects that investment will in turn have on expectations. It is here that one can glimpse the road one must follow in order to build a realistic theory of investment. Its starting-point should be the solution of the problem of investment decisions, of *ex ante* investment. Let us suppose there to be, at a given moment, a certain state of expectations as to future incomes, a given price level of investment goods, and, finally, a given rate of interest. How great then will be the investment that entrepreneurs intend to undertake in a unit of time? Let us suppose that this problem has been solved (despite the fact that it seems impossible to do this without introducing some special assumptions on the psychology of entrepreneurs or on money market imperfections). A further development of the theory of investment could be as follows. The investment decisions corresponding to the initial state will not generally be equal to the actual volume of investment. Therefore, in the next period the volume of investment will generally be different and the short-period equilibrium will change together with it. Hence we should now deal with a state of expectations that in general will be different from that of the initial period, different prices of investment goods, and a different rate of interest. From these a new level of investment decisions will result—and so on.

The detailed analysis of this dynamic process goes beyond the scope of this article; one must emphasize, however, that the first part of Keynes's theory still holds. The level of investment in the dynamic process sketched here is subject to continuous change; but at every level of investment, employment and production will be determined along the lines of the first part of Keynes's theory. Keynes did not explain precisely what causes changes in investment, but, on the other hand, he has fully examined the close link between these changes and global employment, production, and income movements.[3]

Essays in the Theory of Economic Fluctuations[1]

(1939)

Contents

Foreword

These essays, though formally independent, nevertheless constitute a whole. Each of them treats a problem which is interesting in itself, but at the same time it prepares the ground for the succeeding essays. In particular the first five essays lead up to the sixth, which contains a theory of the business cycle.

The following are reprinted (all with important alterations) by permission of the editors concerned: 'The Distribution of the National Income' from *Econometrica*, April 1938, 'The Principle of Increasing Risk' from *Economica*, November 1937, and 'A Theory of the Business Cycle' from *Review of Economic Studies*, February 1937.

I am very much indebted to Mrs Joan Robinson, whose comments have enabled me to make various improvements, and to Mr Brian Tew for improving the style. I have also to thank Mr P. Sraffa and Mr R. F. Kahn for valuable remarks.

M. KALECKI

Cambridge
June 1938

1. The Distribution of the National Income[1] [2]

Introduction

In this essay we investigate both statistically and analytically the relative share of manual labour in the national income. From the social point of view it would be more interesting to consider the share of labour as a whole: but it is the relative share of *manual* labour which is suitable for theoretical analysis.

For the same reason the national income is here given a slightly unorthodox meaning. First, as we are interested in the *home-produced* income alone, we exclude from national income that part which is derived from foreign investments. Further, we shall deal with *gross* income, by which is meant the income before deductions for maintenance and depreciation (gross income = net income + maintenance and depreciation).[2]

It is easy to see that the gross national home-produced income is equal to the value added by all industries of an economy. Usually the government[3] is treated as an 'industry' producing public services, but we shall not adopt this procedure here. Instead we shall mean by national income *the total value added by private enterprises* which we denote below by A.

The statistical data

1. The figures for Great Britain are based on Professor Bowley's *Wages and Income in the United Kingdom since 1860* (Cambridge University Press, 1937), and Mr Colin Clark's *National Income and Outlay* (London, Macmillan, 1937).

Using Professor Bowley's data on the distribution of national income (pp. 92, 139) and deducting from the total income the income from overseas (mentioned on p. 96), we obtain the relative share of manual labour[4] in home-produced income: 41.4% in 1880 and 39.4%

[1] This essay is an altered version of the article published in *Econometrica*, Apr. 1938. The statistical data differ from those quoted in this article owing either to the slightly altered meaning of some concepts (e.g. of the national income) or to new sources becoming available.

[2] For the sake of brevity we shall speak throughout the essay of 'depreciation' instead of 'maintenance and depreciation'.

[3] We mean here by the government all public authorities.

[4] Shop assistants excluded.

in 1913. These figures are for relative shares in *net* income; Professor Bowley does not give data on depreciation and gross income. The rate of increase of gross income in the period, 1880–1913, is, however, unlikely to differ much from that of net income; for the proportion of depreciation to net income in 1913 was only about 8%, and the changes in the volume of capital equipment and in the national income between 1880 and 1913 were such that this percentage could not have undergone a great proportional change within this period.[5] Thus the relative share of manual labour in gross income must have altered within the period in question similarly to that in net income. Professor Bowley's figures of national income contain also the value of governmental services, which should strictly be excluded for our present purpose, but this would for similar reasons only slightly alter the trend of the relative shares of manual labour from 1880 to 1913.[6] Thus it can be concluded from the above that the change in the relative share of manual labour in the national income in our sense (value added by private enterprises) was small.

The figures for 1911 and 1924–35 are obtained from Mr Colin Clark's data on 'Distribution of Income between Factors of Production, 1911 and 1924–35' (*National Income and Outlay*, p. 94), and on depreciation (pp. 86, 169), and expenditure on governmental services (p. 141) in these years. The relative shares here calculated differ from those given by Mr Clark (p. 94) in that they are taken in relation to *gross* home-produced income, from which expenditure on public services has been excluded.

From Table 6 we see that the relative share of manual labour in the national income in Great Britain showed a remarkable stability both in the long run and in the short period.

2. The figures for the USA are based on W. I. King, *The National Income and Its Purchasing Power* (New York, NBER, 1930) and S. Kuznets, *National Income and Capital Formation, 1919–1935* (New York, NBER, 1937).

[5] The real capital per head increased by about 25%, the real income per head by about 40% (Clark, *National Income and Outlay*, pp. 273 and 232), while the rate of depreciation was probably to some extent higher in 1913 than in 1880.

[6] The proportional rise in expenditure on administration, army, navy, etc. in Great Britain in the period considered was not much different from that in national income. See e.g. Bernard Mallet, *British Budgets, 1887–1913* (London, Macmillan, 1929), pp. 358 and 407.

Table 6. *Relative Share (%) of Manual Labour[a] in the National Income of Great Britain*

1911	40.7	1924	43.0	1928	43.0	1932	43.0
		1925	40.8	1929	42.4	1933	42.7
		1926	42.0	1930	41.1	1934	42.0
		1927	43.0	1931	43.7	1935	41.8

[a] Shop assistants excluded.

The relative share of wages[7] in the net national income[8] was, according to Dr King, 37.9% in 1909 and 40.2% in 1925. The change in the relative share of manual labour in the gross income less 'government-produced' services was probably not very different.

For the period 1919–34 Dr Kuznets's estimates are used. It is easy here to calculate 'national income' in our sense. We have taken 'income produced' by private industries including depreciation and maintenance (pp. 14, 80). A difficulty arises, however, in connection with wages being estimated separately only in 'selected industries': agriculture, mining, manufacturing, construction, and railways; for other industries they are given jointly with salaries (pp. 62–7).

In 1925 the wage bill in the 'selected industries' mentioned above was $17 milliards, while the total wage and salary bill (excluding government employees) was about $44 milliards. But according to Dr King's estimate the wage bill in trade, services, etc. amounted in 1925 to about $13 milliards, so that if we admit his figure we obtain: wages in 'selected industries' 17, in other industries 13, and total salaries $14 milliards. Now, as regards the amplitude of fluctuations, the wages in 'other industries' keep the middle position between wages in 'selected industries' and total salaries. Thus they are likely to fluctuate more or less proportionally to the total wage and salary bill. With this hypothesis it is possible to estimate roughly the wage bill in 'other industries' throughout the period considered. Adding the results to the wage bill in 'selected industries' as given by Dr Kuznets, we obtain the hypothetical total wage bill in the period 1919–34 and find its relative share in the national income. The figures obtained are given in Table 7.

[7] Shop assistants included.

[8] *The National Income and its Purchasing Power*, p. 74. We have excluded from income the services of durable consumer goods, which King treats as a part of national income (he calls this part 'imputed income').

Table 7. *Relative Share (%) of Manual Labour*[a] *in the National Income of the USA*

1919	34.9	1923	39.3	1927	37.0	1931	34.9
1920	37.4	1924	37.6	1928	35.8	1932	36.0
1921	35.0	1925	37.1	1929	36.1	1933	37.2
1922	37.0	1926	36.7	1930	35.0	1934	35.8

[a] Shop assistants included.

These figures represent, of course, only a rough estimate, but they are adequate in order to show the stability of the relative share of manual labour in the period considered.

We see that in the USA, as in Great Britain, the relative share of wages in the national income shows only small variations both in the long and in the short run. We shall now try to explain this 'law', and to establish the conditions under which it is valid.

The degree of monopoly and the distribution of the product of industry

1. Let us consider an enterprise with a given capital equipment which produces at a given moment an output x and sells it at a price p.[9]

If we denote the entrepreneurial income (inclusive of dividends) per unit of output by e_a, the average 'overhead' costs (interest, depreciation, and salaries) by o_a, and the average wage and raw-material cost by w_a and r_a respectively, we have:

$$p = e_a + o_a + w_a + r_a$$

Further, the short-period marginal costs m (i.e. the cost of producing an additional unit of product with a given capital equipment) is made up of the sum of the short-period marginal cost of 'overheads' o_m, wages w_m, and raw-materials r_m.

$$m = o_m + w_m + r_m$$

We subtract the second equation from the first and obtain:

$$p - m = e_a + (o_a - o_m) + (w_a - w_m) + (r_a - r_m) \qquad (1)$$

[9] We mean here by p the 'net price', i.e. the revenue per unit of product after deduction of advertising costs, etc.

Following Mr Lerner,[10] we shall call the 'degree of monopoly' of the enterprise, the ratio of the difference between price and marginal cost to price, or:

$$\mu = \frac{p - m}{p}$$

If marginal cost is equal to marginal revenue, μ is equal to the inverse of the elasticity of demand for the product of the enterprise. Substituting μ for $p - m/p$ in equation (1), and multiplying both sides by the output x, we get:

$$xp\mu = xe_a + x(o_a - o_m) + x(w_a - w_m) + x(r_a - r_m)$$

Such an equation can be written for each enterprise of an economy. Adding the equations for all enterprises we obtain:

$$\Sigma xp\mu = \Sigma xe_a + \Sigma x(o_a - o_m) + \Sigma x(w_a - w_m) + \Sigma x(r_a - r_m) \qquad (2)$$

The sum Σxe_a is the aggregate entrepreneurial income (inclusive of dividends). Further, the marginal 'overhead' cost is in general small in comparison with the average cost; thus $\Sigma x(o_a - o_m)$ can be represented by $(1 - \beta)O$, where O is the aggregate overhead cost (interest, depreciation, and salaries), and β a small positive fraction. The average cost of raw materials can be supposed approximately constant and consequently the sum $\Sigma x(r_a - r_m)$ can be neglected. Most complicated are the problems connected with the member $\Sigma x(w_a - w_m)$; we must deal with them at some length.

2. The prevailing type of average wage cost curve seems to have the following shape. It is more or less horizontal up to a point corresponding to the 'practical capacity' of the plant, but slopes sharply upwards beyond it. This point is seldom reached—factories, for example, only exceptionally work in more than two shifts. Thus in enterprises of this type $w_a - w_m$ is small in comparison with w_a.

Of course, in some industries the situation is different. Those producing basic raw materials (agriculture and mining) are normally subject to diminishing returns, and $w_a - w_m$ is usually negative and not small as compared with w_a in the enterprises concerned. Other industries have, on the other hand, distinctly falling average wage costs

[10] "The Concept of Monopoly and the Measurement of Monopoly Power', *Review of Economic Studies*, June 1934.

until 'practical capacity' is reached (e.g. railways), and here $w_a - w_m$ is positive and not small in relation to w_a.

It is now easy to see that if wage cost curves of the first type represent a large part of the aggregate wage bill W, the sum $\Sigma x(w_a - w_m)$ is likely to be small in comparison with W. For then in most enterprises $\frac{w_a - w_m}{w_a}$ will be small, while the rest will be divided between those in which $\frac{w_a - w_m}{w_a}$ is positive and those in which it is negative.

We therefore conclude that $\Sigma x(w_a - w_m)$ can be represented by γW where γ is likely to be a small (positive or negative) fraction. In other words: conditions of approximately constant returns prevail, in the short period, in the economy as a whole.

3. On the basis of the above considerations we can now write equation (2) as follows:

$$\Sigma xp\mu = E + (1-\beta)O + \gamma W$$

or:

$$\Sigma xp\mu = (E+O) - (\beta O - \gamma W)$$

where β and γ are small fractions.

It is obvious that βO is small in relation to $E+O$; and the same can be said of γW since, as the statistical data quoted above show, W is less than half the gross national income A and thus less than $A - W = E + O$. We can conclude that $\beta O - \gamma W$ is small in comparison with $E+O$, and therefore:

$$\Sigma xp\mu = E + O$$

can be regarded as a good approximation. Now let us divide both sides of this equation by the aggregate turnover $T = \Sigma xp$.

$$\frac{\Sigma xp\mu}{\Sigma xp} = \frac{E+O}{T}$$

The expression on the left-hand side of this equation is the weighted average of the degrees of monopoly μ, which we shall denote by $\bar{\mu}$. The sum $E+O$ is made up of profits, interest, depreciation, and salaries, and thus it is equal to gross capitalist income plus salaries.

We have thus the following proposition: The relative share of gross capitalist income and salaries in the aggregate turnover is with great

approximation equal to the average degree of monopoly:

$$\bar{\mu} = \frac{E+O}{T} \tag{3}$$

Some remarks are still necessary on the notion of the turnover T. In our above argument, 'enterprise' really meant, not the firm, but a unit producing marketable goods—for example, spinning and weaving mills which belong to the same firm must be considered separate 'enterprises'. Indeed, such a weaving mill in its pricing would account the yarn from its 'own' spinning mill at the market price, and consequently the formation of prices is here much as it would be if the two factories belonged to distinct firms.

Now it is important to stress that, with this definition of an 'enterprise', the turnover T is *not* dependent on the degree of integration of industry so long as markets for intermediate products are in existence. T is equal to the gross national income plus the aggregate cost of marketable raw-materials.

How is it possible for the degree of monopoly to determine the distribution of the product of industry?

1. The results obtained in the last section may seem paradoxical. In the case of free competition the average degree of monopoly $\bar{\mu}$ is equal to zero; thus equation (3) seems to show that free competition makes it impossible not only to earn profits and interest but even to cover depreciation and salaries—all gross income being absorbed by wages. This paradox is, however, only apparent. Formula (3) can be correct only when the assumptions on which it is based are fulfilled. According to these assumptions: (i) the short-period marginal-cost curve does not differ considerably in the majority of enterprises from the short-period average-cost curve of manual labour and raw materials up to a certain point corresponding to 'practical capacity'; (ii) the output in these enterprises is usually below this point. These assumptions are quite realistic, but such a state of affairs is possible only with the existence of monopoly or imperfect competition. If free competition prevails, the second condition cannot be fulfilled; enterprises must close down or maintain such a degree of employment that the marginal cost is higher than the average cost of manual labour and raw materials.

In the real world an enterprise is seldom employed beyond the 'practical capacity', a fact which is therefore a demonstration of general

market imperfection and widespread monopolies or oligopolies. Our formula, though quite realistic, is not applicable in the case of free competition.

The second question which may be raised is of a more complex character. According to our formula, the distribution of the product of industry is at every moment determined by the degree of monopoly. Our formula therefore holds both for the short period and in the long run, even though it was deduced on the basis of, so to speak, pure short-period considerations. And, contrary to the usual view, neither inventions nor the elasticity of substitution between capital and labour have any influence on the distribution of income.

The source of the conflict between our theory and the orthodox view may be explained thus: (1) The long-period analysis of distribution is generally conducted on the basis of oversimplified representation of output as a function of only two variables—capital (taken *in abstracto*) and labour. In this way, the short-period cost curves are, as we shall see at once, excluded artificially from this analysis. (2) On the basis of our assumptions, these curves have a special shape which makes for the elimination of factors other than the degree of monopoly from the mechanism of distribution. To clarify the problems concerned, we shall now consider the dependence of the long-run distribution of the product of industry on the shape of the short-period cost curves.

2. A particular commodity can be produced with various types of equipment, requiring more or less labour and raw materials per unit of product. (A change in the scale of plant is also considered a variation in the type of equipment.) The conditions of production are, however, determined not only by the choice of the type of equipment but also by the intensity with which it is used. Not only may the kind of machinery be varied, but it is also possible, for example, to work with the same machinery in either one or two shifts.

Let us assume for a moment free competition, and draw for each alternative type of equipment which can be applied in the production of the commodity considered a short-period marginal-cost curve and a short-period average-cost curve of manual labour and raw materials (Fig. 12). The shaded area then represents the value of net capitalist income, depreciation, and salaries, while the unshaded area $LMN0$ represents the cost of manual labour and raw materials.

To determine the position of long-period equilibrium, we define first for each type of equipment the level of prices at which the shaded area

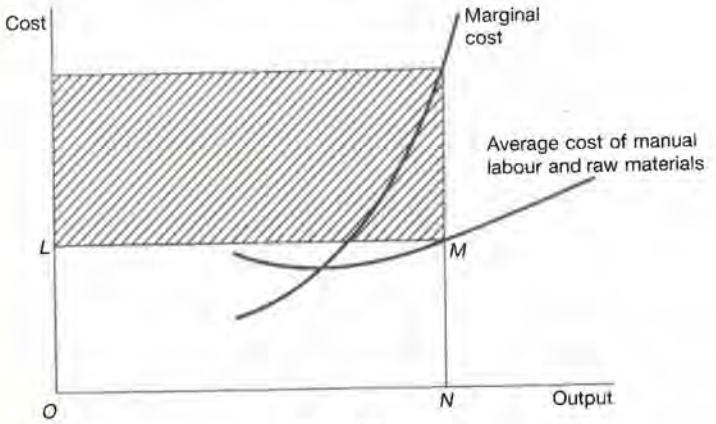


FIG. 12

covers salaries, depreciation, interest, and normal profit (i.e. the rate of profit at which the industry in question neither expands nor contracts). We shall call this price the normal price attached to a given type of equipment, and the corresponding use of this equipment, its normal use.[11] We choose, of all types of equipment, that to which the lowest normal price is attached. It is easy to see that the normal use of this type of equipment represents the long-run equilibrium. It is clear now that the shape of the short-period marginal-cost curves corresponding to various types of equipment influences the formation of long-run equilibrium.

If some change in basic data takes place, e.g. if the rate of interest alters or a new invention occurs, the long-run equilibrium is shifted; a new type of equipment is used in a 'normal' way, and in general the relation of the shaded and unshaded areas will be different from that in the initial position. This is quite in accordance with the prevailing long-run theory of distribution. We shall see, however, that such is not the case with the peculiar shape of marginal-cost curves assumed in the deduction of formula (3), and if we admit, instead of free competition, a certain given degree of monopoly.

[11] It is easy to see that with free competition the normal use coincides with the so-called 'optimum' use.

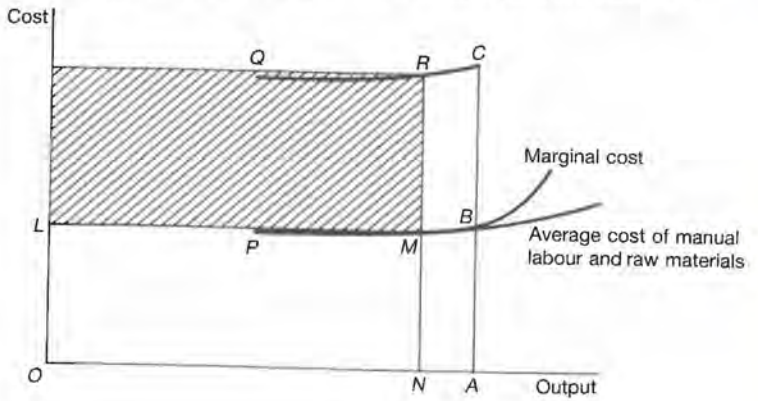


FIG. 13

We take for granted that the short-period marginal-cost curve does not differ appreciably from the average-cost curve of manual labour and raw materials, below point A (Fig. 13). We represent them therefore by the same thick curve PMB.

With a given degree of monopoly the relation of price to marginal cost is a constant $1/(1-\mu)$. Thus, if output remains below OA, the price corresponding to it is represented by the curve QRC, whose ordinates are proportionate to those of the curve PMB. The ratio of the shaded area, representing profits, interest, depreciation, and salaries, to the unshaded area, representing wages and the cost of raw materials, is equal to $1/(1-\mu)$. We define, in exactly the same way as before, the normal use for each type of equipment as that at which normal profit is earned. The long-run equilibrium is again represented by the normal use of such a type of equipment that, with a given degree of monopoly, it is impossible to earn profits higher than normal by employing a different type. If the basic data alter, the new long-run equilibrium is represented by the normal use of a different type of equipment. The long-run equilibrium price of the product alters too, but not its relation to the average cost of manual labour and raw-materials, because for all types of equipment the marginal-cost curve coincides with the average-cost curve of manual labour and raw-materials, and the degree of monopoly is supposed to be given. In this way the distribution of the product among factors, as expressed by the relation of the shaded to the unshaded area, remains unaffected by changes of basic data so long

as the degree of monopoly is unaltered and the use of equipment in the long-run equilibrium does not reach point A.[12]

The change of basic data may, of course, influence the degree of monopoly. For instance, technical progress, by affecting the size of enterprises, influences the degree of monopoly in an industry. In this case such changes influence the distribution of income, but this is not in contradiction with our results, because it is via the degree of monopoly that the influence operates.

The distribution of the national income

1. Our aim in this essay is to investigate the changes of the relative share of the wage bill W in the national income A. The difference $A-W$ is of course equal to the sum of gross capitalist income and salaries. Thus equation (3) can be written as

$$\frac{A-W}{T}=\bar{\mu} \tag{3a}$$

In multiplying both sides by T/W we obtain

$$\frac{A-W}{W}=\bar{\mu}\cdot\frac{T}{W}$$

From this it follows that the relative share of manual labour in the national income is:

$$\frac{W}{A}=\frac{1}{1+\bar{\mu}\cdot\frac{T}{W}} \tag{4}$$

This formula shows at once that the increase in the degree of monopoly reduces the relative share of manual labour. The expression increases not only because of the rise in $\bar{\mu}$, but also because T/W is increased by a rise in the degree of monopoly since this raises prices in relation to wages.[3]

[12] It may be asked how it is possible for surplus capacity to exist in the long-run equilibrium without inducing firms to curtail their plant. The answer is that large-scale economies prevent the firms from reducing their plant below a certain limit, a state of affairs described by those writers who have shown that imperfect competition must cause equipment in the long run to be used below the 'optimum point'. See e.g. R. F. Harrod, 'Doctrines of Imperfect Competition', *Quarterly Journal of Economics*, May 1934.

2. Changes in T/W can, of course, be caused by influences other than changes in the degree of monopoly. A change in the price of 'basic raw-materials', i.e. of the products of agriculture and mining, in relation to wage costs in other industries, will clearly also have an important influence. It is easy to see that a rise in the prices of basic raw materials in relation to wage cost must result in an increase of *all* prices in relation to wage cost and consequently in an increase of T/W. On the other hand, T/W increases in a much lesser proportion than do basic raw-materials prices relative to wage costs. For in each stage of production prices increase (with a given degree of monopoly) proportionally to the sum of raw-material *and* wage costs.

It is obvious from formula (4) that with a given degree of monopoly the relative share of manual labour falls when T/W increases, and consequently that a rise in the prices of basic raw materials as compared with wage costs, by raising T/W, must lower the relative share of manual labour. (This may be seen also directly from formula (3a), according to which non-wage-earners' income $A-W$ changes with a given degree of monopoly proportionally to the turnover T. Thus if the ratio of turnover to wage bill T/W increases owing to a rise in the prices of basic raw-materials as compared with wage costs, $A-W/W$ must also increase.)

It has been noticed already that a rise in the prices of basic raw materials relative to wage costs causes an increase of T/W in a *much lesser* proportion. It is easy to see from formula (4) that the proportional fall in the relative share of manual labour in the national income is even smaller.

3. We have seen that: (1) a rise of the degree of monopoly causes a decrease in the relative share of manual labour W/A; (2) a rise in prices of basic raw materials in relation to wage costs causes a fall in W/A but in a much lesser proportion. We thus have here some reasons for the tendency of the relative share of manual labour in the national income towards stability. For the degree of monopoly does not undergo violent changes either in the long or the short run. The fluctuations in the prices of 'basic raw materials' in relation to wage costs, though strong, are, as stated above, only slighly reflected by changes in manual labour's relative share. But, of course, if the most unfavourable case of joint action of these factors occurs, the change in manual labour's relative share may be appreciable. We shall see below that the remarkable stability of the relative share of manual labour which we

notice in statistics is the result of these determinants working in opposite directions. This phenomenon occurred only by chance during the long period considered, and may cease in the future; but in the business cycle there seems to be a steady tendency for the conflict of these two forces to keep the fluctuations in relative share of manual labour within narrow limits.

Changes in the distribution of the national income in the long run

1. The increasing concentration of industry tends undoubtedly to raise the degree of monopoly in the long run. Many branches of industry become 'oligopolistic', and oligopolies are often transformed into cartels.

This tendency for the degree of monopoly to increase in the long run may, however, be offset by the diminishing imperfection of the market caused by the fall of transport costs in relation to prices, the standardization of goods, the organization of commodity exchanges, etc. In the *Spätkapitalismus* [phase of advanced capitalism], however, the first tendency has the upper hand, and the degree of monopoly tends to increase.

As concerns the secular trend of the relation of the prices of basic raw materials to wage costs, it is difficult to say anything definite a priori.

2. As we have seen in the first section above, the relative share of manual labour in the national income in Great Britain did not change appreciably between 1880 and 1913. It can be shown that the relation of the prices of basic raw materials to wage costs also did not alter in this period. For this purpose we shall compare Sauerbeck's index of wholesale prices with Mr Clark's index for the deflation of national income.[13] It is clear that the influence of raw-material prices as compared with that of wage costs is much greater upon the first index than upon the second. Now, between 1880 and 1913 both of these indices changed in the same proportion (increased by 6%), so that we can conclude that the prices of basic raw materials relative to wage costs did not change. Obviously, then, the degree of monopoly could not have undergone a substantial change between 1880 and 1913 since, with raw-material prices unaltered as compared with wage costs, such

[13] *National Income and Outlay*, p. 231.

a change would have been reflected in the relative share of manual labour in the national income.

Turning to the period 1913–35, Sauerbeck's index fell during that time by 2% while 'income prices' rose by about 60%,[14] which shows that there was a considerable fall in the prices of raw materials in relation to wage costs. Thus, since the relative share of manual labour was stationary between 1913 and 1935, the degree of monopoly must have substantially increased in this period. Had a fall in the prices of basic raw materials not occurred in the last 25 years, the relative share of manual labour would have tended to fall appreciably, and the recent economic and political development of Great Britain would have been quite different.

The course of events in the USA between 1909 and 1925 was similar. The relative share of manual labour was approximately stable. The wholesale all-commodity index increased in this period by about 50%, King's index of 'income prices' by about 80%.[15] Thus here again the degree of monopoly must have risen considerably, but its influence on the relative share of manual labour was counterbalanced by the fall of the prices of basic raw materials in relation to wage costs. It is, of course, not at all certain that in the future the rise in the degree of monopoly will continue to be compensated by a fall in the prices of 'basic raw materials'. If it is not, the relative share of manual labour will tend to decline.

Changes in the distribution of the national income during the business cycle

1. We shall here examine first the cyclical changes in the prices of basic raw materials in relation to wage costs.

The prices of the produce of agriculture and mining fluctuate much more violently than does the cost of labour in other industries. This is due to the fact that marginal-cost curves in agriculture and mining, as distinct from other sectors of the economy, slope steeply upwards. In addition, wages fluctuate much more in agriculture than in other industries during the business cycle. Consequently, basic raw-material prices rise relative to wage costs in the boom and fall in the slump.

Much more complicated is the question of the change of degree of monopoly during the trade cycle. It has recently been argued by

[14] Ibid., pp. 235, 204.
[15] *The National Income and its Purchasing Power*, pp. 74, 77.

Mr Harrod that the degree of monopoly increases in the boom and falls in the slump. In the slump, consumers 'resent and resist the curtailment of their wonted pleasures . . . . Their efforts to find cheapness become strenuous and eager. Nor are commercial firms exempt from this influence upon their purchase policy; they, too, have received a nasty jolt and must strain every nerve to reduce costs.'[16] Thus the imperfection of the market is reduced and the degree of monopoly diminished.

Mr Harrod was rightly criticized, in that there exist other factors which influence the degree of monopoly in the opposite direction. For instance, in the slump, cartels are created to save profits,[17] and this, of course, increases the degree of monopoly; but when trade revives they are dissolved because of improving prospects of independent activity and the emergence of outsiders.

More important still is the fact that, in spite of the fall of prices of raw materials and wages, some prices of finished goods tend to be relatively 'sticky' in the slump. This is for various reasons: entrepreneurs avoid price cuts because it may induce their competitors to do likewise; cartels are not afraid that outsiders will appear, etc. It can be stated, on the basis of data quoted above, that the influence of these factors in raising the degree of monopoly during the slump is stronger than that of the diminishing imperfection of the market.

Indeed, if we look at our data on the relative share of manual labour in the national income, we see that in general it does not change much during the business cycle. But the prices of basic raw materials fall in the slump and rise in the boom as compared with wages, and this tends to raise the relative share of manual labour in the slump and reduce it in the boom. If the relative share of manual labour remains more or less constant, it can be concluded that the degree of monopoly tends to increase in the depression and decline in the boom.

We now see that, as has already been mentioned, the apparent stability of manual labour's relative share during the cycle is in reality the effect of the opposite changes in the degree of monopoly and in the relation of the prices of basic raw materials to wages.[4]

2. The stability of the relative share of the wage bill W in the national income A in the short period has far-reaching consequences as regards the formation of the prices of finished goods. Let us divide in the

[16] *The Trade Cycle* (Oxford, Clarenden Press, 1936), pp. 86–7.
[17] Joan Robinson, review of Harrod, *The Trade Cycle*, in the *Economic Journal*, Dec. 1936.

equation:

$$\frac{W}{A} = \text{const}$$

both the numerator and the denominator of the left-hand side by an index of the volume of output of finished goods. Since the money value of the latter is the national income A, we obtain:

$$\frac{\text{index of average wage costs}}{\text{index of the prices of finished home-produced goods}^{18}} = \text{const.} \qquad (5)$$

Now, as stated above, conditions of approximately constant returns prevail in the short period in the economy as a whole. Thus the index of the average cost of manual labour does not depend appreciably on the level of output and employment, and, with a constant technique and intensity of work, does not differ much from the index of wage rates. Consequently equation (5) shows that, with constant technique and intensity of work, prices of finished home-produced commodities change approximately in the same proportion as wage rates. This result is clearly of great importance for the theory of real wages, and will be dealt with in more detail and supported statistically in the essay on 'Money and Real Wages' below. We now propose to apply it to the problem of the prices of investment and consumer goods.

3. Let us consider in an economy the sections which produce consumer and investment goods respectively (including in each the corresponding raw-material production). Since our argument throughout the essay is not confined to a closed system, formula (5) applies approximately to each of these two sections. Thus, if the technique of production and the intensity of work are unaltered, it may be concluded that the prices of consumer goods will move proportionally to wage rates in consumer goods industries. A similar development may be supposed to take place in the investment goods industries. It therefore follows that the ratio of the price indices of finished investment and consumer goods, p_i/p_c, is in the short period approximately equal to the ratio of indices of the corresponding wage

[18] All exported commodities must be here included in 'finished' goods. Further 'prices' are here, strictly speaking, differences between the actual prices of commodities and the cost of foreign raw materials used in their production.

rates r_i/r_c:

$$p_i/p_c = r_i/r_c$$

And since wage rates move more or less proportionally in the two sections,[19] marked cyclical fluctuations in p_i/p_c are unlikely. This result is not impaired if we allow for changes in the technique of production. If the increase in productivity due to technical changes differs in consumer goods industries from that in investment goods industries, this will, of course influence the movement of p_i/p_c, but this influence can operate only in the long run, and is not of a *cyclical* nature. In order to investigate the movement of p_i/p_c statistically, we have constructed indices of the prices of finished consumer and investment goods in the USA for the period 1919–35. The index of consumer goods prices is a weighted average of the indices of the cost of living and the prices of motor cars,[20] and that of investment goods is a weighted average of the building costs and the prices of movable equipment.[21]

The results are computed in Table 8. We see that variations in p_i/p_c are in general small. At any rate, contrary to prevailing views there was no tendency for p_i/p_c to fall in the 1930–3 depression.

It is usually supposed that the prices of investment goods fluctuate much more violently than those of consumer goods. This is due to the assumption that increasing marginal-cost curves prevail in the short period; for if such were the case the larger proportional fluctuations in the output of investment goods as compared with those in the output of consumer goods would lead to correspondingly larger fluctuations in the prices of investment goods. The statistical evidence of approximately proportional changes in the prices of the two types of goods indicates that the assumption of rising marginal-cost curves in the

[19] Wage rates in investment goods industries might be expected to fluctuate more, due to stronger changes in employment. In fact this is not the case, because trade unions are strongest in the heavy industry.

[20] The index of prices of motor cars is obtained from Dr Kuznets's *National Income and Capital Formation, 1919–35* by dividing the value of consumer durable commodities in current prices by their value in 1929 prices (p. 40). The indices of cost of living and prices of motor cars are weighted in the proportion 80:12 according to the 'composition of consumers' outlay' in 1929 (ibid., pp. 59).

[21] The price index of movable equipment is obtained by dividing the value of 'producer durable commodities' at current prices by their value at 1929 prices (ibid. 40). The indices of building costs and of prices of movable equipment are weighted in the proportion 2:1 according to the amounts spent on these two types of investment (inclusive of maintenance) in 1929 (ibid., pp. 40, 80).

Table 8. *Prices of Consumer and Investment Goods in the USA (1929 = 100)*

	p_c	p_i	$\frac{p_i}{p_c}$		p_c	p_i	$\frac{p_i}{p_c}$
1919	102	110	108	1928	100	97	97
1920	119	125	105	1929	100	100	100
1921	105	105	100	1930	96	97	101
1922	98	94	96	1931	87	94	108
1923	101	101	100	1932	78	82	105
1924	101	101	100	1933	76	78	103
1925	104	98	94	1934	80	85	106
1926	103	98	95	1935	83	86	104
1927	101	96	95				

short period is unrealistic, and indirectly supports our assumption about the shape of short-period marginal-cost curves.

The important consequence of the above is that, since p_i/p_c has no marked cyclical fluctuations, changes in the ratio of the prices of investment and consumer goods may be neglected in the theory of the trade cycle. We make use of this conclusion in the last essay.

Final remarks

The results arrived at in this essay have a more general aspect. A world in which the degree of monopoly determines the distribution of the national income is a world far removed from the pattern of free competition. Monopoly appears to be deeply rooted in the nature of the capitalist system: free competition, as an assumption, may be useful in the first stage of certain investigations, but as a description of the normal state of capitalist economy it is merely a myth.

2. Investment and Income[5]

General principles

1. The object of this essay is to clear up some questions arising out of the Keynesian theory of the multiplier. We shall first deal with the equality between the expenditure on investment I and the value of savings S which has been so much discussed since *The General Theory*

appeared. However, before embarking upon further argument we want to examine in detail one point often touched upon in this discussion: whether or not $I = S$ is a tautology. We define (as in the first essay, p. 235) the gross national income as the value added by all enterprises of an economy. Thus it is equal to total sales of all enterprises except those producing raw materials, i.e. to sales of goods to ultimate consumers + sales of newly produced fixed capital equipment + any increase in stocks and working capital. Sales of fixed capital equipment + increase in working capital and stocks may be called gross investment. Thus we have *by definition*:

National income = Sales of investment goods[22] + Sales of consumer goods

where both national income and investment are gross concepts (from which maintenance and depreciation must be subtracted in order to obtain net national income and net investment respectively). Further, we shall call saving the difference between the national income as defined above and the expenditure on consumption. Thus we have, again *by definition*:

Sales of investment goods + Sales of consumer goods = Saving + Expenditure by consumers

saving again being a gross concept. We have now the further equation:

Sales of consumer goods = Expenditure by consumers

which, however, is *not* a tautology since it represents the exchange process operating on the market of consumer goods (though it is an identity in the sense that it is fulfilled in all circumstances). Thus the equation derived from this exchange equation and the proceeding tautology:

Sales of investment goods = Saving

is also not a tautology. Now we take into account the exchange equation for the market of investment goods:

Sales of investment goods = Expenditure on investment

and we get finally:

Expenditure on investment = Saving

[22] Including increase in working capital and stocks. This type of investment does not often involve a sale, the increase of inventories of a firm being created by its own production. Such a case, however, may be considered as the firm's sale to itself.

or:

$$I = S$$

It is useful to show how an increase in expenditure on investment by ΔI causes—by means of the exchange process operating on the market of investment and consumer goods—saving S to increase by an amount ΔS equal to ΔI.

If in a certain period the expenditure on investment is I and in the next $I + \Delta I$, sales of investment goods must increase by ΔI. If the output of them was not changed, the total amount ΔI is an addition to the income of capitalists (entrepreneurs and rentiers), but if output and employment also increase, a part of ΔI is received by the workers. Out of the addition to income ΔI flowing to the investment goods industries, a part ΔS_1 is saved, while another part, $\Delta I - \Delta S_1$, is consumed. This last amount makes for an additional expenditure on consumer goods.

Consider now the consumer goods industries: a part of the total sales of consumer goods is bought by the capitalists and workers in consumer goods industries, the rest is purchased by the capitalists and workers in investment goods industries. And it is the value of this latter which is equal to the savings 'in consumer goods industries' S, for it is equal to the difference between the total sales of consumer goods and the expenditure on consumption by the capitalists and workers drawing income from their production. Thus an additional expenditure on consumption by the capitalists and workers in the investment goods industries creates an equal additional saving ΔS_2. We have:

$$\Delta I - \Delta S_1 = \Delta S_2$$

or:

$$\Delta I = \Delta S_1 + \Delta S_2 = \Delta S$$

and we see how an additional expenditure on investment ΔI creates an equal addition to saving ΔS.

2. It may be interesting to notice that the above equations are contained in the famous Marxian scheme of 'extended reproduction'.[23] Marx even considers the questions of how to provide 'means' for increased expenditure on investment.[24] It must be added, however, that the problems discussed here are treated by Marx from a rather

[23] *Capital*, ii, *The Process of Circulation of Capital*, London, Swan Sonnenschein, 1907, pp. 571–611. [24] Ibid., pp. 593.

special point of view. He is interested in finding out, with the help of exchange equations, the pace of investment in investment and consumer goods industries respectively, which is necessary in order to secure a steady expansion of output. (The rates of profit in both departments of industry are assumed to be equal throughout, and on this basis the process of expansion is constructed so as to make investment in each, at the end of every 'production–exchange cycle', equal to its saving so that there is no 'shift of capital' from consumer to investment goods industries or conversely.) Marx does not pay attention to the problem of what happens if investment is inadequate to secure the moving equilibrium, and therefore does not approach the idea of the key position of investment in the determination of the level of total output and employment.

Exactly the reverse attitude is represented by one of his eminent pupils, Rosa Luxemburg. In her *Akkumulation des Kapitals* she stressed the point that, if capitalists are saving, their profits can be 'realized' only if a corresponding amount is spent by them on investment. Luxemburg, however, considered impossible the persistence of net investment (at least in the long run) in a closed capitalist economy; thus, according to her, it is only the existence of exports to the non-capitalist countries which allows for the expansion of a capitalist system. The theory cannot be accepted as a whole, but the neccessity of covering the 'savings gap' by home investment or exports was outlined by her perhaps more clearly than anywhere else before the publication of Mr Keynes's *General Theory*.[6]

3. We tacitly assumed in Section 1 above that we were dealing with a closed economy. In an open economy the national income is equal to home sales of goods to consumers + home sales of (newly produced) fixed capital equipment + increase in working capital and stocks + foreign balance of goods and services. Following an argument analogous to that of the first paragraph, we obtain the equation:

$$\left.\begin{array}{l}\text{Expenditure on investment}\\ \text{Balance of foreign countries' expenditure}\end{array}\right\} = \text{Saving}$$

An increment in the balance of foreign countries' expenditure, home investment remaining constant, creates in the same way as shown in section 1 above an equal increment of savings. (This, I think, is the correct interpretation of the theory of Rosa Luxemburg.)

4. We simplified tacitly in another respect also our argument in section 1 above: we ignored the complications arising out of government income and expenditure. The value added by private enterprise does not coincide with the total income of capitalists and labour, for a part is transferred by taxation to the government.[25] We do *not* consider, as is often done, this part as the equivalent of consumption of government services. (We mean here by consumption only the voluntary spending for goods and services.) The government in turn spends its revenue partly on officials' salaries, doles for unemployed, etc., and interest on the public debt; while the rest of the revenue, being devoted to government investment[26] and to the increase in governmental claims, constitutes government saving.

Thus the consumption of people drawing their income from the government is included in consumption; a part of saving is done by the government; and a part of the output of investment goods is sold to the government. The national income can therefore be represented in the following two ways:

Private investment[27]	Private saving
Government investment	Governmental saving
Balance of foreign countries' expenditure	Consumption
Consumption	

Let us subtract from both sides government saving. As government investment less government saving constitutes the budget deficit or the 'balance of government expenditure', we obtain:

Private expenditure on investment	Private saving
Balance of government expenditure	Consumption
Balance of foreign countries' expenditure	
Consumption	

The sum of private saving plus (voluntary) consumption may be called private national income Y. It is equal to the value added by all enterprises less government saving, and also to the sum of all private incomes after the deduction of taxes.[28] It is this definition of 'national

[25] 'Government' here means all public authorities.
[26] Armaments, public buildings, etc.
[27] Including residential building.
[28] Both direct and indirect. Thus the value of consumption is here reckoned at prices from which excise, etc. have been deducted.

income' which we shall use in the following argument. The sum: private home investment + balance of foreign countries' expenditure + balance of government expenditure will be denoted by I, and private saving by S. Thus the equation:

$$I = S$$

refers now to investment in the above sense and to private saving.

It may be useful to show how the increase in the balance of government expenditure (the other two components of I remaining constant) creates an equal increase in private saving. Let us suppose, for example, that the government increases officials' salaries by ΔI by borrowing to that extent. The officials save out of their additional revenue ΔS_1 and spend $\Delta I - \Delta S_1$. Thus the sales by consumer goods industries to people other than capitalists and workers attached to these industries increases by the amount of officials' additional expenditure $\Delta I - \Delta S_1$. But the sales of consumer goods industries to 'outsiders' is equal to the saving of capitalists and workers attached to these industries. Consequently, savings 'in consumer goods industries' rise by $\Delta I - \Delta S_1$. Since the savings of officials increase by ΔS_1, total private saving rises by $\Delta I - \Delta S_1 + \Delta S_1 = \Delta I$, i.e. by the increment in the balance of government's expenditure.

It is interesting to notice that here the rise of 'investment' by ΔI (creating an equal increase in private saving) causes *directly* a rise of consumption by $\Delta I - \Delta S_1$. If the government spends the amount borrowed ΔI for additional dole payment, ΔS_1 may be supposed equal to zero, because dole receivers do not save. Then the rise of 'investment' by ΔI *directly* increases consumption also by ΔI.

5. Changes in the three components of I—private investment, the balance of governmental expenditure, and the balance of foreign countries' expenditure—are in general interconnected. The most typical interconnection is the influence of a 'primary' change in private investment on the other two components. An increment in home private investment, by raising employment and income, reduces dole payments and increases the tax revenue so that the deficit tends to fall. An increase in output and consumption also requires more foreign raw materials, foodstuffs, etc., which tends to diminish the balance of trade. Thus the stimulating influence of an increase in private home investment on employment and income is hampered by a decrease in the other two components of I.

Special assumptions

1. In our further argument we shall use some results reached in the first essay. We saw there that the relative share of manual labour in the national income shows great stability in a moderately long period. In the first essay we defined national income as the value added by all enterprises of an economy; now, however, we mean by it 'private national income', which is less than the value added by all enterprises by the amount of governmental saving. But since the latter bears a small proportion to the national income, the ratio of the wage bill to the 'private national income' Y is not appreciably changed.

The wage bill is the income of employed manual workers before the deduction of taxes. Their spendable income is thus less than the wage bill, but if changes in the system of taxation do not occur, we can assume that income approximately proportional to the wage bill. From that we can conclude that the ratio of manual workers' spendable income to Y, which we denote by a, must also show great stability. The rest of the national income represents the income of all non-wage earners after the deduction of taxes. We denote it by y; it includes the incomes of capitalists, salary-earners, and also dole receivers. We have then:

$$y=(1-a)Y^{29} \tag{6}$$

The savings of manual workers are so small that we can neglect them[30] and thus identify total private saving S with non-wage-earners' savings. Hence we can now write the investment–saving equation in the form:

$$I=S=s$$

But s is, of course, equal to the difference between income y and consumption c of non-wage-earners.

$$I=y-c \tag{7}$$

It is clear that equations (6) and (7) establish a functional relation between investment I and national income Y if such a relation exists between non-wage-earners' income y and the consumption out of it, c.

[29] Since a is equal to about 0.38 in Great Britain and about 0.32 in the USA (with shop assistants classified as manual labour), the stability of $1-a$ is much greater than that of a.

[30] a is in general smaller than $1-a$, while the proportion of savings in workers' income is incomparably lower than that in y.

Here, however, we touch upon the problem of how to measure the amounts dealt with. For we clearly cannot expect a definite functional relation between income and the consumption out of it unless both are expressed in 'real' terms.

2. We shall express investment, income, and consumption in 'stable values' by deflating them with the index of prices of finished (consumer and investment) goods. This index has for this purpose the following advantage. It was established in the preceding essay (pp. 251–2) that the index of prices of finished consumer goods (cost of living) and the index prices of finished investment goods (building costs and prices of movable equipment) tend to deviate only slightly from each other. Thus if we deflate income and consumption with the joint index of prices of finished goods (composed of these two indices), we get figures approximately equal to 'real' income and consumption, i.e. to income and consumption deflated with the index of finished consumer goods. And, similarly, investment (which is largely in *fixed* capital) is deflated with an index not much different from that of prices of finished investment goods.

We do not use here the Keynesian wage units because, even in not very long periods, there is a considerable change in the productivity of labour due to technical progress. Thus income measured in wage units often fails to be an adequate indicator of the 'real' income.

Investment and income in a simplified model

1. We noticed above that the equations:

$$y=(1-a)Y \tag{6}$$

and

$$I=y-c \tag{7}$$

enable us to establish a functional relation between national income Y and investment I, provided we can establish such a relation between the income of non-wage-earners y and their consumption c. Before enquiring into the connection between y and c in the real world, we shall apply the above equations to the analysis of investment and income in a simplified model.

We assume that, in this hypothetical economy, the joint consumption of capitalists, salary-earners and dole-receivers c expressed

in 'stable values' is constant. We denote this constant by c_0 and thus we obtain from equations (1) and (2):

$$Y=\frac{1}{1-a}I+\frac{c_0}{1-a}$$

It is easy to see that the ratio of an increment of income ΔY to the corresponding increments of investment ΔI is equal to $1/(1-a)$:

$$\frac{\Delta Y}{\Delta I}=\frac{1}{1-a}$$

Thus $1/(1-a)$ is the multiplier which has in our system a constant value. It does not follow, of course, that the ratio of income to investment Y/I is also constant. On the contrary, it follows from the above equation that Y/I falls with the increase of investment. This means that investment must fluctuate more than national income and *a fortiori* more than consumption (for national income is the sum of consumption and investment).

The formula of the multiplier shows that, if some increase in the rate of investment has occurred, income must have increased by an amount which is $1/(1-a)$ times as great. Therefore, the multiplier cannot tell us what would happen if, for example, public works financed by state borrowing were undertaken since other kinds of investment might increase or fall off in consequence. If, however, we can demonstrate that in the period considered this influence is negligible, then the multiplier will show approximately what will be the increase in income.

Our discussion of the investment–saving equation in the first section of this essay demonstrates that there is no magic in the working of the multiplier. Suppose we know that in a certain year the total expenditure on investment was greater by ΔI than in the preceding year; then savings must have increased by the same amount. But since the manual workers do not save and since in our model the consumption of other classes is constant, this means that the incomes of the latter increased by the amount ΔI. As, however, the ratio of the distribution of income between manual workers and all other classes is steadily $a/(1-a)$, output must have expanded so that the rise of non-wage-earners' incomes by ΔI was accompanied by a rise of $1/(1-a).\Delta I$ in the wage bill, the total increase in income being:

$$\Delta I+\Delta I.a/(1-a)=\Delta I/(1-a)$$

2. There is a point in the 'working of the multiplier' which, I think, requires special explanation. If an increase in the expenditure on investment, e.g. in fixed capital, takes place, an additional demand for consumer goods arises. But how can the production of them, which, even with given capital equipment, requires a certain time, immediately rise? Such a rise is not at all impossible, because existing stocks of raw-materials and semi-manufactures may be immediately converted into working capital, enabling the factories to supply the market without delay with finished consumer goods. If, however, for this or any other reason, such a process of adjustment does not occur with sufficient speed, stocks of finished consumer goods are depleted, and, in the formula of the multipler, ΔI is equal to the difference between the additional investment in fixed capital and any consequential disinvestment in stocks in the period considered.

What happens, however, if no reserves of raw materials, semi-manufactures, and finished consumer goods are in existence, and thus the supply of consumer goods is fully inelastic at the time? The multiplier is then equal to 1, since the volume of consumption does not increase, and our formula appears wrong. This is due to the fact that our assumption of the constancy of the relative share of manual labour a in the national income is incompatible with an inelastic supply of consumer goods. For in this case the increase of employment in investment good industries must cause a shift in the national income to the disadvantage of the workers. Since, according to statistical evidence, a tends to be stable, we can exclude from our consideration the case of an inelastic supply of consumer goods.

Income and consumption in the real world

1. We pass now from our simplified model to real conditions. The consumption of non-wage earners is no longer supposed to be stable. It is clear that there must be *some* connection between their income y and the consumption c out of it. (Both are supposed to be expressed in 'stable values'.) Various objections, however, may be raised against this connection being close.

The first is that consumption out of a given income or the 'propensity to consume' is greatly affected by the level of the rate of interest. In classical economics the stimulating influence of a rise in the rate of interest upon the level of savings was strongly emphasized. It

has, however, long been indicated that it is not at all certain whether consumption is really encouraged or discouraged by a higher rate of interest. But all this discussion appears to be of a rather academic character, at least as concerns development in the moderately long period with which we are here concerned. For in such periods the long-term rate shows only small changes (see pp. 296–7), and clearly this is the rate which is relevant here. Thus we can safely neglect the influence of the rate of interest in the analysis of the connection between y and c.

2. Another very important objection is that capitalists' expenditure is only loosely connected with their income because their 'propensity to consume' depends to a great extent on the actual level of capital values; in particular, on that of stock exchange prices. For if he feels wealthier, the capitalist may assume less thrifty habits, even though his current real income has not altered.

Or one can imagine him being influenced not by the *level* of actual capital valuations but by the *change* in these valuations within the period considered. For he may be supposed to consider as income not only his current revenue but also the windfall gain or loss due to changes in the valuation of his assets.

It is idle to discuss theoretically the problem of whether these factors are more or less important in the determination of capitalist consumption. And since the period of the American stock exchange boom 1926–9 is often considered typical in this respect, it will be useful to look at the relevant figures in these years.

Table 9 gives the gross and net income of capitalists,[31] the approximate value of capitalist consumption,[32] the index of stock exchange prices, and the change of this index from the beginning to the end of each year. It must be added that in the period 1926–9 commodity prices were stable, and thus there is no necessity to deflate the money

[31] Based on Kuznets, *National Income and Capital Formation*, p. 24. Income tax not deducted.

[32] This is calculated in the following way. We deduct from the income of capitalists the total investment (also Kuznets's estimate) and thus obtain the capitalist consumption less the saving of workers (chiefly of salary-earners, because that of manual workers is small). Further, from *America's Capacity to Produce and America's Capacity to Consume* (Pittsburgh, Pa., Brookings Institute, 1934), we estimate the average rate of saving of all workers (black coat and manual) in 1929 as 6%. Since the size and distribution of workers' income did not change very much in the period 1920–9, we applied the same rate to all years and thus obtained approximate figures for workers' saving, which we added to the figures of capitalist consumption less the saving of workers.

Table 9. *Capitalist Income and Consumption in the USA, 1926–9* (*$ milliards*)

	1926	1927	1928	1929
	($ milliards)			
Gross capitalist income (before deduction for depreciation and maintenance)	41.9	39.3	42.1	42.9
Net capitalist income (after deduction for depreciation and maintenance)	26.5	24.1	25.7	25.9
Approximate capitalist consumption	21.7	19.0	22.4	20.7
Prices of shares (Standard Statistics, 1926 = 100, yearly averages)	100.0	118.3	149.9	190.0
Change in the prices of shares (the change of the same index from the beginning to the end of a given year)	+3.8	+31.6	+40.1	−33.7

values. Both capitalist income and capitalist consumption show small changes in the same direction. Share prices are violently rising throughout the period, and the change of share prices from the beginning to the end of the year (measuring the windfall loss or gain) varies greatly in different years. (In 1928 *both* figures are much greater than in the preceding years.) The only possible interpretation of these data is that the influence of the stock exchange on capitalist consumption in the USA in 1926–9 was not very great. But if the stock exchange did not greatly influence the capitalists' propensity to consume even under such favourable circumstances, its influence cannot generally be very important.

3. Another argument is directed against the existence, not so much of a functional relation between the consumption and income of capitalists, but rather of one between their current consumption and their current income. It is not here denied that an appreciable time-lag exists between y and the corresponding c (as opposed to income and consumption of manual workers). This modifies but does not invalidate the 'theory of the multiplier'. We shall introduce this modification at the final stage of our argument (see pp. 268–9).

4. A further argument against a close connection between c and y refers to the variations in the distribution of income. The earners of y fall into various groups with different 'propensities to consume', and consequently it is not only the change in the amount of y but also the shifts in its distribution which determine the fluctuations of c.

We can distinguish the following groups among non-wage-earners: (1) dole-receivers (unemployed, etc.); (2) salaried employees; (3) small entrepreneurs; (4) rentiers; (5) dividend receivers; (6) joint-stock companies (the gross income of the last consists of depreciation and net corporate savings).

Considerable shifts in the distribution of income among these groups occur in the trade cycle and obviously affect their joint consumption c, but it can be shown that these shifts are strongly correlated with changes in the volume of y (expressed in stable values) and thus c is a fairly close function of y.

It is easy to see that the distribution of non-wage-earners' income y among the various groups is *grosso modo* determined by (i) the volume of y itself; (ii) the index of prices of finished goods, p, with which we deflated the incomes; (iii) the dole rate; (iv) the average salary rate. Indeed, y and p determine the money value of non-wage-earners' incomes yp. Further, y bears a constant proportion to national income Y, and the latter varies inversely with the amount of unemployment. Thus, given y and the dole rate, the aggregate dole payment is determined. In a similar way, y and the average salary rate determine the salary bill. Subtracting dole payments and the salary bill from yp, we obtain the money value of capitalist incomes. Now the aggregate interest on loan debt is approximately stable (in money terms) over the moderately long period and can be considered as given. Subtracting it from total capitalist income, we obtain dividends and entrepreneurial incomes. It may now easily be shown that the changes in the distribution of non-wage-earners' income y depend to a great extent on those in its volume. For a fall, say, in y (which is proportional to the national income Y) means, of course, a decline in output and employment, and this depresses in a more or less definite way the salary rate and the prices of finished goods (which, according to results arrived at in the preceding essay, p. 250, move more or less proportional to the wage cost). Thus the chief factors determining the distribution of non-wage-earners' income can be reduced to a function of its volume y.[33]

The effect of the fall in y will be to increase the relative share of dole-receivers, salary-earners, and rentiers. This is clear as regards dole-receivers and rentiers. As concerns salary-earners, the proportional fall in the salary bill in the slump is always smaller than that in the wage bill; while, as the relative share of manual labour in the national

[33] Except the dole rate, which thus must be treated as a datum.

income is constant, the total income of non-wage-earners must change proportionally to the wage bill. Thus the proportion that the salary bill bears to the total non-wage-earners' income must rise when y falls.

Corresponding to the rise in the relative share of dole-receivers, salary-earners, and rentiers in y as y diminishes is the sharp fall in the relative share in y going to corporations (in the form of depreciation and net corporate savings). The change in the income of small entrepreneurs and in dividends follows a middle course, and is likely neither to rise not to fall very much relatively to the total income of non-wage-earners.

It therefore follows that the shift in the distribution of non-wage-earners' income y when it is declining tends to hamper the fall of consumption c out of it, i.e. c falls less than it would if the distribution of y did not alter. If y rises, c increases less than it would if there were no shifts in the distribution of y.

Investment and income in the real world

1. As a result of the above investigation, it can be said that on certain assumptions—which are usually fulfilled in the moderately long period—and neglecting provisionally the time-lag between income and consumption, a more or less close connection between c and y is likely to exist. Thus we can write:

$$c = \eta(y) \tag{8}$$

As already mentioned above (p. 258), this equation enables us to establish the functional relation between investment I and national income Y. For besides equation (8) we have the equation

$$I = y - c \tag{7}$$

which expresses the fact that investment, since it is equal to total saving, is also equal to that of non-wage-earners alone, because the saving of wage-earners is negligible. Further, the relative share of manual labour in the national income is a constant a, and thus we have for non-wage-earners income y:

$$y = (1 - a)\,Y \tag{6}$$

From equations (7) and (8) it follows that I is a function of y, which in conjunction with equation (6) shows that there must be a functional relationship between investment I and the national income Y.

Consequently we can write

$$Y = f(I) \tag{9}$$

where f is, of course, an increasing function, and from this equation we obtain the multiplier:

$$\Delta Y/\Delta I = f'(I)$$

It is interesting to see how the multiplier works in the real world. If we have an increase in investment from level I to a given level $I + \Delta I$, there is an increase in employment, output, and national income. If, as in our simplified model, the consumption of non-wage-earners c remained stationary, this increase would be pushed to the point at which non-wage-earners' income increases by ΔI; for at that point non-wage-earners save ΔI more, and by assumption they would not tend to expand their consumption. But in reality, when their income increases they do consume more. And thus the rise of employment, output and income stops only when that level of non-wage-earners' income is reached at which their increased saving and consumption correspond to their propensity to consume. Consequently the multiplier is in the real world greater than in our simplified model. And since in the latter it was equal to $1/(1-a)$ (where a is the relative share of manual labour in the national income) we have:

$$\Delta Y/\Delta Y = f'(I) > 1/(1-a)$$

How much $f'(I)$ exceeds $1/(1-a)$ depends on the saving habits of the various groups of non-wage-earners, and on the redistribution of income between these groups associated with the rise of their total income y.

2. The consumption of non-wage-earners, c, changes always in a lesser proportion than their income y, and for two reasons. First, each individual's consumption is less elastic than his saving; and, second, the redistribution of y associated with the change in its amount, is—as shown above—such as to reduce the resultant change in c (since a rise of y is accompanied by an increase in the relative share of it going to corporations, and vice versa).

Since the consumption of non-wage-earners changes in a lesser proportion than their income, the reverse must be true of their saving, i.e. the latter must change always in a greater proportion than y. From

this results an important feature of the function connecting national income Y with investment I. Since I is equal to the saving of non-wage-earners, it must change always in a greater proportion than their income y. But the latter bears a constant proportion to the national income Y. Thus investment rises or falls always in a greater proportion than the national income. The shape of the function f is such that $I/f(I)$ increases when I rises. In other words, investment fluctuates more violently than national income, and *a fortiori* more violently than consumption.

3. The last proposition has been known in economics for a long time, but it was deduced from the so-called acceleration principle. The argument ran thus: let us assume that at a certain time the volume of capital equipment is 20, the output of consumer goods 10, and gross investment 1.5, of which depreciation is 1 and new investment 0.5. If now consumption increases in a period by 10% to 11, equipment must increase in the same proportion to 22. Thus net investment in this period must be 2. (There will also be some increase in depreciation because of the increase in the amount of capital equipment, but it will be negligible.) Thus, while consumption increases by only 10%, gross investment rises from $1+0.5$ to $1+2$, i.e. by 100%.

The argument is apparently based on the unrealistic assumption that the degree of use of equipment is constant; while it is clear from trade cycle statistics that it is precisely the fluctuation in the use of equipment which accounts chiefly for changes in output, and that the proportional increase or decrease of equipment is of minor importance. Consequently the connection between investment and consumption given by the acceleration principle is also unrealistic: for, according to this principle, investment is an increasing function of the rate of *change* in consumption. Thus, on the top of the boom, when consumption is stationary, investment should fall to the level of depreciation, while the statistics show that its maximum is reached almost simultaneously with that of consumption. (See e.g. the statistical data in the next section.)

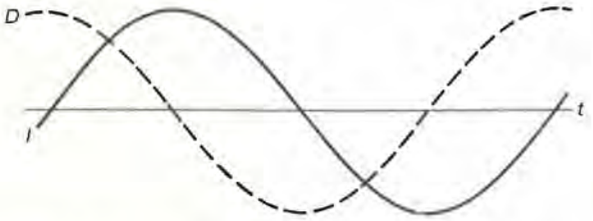
This is, however, in accordance with the connection between investment and consumption which was established above on a quite different basis. Starting from the equation of saving and investment and making some assumptions about the distribution of the national income among various classes and about their propensity to consume,

we demonstrated that national income and, therefore, consumption is an increasing function of investment, which, however, changes always in a greater proportion than consumption.[34]

4. We have now to make the modification which we promised in connection with the existence of the time-lag between non-wage-earners' income, y, and consumption out of it, c. This time-lag results in the present national income being influenced not only by present but also by past investment. Consequently the system behaves as if a certain delay were involved in the functional connection between investment and income. Thus, if we denote investment and income at time t by I_t and Y_t respectively, our equation (9) must be written:

$$Y_t = f(I_{t-\lambda}) \tag{10}$$

[34] A new interpretation of the acceleration principle was given by R. F. Harrod in *The Trade Cycle*. The material modification introduced by him is that it is not the actual investment but investment decisions or orders which are a function of the rate of change in consumption. In this form the acceleration principle *is* compatible with the theory of the multiplier. For there is a time-lag between investment orders and actual investment, and thus they are in general not equal; consequently it is possible that the rate of investment decisions is an increasing function of the *change in consumption*, while *consumption itself* is a function of the rate of actual investment.



But this theory is also unrealistic. It implies that the rate of investment decisions D is an increasing function of the change in the rate of actual investment I, and therefore that the respective time-curves are situated as shown on the chart. It is easy to see that the period is then 4 times the time-lag between D and I. Since the average time-lag between investment decisions and investment output is unlikely to be greater than half a year (see p. 305), the period of trade cycle would be less than 2 years, while its actual length is 7–12 years.

where λ is the time-lag between investment and income.[35] The multiplier may be defined as:

$$\frac{\Delta Y_t}{\Delta I_{t-\lambda}} = f'(I_{t-\lambda})$$

The time-lag λ being in general not constant, and the function not quite stable, what is the real meaning of equation (10)? It may be formulated in the following way: there exists such a function f and such a constant λ that the deviations of Y_t from $f(I_{t-\lambda})$ are relatively small.

A statistical illustration

1. We shall use, as a statistical illustration of the above, data on national income and investment in the USA computed in Dr Kuznets's *National Income and Capital Formation, 1919–35*.

In order to obtain the 'gross private national income' Y we subtract from gross income (including repairs of equipment) of all private industries the government's[36] gross saving (pp. 14, 80, 18).

[35] Let us denote the time-lag between y and c by ω. Then we have:

$$c_t = \eta(y_{t-\omega})$$

and the equation between investment and non-wage-earners' saving gives:

$$I_t = y_t - \eta(y_{t-\omega})$$

On the other hand, it is clear from p. 265 that formula (10) can be established if the time-lag fulfils the equation:

$$I_t = y_{t+\lambda} - \eta(y_{t+\lambda})$$

Thus λ must fulfil the equation:

$$y_t - \eta(y_{t-\omega}) = y_{t+\lambda} - \eta(y_{t+\lambda})$$

or:

$$y_{t+\lambda} - y_t = \eta(y_{t+\lambda}) - \eta(y_{t-\omega})$$

We divide this equation by $y_{t+\lambda} - y_{t-\omega}$:

$$\frac{y_{t+\lambda} - y_t}{y_{t+\lambda} - y_{t-\omega}} = \frac{\eta(y_{t+\lambda}) - \eta(y_{t-\omega})}{y_{t+\lambda} - y_{t-\omega}}$$

If the time-lags are small and the time-curve y_t continuous, we obtain as a good approximation:

$$\frac{\lambda}{\lambda + \omega} = \eta'(y_t)$$

which defines λ in terms of ω and η'. If ω and η' are slowly changing variables, as they are likely to be, the same is true of λ.

[36] We mean by government, as above, all public authorities.

The latter subtracted from gross capital formation (inclusive of repairs, pp. 40, 80) gives investment I in our sense of the term. The results are represented in Table 10.

In order to obtain 'stable values' we must deflate these items with the index of prices of finished goods given in Table 11. This was constructed from the indices of prices of finished consumer and investment goods in the USA computed on p. 252[37] (see Table 11).

Deflating with this index the money values of national income and investments contained in Table 9, we obtain Table 12.

2. Plotting the figures (see Fig. 14), we see that, while the points corresponding to the period 1924–35 are scattered round the straight line AB, those corresponding to 1919–23 lie far above it. The points

Table 10. *Gross National Income* (Y) *and Investment* (I) *in the USA* (\$ *milliards*)

	Y	I		Y	I
1919	79.3	31.3	1928	86.0	22.9
1920	82.4	29.1	1929	89.7	25.5
1921	65.3	17.1	1930	79.6	19.4
1922	64.6	17.7	1931	63.0	13.6
1923	74.8	22.4	1932	44.6	7.0
1924	74.7	18.9	1933	42.1	7.4
1925	78.7	22.7	1934	51.8	10.6
1926	84.3	23.2	1935	58.7	14.9
1927	81.8	22.3			

Table 11. *Index of Prices of Finished Goods in the USA* (*1929 = 100*)

1919	104	1925	102	1931	89
1920	120	1926	102	1932	78
1921	105	1927	100	1933	76
1922	97	1928	99	1934	81
1923	101	1929	100	1935	84
1924	101	1930	96		

[37] We have weighted them in the proportion 3:1 according to the composition of the gross national product inclusive of repairs in 1929; see Kuznets, *National Income and Capital Formation*, pp. 45, 80.

Table 12. *Gross National Income* (Y) *and Investment* (I) *in the USA* (\$ *milliards at 1929 prices*)

	Y	I		Y	I
1919	76.1	30.0	1928	86.9	23.1
1920	68.7	24.2	1929	89.7	25.5
1921	62.3	16.3	1930	82.8	20.2
1922	66.6	18.2	1931	70.8	15.3
1923	74.0	22.2	1932	56.5	8.9
1924	74.0	18.7	1933	54.4	9.7
1925	77.1	22.3	1934	64.0	13.1
1926	82.6	22.5	1935	70.0	17.8
1927	81.8	22.3			

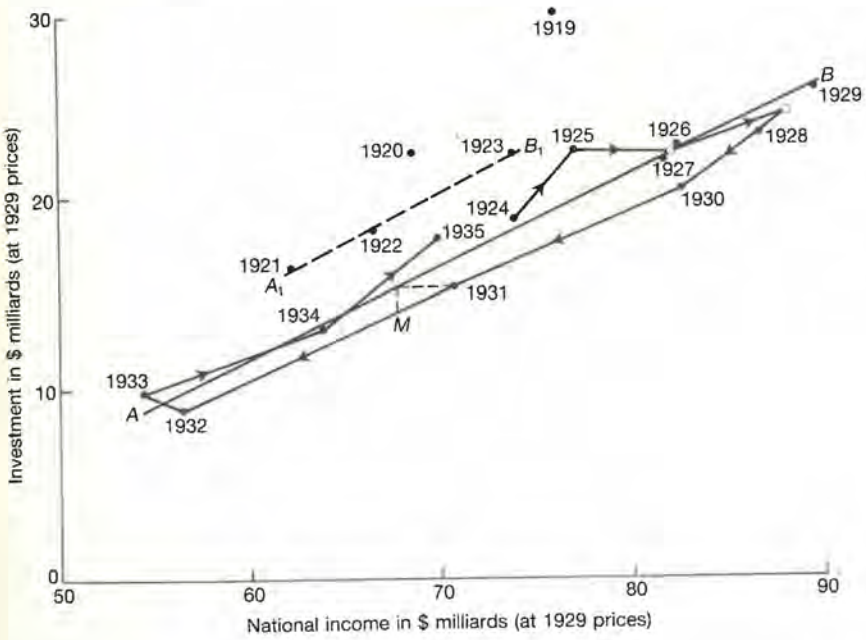


FIG. 14

1919 and 1920 are the highest, and below them are the points 1921, 1922, and 1923 round the straight line A_1B_1 parallel to AB.

This can be interpreted as a shift of the investment–income curve. There was evidently a sharp increase in the propensity to consume in the period 1919–24. A shifting of the investment–income curve in the

long run is, of course, a quite normal phenomenon. Here, however, we have a change of a rather discontinuous character. We do not here attempt to account for this shift, which presents a problem requiring special investigation, but will only examine in more detail the period 1924–35, during which we notice a more or less stable connection between investment and income.

The way in which the points 1924–35 are scattered round *AB* shows a certain regularity: looking at them in chronological order (treating both 1926–7 and 1928–9 as biennial, which are denoted on the chart by white circles), they form a polygon rotating in a clockwise direction. This shows that there is a time-lag between investment and income. Indeed, the straight line *AB* represents in such circumstances the approximate connection between investment in a year considered and income at a later date. For instance, to investment in 1931 corresponds the abscissa of point *M* lying between 1931 and 1932. On the basis of our polygon it is possible to determine the average time-lag. It appears that it is here equal to about 4 months.

Thus we see that a correlation between present income and investment 0.33 years earlier must obtain. (For instance, the income in 1931 corresponds to investment 4 months earlier, which we determine by adding two-thirds of investment in 1931 to one-third of investment in 1930.) The results are again plotted (Fig. 15). The ordinates of the points plotted now represent not I_t but $I_{t-0.33}$. The deviations from the line of best fit are now relatively small. The equation of this line is:

$$Y_t = 2.25 I_{t-0.33} + 33.2 \qquad (11)$$

It represents the function f for the USA in the period 1924–35. It proves, as is easy to see, the rule (pp. 266–7) that income changes in a lesser proportion than investment. (It is obvious that the ratio $Y_t/I_{t-0.33}$ falls when investment increases.) The multiplier $\Delta y_t/\Delta I_{t-0.33}$ is equal to 2.25. As shown on p. 266, the multiplier must be greater than $1/(1-a)$ where a is the relative share of manual labour in the national income. According to my rough estimate, a for the USA is about 0.32, and thus $1/(1-a)$ is about 1.5. Thus this rule also is proved.

The line of best fit is here a straight one. But probably this is not the case outside the range of income and investment here considered.

Figure 16 compares the actual national income and that calculated from formula (11).

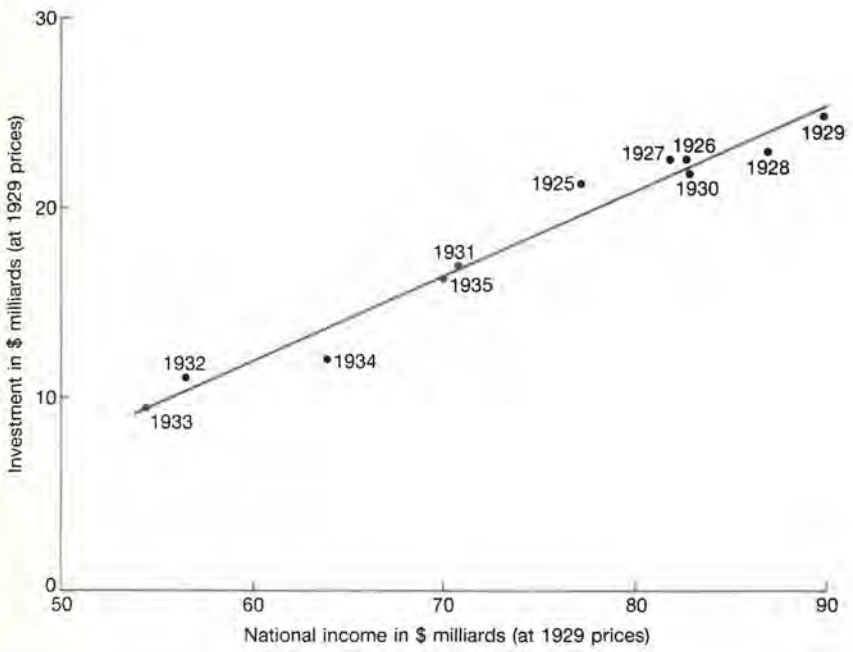


FIG. 15

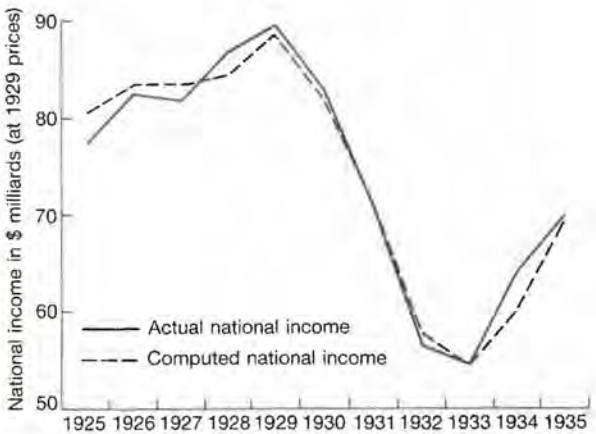


FIG. 16

3. Money and Real Wages[7]

Introduction

We intend in this essay to discuss at some length the Keynesian theory of wages. We are limiting ourselves to the consideration of a closed economy, for this is the only case to which the Keynesian argument fully applies. To take an extreme example, let us imagine an economy which exports all its produce and imports all consumer goods. It is obvious that in such an economy a reduction in money wages is equivalent to one in real wages, and increases output and employment (but not necessarily the real wage bill).

A simplified model

1. In order not to confuse the various questions involved, we shall first consider the problem of wages in a highly simplified model. We assume for the moment (i) that free competition prevails; (ii) that the salary-earners and manual workers do not save; (iii) that the various types of wage and salary change always in the same proportion; (iv) that entrepreneurs and rentiers have an equal propensity to consume; and (v) that the rate of interest is kept constant. All these simplifying assumptions will be gradually removed afterwards.

2. Since in our model free competition prevails, the short-period equilibrium of a firm is reached at the point of intersection of the horizontal 'individual' demand curve and the upward-sloping part of the short-period marginal-cost curve. Thus, with an increase in employment the ratio of prices to wages must increase, or (what amounts to the same) the real wages must fall (if there is no rise in the productivity of labour due to changes in technique or intensity of work). This is the classical doctrine of real wages, and is admitted also by Keynes. As we shall see below, this rule does not apply to real conditions of imperfect competition as described in the essay on 'The Distribution of the National Income', but it holds good in the model now considered.

3. We will now deal with the problem of changes in money wages in our system. But before going into the matter some general remarks are necessary.

The national income may be represented in two ways as follows:

Capitalist income	Investment
Wages and salaries	Consumption

Since in our model the consumption of salary-earners and manual workers is equal to their income, we obtain by subtracting wages and salaries from both sides:

Capitalist income = Investment + Capitalist consumption

This equation is very important for the further argument. It follows from it that capitalist income expressed in 'stable values' is fully determined by the volume of investment and capitalist consumption.

It will perhaps be useful to look at this simple but paradoxical theorem in a different way.[38] Let us schematically represent our economy as consisting of three industries, producing wage goods, investment goods, and goods consumed by capitalists (or luxury goods) respectively. Wage goods are in part consumed by the workers producing them, while the surplus sold to workers of the other two industries constitutes capitalist income derived from the wage goods industry. Thus employment in the investment and luxury goods industries determines capitalist income in the wage goods industry expressed in 'stable values'. But capitalist incomes drawn from investment and luxury goods production (expressed in 'stable values') are of course also determined by employment in these two industries. Thus the output of investment and luxury goods determines total capitalist income expressed in 'stable values'. And because capitalist income from the wage goods industry is equal to workers' income in the other two industries, the value of capitalist total income is equal to the value of the output of investment and luxury goods.

4. Let us now consider what happens when all wages and salaries are reduced in the same proportion. If the capitalists, having succeeded in cutting wages, immediately raise the volume of their consumption and investment in the expectation of higher profits, employment must increase. Indeed, capitalist income expressed in stable values must rise by the same amount that the volume of their consumption and investment has risen, and this can be attained only by an increase in

[38] The above equation is of course equivalent (under the assumption that the salary-earners and manual workers do not save) to the equality of saving and investment which can be obtained from it by subtracting the capitalist consumption from both sides.

employment. And the latter is connected in our model with the fall of real wages, which therefore decline as a result of a decline in money wages.

Or, to represent this process in a different way: employment in the luxury goods and investment goods industries increases because of the rise in effective demand on the part of capitalists, and employment in the wage goods industry rises because of the demand on the part of workers set to work in the other two industries. This rise in employment, as shown in the preceding section, is just sufficient to raise profits by the same amount that capitalist consumption and investment have risen.

Such a state of affairs is, however, extremely unlikely. First, entrepreneurs will in general not hurry with new investment orders simply on the strength of a successful wage reduction, but will rather wait until the expectations of higher profitability have been realized. Even should they give new orders at once, the technical time-lag between investment orders and the actual production of investment goods would prevent the latter from increasing immediately.

The position as regards capitalist consumption is similar, in that it is actual rather than expected income which influences the capitalist standard of living, and, as was shown in the preceding essay, even this influence operates with considerable delay.

If the above is a true description of the course of events, then a wage cut cannot raise capitalist incomes expressed in stable values either immediately or later. Immediately after a wage reduction, the volume of investment and capitalist consumption remains unaltered, and thus so does the capitalist income expressed in stable values. Employment does not alter, while all prices fall in the same proportion that wages have been reduced. Thus nothing is changed by wage reduction except the general level of prices, and thus there is no reason for capitalists to increase the volume of their consumption and investment later if they did not do so at the beginning.[39]

Or, to put it in a different way, the volume of capitalist consumption and investment is initially unchanged. Thus there is no increase in output and employment in the luxury and investment goods industries. It follows that the demand for wage goods falls proportionally to wages, so that, since prime costs are reduced also in the same

[39] I have already treated the problem of wages in this way in my article 'Essai d'une Théorie du Mouvement Cyclique des Affaires', *Revue d'Économie Politique*, Mar.–Apr. 1935, pp. 301–2; see also p. 100 above.

proportion, there is no change in the output of the wage goods industry. Consequently, output and employment in all three industries are unchanged, and prices fall uniformly in proportion to the wage reduction. But then capitalists have no incentive to raise their consumption or investment, for their income expectations are not realized.

Since capitalist consumption and investment do not increase immediately, their income is initially unchanged; since their income is initially unchanged, their consumption and investment and consequently their income also fails to increase later on.

Imperfect competition introduced

1. We are going now gradually to remove our assumptions. We drop first that of free competition and examine the relation between real wages and employment in a system such as described in the first essay, in which imperfect competition prevails and average wage cost curves in the majority of enterprises are more or less horizontal. We have shown there (pp. 249–51): (i) that in such a system the ratio

$$\frac{\text{index of average wage cost}}{\text{index of prices of finished goods}}$$

is approximately constant; (ii) that the index of average wage cost does not depend appreciably on the level of output and employment, and thus, with a constant technique and intensity of labour, the index of average wage cost does not differ greatly from the index of wage rates; (iii) that the index of prices of finished goods does not greatly deviate from that of the cost of living.

It follows from these three points that the index of real wages tends to be more or less stable, provided the technique of production and intensity of labour do not alter. Consequently, in actual fact the index of real wages must show a steady tendency to rise, since there is a strong secular trend in the productivity of labour due to improvements in technique and the increase in intensity of work. But if we eliminate the trend from the index of real wages, we can expect a series of great stability, though *some* fluctuations must be present, as both the technique of production and the intensity of labour may show some rather irregular changes apart from the secular trend, and in addition the ratio

$$\frac{\text{index of average wage cost}}{\text{index of prices of finished goods}}$$

is only approximately constant. (The small fluctuations in it depend partly, as we shall see, on changes in money wages.) To sum up, we should expect that in a closed system real wages, after the elimination of secular trend, would show relatively small changes which would not be likely to have any strong (positive or negative) correlation with the level of employment.

We shall use as a statistical illustration the data on real wages in the USA—which may be considered an approximately closed system—for the period 1919–35. We have computed for this purpose a combined index of hourly wages in manufacturing, building, railroads, and agriculture, and divided it by an index of the cost of living[40] (see Table 13). We see at a glance a strong trend, doubtless due to technical progress, etc., which amounts on average to 2.25% per year. The series obtained after eliminating the trend is given in Table 14, together with the index of output in the USA (gross national product at 1929 prices).[41] The fluctuations in real wages are small, and it is easy to see that no clear negative or positive correlation with those of output exists. Real wages at the bottom of the slump (1932, 1933), for example, are equal to those at the top of the boom (1928, 1929).

2. Let us next examine the process of wage reduction. So long as we assume that the degree of monopoly (i.e. the ratio of prices to marginal costs) remains unaltered, the effect of an all-round wage reduction is just the same as with perfect competition. For if it is assumed that the volume of capitalist consumption and investment does not change immediately, there is initially no change in employment; while prices,

Table 13. *Real Wages in the USA (1929 = 100)*

1919	81	1925	92	1931	108
1920	86	1926	92	1932	106
1921	87	1927	96	1933	109
1922	87	1928	98	1934	118
1923	91	1929	100	1935	117
1924	93	1930	103		

[40] We used the data on hourly (for agriculture, monthly) wages, published in *Survey of Current Business*. The indices of wages of the four industries mentioned were weighted in proportion to their wage bills in 1929, as given in Kuznets's *National Income and Capital Formation*, pp. 62, 63.

[41] Inclusive of repairs; see Kuznets, *National Income and Gross Capital Formation*, pp. 8, 80.

Table 14. *Real Wages, after Elimination of Trend, and Output in the USA (1929 = 100)*

	Real wages	Output		Real wages	Output
1919	100	71	1928	100	97
1920	103	73	1929	100	100
1921	102	69	1930	101	91
1922	100	74	1931	104	78
1923	103	82	1932	100	61
1924	103	83	1933	100	63
1925	100	86	1934	106	73
1926	98	92	1935	103	78
1927	100	92			

since they change proportionally to prime costs, are in this case reduced proportionally to wages. But since the only change in the system is that in the general price level, there will be no inducement for capitalists to increase their consumption and investment at a later date.

It is doubtful, however, whether the degree of monopoly really remains unaffected by the process of wage reduction. Some prices are likely to be 'sticky,' i.e. not to fall at all, or to fall less than marginal costs.[42] This has an important influence upon the result of a wage cut. The output of investment and luxury goods does not change immediately after a wage reduction (according to our fundamental assumption), and thus employment in the industries making these goods is unaltered. The money demand of workers is consequently reduced (as in the cases considered above) proportionally to wages, but the prices of wage goods do not decline on the average to the same extent. As a result, the 'real' demand for wage goods falls off, and so do output and employment in the wage goods industry. Thus, paradoxically, both employment and real wages are here reduced by the wage cut. And when this has occurred, there will still be no incentive for capitalists to increase their consumption and investment.

Indeed, as the volume of capitalist consumption and investment is initially unaltered, capitalist money income (being equal to the value of these two items) is reduced in the same proportion as the prices of luxury and investment goods. If the respective prices of these two types

[42] See p. 249.

of good are reduced roughly in the same proportion, the ratio of profits to the price of investment goods is unchanged, and so also is the profitability of new investment. Thus neither investment nor capitalist consumption is encouraged at a later stage provided it did not rise at the beginning.

To sum up, any increase in the degree of monopoly due to a wage cut reduces employment, the real wage rate, and (for both these reasons) the real wage bill, but it does not increase capitalist income expressed in stable values.

3. If the wage cut increases the degree of monopoly and thus reduces the relative share of manual labour in the national income, it may be asked how it is possible for this relative share to remain approximately stable throughout the business cycle. We have already stated in the essay on 'The Distribution of the National Income' that in a depression the degree of monopoly increases (because of wage reductions and for other reasons), but this adverse influence upon the share of manual labour is counterbalanced by the fall in raw-material prices relative to wages (see pp. 249 ff). In the boom the reverse occurs.

As a result, the influence of a change in money wages upon real wages via the degree of monopoly is obscured, and only sharp fluctuations in the former are reflected in the latter. This is illustrated by Table 15, which computes the indices of money wages in the USA (the combined index of wage rates in agriculture, manufacturing, building, and railways used above) and real wages (the corresponding series after elimination of secular trend calculated above). As we see,

Table 15. *Real Wages after Elimination of Trend and Money Wages in the USA (1929 = 100)*

	Money wages	Real wages		Money wages	Real wages
1919	83	100	1928	98	100
1920	102	103	1929	100	100
1921	89	102	1930	100	101
1922	84	100	1931	94	104
1923	91	103	1932	82	100
1924	95	103	1933	81	100
1925	96	100	1934	94	106
1926	96	98	1935	97	103
1927	98	100			

the fluctuations in money wages are much more violent than those in real wages. The jumps in the former (1919–20, 1920–1, 1931–2, 1933–4) are reflected on a much smaller scale by the latter.

Further assumptions removed

1. We have supposed so far that salary-earners and manual workers do not save, and that the various types of salary and wage rate change always in the same proportion. We shall now make more reasonable assumptions.

We divide the salary-earners into two categories, which we shall typify as 'clerks' and 'managers'. We assume that the salary rates of the first group move proportionally to wage rates, and that both manual workers and clerks do not save (for their saving is in fact unimportant). However, we do allow for managers saving, and suppose their salaries to change in the same direction as capitalist incomes, but in a lesser proportion.

The balance sheet of the national income can now be written as follows:

Capitalists' income	Investment
Managers' salaries	Consumption
Wages and clerks' salaries	

Since manual workers and clerks do not save, we obtain by subtracting their joint incomes from both sides

Capitalists' and managers' income = Investment
+ Capitalist's and managers' consumption

If the money income of managers always moved proportionally to that of capitalists, our previous argument on wage reduction would fully apply to the case now considered, with this one change: that capitalists' and managers' income or consumption must be substituted for capitalist income or consumption respectively.

But the fact that the income of managers varies to a lesser extent than that of capitalists modifies to a certain degree the results of a wage cut. Indeed, the relative shift of income from capitalists to managers increases their joint consumption, for the latter have a greater propensity to consume than the former (capitalist incomes include corporate saving). Thus employment is stimulated. On the other hand, this shift unfavourably affects the profitability of investment, and thus

exerts a certain pressure on investment and consequently upon employment. On balance, it is uncertain how employment will be affected, but the effect of the shift of income from capitalists to managers caused by wage reduction is not likely to be great.

2. A similar problem arises when we discard our assumption that entrepreneurs and rentiers have an equal propensity to consume. In reality, that of rentiers is usually higher because entrepreneurial incomes include corporate saving. Thus, when the total money income of capitalists declines as the result of a wage cut and the relative share of rentiers in it increases, the volume of capitalist consumption tends to increase. And this, consequently, affects favourably total capitalist income (expressed in stable values) and employment. As a result, also, investment becomes more profitable, for (with a given rate of interest) the increased burden of payments to rentiers does not concern new investments, but only past ones. This in turn strengthens the tendency for employment and capitalist income to rise. However, the change in capitalist propensity to consume because of the shifts in the distribution of income between entrepreneurs and rentiers described above is not likely to be very important, and so its final effect must not be overestimated.[43]

3. We can now sum up the modifications introduced by passing from our simplified model towards real conditions.

(i) Real wages have no close (positive or negative) correlation with employment because in reality imperfect competition and more or less horizontal curves of average wage cost prevail in the majority of enterprises.
(ii) A wage cut tends to raise the degree of monopoly, and consequently to reduce real wages and to affect employment unfavourably.
(iii) A wage cut causes a relative shift of income from capitalists to managers. As a result, consumption tends to increase and investment to fall off. How it affects employment is uncertain, but the change in either direction is likely to be small.
(iv) A wage cut causes also a relative shift of income from entrepreneurs to rentiers. This tends to increase capitalists' propensity to consume, and consequently employment and real capitalists' incomes.

[43] The more so because, as a result of the redistribution of capitalists' income, the saving of enterprises is smaller in relation to total saving, and this tends to discourage investment. See below, p. 308.

On balance we can say that:

(i) A wage reduction may change employment in either direction, but this change is likely to be small.
(ii) It tends to redistribute income to the disadvantage of the workers. (The fall in real wages is, however, much smaller than that in money wages.)

Of course, in the case of a rise in money wages the statements must be reversed.

4. One last assumption has been left: that of a constant rate of interest. As we have seen, a wage cut does not cause any important change in employment and output, while prices decline. As a result, the value of output must diminish and the demand for cash for transactions fall off. Thus the rate of interest tends to decline, and this encourages investment so that we have yet another possible way for a wage cut to raise employment.

This argument, though theoretically quite correct, is, however, without practical importance. The increase in the demand for cash in general affects only slightly the long-term rate of interest, which is the most important rate in the determination of the level of investment.[44] Thus it seems quite justifiable to neglect this channel through which a wage reduction could influence the level of employment.

5. We gave above a statistical illustration of there being no close connection between real wages and employment, and of the influence of change in money wages upon real wages. The effect of a change in money wages on employment is much more difficult to trace statistically because the latter is usually subject to many other influences. In the slump, for example, both wages and employment decline—which does not prove, however, that wage reductions depress employment.

A crucial test in which most of the irrelevant factors were absent was provided by the Blum experiment. The detailed account of this investigation has been published elsewhere,[45] and we will here refer only briefly to the chief conclusions.

In the article concerned we came to the conclusion that the results of the Blum experiment (lasting from the spring of 1936 till the spring of 1937) were approximately equivalent to the consequences of an increase of wages in a closed economy by 60%. It was further stated

[44] See below, p. 296.
[45] See pp. 326–41 below.

that this great change hardly affected output, and that real wages per hour rose by 26%. (The long-term rate of interest was approximately stable.) This is in full accordance with the theory developed above. It must be noticed that some factors (government control of rents, railway tariffs, prices of bread, etc.) strengthened the natural tendency of some prices to remain sticky, and thus the rise in real wages was greater than if 'natural' conditions had prevailed. (In other words, the fall in the degree of monopoly was unusually great.)

Final remarks

1. There are certain 'workers' friends' who try to persuade the working class to abandon the fight for wages in its own interest, of course. The usual argument used for this purpose is that the increase of wages causes unemployment, and is thus detrimental to the working class as a whole.

The Keynesian theory undermines the foundation of this argument. Our investigation above has shown that a wage increase may change employment in either direction, but that this change is unlikely to be important. A wage increase, however, affects to a certain extent the distribution of income: it tends to reduce the degree of monopoly and thus to raise real wages. On the other hand, 'real' capitalist incomes tend to fall off because of the relative shift of income from rentiers to corporations, which lowers capitalist propensity to consume.

If viewed from this standpoint, strikes must have the full sympathy of 'workers' friends'. For a rise in wages tends to reduce the degree of monopoly, and thus to bring our imperfect system nearer to the ideal of free competition. On the other hand, it tends to increase the thriftiness of capitalists by causing a relative shift of income from rentiers to corporations. And 'workers' friends' are usually admirers both of free competition and of thrift as a virtue of the capitalist class.

2. Another question may arise in connection with the Keynesian theory of wages. Is not the struggle of workers for higher wages idle if they lose whatever gain they may make in the form of a higher cost of living? We have shown that wage reduction causes a change in the distribution of the national income to the disadvantage of workers, and that in the event of an increase in wages the reverse occurs. This is not to deny, however, that changes in real wages are much smaller than those in money wages; but never the less they may be quite material,

especially as we are dealing with averages which reflect only slightly great fluctuations in real wages in particular industries.

We noticed above the great stability of the relative share of manual labour in the national income. This is not in contradiction with the influence of money wages upon the distribution of the national income. On the contrary, the resistance to wage cuts prevents the degree of monopoly from rising in the slump to the extent it would if 'free competition' prevailed on the labour market. Although, in fact, the relative share of manual labour is more or less stable, this would not obtain if wages were very elastic.

It is quite true that the fight for wages is not likely to bring about fundamental changes in the distribution of the national income. Income and capital taxation are much more potent weapons to achieve this aim, for these taxes (as opposed to commodity taxes) do not affect prime costs, and thus do not tend to raise prices. But in order to redistribute income in this way, the government must have both the will and the power to carry it out, and this is unlikely in a capitalist system.

4. The Principle of Increasing Risk[46] [8]

The problem

1. The subject of this essay is the determination of the amount of investment undertaken at a given time by a single entrepreneur. He intends, for instance, to build a factory for the production of a certain product. He is faced with given market conditions: he knows the price of the product in question, the level of wages and the prices of raw-materials, the cost of construction and the rate of interest. Besides that, he has some rather vague ideas as to the probable future change in prices and costs. This knowledge is the basis for the planning of investment, i.e. for the choice of the amount of capital k (measured in terms of money) to be invested and the method of production to be applied:

With a *given* amount of capital k and a given method of production, the entrepreneur is able to estimate the series of future returns (differences between revenues and effective costs) $q_1, q_2 \ldots q_n$ during

[46] This essay is an altered version of the article published in *Economica*, Nov. 1937.

the prospective life of the factory. We shall call the rate ε at which the series of returns must be discounted in order to obtain the amount invested k, the prospective rate of profit,[47] [9] while by prospective profit π we mean the product $k.\varepsilon$. Now we can assume that, with a given amount to invest, k, the entrepreneur will choose such a method of production as will maximize the prospective rate of profit, or, what amounts to the same (k being given), the prospective profit $\pi = k\varepsilon$. Thus to every value of k there corresponds a definite maximum prospective profit π_m.

The method of production having been chosen for each value of k, the entrepreneur has still to decide on the optimum k, i.e. the size of investment. He must charge the capital invested at the market rate of interest ρ and also make some allowance for risk, the rate of which we denote by σ. Thus the entrepreneur's prospective gain g is:

$$g = \pi_m - (\rho + \sigma)k$$

The entrepreneur will obtain the maximum gain at the value of k which satisfies the equation

$$\frac{d\pi_m}{dk} = \rho + \sigma$$

and this value of k is the optimum amount of investment. Now $d\pi_m/dk$ is simply the prospective rate of profit of a small capital addition dk to the amount invested k, supposing that both k and $k + dk$ are invested with the appropriate optimum method of production. We shall call $d\pi_m/dk$ marginal prospective rate of profit, or, for the sake of brevity, marginal rate of profit. We can consequently say that the size of investment k_0 is determined by that level at which the marginal rate of profit is equal to the sum of the rate of interest ρ and rate of risk σ. (See Fig. 17.)

2. It can easily be seen from Fig. 17 that the optimum amount k_0 to be invested is finite only if the marginal rate of profit falls when k exceeds a certain value. It is commonly believed that such a fall does in fact occur, and for two reasons: (i) large-scale diseconomies; (ii) imperfect competition. The first reason seems to be unrealistic. Clearly it has no technological basis. True, every machine has an optimum size,

[47] This definition corresponds to Professor I. Fisher's 'rate of return over cost', Mr K. E. Boulding's 'internal rate of return', and Mr J. M. Keynes's 'marginal efficiency of capital'.

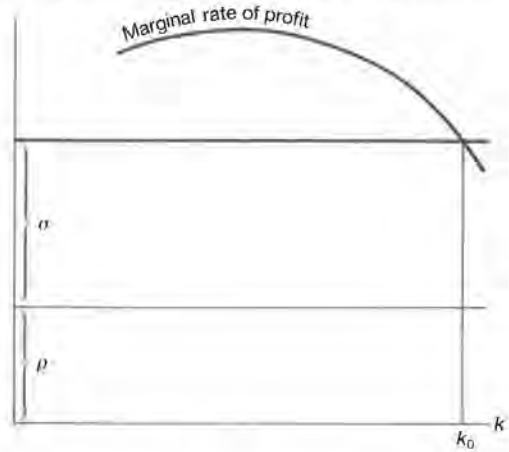


FIG. 17

but why not have 10 (or more) machines of this type? There remains the argument of difficulties of management arising out of large-scale enterprise. But this also is doubtful (why not start 10 factories instead of one with 10 independent directors?), and anyway could apply only to industrial giants far above the average size of existing enterprises.

The second reason for the limited size of investment is quite realistic, but does not cover the ground fully. The effect of imperfect competition in limiting the amount of investment k may often be overcome by spreading the latter over various fields: imperfect competition then operates to limit the portion of k invested in any particular field, but not to limit the total amount of k. On the other hand, imperfect competition cannot account for the fact that, in a given industry, at the same time large and small enterprises are started. Thus there must be yet another factor restricting the size of an investment.

Increasing risk

1. We have assumed so far—as is usually done—that the rate of risk is independent of the amount invested k. It is this assumption which has to be dropped, I think, in order to obtain a realistic solution of the problem of limited investment. It is reasonable to assume that marginal risk increases with the amount invested. For the greater the

investment, the greater is the reduction of the entrepreneur's income from his own capital when the average rate of profit falls short of the rate of interest. Suppose the rate of interest is 5%, the entrepreneur's own capital £1,000,000, and the credit taken also £1,000,000. If the average rate of return is only 3%, the total income of the entrepreneur is £10,000 as compared with £30,000 if he had borrowed nothing; while with £2,000,000 credit he suffers a net loss of £10,000, which, if it continues long enough, will drive him into bankruptcy.[10]

If, however, the entrepreneur is not cautious enough in his investment activity, it is the creditor who imposes on his calculation the burden of increasing risk, charging the successive portions of credits above a certain amount with a rising rate of interest.[48]

The amount invested k_0 is now given by the condition of the marginal rate of profit being equal to the sum of the marginal rate of risk σ and the rate of interest ρ. The $\rho + \sigma$ curve is not a horizontal curve as in Fig. 17, but an upward-sloping one. The point of its intersection with the marginal rate of profit curve determines the amount of the investment in the absence of large-scale diseconomies and imperfect competition (Fig. 18).

Now the various sizes of enterprise started in the same industry at a given time can be easily explained. The smaller the private capital of an

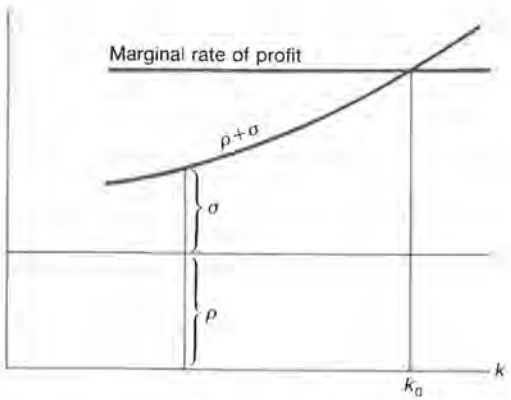


FIG. 18

[48] See M. Breit, 'Ein Beitrag zur Theorie der Geld- und Kapitalmarktes', *Zeitschrift für Nationalökonomie*, 6/5, p. 641. The principle of increasing risk is a generalization of Mr Breit's ideas.

entrepreneur investing an amount k, the greater the risk of impairing his income. Thus the smaller the private capital the higher is the $\rho + \sigma$ curve, and—as is easy to see from the chart—the smaller the amount invested k_0. The enterprises started in a given industry at a given moment are not of equal size because the private capital of the various entrepreneurs is not the same. 'Business democracy' is a fallacy: the amount of the entrepreneur's private capital is a 'factor of investment'.

2. Legitimate doubt may arise as to whether the results arrived at above are applicable to the case of joint-stock companies.[11] If a company issues bonds or debentures the situation is not materially altered. The greater the issue, the more dividends are impaired in the event of unsuccessful business. The position is also similar in the case of an issue of preference shares (the fixed interest on which is paid from profit before dividends on ordinary shares are distributed). But what about an issue of ordinary shares? *Prima facie* it would seem that no limits are set to such an issue, but in fact this is not the case. It is clear that the shareholders of an existing company or the promoters of a new one have no reason whatsoever to grant to new shareholders the full rate of profit from the investment undertaken: on the contrary, they will keep back a part for themselves, either by accepting bonus shares or by issuing the new shares above par and adding the agio gains to reserves. But a limit is set to these efforts to cheapen the capital received from new shareholders by the fact that the narrower the margin between the prospective dividend on new shares and the rate of interest, the smaller will be the market for the new shares. Thus there exists an optimum size of issue which is relatively small. (Even if the company tries to increase it by exaggerating the prospects of the enterprise, the limit is set by the cost of advertisement and kindred services.) This explains the fact that issues of ordinary shares do not play a very important part as compared with issues of bonds and preference shares.

The fundamental factors determining the optimum size of an issue of ordinary shares are essentially the same as in the case of floating a loan: the prospective rate of profit and the rate of interest. But their influence is here exerted in a much more complicated way, and may be distorted by speculative demand for shares which is often only loosely connected with the actual profitability of the enterprise. However, it seems justifiable to assume as a first approximation that conditions of investment activity are such as would obtain if all finance was by way

of loans—the more so because, as mentioned above, ordinary shares do not play a very important part in the finance of investment.

The rate of interest and the method of production

1. In the case represented in Fig. 18 we have constant returns and imperfect competition is ignored. Though in the general case, Fig. 17, there corresponds to each point on the marginal rate of profit curve a different method of production, it is clear that, with constant returns and perfect competition, technique does not change with the amount invested: the maximum rate of profit is obtained by the application of the same method of production, whatever the scale of enterprise.

Let us now consider what happens if the rate of interest is lowered. The $\rho + \sigma$ curve shifts down, and its point of intersection with the marginal efficiency curve moves to the right (Fig. 19). The method of production chosen by the entrepreneur in his plan does not change as the size of investment increases. Consequently, so long as constant returns prevail and we ignore the influence of imperfect competition, the change in the rate of interest does not affect the method of production chosen by the entrepreneur, but only the size of the investment planned.

2. This statement seems to contradict the classical theory of marginal productivity of capital and labour; but the contradiction is only apparent. The point of departure of the classical doctrine is a drastically simplified model of production in which the quantity of product is a definite function of the amount of 'real' capital and labour used. A necessary condition of long-run equilibrium is equality between the

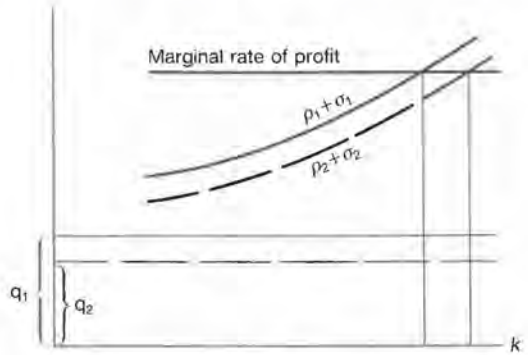


FIG. 19

marginal productivity of each factor and its price divided by the price of product. In the case of constant returns (homogeneous production function), this is also a *sufficient* condition for long-run equilibrium, for with constant returns the marginal-productivity equations exclude the existence of entrepreneurial gain. If the rate of interest falls, a shift towards a new long-run equilibrium must take place in which the marginal productivity of capital is lower, that of labour higher, and more capital is used in proportion to labour. But the theory says nothing about the immediate influence of a fall in the rate of interest on the plans of the entrepreneur. Such a fall in the case of constant returns (if our principle of increasing risk is not taken into account) must create a tendency to plan investment of infinite size and with an indefinite method of production.[49]

However, after the output of the product has suddenly increased, its price falls, and this makes possible the restoration of another long-run equilibrium in which the marginal-productivity equations are satisfied.[50]

Thus our problem was quite different from that of classical theory. We examined the planning of the entrepreneur in a given situation which in general was *not* the position of long-run equilibrium. We tried to find the factor limiting the size of the investment planned, and this factor, as we see, is non-existent in the classical theory in the case of firms subject to constant returns and not in the position of long-run equilibrium. And our statement that the fall in the rate of interest does not affect the method of production, but only the scale of investment plans, referred only to the *plans* and not to the situation arising out of their realization.

The classical thesis that a low rate of interest causes the use of more capitalistic method of production was often applied not only to the long-run equilibrium position but also to entrepreneurs' planning in 'disequilibrium'. This interpretation is of course wrong, and, as we have shown above, if we ignore imperfect competition and introduce the principle of increasing risk, the fall in the rate of interest has no

[49] It is sometimes considered obvious that the method of production is chosen so as to minimize average costs. This assumption, however, attributes to the entrepreneur the tendency to maximize the profit per unit of output, while he of course tends to attain the maximum total profit. Both tendencies are equivalent only if a given output is planned.

[50] This treatment is, however, very formal, for in reality an upward self-stimulating process begins which causes (if the rate of interest is not raised) either hyperinflation or fluctuations about the new position of long-run equilibrium.

immediate effect on the method of production decided upon by entrepreneurs in making their plans.[51]

'Commitments' as a function of marginal net profitability[12]

So far we have dealt with the investment of a firm starting afresh, with a given capital of its own. This is of course a special case. In general, investments undertaken by firms are not their 'maiden' ones. The burden of risk borne by a firm does not depend solely on investment currently planned. This burden is the result of all its commitments, by which term we mean here all its investments past and present minus its own (present) capital. Thus its commitments are equal to the cost of the past investment constituting its capital equipment plus investment orders in execution, or recently given, minus private capital consisting of the firm's own capital at the start, and the amounts accumulated since (inclusive of amortization). If, for example, the cost of the capital equipment of a firm is £1,000,000, the investment orders in execution £100,000, the investment orders given today £50,000, while the original capital of the firm and the amount accumulated since (inclusive of the amortization fund), £800,000; the commitments of this firm are

$$£1{,}000{,}000 + £100{,}000 + £50{,}000 - £800{,}000 = £350{,}000$$

Now it is easy to see that, in general, it is to the total amount of commitments that the curve of increasing risk relates. The investment plans undertaken today must be such as to push commitments to the point at which marginal risk is equal to the difference between the marginal rate of profit and the rate of interest. Or, if we call this difference the marginal net profitability, we can say that the commitments of a firm are an increasing function of the marginal net profitability.[52]

It is important to note that if a firm's investment in a certain period is equal to its saving, its commitments are unaltered, and the marginal risk incurred is not increased.

[51] It may be shown, however, that if imperfect competition is operative, the decline in the rate of interest exerts some influence towards more capitalistic methods of production in investment plans. This different effect of increasing risk and imperfect competition upon the method of production depends on the fact that the marginal risk increases with the amount of *capital* invested, while the marginal revenue falls with the increase in *output*.

[52] If we consider a long period in which the proportional rise of the private capital of the firm may be substantial, it is really the ratio of commitments to private capital which is the function of the marginal net profitability.

The connection due to increasing risk, between commitments and net profitability, plays an important part in the theory of the business cycle developed in essay 6 below.

5. The Long-Term Rate of Interest[13]

The finance of investment

1. We propose in this essay to analyse briefly the monetary phenomena accompanying investment in fixed capital equipment. In particular we intend to examine the influence of the latter upon the long-term rate of interest, and also to explain the remarkable stability of this rate.

We assume throughout the essay a closed economic system.

Liabilities of the banks are regarded as being composed of deposits on which interest is paid and current accounts on which none is paid, while assets consist of notes, bills, bonds, and advances. The ratio of notes to liabilities is kept more or less constant. The central bank is supposed to behave as in Great Britain, i.e. to supply the economy with cash by buying bills and bonds on the market.

2. We shall first consider the financing of investment in fixed capital under simplifying assumptions which will eventually be removed. We assume for the time being: (i) that on each day of the construction period of a given object of investment, bank advances are taken to the extent of the expenditure made during the day; (ii) that on the next day a loan of the same amount is floated and the advance of the preceding day repaid; (iii) that savings accumulated in any one day are used in the next to buy bonds.

What will happen under these conditions if additional investment is undertaken can easily be seen. Since saving is equal to investment, today's additional accumulation of savings on current accounts equals advances taken for additional investment. Tomorrow the flotation of loans to the amount of today's investment will be met out of today's savings. In this way an increase in the rate of investment will directly result in only a negligible addition to the advances and current accounts of the banks.

The increase in the rate of investment, however, brings about a rise of output in both investment and consumer goods industries, and this creates a greater demand for money for transactions. Current accounts

and advances tend to increase, and the banks are obliged to sell bills and bonds in order to expand their credits.

We will consider the results of these sales in detail later on, but first we shall remove our simplifying assumptions and thus show other factors tending to intensify the pressure on the bill and bond market.

3. We suppose now that, instead of financing construction day by day with advances for one day only, the cost of a given object of investment is advanced *en bloc* at the time when its construction is begun. A deposit account (of the same amount as the total cost of the investment object) is opened, out of which the expenditure on construction is financed. We shall call this account the 'investment finance fund'.[53] It diminishes gradually as construction proceeds, and is fully spent when the object of investment is finished. (Thus the average period of turnover of the investment finance fund is half the construction period.)

The sums spent on construction create equal amounts of saving, which, let us suppose, are accumulated for the time being also on the deposit account, and which are consequently equal in value at the end of construction to the total credit advanced. The loan then floated in order to fund this credit is exactly taken up by the accumulated savings. We shall call the savings which accumulate on deposit account the 'intermediate savings fund'. The fund's average period of turnover is also half the construction period.

Now it is easy to see that, if the money value of the rate of investment in fixed capital I_m prevails at a certain level and the average construction period is υ, the bank advances for construction must be equal to $I_m . \upsilon$. And on deposit accounts there is an 'investment finance fund' and an 'intermediate savings fund', each of the value $I_m . \upsilon/2$. If I_m increases, all these items rise proportionally.

It must be added that the above representation is based on the assumption that the time-lag in directing savings towards the purchase of securities is just half the construction period. If it is not, certain complications arise; these, however, do not materially affect our result, and thus we omit them from our argument.

4. We see now that if investment in fixed capital increases, bank advances tend to rise, not only because of the increase in the demand for money for transactions, but also because the investment finance

[53] It is this fund which Keynes has called 'finance'.

fund and intermediate saving fund are expanding. In this way additional pressure is exerted on the banks to sell bills and bonds. Before we start to consider the influence of this pressure upon the rate of interest, we must remove another simplification involved in the above argument.

We have supposed so far that new savings are (with a certain delay) fully used for the purchase of securities. It is quite possible, however, that they may be devoted partly to the repayment of advances (or—what amounts to the same thing in periods of increasing activity when the demand for money for transactions rises—they are left on current account while advances increase correspondingly less). This, however, does not materially affect our argument. A part of the loans floated is then not taken up by savers, but the banks are to that extent relieved from advances and enabled to take up loans instead. Here, however, a complication arises, since in general banks use the amounts released by repayment of advances partly for the purchase of bills and not of bonds. As a result, the pressure on the bill market is relieved, and that on the bond market proportionally strengthened.

The influence on the rates of interest

1. We stated above that an increase in investment causes the banks to sell bills and bonds in order to expand advances. If we ignore for a moment that a part of this supply may be purchased by the central bank, the only possible eventual buyers are the owners of deposits and current accounts. Let us first consider how this works as regards bills.

The sales of bills increase, of course, the discount rate, and this makes bills more attractive to the potential buyers. But it is easy to show that the demand for them is rather inelastic. Indeed, the most likely buyers are the owners of deposits, for the latter bear more or less the character of reserves. The rate paid on the deposits, however, usually moves parallel to the discount rate, and thus there is no change in comparative advantage. Therefore the bills must eventually be bought by the owners of current accounts. The higher rate of discount induces people to manage their transactions with smaller amounts of money, and thus enables some bills to be bought (or permits repayment of advances, the rate on which moves parallel to the rate of discount, and so reduces the sales of bills by banks). It is clear, however, that in order to produce this effect the change in the rate of discount must be appreciable.

Of course, in buying bills the central bank greatly reduces the pressure of sales. For banks may obtain in this way additional amounts of notes, and this enables them to expand credit by, say, £10 for each £1 note obtained. But the effect of the central bank's buying is partly counterbalanced by the fact that, with increasing activity, the demand for notes 'in circulation' rises. At any rate, there is an inherent tendency in the system towards strong fluctuations in the discount rate, which in fact often makes itself felt.

2. What, however, about the sale of bonds? It is known that their yields fluctuate much less than the discount rate. Why do sales of bonds taking place together with sales of bills depress only slightly the long-term rate of interest? This, I think, is due to the fact that many of the deposit-owners are willing to buy bonds when their yield increases in spite of the much greater increases in the rate on deposits (if e.g. the long-term rate increases from 4 to 4.2, while the rate on deposits increases from 2 to 3.) The reason for such behaviour on the part of this type of deposit-owner is as follows.

Consider a capitalist with a non-speculative outlook, who faces the alternatives of holding his reserves in bonds or deposits. There is the advantage of a stable and generally higher income on the side of bonds; on the other hand, deposits are constant in value, while the price of bonds, in the case of an emergency which may necessitate their sale in the indefinite future, cannot be foreseen, and the risk of loss is always present. Thus it is clear that the stimulus to keep bonds is the margin between the *present* long-term rate and the anticipated *average* short-term rate over a long period. Now it is very likely that the change in the present rate on deposits does not greatly affect the expectations of its average over a long period. Thus it is plausible that a deposit-owner of the type considered may be induced to buy bonds even though the rate on deposits has increased much more than the yield of bonds.

Statistical illustration and general remarks

1. The relative stability of the long-term rate of interest is generally known. But perhaps it is not fully realized how small in fact its purely cyclical fluctuations are. This can be seen from Table 16, in which we have computed the difference between the yield of consols and the 9-year moving average for the period 1853–1932.[54]

[54] The yields of consols over the period considered are taken from J. Stafford, 'The Future of the Rate of Interest', *The Manchester School*, 8/2, p. 137.

Table 16. *Deviations of the Yield of Consols from the 9-Year Moving Average*

1853	−0.11	1873	+0.04	1893	+0.08	1913	−0.16
1854	+0.11	1874	+0.05	1894	+0.04	1914	−0.28
1855	+0.14	1875	+0.03	1895	−0.06	1915	−0.07
1856	+0.04	1876	−0.02	1896	−0.14	1916	+0.18
1857	+0.06	1877	−0.01	1897	−0.18	1917	+0.28
1858	−0.13	1878	+0.03	1898	−0.16	1918	−0.06
1859	−0.07	1879	−0.01	1899	−0.10	1919	+0.06
1860	−0.03	1880	−0.01	1900	+0.02	1920	+0.70
1861	+0.04	1881	−0.04	1901	+0.10	1921	+0.57
1862	−0.02	1882	−0.03	1902	+0.02	1922	−0.21
1863	−0.03	1883	−0.04	1903	+0.04	1923	−0.35
1864	+0.06	1884	+0.02	1904	+0.07	1924	−0.26
1865	+0.07	1885	+0.12	1905	−0.04	1925	−0.12
1866	+0.13	1886	+0.12	1906	−0.04	1926	+0.07
1867	−0.06	1887	+0.12	1907	+0.04	1927	+0.13
1868	−0.09	1888	−0.18	1908	−0.08	1928	−0.05
1869	−0.03	1889	−0.12	1909	−0.07	1929	+0.08
1870	0.00	1890	−0.05	1910	−0.02	1930	0.00
1871	+0.01	1891	+0.04	1911	−0.04	1931	+0.08
1872	+0.03	1892	+0.10	1912	−0.07	1932	−0.37

Only in the World War, early post-war years, and 1932 does the 'cyclical deviation' of the long-term rate of interest exceed 0.2.

These facts are of great importance in the investigation of the business cycle. It seems unlikely that changes in the long-term rate of interest of the order of those noticed, say from 3.0 to 3.2, can influence investment activity[55] to any great extent. Thus it will be a justifiable simplification if we assume in the analysis of the business cycle that the long-term rate of interest is constant. This assumption may be contested on the grounds that it is the yield of industrial bonds which matters in investment activity, and that this yield increases (sometimes appreciably) in deep depressions because of the decline in lenders' confidence. The omission of this factor, however, does not distort the picture of the business cycle because it works in the same direction as the fall of the rate of profit, and therefore only aggravates the crises; it is not of fundamental importance for the mechanism of the trade cycle.

2. The fact of the stability of the long-term rate of interest stated above is particularly important for the analysis of the last stage of the

[55] See R. F. Harrod, *The Trade Cycle*, p. 112.

boom. It excludes these theories of the business cycle which attribute the breakdown of prosperity to the increase in the rate of interest. For the rate of interest can stop the boom only by hampering investment, and it is chiefly the long-term rate which matters in investment activity.

Moreover, the stability of the long-term rate of interest shows indirectly that the boom ends in general before full employment is reached. When the system comes to the point of full employment, wages must rise sharply. But as shown above, this does not tend to reduce employment directly (see p. 283). Thus wages and prices continue to climb up, the demand for bank advances steadily increases, causing a strong rise in the short-term rate and—at least after a certain time—an appreciable increase in the long-term rate. Only this can overcome 'inflation' by hampering investment and stopping the rise in wages and prices.

Since, however, no appreciable rise in the rate of interest usually occurs in the boom, it can be concluded that something like full employment is approached only in exceptional cases. In general unemployment (manifest or disguised) is sufficient to permit the boom to develop, and it is not the scarcity of labour which brings it to an end.

6. A Theory of the Business Cycle[56] [14]

Methodological remarks and simplifying assumptions

1. The character of this essay is to a great extent different from that of the preceding ones. In the latter we frequently used simplified models, but only in order to solve some basic problems in their pure form, returning afterwards to the complexities of the real world. Here, however, we confine ourselves to the consideration of the business cycle only under simplifying assumptions, some of which may seem drastic. This is partly due to the peculiar character of the subject. The business cycle as such exists only as a tendency which, in conjunction with what we call more or less vaguely 'secular trend', 'structural changes', etc., creates the extremely complex dynamic process we observe in the real world. Thus to pass from a simplified model to

[56] This essay is an altered version of the article published in *Review of Economic Studies*, Feb. 1937. The essential ideas in it had already been developed in my 'Essai d'une Théorie du Mouvement Cyclique des Affaires', *Revue d'Economie Politique*, Mar.–Apr. 1935, and in mathematical form in 'A Macrodynamic Theory of the Business Cycle', *Econometrica*, July 1935.

reality is to undertake a thorough analysis of this process as a whole, which is clearly beyond the scope of this essay.

We cannot even find consolation in the idea that the mechanism of the business cycle, which we attempt here to construct, may simply be superimposed on the secular trend, etc. On the contrary, the latter certainly affects the course of the business cycle as such.

This does not mean, however, that the consideration of the trade cycle in simplified models is a waste of time. To approach the dynamic process in all its complexity is certainly a hopeless task, so that the first step must be to construct elementary mechanisms of the business cycle or secular trend. Only it must be kept in mind that these simple schemes are the beginning and not the end of economic dynamics.

2. We make the following simplifying assumptions: (i) we assume a closed economic system and a balanced state budget;[57] (ii) we suppose the increase or decline in the volume of inventories (working capital and stocks) to be negligible; (iii) we are dealing with an economy with no secular trend. The first assumption makes both the balance of expenditure of foreign countries and that of the government equal to zero. Consequently, investment I (as defined on p. 257), which is equal to private saving S, now becomes identical with private investment in fixed capital, working capital, and stocks. Thus, bringing in assumption (ii) about the constancy of inventories, we shall have in our model the equality between investment I and the output of fixed capital equipment.[58] However, before we proceed further, some explanation of assumptions (ii) and (iii) is necessary.

3. There are various reasons why we omit changes in inventories from our argument. The statistical evidence on this subject is very poor: the only series ranging over many years is that constructed by Dr Kuznets for the USA during the period 1919–35.[59]

Except for this, we know very little about changes in inventories, while our knowledge of fluctuations in output of fixed capital equipment is considerably greater. (Steel production—the data on which are accessible for many countries over long periods—is a good indicator of the general output of fixed capital.)

[57] The doles for unemployed are financed by taxation or by the reduction of other state expenditure.

[58] Equipment in the course of construction is here *not* included in inventories. The change in the volume of equipment in the course of construction is contained in the 'output of fixed capital equipment'.

[59] *National Income and Gross Capital Formation*, p. 40.

Further, if we look at the changes in inventories and private investment in fixed capital in the USA in the period mentioned (see Fig. 20), we see at a glance that the former series is much less regular than the latter: indeed, one cannot properly speak of regular cyclical fluctuations in the changes in inventories. Nor is this surprising, for the latter are influenced by factors which are much more heterogeneous than those affecting investment in fixed capital. It follows that it is difficult to account for changes in inventories in a simple scheme, and, further, that they are not of primary importance in the explanation of the trade cycle. So far we have shown the desirability of keeping the changes in inventories out of our model. But how to remove them, i.e. how to construct our model in such a way as to keep the volume of inventories constant?

It is sometimes thought that the volume of inventories tends to vary proportionally with output, on the assumption that inventories are identical with working capital, which is regarded as bearing a constant relation to output. Neither assumption is correct. Inventories contain, besides working capital *sensu stricto*, 'stocks' in the form either of reserves or of accumulated unsold goods; and these move often in the opposite direction to working capital. Further working capital in

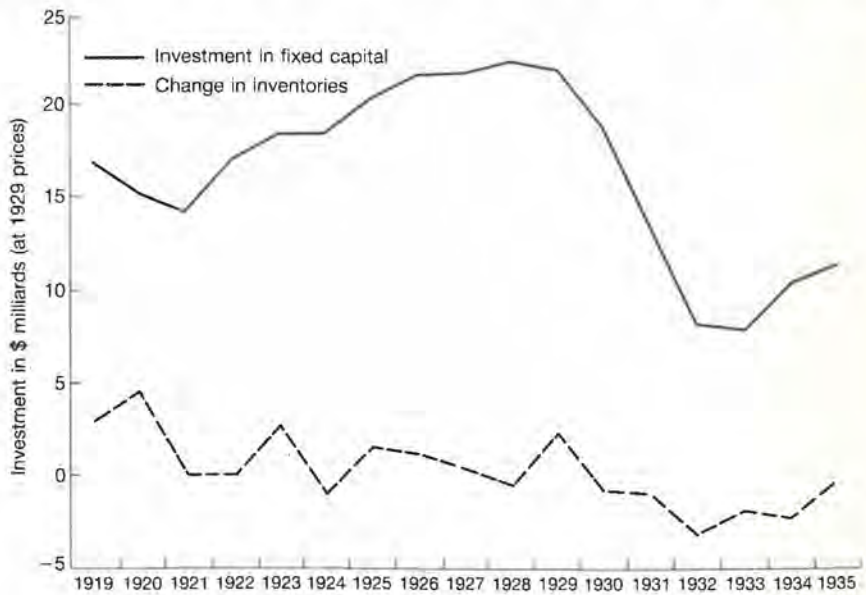


FIG. 20

trade—in particular in the retail trade—changes much more slowly than sales; for dealers during a depression try to attract custom by stocking a greater variety of goods. As a result, the volume of inventories is much more stable than that of output. On the basis of Dr Kuznets's data on changes in inventories and of the level of inventories in 1922 as given by the Census of Production, in Table 17 we have computed the *level* of inventories in the USA in the period 1919–35 (at 1929 prices).[60]

We see that inventories are very sticky; it is, for instance, surprising to learn that their volume in 1932 was only slightly lower than in 1928. Now one can easily imagine an economic system in which this tendency operates to the point of almost full stability of working capital and stocks, each fluctuating to the same extent but in opposite directions. Such a state of affairs need not seem fantastic in the light of the above figures.

4. We are next going to make some comments on the assumption of a 'trendless' economy. We mean by this a system which can attain a state of long-run equilibrium, i.e. that there exists some position at which no change whatsoever occurs in the system.

It is clear that we cannot simply postulate a trendless economy; we must attribute to our system characteristics which will render it trendless. This will be done largely in the course of the argument. At present we make only the following assumption. We suppose that not only manual workers (see p. 258) but also salary-earners and rentiers

Table 17. *Volume of Inventories and Output in the USA (1929 = 100)*

	Inventories	Output		Inventories	Output
1919	72	71	1928	98	97
1920	81	73	1929	100	100
1921	87	69	1930	102	91
1922	87	74	1931	100	78
1923	90	82	1932	95	61
1924	92	83	1933	89	63
1925	93	86	1934	83	73
1926	96	92	1935	80	78
1927	98	92			

[60] Exclusive of the estimated value of movable equipment under construction, which we consider as fixed capital.

do no saving. Obviously a contrary state of affairs is incompatible with a trendless economy. Indeed, if salary-earners and rentiers do save they may be expected, in view of the relative stability of their income, to make some positive net saving in all circumstances. This, however, makes impossible the existence of a long-run equilibrium. For in such a state not only must there be no net saving, but in addition the net saving of salary-earners and rentiers on the one hand and of entrepreneurs on the other must each be equal to zero. For otherwise a shift of capital from entrepreneurs to salary-earners and rentiers would take place, which would change the economic situation quite appreciably, as we shall see below (see p. 308).

If we want to deal with a trendless economy, therefore, we must assume that all saving is done by entrepreneurs.

Assumptions restated

1. The consequences of our assumptions so far established are as follows:

(i) In our system, the sole type of investment is private expenditure on fixed capital equipment (the consequence of the assumptions of a closed system, a balanced budget, and constant inventories).
(ii) The workers and rentiers are supposed not to save, and thus all saving is done by entrepreneurs (the necessary conditions of a trendless economy).

2. Besides these assumptions, some of the conclusions of the preceding essays are used.

On the basis of the first essay we take for granted that the prices of finished investment goods change more or less proportionally to those of consumer goods (see pp. 250–2).

The argument of the second essay (p. 264) enables us to assume that capitalist incomes are determined by the national income Y (both expressed in stable values). We shall also use the equation established there (p. 268)

$$Y=f(I_{t-\lambda}) \tag{10}$$

which describes the functional relation between the national income Y at time T and investment I at time $t-\lambda$ (both expressed in stable values).

Further, we shall use the connection between the level of commitments contracted by entrepreneurs and the difference between the

marginal rate of profit and the rate of interest—which was developed in the fourth essay (on the basis of the principle of increasing risk).

Lastly, in accordance with the results arrived at in the fifth essay, the long-term rate of interest will be assumed stable throughout the cycle.

Investment decisions and investment

1. Investment in our model is solely in fixed capital, i.e. deliveries of finished capital goods plus the increase in fixed capital in the course of construction (the latter was *not* included in inventories). Thus investment is here equivalent to the work actually performed in the industries producing fixed capital equipment. And I (expressed in stable values) is equal to the volume of their output.[61]

2. Since investment coincides in our system with the output of fixed capital, its actual level at any time is the result of past investment decisions which objectively took the form of orders for machines, buildings, etc.

Let us consider first the connection between the flow of decisions—orders for, and output of, a particular type of investment goods. We denote the rate of investment orders for this type of goods by d, the output in the industry constructing them by i, and the construction period by υ.

All orders in the process of execution at the time t (Fig. 21) were given in the period from $t-\upsilon$ to t, for previous orders were completed before $t-\upsilon$, while orders given after $t-\upsilon$ are still unfinished at time t. The volume of these outstanding orders is represented by the shaded area.

On the other hand, since all orders must be executed within a time υ, work corresponding to $1/\upsilon$ of each of the orders under execution must be performed per unit of time by the investment goods industry under consideration. And since the volume of all outstanding orders is given by the shaded area, the output i in this industry at the time t is equal to:

$$i=\frac{\text{shaded area}}{\upsilon}$$

[61] In the second essay, in order to express investment, saving (which is equal to the former), and national income in stable values, we divided them by the index of prices of all finished goods. Since, however, prices of finished investment goods (fixed capital equipment) and prices of finished consumer goods (cost of living) move almost proportionally (see pp. 250–2), I expressed in stable values coincides practically with the volume of output of investment goods industries.

do no saving. Obviously a contrary state of affairs is incompatible with a trendless economy. Indeed, if salary-earners and rentiers do save they may be expected, in view of the relative stability of their income, to make some positive net saving in all circumstances. This, however, makes impossible the existence of a long-run equilibrium. For in such a state not only must there be no net saving, but in addition the net saving of salary-earners and rentiers on the one hand and of entrepreneurs on the other must each be equal to zero. For otherwise a shift of capital from entrepreneurs to salary-earners and rentiers would take place, which would change the economic situation quite appreciably, as we shall see below (see p. 308).

If we want to deal with a trendless economy, therefore, we must assume that all saving is done by entrepreneurs.

Assumptions restated

1. The consequences of our assumptions so far established are as follows:

(i) In our system, the sole type of investment is private expenditure on fixed capital equipment (the consequence of the assumptions of a closed system, a balanced budget, and constant inventories).
(ii) The workers and rentiers are supposed not to save, and thus all saving is done by entrepreneurs (the necessary conditions of a trendless economy).

2. Besides these assumptions, some of the conclusions of the preceding essays are used.

On the basis of the first essay we take for granted that the prices of finished investment goods change more or less proportionally to those of consumer goods (see pp. 250–2).

The argument of the second essay (p. 264) enables us to assume that capitalist incomes are determined by the national income Y (both expressed in stable values). We shall also use the equation established there (p. 268)

$$Y=f(I_{t-\lambda}) \tag{10}$$

which describes the functional relation between the national income Y at time T and investment I at time $t-\lambda$ (both expressed in stable values).

Further, we shall use the connection between the level of commitments contracted by entrepreneurs and the difference between the

marginal rate of profit and the rate of interest—which was developed in the fourth essay (on the basis of the principle of increasing risk).

Lastly, in accordance with the results arrived at in the fifth essay, the long-term rate of interest will be assumed stable throughout the cycle.

Investment decisions and investment

1. Investment in our model is solely in fixed capital, i.e. deliveries of finished capital goods plus the increase in fixed capital in the course of construction (the latter was *not* included in inventories). Thus investment is here equivalent to the work actually performed in the industries producing fixed capital equipment. And I (expressed in stable values) is equal to the volume of their output.[61]

2. Since investment coincides in our system with the output of fixed capital, its actual level at any time is the result of past investment decisions which objectively took the form of orders for machines, buildings, etc.

Let us consider first the connection between the flow of decisions—orders for, and output of, a particular type of investment goods. We denote the rate of investment orders for this type of goods by d, the output in the industry constructing them by i, and the construction period by υ.

All orders in the process of execution at the time t (Fig. 21) were given in the period from $t-\upsilon$ to t, for previous orders were completed before $t-\upsilon$, while orders given after $t-\upsilon$ are still unfinished at time t. The volume of these outstanding orders is represented by the shaded area.

On the other hand, since all orders must be executed within a time υ, work corresponding to $1/\upsilon$ of each of the orders under execution must be performed per unit of time by the investment goods industry under consideration. And since the volume of all outstanding orders is given by the shaded area, the output i in this industry at the time t is equal to:

$$i=\frac{\text{shaded area}}{\upsilon}$$

[61] In the second essay, in order to express investment, saving (which is equal to the former), and national income in stable values, we divided them by the index of prices of all finished goods. Since, however, prices of finished investment goods (fixed capital equipment) and prices of finished consumer goods (cost of living) move almost proportionally (see pp. 250–2), I expressed in stable values coincides practically with the volume of output of investment goods industries.

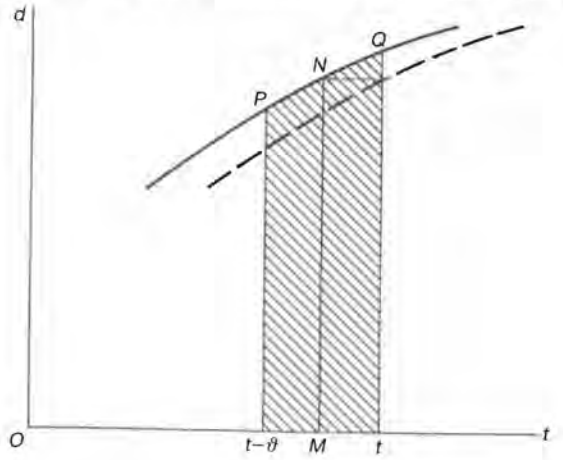


FIG. 21

It is easy to see from Fig. 21 that this quotient is approximately equal to the median line MN. (This equality is perfect if PQ is a straight line.) Consequently the output i of our industry at time t is approximately equal to the rate of investment orders at the time $t-\upsilon/2$. Or the time-lag between d and i is approximately equal to half the construction period.

3. In reality we have, of course, not one type of investment good but many types, with different construction periods. We shall call the volume of all types of investment order per unit of time the rate of investment decisions D; and the volume of the output of all types of fixed capital the rate of investment I.

The construction periods of the various types of investment good are different, but we can define the average construction period υ as the ratio of the volume of all investment orders under execution (at a certain moment) to the total output of investment goods I. The average construction period is not constant, but if the distribution of orders between different types of investment does not undergo very great changes, which seems to be the case, variations in $\bar{\upsilon}$ will be slight. We shall assume that $\bar{\upsilon}$ is constant.

The argument developed in the preceding paragraph for d, i, and υ also applies approximately for D, I, and υ, and thus the time-lag between the rate of investment decisions and the output of investment

goods is approximately equal to $\bar{\upsilon}/2$. Hence investment at time t is equal to the rate of investment decisions at time $t-\bar{\upsilon}/2$.

$$I_t = D_{t-\bar{\upsilon}/2} \tag{12}$$

(The available statistics show that the average construction period is probably between half a year and a year; thus $\bar{\upsilon}/2$ may be regarded as 3–6 months.)

4. We established in the second essay (p. 268) that the national income Y and investment I are connected by the equation

$$Y_t = f(I_{t-\lambda}) \tag{10}$$

Since investment at time $t-\lambda$ must be equal to the rate of investment decisions at time $t-\lambda-\bar{\upsilon}/2$, we have:

$$Y_t = f(D_{t-\lambda-\bar{\upsilon}/2}) \tag{13}$$

This means that since national income is lagging behind investment by λ and investment behind investment decisions by $\bar{\upsilon}/2$, income is lagging behind investment decisions by $\lambda+\bar{\upsilon}/2$. If we denote $\lambda+\bar{\upsilon}/2$ by τ, we can write the last equation in the form:

$$Y_t = f(D_{t-\tau}) \tag{13a}$$

It may be mentioned that, if we take $\bar{\upsilon}/2$ as 3–6 months and λ (see p. 272) as 4 months, τ amounts to 7–10 months.

Equation (13a) has important implications. It shows that past investment decisions determine the present national income, which of course influences current investment decisions; and these will in turn influence the national income in the future. This conception is the basis for the type of treatment which Mr Lundberg has called 'model sequences'.[62]

Let us consider in each period the average level of investment decisions and the national income. Then the income in, say, period 2 is a function of investment decisions in period 1. Now the income in period 2, as we shall see below, in conjunction with some other factors, determines the investment decisions in this period, they in turn determine the national income in period 3, and so on.

[62] Erik Lundberg, *Studies in the Theory of Economic Expansion*, London, P. S. King & Son, 1937. It was applied also in my paper in *Review of Economic Studies*, Feb. 1937, which appeared about the same time.

So far we have established precisely only the connection between investment decisions and income. Now we shall enquire more closely into the determinants of investment decisions.

The inducement to invest

1. Our argument about the inducement to invest, i.e. about the factors determining investment decisions, is based on some of the results arrived at in the essay on 'The Principle of Increasing Risk'.

We concluded there that the commitments which an entrepreneur is willing to enter at any time are an increasing function of net profitability, i.e. of the difference between the marginal rate of profit and the rate of interest. The same holds good for entrepreneurs as a whole.[63]

Commitments were defined as follows:

Commitments = Capital equipment (valued at cost)
+ Investment orders in execution (or just given)
− Private capital (inclusive of amortization funds)

We can now add all such equations relating to individual entrepreneurs, and thus obtain a similar equation for entrepreneurs as a whole.

One may divide outstanding investment orders into the part already produced and the part yet to be completed. If, for example, one third of a factory whose total cost of construction is £1,500,000 has already been constructed, the value of the former part is £500,000 and of the latter £1,000,000. The former part is nothing other than capital in the course of construction. Thus the equation of commitments may be written as follows:

Commitments = Capital equipment + Capital in the course of construction + The uncompleted part of outstanding orders − Private capital

[63] It is clear that in general the marginal rates of profit in various industries are not equal. But we can define the general marginal rate of profit as such a rate which, if it were to prevail in all industries, would affect the 'commitments' in the same way as the given set of marginal rates of profit.

or:

Commitments = (Capital equipment + Capital in the course of construction − Private capital) + The uncompleted part of outstanding orders

It is easy to see that in our model the expression in brackets is constant. Indeed, in a unit of time the sum of capital equipment and capital in the course of construction increases by the value of the output of fixed capital equipment, i.e. by the value of investment. On the other hand, the private capital of entrepreneurs increases by the value of the total saving, for according to our simplifying assumptions entrepreneurs are the only savers in our system. As investment equals saving, the sum of capital equipment and capital in the course of construction minus the private capital of entrepreneurs remains constant through time. Consequently commitments vary only because of changes in the uncompleted part of outstanding investment orders. Thus, since commitments are an increasing function of the gap between the marginal rate of profit and the rate of interest, the same must also be true of the uncompleted part of investment orders.

However great *actual* investment, i.e. the output of investment goods, may be, it cannot increase aggregate commitments, for entrepreneurs (being the only savers) must save as a body always just as much as they invest. Thus increasing risk cannot change actual investment. The point where it does exert pressure is on the unexecuted investment decisions. For an investment decision taken, but as yet unexecuted, has no counterpart in saving. And an increase in the uncompleted part of investment decisions—the only way in which aggregate commitments may increase in our system—thus requires a higher gap between the rate of profit and the rate of interest.

2. So far we have stated the functional connection between the *stock* of the uncompleted parts of investment orders and the difference between the marginal rate of profit and the rate of interest. Our real aim, however, is to discover the determinants of the *rate* of investment decisions. There is obviously a close connection between these two problems. The flow of new investment decisions must be such as to keep the stock of the uncompleted parts of investment orders at the level corresponding to the prevailing net profitability. Now the period of turnover of this stock is $\bar{v}/2$, the time-lag between D (the rate of investment decisions) and I (the output of investment goods). Thus the stock of unexecuted investment orders is approximately equal to

$D \cdot \bar{v}/2$. It follows that the rate of investment decisions D is also a function of the difference between the prospective rate of profit and the rate of interest.[64]

3. Some readers may regard this discussion of the functional relation between the rate of investment decisions and net profitability as labouring the obvious. This theorem has indeed been often used (more or less implicitly), but so far as I know it has not been satisfactorily demonstrated. To make, for example, a statement that net profitability is an incentive to invest does not establish that the *rate* of investment decisions is a function of net profitability.

Further, our argument shows that this theorem holds good only under special assumptions. We assumed in our simplified model that rentiers and workers do not save. If they do, enterpreneurs' commitments increase permanently by the amount saved 'outside enterprises' (for the saving of enterpreneurs falls short of investment by this amount).

If in an economy the steady accumulation of non-enterpreneurial savings is accompanied by a secular growth of wealth, the ratio of commitments to private capital of enterprises may not rise, and the investment activity may not be impaired by saving outside enterprises.

If, however, we consider a system having no secular trend, the accumulation of savings outside enterprises must cause a structural slump of investment activity which is not due to the change in net profitability. For with a given net profitability the rate of investment decisions must decline, because otherwise the marginal risk would increase.

This is the reason why, in order to construct a system tending neither to grow nor to shrink in the long run, we assumed the salary-earners and rentiers not to save.

Two determinants of investment decisions

1. We have shown that in our system the rate of investment decisions D is an increasing function of the difference between the marginal rate

[64] Commitments we have considered as measured in terms of money, while D is the *volume* of investment decisions per unit of time. The money value of D is Dp_i where p_i is the index of prices of investment goods. Thus it may seem that it is $Dp_i \cdot \bar{v}/2$ and not $D \cdot \bar{v}/2$ which is the function of net profitability. While $D \cdot \bar{v}/2$ would then be equal to this function divided by the price index p_i. But, e.g., if p_i rises, enterpreneurs are inclined to evaluate their wealth higher and to enter greater commitments. This may be roughly accounted for by assuming, not $Dp_i \cdot \bar{v}/2$, but $D \cdot \bar{v}/2$ to be a function of net profitability.

of profit and the rate of interest. Since it is the long-term rate that matters here, and this was assumed constant, D is an increasing function of the marginal rate of profit. We are now going to show that the marginal rate of profit at a given time—by which is meant the marginal *prospective* rate of profit (see p. 286)—is determined *grosso modo* by the level of the national income Y and the stock of capital equipment. And thus these two factors are together the determinants of the rate of investment decisions. We shall first consider the effect of changes in the national income with a given capital equipment, and afterwards allow for changes in the latter.

2. As follows from the considerations on p. 264, the level of national income Y (expressed in stable values) determines approximately its distribution between various classes. In particular, Y determines more or less closely the total capitalist income Q (expressed in stable values).

Let us denote now by p the index of prices of finished (investment and consumer) goods by which we deflated the money income in order to obtain income in stable values. The money national income is of course Yp, and total money capitalist income Qp.

The greater Qp is with a given capital equipment, the greater will be the capitalist income qp, which can be obtained at present from a given new investment (q is this income expressed in stable values). We now denote the index of prices of investment goods by p_i. It is easy to see that the capitalist income per unit of newly invested capital is proportionate to qp/p_i. But since, according to the result arrived at in the first essay, the prices of finished investment goods vary in approximately the same way as those of finished consumer goods, the ratio qp/p_i is practically equal to q, where greater the given capital equipment, the greater the actual capitalist income expressed in stable values. And as this latter is determined by the national income Y, it follows that the rate of capitalist income which can be obtained under current conditions from a new investment is the greater in proportion to the national income Y (with given capital equipment).

The rate of capitalist income which can be obtained now from a new investment which is not a sufficient basis for future developments must be taken into account. But since conjectures on this subject are extremely vague, present affairs have a predominant influence upon long-term expectations. Knowing so little about the future, entrepreneurs are inclined to be optimists when present trade is good and

pessimists when it is bad. Thus as a good approximation we may assume that the rate of profit is a function of q, and thus with given capital equipment, the greater is q, the greater the national income Y. And since the rate of investment decisions D is an increasing function of the marginal rate of profit, we have finally the equation

$$D=\phi_e(Y) \tag{14}$$

where ϕ is an increasing function and the subscript e means that it is determined only with given capital equipment.

3. There are good reasons to believe that the curve representing the function ϕ is S-shaped (see Fig. 22). For when things are improving entrepreneurs become more optimistic about their future, and the rate of investment decisions increases strongly; but after a certain point doubts begin to arise as to the stability of this development, optimism ceases to keep pace with the boom, and the rate of investment decisions tends to increase less rapidly. In the slump a symmetrical development is likely to occur.

The function ϕ represents the dependence of the rate of investment decisions at time t on the national income Y at the same time:

$$D_t=\phi_e(Y_t) \tag{14a}$$

We have, however, established another connection between these variables; the national income at time t is determined by the rate of investment decisions at time $t-\tau$, where τ is the time-lag depending both on the construction period and on the lag between income and consumption. In other words, the national income at time $t+\tau$ is a function of investment decisions at time t:

$$Y_{t+\tau}=f(D_t) \tag{13b}$$

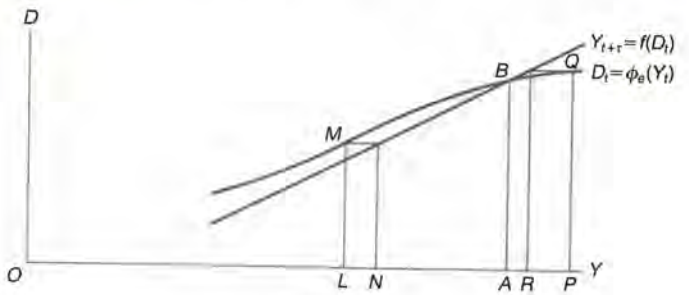


FIG. 22

Both functions are represented on Fig. 22. The ordinate of the S-shaped ϕ curve shows the rate of investment decisions D_t corresponding to national income Y_t; while the abscissa of the f curve (which is taken here to be a straight line[65] (corresponding to D_t gives $Y_{t+\tau}$, i.e. the national income at the time $t+\tau$. Owing to the ϕ curve being S-shaped, it must cut the f curve at some point B. We shall see at once that from these two curves we can find out how the system moves.

Let us imagine time to be divided into τ periods. Suppose that in an initial τ period the national income has the value $0L$.

The rate of investment decisions in this period is determined by the ordinate of the ϕ curve LM. These investment decisions, however, determine in turn the national income in the next τ period, which is equal to the corresponding abscissa of the f curve $0N$. Thus the national income is increasing.

On the other hand, if the national income in the initial period has the value $0P$, investment decisions in this period are equal to PQ, and the national income in the next period is $0R$. Thus the national income is here diminishing.

While if Y is equal to $0A$, the abscissa of the point of intersection B of the ϕ and f curves, the national income tends neither to rise nor to fall.

To sum up: if the point Y, D lies above the f curve, i.e. if the present investment decisions are higher than investment decisions in the preceding τ period, which have determined the present national income, the latter increases. If the point Y, D lies below the f curve, i.e. if the present investment decisions are lower than those which have determined the present national income, the latter decreases. While if the point Y, D coincides with the point of intersection B of the ϕ and f curves, i.e. if the present investment decisions are equal to those which have determined the present national income, the latter is stationary. Thus the point Y, D either moves towards B, or remains stationary if it coincides with it.

4. A problem concerning the upward movement of the system towards point B is still to be touched upon.

It is theoretically possible that, before point B is reached, employment might rise so much as to absorb the total available labour supply. In other words, the abscissa of point B might exceed the level of

[65] As we have seen in the first essay (p. 273) the diagram of the function f for the USA was a straight line.

national income at which full employment is attained. If, however, there exists at the point of full employment a tendency for a further rise in investment (expressed in stable values), the system must enter into a state of 'inflation' characterized by a violent rise in wages and prices, while no further increase in the 'real' national income can occur.

The 'inflation' would eventually be checked by an 'automatic' rise in the rate of interest (see p. 298). The rise in wages and prices would cause a strong increase in the short-term rate of interest, and a much smaller but still appreciable one in the long-term rate. Thus under 'inflationary' conditions our assumption of a stable long-term rate would not hold good; for under such conditions the rate would increase until investment activity fell to a level compatible with the existing supply of labour. This is very clearly represented in Fig. 23. Suppose that full employment is reached at point E, which lies to the left of point A. In order to prevent inflation, the rate of interest must increase so as to keep the rate of investment decisions at the level EF, for this rate determines the level of the national income equal to $0E$ at which all available labour is absorbed. The rate of investment decisions is *not* equal to EF' because of the rise in the rate of interest. The rise in the rate of interest as the system approaches full employment causes the curve ϕ, determining the rate of investment decisions in terms of income, to flatten out along GF instead of rising to F', so that its point of intersection with the f curve is F instead of B. In this way, the case when full employment is reached may easily be accounted for in our analysis. We have already indicated, however, that such a situation is rather exceptional; thus as a rule point B lies to the left of point F'.

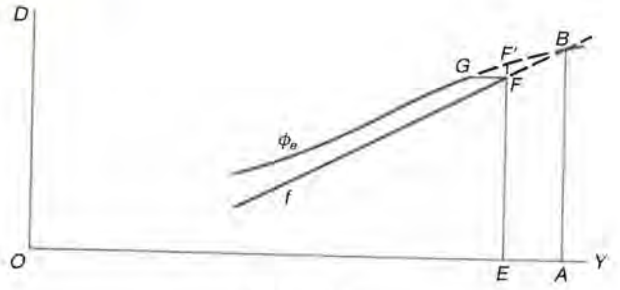


FIG. 23

5. B represents a conditional equilibrium in the sense that at this point the system has no tendency to change provided there is no change in capital equipment (which has so far been assumed constant). However, as investment is generally not at the level of wear and tear, equipment *does* change, and, as will be shown in detail below, the state of 'conditional equilibrium' cannot be permanent.

Many writers[66] who have constructed simplified models of the Keynesian theory have focused their attention on the 'equilibrium' represented by point B. This was due to the fact that they did not distinguish between investment decisions and investment. They were therefore unable to conceive of the system being in a position different from that presented by point B. In addition, they did not consider the influence of changes in capital equipment.

It is true that—as shown above—the system always moves towards point B, but it may, of course, take several τ periods to come close to it. Thus the time of adjustment is considerable (τ is more than half a year).

When at last 'equilibrium' is reached, it cannot last long because of the change in capital equipment. Thus the position of 'conditional equilibrium' is rather exceptional. As we shall see, it is attained only at the top of the boom and at the bottom of the slump.

6. We have so far examined the dependence of the rate of investment decisions D on the national income Y under the assumption of a given capital equipment. We must now analyse the influence of changes in equipment on investment decisions with a constant national income. In this way we shall be able to describe D as a function of both national income Y and capital equipment.

It is easy to see that if the capacity of equipment increases while Y is stationary, the state of affairs becomes worse. Capitalist income Q (expressed in stable values) is, with constant Y, still approximately constant. Thus the capitalist income per factory must diminish. The new plants compete with the old ones, and draw from them a part of the total sales. In this way a part of aggregate profits is transferred to new factories.

This deterioration in the state of affairs clearly influences adversely the prospective rate of profit. Thus we can conclude that the greater the

[66] J. E. Meade, 'A Simplified Model of Mr Keynes's System', *Review of Economic Studies*, Feb. 1937; J. R. Hicks, 'Mr Keynes and the Classics', *Econometrica*, Apr. 1937; Oskar Lange, 'The Rate of Interest and the Optimum Propensity to Consume', *Economica*, Feb. 1938.

equipment with constant national income the smaller the rate of investment decisions. Consequently the curve representing the function

$$D = \phi_e(Y)$$

is shifted downwards when equipment increases. D is in this way a function of two determinants, the national income and capital equipment. It is represented by a family of ϕ_e curves (see Fig. 24).

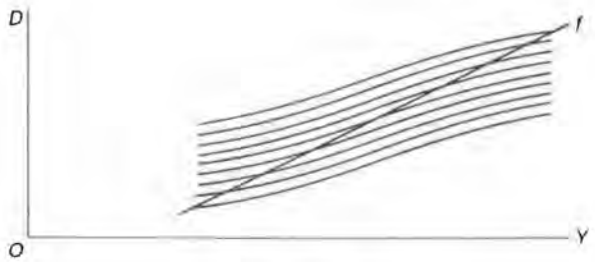


FIG. 24

The business cycle

1. With the results arrived at in the preceding section, we are now able to describe the dynamic process in our system. The time is supposed to be divided into τ periods. To simplify the exposition, we will examine this process in two stages: in the first we ignore the changes in capital equipment; in the second stage we allow for the effect of these changes which result from investment and wear and tear.[67]

Suppose the level of national income (expressed in stable values) in the first τ period to be Y_1 (see Fig. 25). The corresponding ordinate of the curve ϕ, which represents the dependence of the rate of investment decisions on national income (with given capital equipment), is the rate of investment decisions D_1 in the first period. In turn D_1 defines the national income Y_2 in the second τ period, which causes in the same period a rate of investment decisions D_2, etc. The point Y, D moves along the ϕ curve and, strictly speaking, it never reaches point B, or, in other words, reaches B only after the lapse of an infinite number of

[67] In the first stage we can imagine, for instance, that both investment and wear and tear are very small in relation to equipment; thus equipment changes only a little in the course of the process considered.

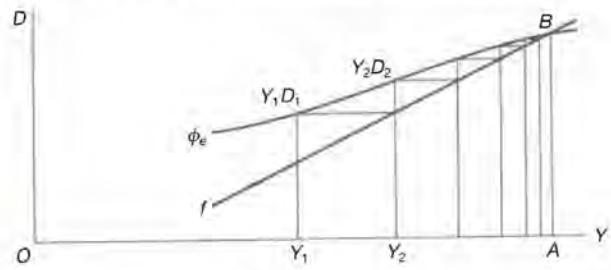


FIG. 25

periods. It is clear, however, that after a relatively small number of periods the difference between Y, D and Y_B, D_B is negligible, i.e. the position of equilibrium is practically reached. For in succeeding τ periods the increase in Y and D is negligible.

Starting from the position represented by a point Y, D lying above the f curve we obtain an upward, 'self-stimulating' process in which D and Y tend to reach the level D_B and Y_B. It is easy to see that if the initial position is represented by a point Y, D, lying below the f curve, this process is reversed, and the system travels downwards towards B. As already mentioned, the position Y_B, D_B is that of equilibrium only on the assumption of a constant equipment. We shall see in the next section that it is the change in equipment which disturbs this equilibrium.

2. We come to the second stage of our argument: we have now to consider the influence exerted upon the dynamic process by changes in the capacity of equipment.

To every state of capital equipment there corresponds a certain level of investment necessary for the maintenance of its capacity, i.e. to make good wear and tear.

If the upward self-stimulating process described in the preceding section starts from a position in which deliveries of investment goods are lower than the 'level of maintenance', so that capacity is shrinking, the rise of investment is thereby stimulated. The ϕ curve, up which the point Y, D moves, itself shifts upwards. But the situation alters when the deliveries of investment goods begin to exceed the level of maintenance. From then onwards, capital equipment keeps expanding, and the upward process is retarded. The point Y, D moves further up the ϕ curve, but now the latter shifts downwards. Similarly,

a downward self-stimulating process (which is represented by a downward movement of point Y, D along the ϕ curve) is initially strengthened by the expansion of capital equipment, but afterwards hampered by its shrinkage. The point of intersection of the ϕ and f curves B is now *not* a position of equilibrium. If investment decisions D_B are greater than the maintenance level of equipment, so also will be the deliveries of investment goods; thus capital equipment will increase and the ϕ curve shift downwards. If D_B is less than the maintenance level, the reverse must occur.

We shall see in the next section that the self-stimulating process (represented by the movement of point Y, D along the ϕ curve) and the change in capital equipment (represented by the shift of the ϕ curve) create together an automatic business cycle.

3. Imagine that, in the initial position, income and investment decisions are represented by point E in the Y, D plane (Fig. 26), and that at this point the deliveries of investment goods are just equal to the maintenance level of equipment. Thus, as equipment is neither expanding nor shrinking, the ϕ curve is stationary in the period considered. Point Y, D tends to move up this curve, but in succeeding periods investment activity increases, and the ϕ curve shifts downwards. As a result the moving point Y, D has the trajectory EF, which is the result of its movement up the downward-shifting ϕ curve. (At E this trajectory is tangential to the ϕ curve, since Y, D is there moving along ϕ while the latter is stationary.) After point F, in which the national income Y ceases to grow, has been reached, the ϕ curve still shifts downwards, and consequently point Y, D moves vertically downwards. Thus it falls below the f curve and begins to move down the ϕ curve, which itself shifts downwards because investment activity still exceeds the maintenance level of capital equipment. But after a certain time the

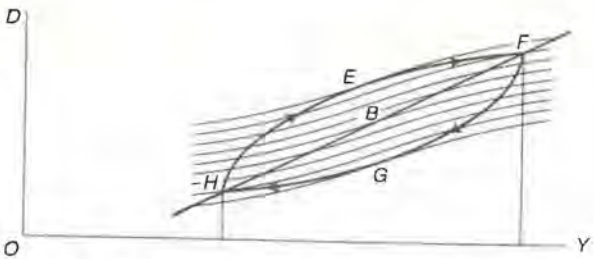


FIG. 26. The 'kinks' of the curve $EFGH$ in F and H are due to the discontinuity introduced by division of the process into τ periods.

steady fall in investment decisions brings the system to position G, in which deliveries of investment goods just cover wear and tear. The ϕ curve now ceases to shift downwards, and the trajectory becomes tangential to it, as it was before in E. In succeeding periods, investment activity is lower than the level of maintenance, so that the ϕ curve begins to shift upwards, but as point Y, D is still below the f curve, it continues to move down the ϕ curve. At point H, income Y ceases to fall, while the ϕ curve continues to shift upwards. Consequently, point Y, D rises vertically. As point Y, D comes in this way above the f curve, its movement along the ϕ curve is now upward, while the ϕ curve itself continues to shift upwards. Thus the moving point comes back to point E and a new cycle begins.

We now see clearly that a business cycle is inherent in our model. This may be summarized shortly as follows.

4. We start from a position in which the requirements of wear and tear are just covered by investment activity, and in which investment decisions are at such a level that they tend to cause a higher level of income in the future (point E). Thus equipment is initially stationary while national income tends to rise. The result is a further rise in investment decisions, and later in income, and so on cumulatively. However, capital equipment also expands, because investment activity increases above the level of maintenance. This hampers the self-stimulating process of the rise in investment decisions and national income. After a certain time a position is reached in which national income ceases to grow (point F). But investment activity, which is now at its maximum, continues to add to the stock of capital equipment. Income being stationary, this brings the first fall in investment decisions, and thus breaks the boom. The fall of investment decisions causes a fall in income, which in turn depresses investment decisions. So long as investment activity is higher than the level of maintenance, the downward movement is aggravated by the continued expansion of capital equipment. The effect of the latter is reversed when investment activity falls below the level of wear and tear (point G), i.e. capital equipment shrinks, and thus hampers the downward movement. Eventually the position is reached at which national income ceases to fall (point H). The shrinkage of capital equipment continues, however, and, as income is stationary, this starts a rise in investment decisions. Thus the bottom of the slump is passed. The rise in investment decisions causes a rise in income, which in turn further stimulates investment decisions. This upward process is accelerated by the

shrinkage of capital equipment until investment activity reaches the level of maintenance (point E), and a new cycle begins.

5. We return for a moment to Fig. 26. It is clear that the moving point cannot stop anywhere on the trajectory. At E and G equipment is stationary, but investment decisions are such as to cause in the next period a level of income which is higher or lower respectively than the present one, and thus to start a self-stimulating process. At F and H there is no tendency towards a self-stimulating process, but the amount of equipment is changing. There exists, however, on the f curve somewhere between F and H a point B, at which investment activity just covers wear and tear. This point corresponds to a long-run equilibrium. For, since it lies on the f curve, there is no tendency for a self-stimulating process to begin; investment decisions, and therefore deliveries of finished investment goods, tend to be stable; while since they are both at the level of maintenance there is no change in equipment. If in its initial position the moving point does not coincide with B, it must move around B, and a business cycle arises.[68]

6. We see that the question, 'What causes periodic crises?' could be answered shortly: the fact that investment is not only produced but also producing. Investment considered as expenditure is the source of prosperity, and every increase of it improves business and stimulates a further rise of investment. But at the same time every investment is an addition to capital equipment, and right from birth it competes with the older generation of this equipment. The tragedy of investment is that it causes crisis because it is useful. Doubtless many people will consider this theory paradoxical. But it is not the theory which is paradoxical, but its subject—the capitalist economy.

[68] Clearly it is an arbitrary and even unlikely assumption that the moving point comes back to its initial position E—the trajectory may well be a spiral and not a closed curve. If the fluctuations produced by our mechanism have a tendency to subside, this means that the spiral converges towards point B, and in this way the system tends to attain long-run equilibrium. But as shown by the investigations of Prof. Frisch ('Propagation Problem and Impulse Problems in Dynamics', in *Economic Essays in Honour of Gustav Cassel*, and unpublished works), this is prevented by the existence of 'erratic shocks'. Since the relationships represented by f and ϕ are in reality not quite stable functions, the actual dynamic process may be imagined as the result of the operation of the mechanism described above and of random shocks. Now Professor Frisch has shown that, if the basic mechanism produces slightly damped fluctuations, the existence of shocks establishes a state of relatively regular undamped fluctuations with an average period similar to that of the fluctuations created by the 'basic mechanism'.

A Theory of Commodity, Income, and Capital Taxation[1]

(1937)

In this paper we shall consider the effects of commodity taxes, income taxes, and capital taxes on employment, national income, and its distribution—with capital equipment and money wages given.[2] The first condition confines our analysis to the short period; the second is merely a simplification which can be avoided by measuring the values, not in money terms, but in wage units. In addition we make the following simplifying assumptions:

(i) that we are considering a closed economic system with a surplus of all types of labour and equipment;

(ii) that workers spend all they receive as wages or doles (for unemployment, disability, etc.) and, thus, that only capitalists (entrepreneurs and rentiers) save; and

(iii) that the state budget is balanced, all state expenditure being financed by taxation.[1]

We make also in the course of the argument some additional assumptions of more special character.

Our argument is divided into four stages. In the first stage we briefly consider short-period equilibrium in an economy without taxation and state expenditure, and in the subsequent stages introduce commodity taxes, income taxes, and capital taxes. We assume the commodity tax to be levied only on wage goods and the income tax only on capitalist income.

1. We shall mean by gross profit from an enterprise the difference between the value of sales and prime costs. It is this quantity which is maximized when the output of the enterprise corresponds to the point of intersection of the marginal prime cost and the marginal revenue curve. National income we shall call (as Keynes does) the sum of all gross profits and of the wage bill. On the other hand, national income

[1] It is quite simple to pass from this to the more general case of an unbalanced budget, superimposing on our results the effects of state borrowing or repayment of debts.

is also the value of total consumption and investment. Since the workers are supposed to consume all they earn, the total gross profit P must be equal to capitalist consumption C_c plus investment I:

$$P = C_c + I$$

If the sum of capitalist expenditure on consumption and investment $C_c + I$ increases (or decreases), a shift of the marginal revenue curves takes place, and employment is pushed to the point at which total gross profit P is equal to the increased (or decreased) sum of spending for capitalist consumption and investment.

It is clear that the above equation is equivalent (on our assumption that workers do not save) to the equality of savings S and investment I, for by subtracting C_c from both sides we attain: $S = I$.

As we see, the total gross profit P is determined by the rate of investment I—which is equal to the capitalists' saving S—and by their propensity to consume. We make now some plausible assumptions as to these determinants of gross profit. We assume that if some change in basic data occurs:

(i) the rate of investment I does not change *immediately*, because it is the result of previous investment decisions requiring a certain not very short time for completion;

(ii) the capitalists' propensity to consume is insensitive to the expectations of the change in income, and it is only the actual rise (or fall) in income which can induce them to raise (or to lower) their standard of living.

It follows from these assumptions that the gross profit $P = C_c + I$ can be altered by the change of basic conditions only with a certain time-lag, and one which is not very short. For in the mean time the rate of investment I remains unaltered, while the capitalists' propensity to consume is not affected by the expectations of the change in their income.

2. Let us now introduce into our system state expenditure financed by wage goods taxation. The government spends money either for officials' salaries or for the doles of the unemployed, disabled, etc. The tax is regarded, for the sake of simplicity, as being reckoned *ad valorem* at a constant rate for all kinds of wage goods. It is obvious that this type of tax constitutes a new kind of prime cost.

The national income is now equal to the sum of gross profits, workers' wages, and taxes imposed on wage goods. On the other hand,

the national income is equal to the value of total consumption and investment. Now, the workers' wages are equal to the value of their consumption. The sum of taxes is equal to the sum of salaries of officials and doles, which are also totally spent on wage goods. Thus it is clear that the total gross profit is again equal to the sum of capitalist consumption and investment. The equation:

$$P = C_c + I$$

holds good also for an economy with commodity taxes.

Let us now examine what will happen if the rate of taxation on wage goods is increased, say from 3 to 5%, and the proceeds of the tax spent on behalf of the unemployed.

According to our assumptions made in the preceding section, the rate of investment I and the capitalist propensity to consume will not change immediately upon the introduction of such increased taxes. Hence the gross profit $P = C_c + I$ and employment will remain at the old level, as at the beginning of the new taxation regime. If, however, employment, and thus the wage bill, has not changed, while the sum of doles has increased by the amount of the new tax revenue, it is clear that the total demand for wage goods has also risen by 2%. But so has also the marginal cost of wage goods, and in this situation, it is obvious that the prices of wage goods will be increased also by 2%, while their output has remained unchanged; in this way a new short-period equilibrium is established which differs from the former one only in that the wage goods' marginal costs and prices are both increased by 2%.[2] No stimulus exists in this new situation for the change of capitalist consumption or investment. Thus if the spending of capitalists does not change immediately after the increase of taxation, neither does it change later; nor does gross profit change, since it is equal to capitalist spending.

It must be added, however, that this is true only under an additional assumption. For though the volume and structure of output have not changed, the nominal value of output has increased. Thus demand for cash is greater, and the rate of interest tends to rise, exerting a depressing influence on investment. We shall assume here that this

[2] This is not quite precise. The capitalist consumption is partly directed to wage goods, the increase in the price of which may cause a rise of capitalists' expenditure on wage goods and a fall in the purchases of other goods subject to their consumption. Then a corresponding shift in the output will take place.

increase is very small, i.e. that the supply of cash for transactions is elastic.

It is easy to see from the above that the change in distribution of national income caused by the increase of wage-goods' taxation consists chiefly in the shift of purchasing power from workers and officials to the dole-receivers. Real wages and state officials' salaries fall in the case considered by 2%, while the 'real' capitalists' consumption falls by a much smaller proportion, since only a certain, not very great percentage of their expenditure is devoted to wage goods.

3. We shall now go a step further, and introduce into our system taxes on capitalist incomes. For the sake of simplicity, we suppose that the rate of taxation is a constant percentage. It is obvious that these taxes are not prime costs but form a part of gross profits. The entrepreneurs continue to maximize the difference between sales and prime costs, e.g. wages, cost of raw materials, commodity taxes; for the greater this differential, the greater the income from the enterprise remaining after the payment of income tax.

National income can be represented in the same way as before:

Gross profits	Capitalist consumption
Wages	Investment
Commodity taxes	Consumption of wage goods

But now the consumption of wage goods is covered not only by wages and commodity taxes but also by income taxes. It is evident that gross profit P is now equal to the sum of capitalist consumption C_c, investment I, and income tax revenue T_i:

$$P=(C_c+I)+T_i$$

and the part of P received by capitalists is equal to C_c+I.

Next we shall consider what happens if the income tax is raised, again for the purpose of dole payments, say from 15% to 25%. According to our assumptions no change of investment and capitalist consumption will happen in the period immediately succeeding the introduction of the additional tax. Thus the immediate result of an increased income tax is a rise of gross profit $P=(C_c+I)+T_i$ because of the rise of T_i;[3] employment is pushed to a point at which the gross profit is greater by the amount of the increment of T_i. This is not at all surprising, for new state expenditure has taken place, while at no other point has the spending been curtailed. But it is conceivable that such is

not the final effect, because of the influence of the income tax on the profitability of investment.[4]

It is clear that the income tax must raise the rate of interest, otherwise the net reward for lending would be diminished. If, for instance, the rate of interest is initially 3%, the reward for lending with a 15% income tax will be 2.55%; likewise, it is clear that with the increase of income tax to 25% the rate of interest rises to 3.4% (3.4% reduced by 25% gives 2.55%).

Now, if the prospective rate of profit of a certain type of investment is initially 9%, let us say, and the rate of interest 3%, the entrepreneur planning investment has a differential of 6% before income tax deduction, and 5.1% after the deduction of 15% income tax, to cover his risk. But at the new level of taxation the rate of interest is 3.4%, and only 5.6% remains as net profit and income tax; further, because of the increase of the income tax, we have now to deduct 25% from that difference, leaving 4.2% for net profit, while before the introduction of the increased tax there was a 5.1% differential. The difference of 0.9% is equal to the charge of 'new' 25% − 15% = 10% income tax on the 9% prospective rate of profit. There is nothing surprising in this fact, since the lenders' reward is not diminished by an increase in the income tax, and therefore the whole burden falls on the entrepreneur planning investment. Thus this whole burden exerts pressure on the inducement to invest.

It would be premature to conclude that *this* is the final result. One must take into account that in the first period of the new taxation regime the gross profit increased by just the amount of the total 'new taxes'. Thus if the entrepreneurs expected the future returns to increase by the same amount as the present ones have done, which seems probable [5] (for instance, the prospective rate of profit of 9% to rise to 9.9%), this would be just enough to counterbalance the depressive influence of income tax on the inducement to invest.[6]

Thus total income of capitalists (C_c+I) remains unaltered. Consequently, the gross profit $P=(C_c+I)+T_i$, in which the component T_i has risen, is likely to increase, as is employment. (We are assuming that the supply of cash for transactions is elastic.)

In this way the chief change resulting from income taxation would be the rise of the demand for wage goods on the part of the unemployed. This raises, of course, not only the output of wage goods, but also their prices, and thus reduces the real consumption of workers employed before the introduction of the new tax.[7] On the other hand,

there will be an increase in consumption on the part of newly employed workers. What rise results in total real wage bill depends, of course, on the elasticity of supply of wage goods.

4. In the last stage of our argument we introduce capital taxation. We may, for example, imagine a tax to be levied on every type of owned capital at the rate of 2% per year. Of course, as with income taxation, it does not constitute a prime cost. Thus, with the help of an argument similar to that applied in the last section, we obtain for the gross profit the equation:

$$P=(C_c+I)+T_i+T_c$$

where T_i is the total amount of income taxes and T_c that of capital taxes.

Let us examine the effect of raising the rate of capital tax, the proceeds of which continue to be used for dole payments. Again, according to our assumptions the investment I and the capitalist consumption C_c remain unaltered immediately after the introduction of the new tax. Thus the first effect of the latter is such an increase of employment that the gross profits P rise by the amount of the increment of T_c.

Here, however, the course of events does not follow the same path as in the case of income taxation. It is not difficult to see that the increase of the rate of capital taxation does not tend to lower the net profitability of investment (which covers the risk) or to raise the rate of interest. Indeed, if somebody borrows money and builds a factory, he does not increase his own capital by this action and does not pay a greater capital tax. And if he ventures his own means, he also pays the same tax as he would if he abstained from investment. Thus the net profitability of investment is unaffected by capital taxation. Unlike income tax, the capital tax is not a cost of production in the long run either.

In the same way, everybody is ready to lend at the current rate of interest; for whether one lends money or not does not affect the capital tax one pays.

Thus we see that the inducement to invest is not weakened by an increase of the rate of capital tax if the expected returns are the same as before. But because the gross profit

$$P=(C_c+I)+T_i+T_c$$

has increased under the new taxation regime, these expectations are

improved. The inducement to invest is now stronger than before the introduction of the additional taxes. Investment consequently increases, and causes a new rise of gross profit P and of employment.

Curiously enough, capital taxation not only makes the gross profit rise by the total amount of this taxation, but also the income C_c+I, which remains to capitalists after they have paid the taxes, increases significantly. (In the case of income taxation, C_c+I remains unaltered and the gross profit is increased by the amount of the taxation.)[8]

The increase via the real wage bill is higher than in the case of income taxation, due to the stronger rise of employment.

It follows from the above that capital taxation is perhaps the best way to stimulate business and reduce unemployment. It has all the merits of financing the state expenditure by borrowing, but is distinguished from borrowing by the advantage of the state not becoming indebted. It is difficult to believe, however, that capital taxation will ever be applied for this purpose on a large scale; for it may seem to undermine the principle of private property, and therefore in this case, as in general, 'any government which had both the power and the will to remedy the major defects of the capitalist system would have the will and the power to abolish it altogether'.[3]

[3] Joan Robinson, review of R. F. Harrod, *The Trade Cycle*, in the *Economic Journal*, Dec. 1936.

The Lesson of the Blum Experiment[1]

(1938)

Introduction

The Blum experiment offers an excellent opportunity for an enquiry into the consequences of an increase in money wages. In one year the cost of manual labour in France increased by about 60%. The prices of foreign raw materials rose in almost the same proportion (because of the devaluation of the franc and increase in world prices). Since, on the other hand, the change in the joint influence of 'external forces', i.e. of the deficit and the balance of trade, was, as we shall see, very small, what happened as a result of the Blum experiment was approximately equivalent to the consequences of a rise of prices of prime factors in a closed economy by 60%. Since, further, the rate of interest has changed only slightly within the period considered, the Blum experiment enables us to investigate the consequences of the rise of money wages in a closed system with the rate of interest kept constant.

The Blum experiment lasted from the middle of 1936 to the middle of 1937. Thus, to estimate its results, we had to compare the situation in June 1936 with that in 1937. Since, however, production in June 1936 was already affected by big strikes, and consequently not representative of the preceding period, we compared April 1937 (when all fundamental reforms were already carried out) with April 1936, and for production, balance of trade, etc.—the monthly figures of which are much affected by random factors—the 3-month period March–May in both years.

Costs, Prices, Production, and Rate of Interest

1. As has been already mentioned, the increase in wages of industrial workers was the prevailing factor in the Blum experiment. The first increase took place immediately after the *Front Populaire* came to power in the middle of 1936. The usual official October inquiry into wages estimated it to average 13% in Paris and 16% in the provinces, but this does not seem to account sufficiently for the big augmentation of wages in many enterprises where trade union rates were not observed during the depression. A figure of 15–20% is probably nearer

to the truth, and for the following calculation we assume an increase of 17.5%.

Simultaneously, holidays with pay (2 weeks per annum) were granted, while at the end of 1936 and the beginning of 1937 the 40-hour week (without reduction of weekly earnings) was introduced. Both these measures increased hourly wages in the proportion $1.04 \cdot 1.20 = 1.25$.

Since in the spring of 1937 a strike wave, caused by the rise in the cost of living, again raised wages by an average of about 10%, the total increase of hourly wages from April 1936 to April 1937 was: $1.175 \cdot 1.25 \cdot 1.10 = 1.61$.

In the evaluation of labour costs, labour intensity must also be taken into account. There was much talk in the French right-wing press of its fall within the period considered. But statistics do not support this in the least. The number of working hours in large establishments *fell* from April 1936 to April 1937 by 5%, while industrial production *increased* by 3% (see Table 20), and there was no reason for big establishments to be doing worse than smaller ones. This would mean an increase in productivity of 8%. It is true that the working hours include those of clerks, etc., who, though enjoying the 40-hour week, were probably (most of them) made to perform in that week 48 hours of work. (This was possible because during the preceding period the administration had probably not been working—as usual in depression—with 'full capacity'.) But when estimating the relative share of salaried employees in the working hours as 20%,[1] the increase of their productivity by 20%, accounts for only half the 8% mentioned. The remaining 4% is certainly due to the increased intensity of workers in large enterprises. Since, however, intensity in the smaller establishments (with the introduction of trade union control) is likely to have fallen, I assume only 2% increase in the average intensity of labour, and thus $1.61 \cdot 0.98 = 1.58$ increase in manual labour costs.

By a strange coincidence, the increase in prices of foreign raw materials was approximately the same as that of the cost of manual labour. The index of prices of imported goods (*Statistique Générale*) shows an increase from April 1936 to April 1937 of 60%. This index includes also some foodstuffs. Eliminating these, I obtained for industrial foreign raw materials an increase of 63%. This is due both to

[1] This rough estimate is based on the date of the Census of Population for 1931 and the subsequent change in employment.

the depreciation of the franc—which raised the price of gold within the period considered by 43%—and to the increase in world prices.

We see that the prices of prime factors increased in the period considered by about 60%.

2. The wholesale prices of industrial commodities rose in the same proportion. The index of wholesale prices of industrial goods (*Statistique Générale*) increased from April 1936 to April 1937 by 61%. It includes also foreign raw materials, the prices of which increased, as we have seen, by 63%. Home-produced industrial goods became about 60% dearer.

The index of the *Statistique Générale* is not quite representative, since it is composed mainly of raw materials and semi-manufactures. But the prices of finished goods also increased on the average in a similar proportion. The comparison of building costs in April 1936 and 1937 made by a friend of mine working in a building enterprise in Paris shows an increase of 60%.[2] Further, the index of retail prices of clothes has increased, according to the *Statistique Générale*, by 62%, that of household articles (utensils, etc.) by 37%, and that of soap by 59%. Attributing to these indices the weights 2:1:1, we obtain a combined index of 155 (see Table 18), which cannot be far from representing how much, on average, the retail prices of industrial goods have really risen. The corresponding wholesale prices must have increased a little more, since in the shops the 40-hour week had not yet been introduced in April 1937. Thus we can conclude that the wholesale prices of raw materials, semi-manufactures and finished products have increased during the period under consideration by about 60%, and thus in the same proportion as the prime costs.

3. The cost of living has risen much more slowly. The official index shows an increase of 20% up to February. Comparison with the trend

Table 18. *Costs of Production and Prices of Industrial Products, April 1937 (as % of April 1936)*

Prime costs		Prices of home produced industrial products		
Wages	Foreign raw materials	Wholesale	Building costs	Retail
158	163	160	160	155

of retail prices, however, seems to suggest some underestimation, and we have considered 22% as more probable. The further rise in retail prices from February to April has caused an increase of the index which we estimated to be 5 points, thus obtaining (see Table 19) an index of 127 (April 1937, as a percentage of April 1936).

The discrepancy between the trend of the cost of living and that of wholesale (and also retail) prices of industrial commodities has various explanations. (i) Wholesale prices of farm products (index of the *Statistique Générale*) increased in the period under consideration by 36% only. (There was no increase of labour cost in agriculture comparable with that in industry.) The index of retail prices of food increased even less: by 27%. The divergence between these two indices is due partly to their different structure, but it is caused also by the relative fall of the margin between the price of wheat and flour as a result of governmental control (*Office de Blé*), and also by there being no increase in the relevant commodity taxes and the cost of transport. (The railways tariffs were not increased in spite of the rise of labour costs, and the government covered the corresponding 'losses'.) (ii) The second important reason for the relatively slow rise in the cost of living was the maintenance of government-controlled rents at a constant level. (iii) The retail price of coal and the prices of gas and electricity increased but slightly, owing to there being no increase in the cost of transport of coal.

4. The index of industrial production (*Statistique Générale*) shows from April 1936 to 1937 only a slight rise (3%). Employment in big establishments has even fallen, which was attributed above to the increased intensity of labour. The increase of freight-car loading was very small (1%). To illustrate the shifts in production, we give also (see Table 20) the combined indices of engineering and building, and of

Table 19. *Prices of Farm Products, Retail Prices, and Cost of Living, April 1937 (as % of April 1936)*

Wholesale prices of farm products	Retail prices of food	Retail prices of industrial products	Rents	Cost of living
136	126	155	100	127

Table 20. *Industrial Production, Employment, and Freight-Car Loading, April 1937 (as % of April 1936)*[a]

General	Industrial production		Working hours in large establishments	Freight-car loading
	Investment goods	Consumer goods		
103	110	98	95	101

[a] To eliminate the influence of random fluctuations, the figures for the period Mar.–May in both years are compared.

textiles, leather, and paper respectively, as an illustration of the trend of production of investment and consumer goods.[2]

We see that there was a relatively large increase in the production of investment goods—due to the rearmament—and a slight decline in the production of consumer goods. (The latter must not be identified with consumption, since it is also influenced by foreign trade and by changes in stocks.)

5. As we have seen above, there was a sharp increase in prices and also a small one in production. This must have caused an increase in the demand for cash, but nevertheless—for various reasons—the short-term rate of interest tended to decline while the long-term rate showed but little change (see Table 21).

Since it is the long-term rate which chiefly matters in the determination of investment, and thus of total production, we can say that the

Table 21. *Rate of Interest, April 1936 and 1937*[a]

Year	Rate of discount		Prices of bonds		Average interest on new issues
	Central bank	Market rate	General average	Industrial average	
1936	5.3	5.5	100	100	6.8
1937	4.0	4.1	97	104	6.6

[a] To eliminate the influence of random fluctuations, the figures for the period Mar.–May in both years are compared.

[2] The weights were taken from the description of the structure of the general index of production of *Statistique Générale*.

Blum experiment was carried out at a constant rate of interest (the more so since the short-term rate has not changed very much either).

Changes in Purchasing Power and its Distribution

1. We shall now estimate roughly the changes in the purchasing power of the various groups of population as a result of the Blum experiment. As was shown above, the cost of manual labour increased from April 1936 to April 1937 by 58%, and the volume of industrial production by 3%. Thus the wage bill in industry must have increased in the proportion $1.58 \cdot 1.03 = 1.63$. In this, however, is also included pay for holidays, which is concentrated in the summer. Thus for the effective wage bill in April we have the index $1.63/1.04 = 1.57$.[3] The wage bill in transport, where a parallel trend in wages took place, cannot have differed much from that. And, since the cost of living increased by 27%, we can estimate the proportional change of purchasing power of the manual workers as: $1.57/1.27 = 1.24$.

It is interesting to notice that a worker who in 1936 was employed 48 hours a week was only slightly better off in 1937. Indeed, the hourly nominal wage increased (see p. 327) by 61%, and thus the real hourly wage in the proportion $1.61/1.27 = 1.26$; but the number of his working hours on account of the introduction of the 40-hour week and holiday with pay was reduced in the proportion $1/1.20 \cdot 1.04 = 0.80$, and consequently the index of his total real earnings was $126 \cdot 0.80 = 101$.

The workers as a body, however, gained—as shown above—24%, because of increased employment (of men) and the rise in real earnings of those who were part-time workers in 1936.

2. The situation of blue-collar workers (including shop assistants) was very different. The 40-hour week hardly increased the income of this class, for, as mentioned above, they were often made to perform 48 hours of work in 40 hours, while in the shops (with the exception of department stores) the 40-hour week had not yet been introduced in April 1937. Salary rates increased by some 13% in the summer of 1936 and by some 10% in the spring of 1937, making together about 24%. This would mean, with unaltered employment and with a rise in the cost of living of 27%, a slight fall in real earnings. Since, however, in some cases the introduction of the 40-hour week must have increased

[3] The holidays with pay increased the yearly wage bill by 4%.

employment because a corresponding increase in the intensity of labour was impossible, we shall assume that the purchasing power of the blue-collar workers remained approximately unaltered.

3. We shall next consider the group with 'fixed incomes', i.e. state officials, pensioners (retired officials and disabled soldiers), small rentiers, and house-owners. The change in the money incomes of these people from April 1936 to April 1937 arose from a partial annulment of the Laval decrees of July 1935, which had curtailed officials' salaries and pensions and imposed new taxes on incomes from bonds. Judging from the budget bill for 1937, the total amount added to the incomes of the group considered was about 2 milliard francs.[4] The income of officials and pensioners in the first half of 1936 was—taking as basis estimate of national income of L. Dugé de Bernonville—about 25 milliards. The total income from securities and houses was over 30 milliard francs. It is impossible to estimate how much of the latter goes to small rentiers and house-owners. We know only that in France it is an important part of incomes of this kind. We shall assume arbitrarily the sum of 15 milliard francs; this method is not as hopeless as it looks, for it is easy to prove that the alternatives of 10 or 20 milliards would only slightly affect the results arrived at below.

In this way total fixed incomes have been estimated at $25+15=40$ milliard francs. Thus an addition of 2 milliards makes an increase of 5%, while the proportional change of the real purchasing power of fixed incomes is $1.05/1.27=0.83$.

4. We shall next calculate the combined index of purchasing power of the three groups considered above: manual workers, salaried employees, and people with fixed income. We have already calculated the index of purchasing power of each group, and now need only the weights. According to de Bernonville's estimate of national income, wages and salaries, excluding agriculture, totalled in 1935 about 60 milliard francs, and in the first half of 1936 there was no important change in the incomes concerned. Further, from the Census of Population of 1931 and the subsequent fall of production, we have roughly estimated the proportion of employment of black-coated and manual workers as 1:2.[5] The proportion of earnings of these two classes was, of course, different, but to no great extent, since the first

[4] In the case of small house-owners it is to be remembered that rents were stationary.

[5] For part-time workers the figures are correspondingly reduced.

category includes large numbers of badly paid shop assistants; thus, as the preceding estimate is very rough, it is not worthwhile to try to introduce a corresponding correction, and we shall consequently admit as weights for manual workers 40 and for salaried employees 20 milliard francs, while fixed incomes have already been estimated at 40 milliards. Weighting the indices 124, 100, and 83 in the proportion 4:2:4, we obtain the index 103. (This figure, of course, does not claim any precision.)

5. In order to obtain a full picture of the changes in the purchasing power of workers and petty bourgeoisie, we must also briefly consider the trend of incomes in agriculture and in small business. The income of these groups before the Blum experiment totalled some 40 milliard francs, of which about three-quarters went to agriculture (farmers and farm workers).[6] At first glance, agriculture seems to be worse off in April 1937 than in April 1936. The index of farm products increased in this period by 36%, while, on the other hand, the retail prices of industrial products increased by 55% and those of food by 26%; adopting the weights 2:1 for the latter two indices, we find that the cost of products bought by the agricultural population increased by about 45%. This picture is, however, not quite accurate. The purchasing power of the agricultural population in April is partly based on revenue from vegetable products sold in the autumn and winter. The relation of their prices in this period of 1936–7 to those of the same period of 1935–6 was much higher than the relation April 1937:April 1936, owing to the creation of the *Office de Blé* and the government's credit aid to the farmers. This naturally reduced seasonal fluctuations, and so transferred certain amounts from trade to the farmers. To illustrate the influence of this factor we constructed another index of prices of farm products, combining the average index of prices of vegetable products in the period September–February with the index of prices of animal products in April. The relation of the value of this index in 1936–7 to that of 1935–6 is 150, whilst the 'April index' is, as stated above, only 136. The April 1937:April 1936 index of money purchasing power of the agricultural population lies somewhere between these two figures, and thus its real purchasing power (with the

[6] The amount attributed in this way to small businessmen constitutes a great part of the total business income as estimated by de Bernonville; his estimates, however, are based on income tax data, and are thus much too small because of widespread evasions in French big business.

increase of the cost of products bought by 45%) probably remained more or less unchanged.

The major part of small businesses is made up of retail food shops (inclusive of restaurants). The comparison of retail and wholesale prices of food[7] seems to suggest that the retailers maintained their relative share in the price. Since retail prices of food increased by 26% and the cost of living by 27%, their purchasing power also remained approximately unchanged.

We see that the real income of agriculture and small business (40 milliards before the Blum experiment) underwent no important alterations; since the increase in the sum of wages, salaries, pensions, and small rentiers' incomes (100 milliards before the Blum experiment) was evaluated (in real terms) as 3%, the relative increase in the purchasing power of workers and petty bourgeoisie may be estimated at 2–3%. This figure can, of course, be considered only as indicating the order of changes which occurred. It is worth noting that the volume of sales of tobacco, which is usually a good symptom of mass consumption, also increased slightly (by 6%) from spring 1936 to spring 1937 (see Table 22).[8]

6. It is now necessary to say something about changes in the incomes of 'large capitalists'. The notion of 'real income', however, has for this

Table 22. *Incomes of Various Groups and their Indicators, April 1937 (as % of April 1936)*

Volume of sales of tobacco[a]	Purchasing power			Commercial failures[a]
	'Mass consumers' on average	Industrial workers (manual)	People with fixed income	
106	102–3	124	83	66

[a] To eliminate the influence of random fluctuations, the figures for the period Mar.–May in both years are compared.

[7] We do not mean here by wholesale prices of food the prices of farm products but the wholesale prices of finished foodstuffs.

[8] It should be noted that the index of the real value of sales of department stores in Paris fell in the period considered, and that this gave reason for supposing that total consumption did likewise. But clearly sales of department stores in Paris are not representative of total consumption; their fall may be due to the shifts in the distribution of incomes described above.

class—because of the great proportion of savings—a much less definite meaning than for the workers and petty bourgeoisie. We shall, therefore, only try here to estimate changes in the relative share of large capitalists in the total money income. For this purpose we shall compare the trend of the latter with that of the workers' and lower middle-class incomes.

We have shown above that the purchasing power of workers and petty bourgeoisie in real terms has increased slightly, and this means that the money income of these classes increased a little more than the cost of living, i.e. by a little more than 27%. On the other hand, total production—judging from the indices of industrial production and freight-car loading—has also slightly increased, but the index of the prices at which the final product is sold must have increased more than the cost of living. For while the prices of products and services sold to the consumer increased on average in the same proportion as the cost of living, the prices of finished investment goods increased much more (by about 60%). In this way the national money income has risen more than that of the workers and the petty bourgeoisie, and the relative share of large capitalists has increased.

The fact that the increase of wages has caused a shift in the national income in favour of large capitalists may seem paradoxical, but it is not difficult to explain. The wholesale prices of industrial products have increased by about 60%. Since prime costs (foreign raw materials and manual labour cost) have risen in the same proportion, what remains to the entrepreneur after paying prime costs must also have increased by 60%. But the expenditure on salaries has risen much less, and the payment of interest on funded debts has remained unaltered. The latter, of course, affects other large capitalists, but partly also small rentiers. In this way the total income of large capitalists connected with industrial enterprises increased by more than 60%. It was the group whose increase of income was the greatest. It is very well reflected in the large fall in the number of commercial failures from spring 1936 to spring 1937. In considering the total class of large capitalists one must, of course, take into account the fact that the incomes of big house-owners and farm product merchants were kept constant (or even reduced in the case of the latter). But a large increase in entrepreneurs' income could most probably account for a rise in the total income of large capitalists in a greater proportion than that of the workers and petty bourgeoisie.

7. To sum up: (i) The Blum experiment has only slightly altered (increased) the volume of both production and consumption. (ii) It has, however, caused important shifts in the distribution of national income from officials, pensioners, and rentiers (including house-owners) towards manual workers and industrial entrepreneurs. (iii) The relative share of large capitalists in the national income has increased. The income of industrial entrepreneurs has increased more than that of any other group.

Budgetary Deficit and Balance of Trade

1. In the next section we shall try to explain the effects of the Blum experiment with the help of the Keynesian theory of wages. It can, however, be stated now that the facts established above do not fit at all into the classical scheme. An increase in the cost of manual labour by about 60% has not affected the volume of output, but only made wholesale prices rise in the same proportion, as prime costs have increased. But there remains to the 'classicists' one argument. They may claim that the depressive influence of the rise of wages was counterbalanced by the stimulating effect of the deficit (in particular due to increased armaments) financed by borrowing. (Though many classicists, especially in France, consider the deficit able only to shift, not to create, purchasing power!)

Thus it is very important for our analysis to compare the budget deficit in the spring of 1936 and 1937. The estimation of genuine budget deficit is not an easy task in general, and in France it is particularly difficult because of the extraordinarily complicated accountancy. We have based our estimate on parliamentary debates, taking into account the evaluations both of the government and the opposition.

2. The budgetary deficit in 1936 and 1937 falls under the following headings: (i) the deficit of the ordinary budget; (ii) the special expenditures on armaments and investment; (iii) the deficit of the post office; (iv) the deficit of state railways and that of private railways covered by the government.

It is relatively easy to establish the figures relevant to the spring of 1936. The ministry of finance has calculated the actual budget deficit in 1936, eliminating the influence of charges resulting from decrees of the *Front Populaire* government in the second half of the year. These figures are given in Table 23.

Table 23. *The Budgetary Deficit Relevant to the First Half of the Year (fr. milliards)*

	1936	1937
Ordinary budget	6.5	9.6
Armaments and investment	9.0	16.0
Post office	0.7	1.0
Railways	5.0	7.0
Total	21.2	33.6

With regard to 1936, the deficit of the ordinary budget was admitted in the budget statement as 4.6 milliard francs. It was foreseen, however, that the pensions of disabled ex-servicemen would be partly financed by borrowing on the part of the *Caisse de Pensions* to the amount of about 2 milliards. Thus the anticipated deficit of the ordinary budget in 1937 compared with that of 1936 was about 6.6 milliard francs. The execution of the budget during the first 6 months of 1937 has clearly shown that the actual deficit of the ordinary budget must be admitted to be greater. The opposition estimated the necessary addition at 4–5 milliards (for the whole year); this seems exaggerated, however, and taking into account also the various governmental evaluations, I consider 3 milliards to be the most likely figure. Thus the probable amount of the deficit of the ordinary budget in 1937, if the decrees of M. Bonnet in the second half of the year had not taken place,[3] would have been 9.6 milliards, and it is this figure which is relevant to the spring of 1937. The special armament and investment expenditures were admitted in the statement to be 16 milliard francs. And although the Blum government decided afterwards to cut down this amount, it seems that this decision has *not* affected the scale of armaments and investment carried out in the spring of 1937. Finally, the deficits of post office and railways were almost without dispute estimated in the debates at 1 and 7 milliards respectively. And the increase of the tariffs tending to diminish them occurred only in the second half of 1937.

Table 23 compares the deficits relevant to the springs of 1936 and 1937. We see that the budget deficit has risen greatly in its money volume. The stimulus to the national economy, however, has by no means increased in the same proportion. Indeed, as a result of the rise of foreign raw-material prices and labour cost, the prices of finished goods were much higher in 1937 than in 1936, and this must have

reduced *pro tanto* the effect of the increased deficit. It is, however, difficult to determine more or less precisely this effect, since the prices of finished goods have not risen in the same proportion: the cost of living has risen only by 27% and the prices of investment goods by much more. It is clear, however, that if we deflate the deficit by 1.27 we obtain the upper limit of its real effect. This gives $33.6/1.27 = 26.5$ milliards, and thus the effect is equivalent to the increase of the budget deficit in spring 1936 by $26.5 - 21.4 = 5.1$ milliard francs. As an upper limit, with about 200 milliard francs of national income at that time, this is not very much. We shall see, however, that even this effect was partly offset by another external factor which we have left out of consideration until now.

3. By this we mean the balance of foreign trade. Because of the devaluation of the franc and the rise in world prices and French labour costs, both imports and exports show from spring 1936 to spring 1937 a considerable increase (in francs), which is slightly less for exports than for imports; and this naturally resulted in a considerable increase in the passive balance of trade (see Table 24).

It is easy to see that the passive balance of trade causes effective demand to fall, just as the deficit causes it to rise. The deficit may be considered as a positive balance of trade of private industry with the government. The sum of the deficit and the balance of foreign trade thus represents the joint balance of trade of private industry with its own government and foreign countries, and is a measure of the influence of these 'external markets' on effective demand.

This sum was in the spring of 1936: $21.2 - 9.8 = 11.4$ milliard francs, and in spring 1937: $33.6 - 16.0 = 17.6$ milliard francs. Deflating again 17.6 with the index 127, we obtain 13.9, and thus the 'real' increase in the balance of trade with the government and foreign countries is only $13.9 - 11.4 = 2.5$ milliard francs. This is very little in comparison with a

Table 24. *Foreign Trade, March–May*

	1936 (fr. milliards)	1937	Increase (%)
Imports	6.05	9.58	57
Exports	3.60	5.57	52
Balance	2.45	4.01	64
Balance per year	9.8	16.0	

national income of about 200 milliard francs: with a multiplier equal to 3, it results in an increase of national income by $2.5 \cdot 3/200 = 3.75\%$. And it must be remembered that even this is an upper limit.

We see that the 'foreign-market' expansion was very small, and probably accounts for that minor increase in business activity which we have noticed above. Thus it could not perform the task of counterbalancing the alleged depressive influence of the rise in wages, which was consequently nonexistent.

4. It may be interesting to point out that the increase in the budget deficit under the Blum government, generally considered tremendous, was quite moderate in real terms. To stimulate business activity appreciably, a much greater deficit would have been needed. And the very recovery which this would have set in motion would have made possible an increase in tax revenues which would have balanced the budget in the following years. The more so since a reform of the French tax system—which is to a great extent based on indirect taxation, while formidable evasions of income tax are prevalent—could be carried out in the mean time. In order, however, to go forward with the stimulating of production by budgetary deficit, the Blum government needed a basis which it failed to secure from the very beginning: exchange restrictions. The vulgar theory according to which the deficit—in particular when financed by the central bank—is an immediate peril to the currency is deeply rooted among French economists, bankers, and rentiers. Thus a 'large-scale deficit policy' must cause a tendency towards the flight of capital, followed often by a depreciation of the currency, which proves in turn the 'French deficit theory'—at least, for France!

Even with the actual deficit—not sufficient to initiate recovery—the Blum government had to face a steady pressure of capital flight which, to put it mildly, was by no means opposed by the leading financiers. Hence the vacillation of the government between a wish to stimulate the economy and a willingness to reduce the budget deficit. The result was the fall of the Blum government and the return to an orthodox financial policy.

Conclusions

We have seen above: (i) that in the Blum experiment the cost of manual labour and foreign raw materials has increased by about 60%; (ii) that the rate of interest was approximately unchanged; (iii) that the

wholesale prices of industrial goods have increased by about 60%; (iv) that industrial production has risen slightly; (v) that the joint action of deficit and balance of trade was stimulating only to a small extent, and probably accounts for the slight rise in production. From (i) and (v) we can draw the conclusion that what happened in France (with the exception of the small rise in output) is equivalent to the influence of the increase of wages by 60% in an isolated economy. For in such an economy prime costs would increase by 60%, and there would be no external influences. Thus our investigation may be regarded as an empirical verification of the Keynesian theory that the rise of wages in an isolated system tends to change prices in the same proportion, and not to affect the output. Some people will probably object that in the Blum experiment the rate of interest has not increased, while 'naturally' it would rise appreciably and hamper the increase of the money value of production. I think that the long-term rate of interest—and it is this rate which is important for the investment process—is fairly insensitive to fluctuations in the demand for cash. But in any case it does not affect the argument, because the Keynesian theory accounts for the depressing effect of the increase in money wages *through the channel of the rate of interest*. The fact of its remaining constant in the Blum experiment just enabled us to eliminate this channel, and thus to test the point in dispute between Mr Keynes and the classics.

There is, however, one important point at which the reality of the Blum experiment seems to disagree with the Keynesian theory. We mean the fact that the increase in money wages *has* caused an appreciable rise in real wages (though in much lesser proportion), while the Keynesian theory seems to suggest that the latter would remain unaltered. It must, however, be noticed that the prices of industrial commodities *have* risen approximately in the same proportion as money wages,[9] and thus the increase in real wages is due to the slower increase of food prices and the non-increase of rents. So far as this state of affairs caused a shift of purchasing power between workers and classes with a similar propensity to consume (small house-owners, farmers, officials, etc.), the demand for industrial commodities was not affected by it, nor was the output of the industrial sector. But the shift from classes with a lower propensity to consume (big house-owners and merchants of farm products) towards manual workers must have

[9] Even this must not necessarily happen according to the Keynesian theory, for a fall of the degree of monopoly may occur.

increased effective demand, and thus the output of industry. Why did not this effect—which is quite in accordance with the spirit of the Keynesian theory—appear in the Blum experiment? The answer is that it was counterbalanced by other shifts in purchasing power which had an unfavourable influence on effective demand: from rentiers (some of whom are small) to entrepreneurs, because interest payments on old debts are unaltered, and from blue-collar workers to entrepreneurs because salary payments have not increased in the same proportion as wages (see p. 331).

It is clear that every increase in money wages is accompanied by phenomena similar to those described above, and corresponding changes in the propensity to consume must take place which may eventually either raise or reduce output. The fact that in the Blum experiment these changes were approximately balanced is, of course, a mere coincidence, though an increase (or fall) in money wages in a certain proportion is in general likely to cause a much smaller relative variation of output.

Professor Pigou on 'The Classical Stationary State': A Comment[1]

(1944)

Professor Pigou attempts to show in his article that full employment in a stationary state would be established automatically provided wage-earners acted competitively, i.e. provided wage rates continued to fall as long as any unemployment existed. The gist of the argument is roughly as follows.

In a stationary state, equilibrium net investment and thus net saving must be equal to zero. Thus, in order that full employment should prevail in such an equilibrium, saving out of full-employment real income must be equal to nought. If saving out of full-employment income is positive, zero investment will entail a level of real income so much below full employment that the saving out of this income *is* nought.

Such may be the situation in the initial position, but the existence of unemployment causes—according to the assumption of unrestricted competition among workers—a continuous fall in money wages, and consequently in prices. Now Professor Pigou makes the assumption that, when incomes fall, the banking system maintains the stock of money constant. As a result, the fall in money wages and prices causes a fall in the rate of interest; for with the rate of interest unchanged the stock of money would have to fall more or less proportionally to the money volume of transactions. Professor Pigou assumes that this fall in the rate of interest somewhat reduces saving out of a given income, and thus tends to increase employment; but he admits that, even if the rate of interest (net of all risks) approaches closely to zero, it may still not be enough to create full employment. He centres his argument on another factor which takes care of this task.

As mentioned above, on Professor Pigou's assumption the stock of money is constant, and thus its real value increases as wages fall. Thus, argues Professor Pigou, the real value of existing possessions increases. The richer people are, however, the less they are willing to save out of a given real income. Thus, if the increase in the real value of the stock of money reaches a certain limit, people will save nothing out of

real incomes corresponding to full employment. At that point, full-employment long-run equilibrium will be reached.

The following reservations must be made with regard to this argument. The increase in the real value of the stock of money does not mean a rise in the total real value of possessions if all the money (cash and deposits) is 'backed' by credits to persons and firms, i.e. if all the assets of the banking system consist of such credits. For in this case, to the gain for money-holders there corresponds an equal loss for the bank debtors. The total real value of possessions increases only to the extent to which money is backed by gold.[1] In other words, the total real value of possessions increases as a result of the wage fall only by the increase in the real value of gold. If in the initial position the stock of gold is small as compared with the national wealth, it will take an enormous fall in wage rates and prices to reach the point when saving out of the full-employment income is zero. The adjustment required would increase catastrophically the real value of debts, and would consequently lead to wholesale bankruptcy and a confidence crisis. The 'adjustment' would probably never be carried to the end: if the workers persisted in their game of unrestricted competition, the government would put a stop to wage increases under pressure from employers.

[1] Or government securities. The classics and Prof. Pigou do not, however, postulate the existence of national debt as an essential feature of capitalist economy.

PART 6

FULL EMPLOYMENT

Political Aspects of Full Employment[1] [1]

(1943)

I

1. A solid majority of economists is now of the opinion that, even in a capitalist system, full employment may be secured by a government spending programme, provided there is in existence adequate plan to employ all existing labour power, and provided adequate supplies of necessary foreign raw-materials may be obtained in exchange for exports.

If the government undertakes public investment (e.g. builds schools, hospitals, and highways) or subsidizes mass consumption (by family allowances, reduction of indirect taxation, or subsidies to keep down the prices of necessities), and if, moreover, this expenditure is financed by borrowing and not by taxation (which could affect adversely private investment and consumption), the effective demand for goods and services may be increased up to a point where full empolyment is achieved. Such government expenditure increases employment, be it noted, not only directly but indirectly as well, since the higher incomes caused by it result in a secondary increase in demand for consumer and investment goods.

2. It may be asked where the public will get the money to lend to the government if they do not curtail their investment and consumption. To understand this process it is best, I think, to imagine for a moment that the government pays its suppliers in government securities. The suppliers will, in general, not retain these securities but put them into circulation while buying other goods and services, and so on, until finally these securities will reach persons or firms which retain them as interest-yielding assets. In any period of time the total increase in government securities in the possession (transitory or final) of persons and firms will be equal to the goods and services sold to the government. Thus what the economy lends to the government are goods and services whose production is 'financed' by government

[1] This article corresponds roughly to a lecture given to the Marshall Society in Cambridge in the spring of 1942.

securities. In reality the government pays for the services, not in securities, but in cash, but it simultaneously issues securities and so drains the cash off; and this is equivalent to the imaginary process described above.

What happens, however, if the public is unwilling to absorb all the increase in government securities? It will offer them finally to banks to get cash (notes or deposits) in exchange. If the banks accept these offers, the rate of interest will be maintained. If not, the prices of securities will fall, which means a rise in the rate of interest, and this will encourage the public to hold more securities in relation to deposits. It follows that the rate of interest depends on banking policy, in particular on that of the central bank. If this policy aims at maintaining the rate of interest at a certain level, that may be easily achieved, however large the amount of government borrowing. Such was and is the position in the present war. In spite of astronomical budget deficits, the rate of interest has shown no rise since the beginning of 1940.

3. It may be objected that government expenditure financed by borrowing will cause inflation. To this it may be replied that the effective demand created by the government acts like any other increase in demand. If labour, plants, and foreign raw materials are in ample supply, the increase in demand is met by an increase in production. But if the point of full employment of resources is reached and effective demand continues to increase, prices will rise so as to equilibrate the demand for and the supply of goods and services. (In the state of over-employment of resources such as we witness at present in the war economy, an inflationary rise in prices has been avoided only to the extent to which effective demand for consumer goods has been curtailed by rationing and direct taxation.) It follows that if the government intervention aims at achieving full employment but stops short of increasing effective demand over the full employment mark, there is no need to be afraid of inflation.[2]

[2] Another problem of a more technical nature is that of the national debt. If full employment is maintained by government spending financed by borrowing, the national debt will continuously increase. This need not, however, involve any disturbances in output and employment, if interest on the debt is financed by an annual capital tax. The current income, after payment of capital tax, of some capitalists will be lower and of some higher than if the national debt had not increased, but their aggregate income will remain unaltered and their aggregate consumption will not be likely to change significantly. Further, the inducement to invest in fixed capital is not affected by a capital tax because it is paid on any type of wealth. Whether an amount is held in cash or government securities or invested in building a factory, the same capital tax is paid on it and thus the comparative advantage is unchanged. And if investment is financed by loans it is clearly not affected by a capital tax because if does not mean an increase in wealth of the investing entrepreneur. Thus neither capitalist consumption nor investment is affected by the rise in the national debt if interest on it is financed by an annual capital tax. [See 'A Theory of Commodity, Income, and Capital Taxation', this volume.]

II

1. The above is a very crude and incomplete statement of the economic doctrine of full employment. But it is, I think, sufficient to acquaint the reader with the essence of the doctrine and so enable him to follow the subsequent discussion of the *political* problems involved in the achievement of full employment.

In should be first stated that, although most economists are now agreed that full employment may be achieved by government spending, this was by no means the case even in the recent past. Among the opposers of this doctrine there were (and still are) prominent so-called 'economic experts' closely connected with banking and industry. This suggests that there is a political background in the opposition to the full employment doctrine, even though the arguments advanced are economic. That is not to say that people who advance them do not believe in their economics, poor though this is. But obstinate ignorance is usually a manifestation of underlying political motives.

There are, however, even more direct indications that a first-class political issue is at stake here.[2] In the great depression in the 1930s, big business consistently opposed experiments for increasing employment by government spending in all countries, except Nazi Germany. This was to be clearly seen in the USA (opposition to the New Deal), in France (the Blum experiment), and in Germany before Hitler.[3] The attitude is not easy to explain. Clearly, higher output and employment benefit not only workers but entrepreneurs as well, because the latter's profits rise. And the policy of full employment outlined above does not encroach upon profits because it does not involve any additional taxation. The entrepreneurs in the slump are longing for a boom; why do they not gladly accept the synthetic boom which the government is able to offer them? It is this difficult and fascinating question with which we intend to deal in this article.

The reasons for the opposition of the 'industrial leaders' to full employment achieved by government spending may be subdivided into three categories: (i) dislike of government interference in the

problem of employment as such; (ii) dislike of the direction of government spending (public investment and subsidizing consumption); (iii) dislike of the social and political changes resulting from the *maintenance* of full employment. We shall examine each of these three categories of objections to the government expansion policy in detail.

2. We shall deal first with the reluctance of the 'captains of industry' to accept government intervention in the matter of employment. Every widening of state activity is looked upon by business with suspicion, but the creation of employment by government spending has a special aspect which makes the opposition particularly intense. Under a *laissez-faire* system the level of employment depends to a great extent on the so-called state of confidence. If this deteriorates, private investment declines, which results in a fall of output and employment (both directly and through the secondary effect of the fall in incomes upon consumption and investment). This gives the capitalists a powerful indirect control over government policy: everything which may shake the state of confidence must be carefully avoided because it would cause an economic crisis. But once the government learns the trick of increasing employment by its own purchases, this powerful controlling device loses its effectiveness. Hence budget deficits necessary to carry out government intervention must be regarded as perilous. The social function of the doctrine of 'sound finance' is to make the level of employment dependent on the state of confidence.

3. The dislike of business leaders for a government spending policy grows even more acute when they come to consider the objects on which the money would be spent: public investment and subsidizing mass consumption.

The economic principles of government intervention require that public investment should be confined to objects which do not compete with the equipment of private business (e.g. hospitals, schools, highways). Otherwise the profitability of private investment might be impaired, and the positive effect of public investment upon employment offset, by the negative effect of the decline in private investment. This conception suits the businessmen very well. But the scope for public investment of this type is rather narrow, and there is a danger that the government, in pursuing this policy, may eventually be

tempted to nationalize transport or public utilities so as to gain a new sphere for investment.[3]

One might therefore expect business leaders and their experts to be more in favour of subsidising mass consumption (by means of family allowances, subsidies to keep down the prices of necessities, etc.) than of public investment; for by subsidizing consumption the government would not be embarking on any sort of enterprise. In practice, however, this is not the case. Indeed, subsidizing mass consumption is much more violently opposed by these experts than public investment. For here a moral principle of the highest importance is at stake. The fundamentals of capitalist ethics require that 'you shall earn your bread in sweat'—unless you happen to have private means.

4. We have considered the political reasons for the opposition to the policy of creating employment by government spending. But even if this opposition were overcome—as it may well be under the pressure of the masses—the *maintenance* of full employment would cause social and political changes which would give a new impetus to the opposition of the business leaders. Indeed, under a regime of permanent full employment, the 'sack' would cease to play its role as a disciplinary measure. The social position of the boss would be undermined, and the self-assurance and class-consciousness of the working class would grow. Strikes for wage increases and improvements in conditions of work would create political tension. It is true that profits would be higher under a regime of full employment than they are on the average under *laissez-faire*; and even the rise in wage rates resulting from the stronger bargaining power of the workers is less likely to reduce profits than to increase prices, and thus adversely affects only the rentier interests. But 'discipline in the factories' and 'political stability' are more appreciated than profits by business leaders. Their class instinct tells them that lasting full employment is unsound from their point of view, and that unemployment is an integral part of the 'normal' capitalist system.

[3] It should be noted here that investment in a nationalized industry can contribute to the solution of the problem of unemployment only if it is undertaken on principles different from those of private enterprise. The government must be satisfied with a lower net rate of return than private enterprise, or it must deliberately time its investment so as to mitigate slumps.

III

1. One of the important functions of fascism, as typified by the Nazi system, was to remove capitalist objections to full employment.

The dislike of government spending policy as such is overcome under fascism by the fact that the state machinery is under the direct control of a partnership of big business with fascism. The necessity for the myth of 'sound finance', which served to prevent the government from offsetting a confidence crisis by spending, is removed. In a democracy, one does not know what the next government will be like. Under fascism there is no next government.

The dislike of government spending, whether on public investment or consumption, is overcome by concentrating government expenditure on armaments. Finally, 'discipline in the factories' and 'political stability' under full employment are maintained by the 'new order', which ranges from suppression of the trade unions to the concentration camp. Political pressure replaces the economic pressure of unemployment.

2. The fact that armaments are the backbone of the policy of fascist full employment has a profound influence upon that policy's economic character. Large-scale armaments are inseparable from the expansion of the armed forces and the preparation of plans for a war of conquest. They also induce competitive rearmament of other countries. This causes the main aim of spending to shift gradually from full employment to securing the maximum effect of rearmament. As a result, employment becomes 'over-full'; not only is unemployment abolished, but an acute scarcity of labour prevails. Bottlenecks arise in every sphere, and these must be dealt with by the creation of a number of controls. Such an economy has many features of a planned economy, and is sometimes compared, rather ignorantly, with socialism. However, this type of planning is bound to appear whenever an economy sets itself a certain high target of production in a particular sphere, when it becomes a target economy of which the armament economy is a special case. An armament economy involves in particular the curtailment of consumption as compared with that which it could have been under full employment.[4]

The fascist system starts from the overcoming of unemployment, develops into an armament economy of scarcity, and ends inevitably in war.

IV

1. What will be the practical outcome of the opposition to a policy of full employment by government spending in a capitalist democracy? We shall try to answer this question on the basis of the analysis of the reasons for this opposition given in section II. We argued there that we may expect the opposition of the leaders of industry on three planes: (i) opposition on principle to government spending based on a budget deficit; (ii) opposition to this spending being directed either towards public investment—which may foreshadow the intrusion of the state into the new spheres of economic activity—or towards subsidizing mass consumption; (iii) opposition to *maintaining* full employment and not merely preventing deep and prolonged slumps.

Now it must be recognized that the stage at which 'business leaders' could afford to be opposed to *any* kind of government intervention to alleviate a slump is more or less past. Three factors have contributed to this: (i) very full employment during the present war; (ii) development of the economic doctrine of full employment; (iii) partly as a result of these two factors, the slogan 'Unemployment never again' is now deeply rooted in the consciousness of the masses. This position is reflected in the recent pronouncements of the 'captains of industry' and their experts.[5] The necessity that 'something must be done in the slump' is agreed; but the fight continues, firstly, as to *what* should be done in the slump (i.e. what should be the direction of government intervention) and secondly, that it should be done *only* in the slump (i.e. merely to alleviate slumps rather than to secure permanent full employment).

2. In current discussions of these problems there emerges time and again the conception of counteracting the slump by stimulating *private* investment. This may be done by lowering the rate of interest, by the reduction of income tax, or by subsidizing private investment directly in this or another form. That such a scheme should be attractive to business is not surprising. The entrepreneur remains the medium through which the intervention is conducted. If he does not feel confidence in the political situation, he will not be bribed into investment. And the intervention does not involve the government either in 'playing with' (public) investment or 'wasting money' on subsidizing consumption.

It may be shown, however, that the stimulation of private investment does not provide an adequate method for preventing mass

unemployment. There are two alternatives to be considered here. (i) The rate of interest or income tax (or both) is reduced sharply in the slump and increased in the boom. In this case, both the period and the amplitude of the business cycle will be reduced, but employment not only in the slump but even in the boom may be far from full, i.e. the average unemployment may be considerable, although its fluctuations will be less marked. (ii) The rate of interest or income tax is reduced in a slump but *not* increased in the subsequent boom. In this case the boom will last longer, but it must end in a new slump: one reduction in the rate of interest or income tax does not, of course, eliminate the forces which cause cyclical fluctuations in a capitalist economy. In the new slump it will be necessary to reduce the rate of interest or income tax again and so on. Thus in the not too remote future, the rate of interest would have to be negative and income tax would have to be replaced by an income subsidy. The same would arise if it were attempted to *maintain* full employment by stimulating private investment: the rate of interest and income tax would have to be reduced continuously.[4]

In addition to this fundamental weakness of combating unemployment by stimulating private investment, there is a practical difficulty. The reaction of the entrepreneurs to the measures described is uncertain. If the downswing is sharp, they may take a very pessimistic view of the future, and the reduction of the rate of interest or income tax may then for a long time have little or no effect upon investment, and thus upon the level of output and employment.

3. Even those who advocate stimulating private investment to counteract the slump frequently do not rely on it exclusively, but envisage that it should be associated with public investment. It looks at present as if business leaders and their experts (at least some of them) would tend to accept as a *pis aller* public investment financed by borrowing as a means of alleviating slumps. They seem, however, still to be consistently opposed to creating employment by subsidizing consumption and to *maintaining* full employment.

This state of affairs is perhaps symptomatic of the future economic regime of capitalist democracies. In the slump, either under the pressure of the masses, or even without it, public investment financed by borrowing will be undertaken to prevent large-scale unemployment. But if attempts are made to apply this method in order to maintain the high level of employment reached in the subsequent boom, strong opposition by business leaders is likely to be encountered. As has already been argued, lasting full employment is not at all to their liking. The workers would 'get out of hand' and the 'captains of industry' would be anxious to 'teach them a lesson'. Moreover, the price increase in the upswing is to the disadvantage of small and big rentiers, and makes them 'boom-tired'.

[4] A rigorous demonstration of this is given in my article to be published in *Oxford Economic Papers*. [See 'Full Employment by Stimulating Private Investment?', below.]

In this situation a powerful alliance is likely to be formed between big business and rentier interests, and they would probably find more than one economist to declare that the situation was manifestly unsound. The pressure of all these forces, and in particular of big business—as a rule influential in government departments—would most probably induce the government to return to the orthodox policy of cutting down the budget deficit. A slump would follow in which government spending policy would again come into its own.

This pattern of a political business cycle is not entirely conjectural; something very similar happened in the USA in 1937–8. The breakdown of the boom in the second half of 1937 was actually due to the drastic reduction of the budget deficit. On the other hand, in the acute slump that followed the government promptly reverted to a spending policy.

The regime of the political business cycle would be an artificial restoration of the position as it existed in nineteenth-century capitalism. Full employment would be reached only at the top of the boom, but slumps would be relatively mild and short-lived.[6]

V

1. Should a progressive be satisfied with a regime of the political business cycle as described in the preceding section? I think he should oppose it on two grounds: (i) that it does not assure lasting full employment; (ii) that government intervention is tied to public investment and does not embrace subsidizing consumption. What the masses now ask for is not the mitigation of slumps but their total abolition. Nor should the resulting fuller utilization of resources be applied to unwanted public investment merely in order to provide work. The government spending programme should be devoted to public investment only to the extent to which such investment is actually needed. The rest of government spending necessary to main-

tain full employment should be used to subsidize consumption (through family allowances, old-age pensions, reduction in indirect taxation, and subsidizing necessities). Opponents of such government spending say that the government will then have nothing to show for their money. The reply is that the counterpart of this spending will be the higher standard of living of the masses. Is not this the purpose of all economic activity?

2. 'Full employment capitalism' will, of course, have to develop new social and political institutions which will reflect the increased power of the working class. If capitalism can adjust itself to full employment, a fundamental reform will have been incorporated in it. If not, it will show itself an outmoded system which must be scrapped.

But perhaps the fight for full employment may lead to fascism? Perhaps capitalism will adjust itself to full employment in *this* way? This seems extremely unlikely. Fascism sprang up in Germany against a background of tremendous unemployment, and maintained itself in power through securing full employment while capitalist democracy failed to do so. The fight of the progressive forces for all employment is at the same time a way of *preventing* the recurrence of fascism.

Three Ways to Full Employment[1]

(1944)

The purpose of this paper is to discuss the methods of achieving and maintaining full employment in a capitalist society. We shall consider throughout a closed economic system. This does not mean that we neglect the problems of foreign trade in the discussion of full employment, which present perhaps the greatest *practical* difficulties. They will be dealt with in a separate study.[2] Here, however, we leave them aside in order to make clear the fundamental *theoretical* problems of full employment. Similarly, we leave aside the question of mobility of labour, which again is examined in a special article.[3] For the present it may be assumed that working time is variable within certain limits, which provides a sufficient elasticity in labour supply in the short period, while in the longer period one may rely on retraining of labour to restore equilibrium when the structure of demand changes.

First and foremost we shall deal in this article with the generation of effective demand adequate to secure and maintain full employment. Secondly, we shall have to consider the problem of private investment in such a system, in the short period and in the long run.

As the title indicates, we shall distinguish three ways to achieve and maintain full employment:

1. By government spending on public investment (e.g. schools, hospitals, highways) or on subsidies to mass consumption (family allowances, reduction of indirect taxation, subsidies to keep down the prices of necessities)—provided this spending is financed by borrowing. We shall call this method deficit spending.

2. By stimulating private investment (through a reduction in the rate of interest, lowering of income tax or other measures assisting private investment).

3. By redistribution of income from higher- to lower-income classes.

We shall argue that the second method, i.e. stimulating private investment, is not satisfactory, but that both the first method and the third method provide adequate means to maintain full employment.

I. Deficit Spending

Deficit spending generates effective demand in the following way. The government undertakes public investment which does not compete with private enterprise (it builds schools, highways, hospitals and so on), or it subsidizes mass consumption (by paying family allowances, reducing indirect taxation, or paying subsidies to keep down prices of necessities). This expenditure is financed by borrowing, and therefore does not involve curtailing private investment (provided the rate of interest is kept constant) or non-subsidized consumption, and thus creates an additional effective demand.

It should be noted that the rise in incomes causes after some time an increase in the tax revenue, so that the final budget deficit is lower than the increase in government expenditure.

The fundamental questions related to creating employment by deficit spending have been widely discussed in recent years. Nevertheless, it seems useful to restate the main points of the discussion. These points are: (i) Where does the money come from? (ii) Will such a policy not inevitably raise the rate of interest and thus adversely affect private investment? (iii) If the rate of interest does not increase, will deficit spending not create inflation? (iv) If the budget deficit is a permanent feature: how can the burden of the increasing national debt be tackled?

Fundamental problems

Where does the money come from?

Although it has been repeatedly stated in recent discussions that the budget deficit always finances itself—that is to say, its rise always causes such an increase in incomes and changes in their distribution that there accrue just enough savings to finance it—the matter is still frequently misunderstood. We shall therefore demonstrate this fundamental theorem in the budget deficit theory by means of a diagram. The left-hand column on Fig. 27 represents the national expenditure, i.e. the sum of government expenditure, private expenditure on investment for replacement and expansion of capital (all purchases of new fixed capital *plus* changes in working capital and stocks), and expenditure on personal consumption. It is easy to see that in a closed economy in a given period this expenditure must be equal to the sum of wages, salaries, profits[1] (gross of depreciation), and indirect taxation,

[1] Including rent and interest.

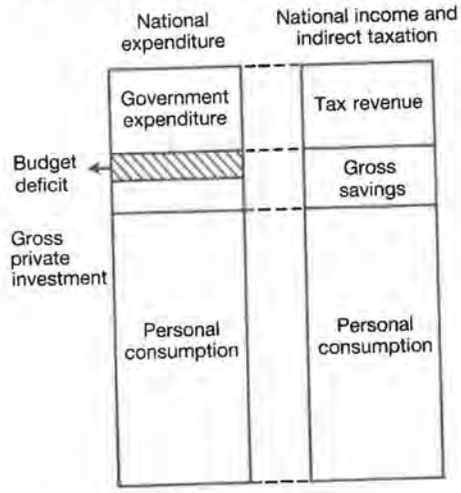


FIG. 27

for the price of any object bought will be fully accounted for by these four items. Therefore the column on the right, representing the sum of these four items for the economy as a whole, is equal to the column on the left, representing the national expenditure. The right-hand column is divided according to the use which is made of incomes. There is first taxation, both indirect and direct, paid by firms and individuals; next there is personal consumption; and the residual is saving, gross of depreciation. For if from the aggregate gross income plus indirect taxation we deduct all taxation and personal consumption, the remainder is saving gross of depreciation. The shaded area in the left-hand column represents the excess of government expenditure over taxation, i.e. the budget deficit, and it follows directly from the consideration of the figure that budget deficit plus gross private investment equals gross savings.[2] If we deduct depreciation from both sides of this equation, we see that the relation holds good if we substitute net savings for gross savings and net investment for gross

[2] In the above argument we have tacitly omitted transfers, i.e. government expenditure on doles, pensions, interest on the national debt, etc. But the argument holds good if we include transfers both in the national expenditure (as part of government expenditure) and in the national income (alongside wages, salaries, and profits).

investment. In other words, net savings are always equal to budget deficit plus net investment: whatever the general economic situation, whatever the level of prices, wages, or the rate of interest, any level of private investment and budget deficit will always produce an equal amount of saving to finance these two items. Thus the question of how it is possible to increase government expenditure if expenditure on private investment and personal consumption is cut is answered by the fact that there will always be such an increase in incomes as to create an increase in savings equal to the increase in the budget deficit.

The rate of interest

Is it not wrong, however, to assume that private investment will remain unimpaired when the budget deficit increases? Will not the rise in the budget deficit force up the rate of interest so much that investment will be reduced by just as much as the budget deficit is increased, thus offsetting the stimulating effect of government expenditure on employment? The answer is that the rate of interest may be maintained at a stable level however large the budget deficit, given a proper banking policy. The rate of interest will tend to rise if the public do not absorb the government securities, by the sale of which the deficit is financed, but prefer to invest their savings in bank deposits. And if the banks, lacking a sufficient cash basis (notes and accounts in the central bank), do not expand their deposits and do not buy government securities instead of the public doing so, then the rate of interest must rise sufficiently to induce the public to invest their savings in government securities. If, however, the central bank expands the cash basis of the private banks to enable them to expand their deposits sufficiently while maintaining the prescribed cash ratio, no tendency for a rise in the rate of interest will appear.[4]

We have considered so far the rate of interest in general. The actual position is a little more complicated, because we must distinguish between the rates on short-term and long-term assets. Even if the banks expand their deposits sufficiently to satisfy public demand at a given level of the short-term rate of interest, the public may absorb short-term assets while the government is issuing long-term bonds. The long-term rate would then rise in relation to the short-term rate to such an extent that the public is prepared to absorb the bonds issued currently by the government. This, however, may be dealt with easily by an appropriate issue policy of the government. A good example is provided by the policy of the British government during this war. The

government has long- and medium-term bonds, bearing $2\frac{1}{2}$ to 3% interest, on tap. The public buy out of their savings as many of these bonds as they choose, and the rest of the deficit is covered by an increase in floating debt, i.e. by the issue of short-term securities. In this way both the long-term and the short-term rate of interest are kept constant (the constancy of the latter is, of course, based on the policy of the Bank of England). The same method of keeping interest rates constant can be followed in peacetime. There is nothing peculiar in the wartime situation which makes this method easier than where a budget deficit is used for financing public investment or subsidizing mass consumption. We may thus conclude that, provided the central bank expands the cash basis of the private banks according to the demand for bank deposits, and provided the government issues long- and medium-term bonds on tap, both the short-term and the long-term rates of interest may be stabilized whatever the rate of the budget deficit.

The danger of inflation

If the rate of interest is kept constant, will not the increasing budget deficit cause inflation, i.e. a vicious spiral of prices and wages? The reply is that inflation will result only if effective demand increases so much that a general scarcity of labour or equipment (or both) arises. Up to a point, the short-period supply curves are horizontal or mildly rising for most commodities. But when effective demand increases significantly beyond this point, the steeply upward-sloping parts of the short-period supply curves become relevant. As a result, there is a general increase in prices out of proportion with average prime costs, and in this way the vicious spiral of prices and wages is started. In order to avoid inflation, the government must, therefore, be careful not to push its deficit spending beyond the mark indicated by full utilization of labour and equipment.

It is thus evident that a prerequisite of full employment is a proper relation between existing equipment and available labour. The volume of equipment must be adequate to employ the available labour and still allow for reserve capacities. If the maximum capacity of equipment is inadequate to absorb the available labour, as will be the case in backward countries, the immediate achievement of full employment is clearly hopeless. If the reserve capacities are non-existent or insufficient, the attempt to secure full employment in the short run may easily lead to inflationary tendencies in large sections of the economy, because the

structure of equipment does not necessarily match the structure of demand. And even if the structure of equipment *is* matched with that of full employment demand in the initial position, the deficiency of reserves will cause trouble when shifts in demand occur subsequently.

In an economy where plant is scarce, it is thus necessary to have a period of industrialization or reconstruction during which the existing equipment is expanded at a fairly high rate. In this period it may be necessary to have controls not unlike those used in wartime. Only after the process of capital expansion has proceeded sufficiently far is a policy of full employment of the kind described above possible.

Another phenomenon may still arise in full employment which, although not inflation in the above sense, resulting from the disproportion between demand for and supply of consumer goods, may cause a continuous increase in prices. In a state of full employment the bargaining power of trade unions will be very strongly enhanced. Thus there may be a spontaneous tendency for money wage rates to increase, leading to a rise in prices and the cost of living; this in turn leads to a secondary rise in wages, and so on.

In so far as the rise in wage rates is equal to the increase in productivity of labour, the problem of the vicious spiral does not arise, because wage costs per unit of output will remain stable and thus there will be no reason for a rise in prices. If, however, wage rates increase more than the productivity of labour, arrangements must be made to prevent prices running away. If no such steps are taken, the workers as a whole do not benefit; for the increase in money wage rates will be offset by the consequent rise in prices. In addition, a quick upward movement of prices will be a disturbing feature in an economy of full employment. How money wages can be raised without causing a rise in prices is outlined in the section on 'Redistribution of Income' below. For the present, it is sufficient to mention that a rise in real wage rates, greater than an accompanying rise in productivity, in an economy of full employment must involve a curtailment of investment or consumption of non-wage-earners. For otherwise the aggregate demand would exceed the aggregate supply, and thus either prices *would* finally rise or, if prices are controlled, shortages and haphazard distribution would ensue.

The burden of the debt

If full employment is maintained by deficit spending, the national debt will expand continuously, and the burden of interest upon it will tend to rise. Will not this increasing burden set a limit to deficit spending as a means to full employment? It may be well to begin by clearing up two popular misconceptions concerning the burden of the debt.

In the first place, interest on an increasing national debt (as indeed on all the debt) cannot be a burden to society as a whole because in essence it constitutes an internal transfer. Secondly, in an expanding economy this transfer need not necessarily rise out of proportion with the tax revenue at the existing rate of taxes. The standard rate of income tax necessary to finance the increasing amount of interest on the national debt need not rise if the rate of expansion of the national income is sufficiently high, as a result of the increase in working population and technical progress. However, even if we leave this factor aside, it is fairly easy to devise a system of taxation to service the debt which will not involve any disturbances in output and employment.

Imagine, for instance, that the interest on the national debt is financed by an annual capital tax, levied on firms and persons (shares and debentures being excluded from the valuation of wealth to avoid a double taxation of the capital of firms). The current income after payment of capital tax of some capitalists will be lower, and of some higher, than if the interest on the national debt had not increased. But their aggregate income will remain unaltered, and their aggregate consumption will not be likely to change significantly. Further, the profitability of investment is not affected by a capital tax because it is paid on any type of wealth. Whether an amount is held in cash or government securities or is invested in building a factory, the same capital tax is paid on it, and thus the comparative advantage is unchanged. And if investment is financed by borrowing, its profitability is clearly not affected by a capital tax, because borrowing does not mean an increase in wealth of the investing entrepreneur. Thus neither capitalist consumption nor the profitability of investment is affected by the rise in the national debt, if interest on it is financed by an annual capital tax.

We shall now consider the order of magnitude of such a tax. If we imagine that the tax is imposed to finance the interest on the national debt incurred after a certain fixed date (the interest on the 'old debt' being already accounted for in the budget), the relevant average interest on the national debt may be assumed in Great Britain to be about 2%. This is approximately the present average cost of (short-term and long-term) borrowing, and there is no reason to assume that

it will increase in future.[3] The rate of the annual capital tax will thus be substantially lower than 2%, because the tax to finance the interest on the 'extra debt' will be collected from all types of privately owned capital, of which the extra debt constitutes only one item. If, for instance, this extra debt were to rise to one half of all privately owned assets, the annual capital tax would amount to 1%.[4]

As an alternative to a capital tax, it is possible to devise a modified income tax, the influence of which upon the national economy as a whole would be more or less equivalent to that of a capital tax. Income tax, as opposed to a capital tax, reduces the net rate of profit, thus weakening the inducement to invest. The following modification may remove this adverse effect. Imagine that income tax is charged on gross income, i.e. before deduction of wear and tear. On the other hand, all investment in fixed capital, whether for the sake of replacement or expansion, is deducted from the taxable amount. (If it exceeds the taxable income, the excess is carried over for deduction in subsequent years.) It is easy to show that such a tax does not affect the rate of profit expected on new investment. Indeed, suppose that an entrepreneur expects for each £100 invested in fixed capital a gross profit of £10 per annum. One shilling in the £ of income tax reduces this expected profit to £9½ per annum. But by investing £100, the entrepreneur gets a £5 reduction in his current income tax and thus the cost of investment is reduced to £95. Consequently the expected gross rate of profit is the same 10% per annum as if the tax were not in existence.

Deficit spending and investment

How much private investment?

Having considered the possible objections to achieving lasting full employment by deficit spending, we shall now examine in more detail

[3] The government can continue to have on tap long-term and medium-term issues, and finance the rest by floating debt (see p. 361). It is true that the cost of borrowing will increase if sales of long- and medium-term issues rise in proportion to the budget deficit, but then nothing prevents the government from reducing the rate of interest on these issues.

[4] The above argument still requires some elucidation. It seems reasonable to deduct the capital tax from income before income tax is paid. For instance, if an asset yields 4% and the capital tax is 1%, the income of 3 and not 4% would be subject to income tax. This causes, of course, a certain reduction in the average yield of income tax, but this is offset by the income tax yielded by the interest on the national debt. If the national debt increases, the national income being constant, and the interest on the national debt is financed by a capital tax, the aggregate yield of income tax is unchanged. It is true that it is being reduced by the increasing amount of capital tax, but it is being *pro tanto* raised by the increasing interest on the national debt.

the functioning of such a system. Its principle is that the government increases expenditure on public investment and subsidies to mass consumption, without changing the tax rates, up to a point where the effective demand created directly and indirectly by this spending (through rising incomes) establishes full employment. Given that the government keeps employment at this level, what will happen to private investment? Firstly, will private investment remain subject to cyclical changes? Secondly, what should be the 'equilibrium' level of private investment?

It is evident that the development of private investment under a regime of full employment will be steady. Violent cyclical fluctuations of investment under *laissez-faire* are due to violent fluctuations in profits.[5] In full employment, however, output and profits will show only long-term changes resulting from the increase in population[6] and increasing productivity of labour.[7] There may, of course, be accidental fluctuations in the rate of private investment, for instance as a result of discontinuous technical progress. Such accidental fluctuations can best be neutralized by an appropriate timing of public investment.

The question of the equilibrium level of private investment at which we should aim in the regime of full employment requires some preliminary remarks about the concept of the degree of utilization of equipment, by which we mean the ratio of actual output to the maximum capacity of equipment. The degree of utilization must be neither too small nor too great. If it is too small, there will be unused capacities which mean waste of productive resources; in the other case, the reserves of equipment will be too small to provide sufficient elasticity for adjustments.

Let us imagine now that we start from a position where the degree of utilization of equipment is at what we consider a desirable level. It follows that in the next period we want this degree of utilization to be maintained. But in the next period our full employment output will be higher, on account of the increase in the working population and in productivity of labour (as a result of technical progress). Thus, to maintain the degree of utilization of equipment, the capacity of the

[5] The causation is actually double-sided: a fall in investment causes a fall in effective demand and profits, and this in turn leads to a new decline in investment.

[6] Throughout this paper we refer, for convenience only, to an *increase* in working population. In the event of a decrease occurring, the various conclusions arrived at should be modified accordingly.

[7] In so far as changes in net profits will result from a deliberate policy of redistribution of income, care will have to be taken to neutralize the negative effect upon investment by appropriate measures (cf. p. 372).

latter must expand proportionately to the increase in working population and productivity of labour. This gives us the clue to what should be the level of private investment. Private investment must be at a level adequate to expand the capacity of equipment *pari passu* with the increase in working population and productivity of labour, i.e. proportionately to full employment output.[8]

In the case of an increase in working population this statement is obvious, but it requires perhaps some explanation in the case of a rise in the productivity of labour. Imagine that an old machine is replaced by a new one requiring less labour to produce a given output. The supply of labour thus increases proportionally to the rise in average productivity, and if full employment is maintained a proportional expansion in the capacity of equipment is necessary if no increase in the degree of its utilization is to occur.

Regulating private investment

To establish private investment at the level conforming to the above rule, a variety of methods may be used. It is known that a reduction (increase) in the rate of interest causes *ceteris paribus* a rise (fall) in the rate of private investment because it raises (diminishes) the expected net profitability of investment. The same is true of the rate of income tax. Thus, when private investment tends to be too low it may be stimulated by a reduction of the rate of interest and the rate of income tax, and conversely.

The operation of either of these methods, however, involves serious difficulties. To bring about an appreciable change in the *long-term* rate of interest—which is relevant for influencing investment—is rather a slow process.[9] Moreover, and more importantly, there are limits to the reduction of the long-term rate because (in longer periods) this rate always exceeds the short-term rate by some margin, and the short-term rate cannot fall below zero.

[8] If the working population is decreasing, but the rise in productivity is higher than the decline in population, the resulting full-employment output will rise more slowly than the productivity of labour. The capacity of equipment must expand in this case also proportionally to full employment output.

[9] If the reduction of the long-term rate of interest is carried out by reducing the short-term rate, a considerable time-lag is involved. This difficulty may be overcome by large-scale open-market operations. However, a quick fall in the long-term rate of interest would have undesirable consequences (see *The Economics of Full Employment*, Oxford, Basil Blackwell, 1944, p. 113).

Changes in the rate of income tax involve, in full employment, a redistribution of consumption, and it is inconvenient that the attempt to influence investment should be tied up with it. For instance, the application of this method involves a redistribution of consumption from the lower- to higher-income classes whenever private investment is to be stimulated.

The best method seems to be to replace a part of the existing income tax by the 'modified income tax', described on pp. 363–4, which does not affect the net profitability of investment. (Replacing income tax by a capital tax may be used for this purpose also.) If, for instance, the standard rate of income tax at a given moment is 7*s.* in the £ we may make 3*s.* of it subject to the modification. This removes the adverse effect of income tax on the net rate of profit. Thereby we shall leave only 4*s.* to exert the normal pressure on investment. The larger the shift from normal to modified income tax, the more investment will be stimulated.

State enterprise

In addition to stimulating or discouraging private investment, direct government intervention in the sphere of private investment is possible and may be useful.

The curtailment of private investment may be done by direct controls, for instance by the licensing of investment. This will be of special advantage as compared with the global methods described above if investment is much too high (i.e. creates large excess capacities) in a particular sector. On the other hand, if private investment is inadequate, the deficiency may be made good by the government itself taking a hand in this sphere. State-owned enterprises may be created which will fulfil this task to the extent to which private enterprise is unable to do so. This method is also of particular advantage when the deficiency in private investment has a pronounced sectoral character.

A good example is provided by slum clearance. The authorities withdraw gradually from occupation a certain number of obsolete buildings, and thereby raise the level of investment necessary to maintain the housing capacity. They then fill the gap themselves by building new houses instead of stimulating private building activity.

Public investment versus *subsidies to consumption*

The long-run level of the rate of investment in the private sector, discussed above, has an important bearing upon the size of govern-

ment expenditure required to achieve full employment at the existing tax rates.[10] The government spending programme must be on such a scale that it will establish full employment in combination with investment adequate to expand productive capacity *pari passu* with the increase in population and productivity of labour.

Let us now consider in turn how the spending programme should be divided between public investment in the strict sense (roads, hospitals, schools, etc.)[11] and subsidies to private consumption. It is frequently maintained that the spending programme should be fully devoted to public investment, and there is no objection to this view from the aspect of generating sufficient effective demand. But the gap to be covered by this government expenditure may be so large that public investment will soon become entirely, or at least nearly, useless. In such a case it would be absurd to restrict the government spending programme to public investment when a higher standard of living can be achieved by devoting a part of this spending to increasing consumption. The general principle must be that social priorities should decide the nature of the government's spending programme. It will have to be decided, for instance, whether it is more important to provide in a given year more swimming pools or more milk for children. Such decisions may be affected to a great extent by political factors. However, the principle of social priorities will in any case eliminate such projects as building five bridges over one stretch of the river for the mere purpose of providing employment.

It should be added that, if investment in the private sector (in which, however, the government may participate—see p. 367) increases, say as a result of slum clearance, the amount of government spending on 'pure' public investment and subsidizing consumption necessary to achieve full employment will be *pro tanto* reduced.

2. Stimulating Private Investment

The process and its consequences[5]

We shall now consider the stimulation of private investment as a way of achieving and maintaining full employment. In this conception, private investment is to be stimulated (by one of the methods described

[10] It should be remembered that only a part of the increase in government expenditure will be finally financed by borrowing, because a part is covered by the increase in tax revenue resulting from the rise in incomes (cf. p. 358).

[11] We include housing, whether carried out by public agencies or by private entrepreneurs, in the sector of private investment.

above—see p. 366) to such a degree that the effective demand caused directly and indirectly (multiplier effect) by it establishes full employment. We have already shown that, if full employment is achieved by deficit spending, measures to stimulate private investment may be necessary. However, this assistance to private investment did not have the purpose of creating effective demand—this task was fulfilled by the deficit spending—but was necessary to ensure that the level of investment expanded productive capacity proportionately to the long-run increase in full-employment output. Now, there is no a priori reason for this long-run equilibrium rate of investment to be just equal to that rate of investment which is necessary to generate sufficient effective demand to obtain full employment. We have so far assumed that, where this latter level is higher—which seems to be a likely case—the difference would be made good by government loan expenditure. In the conception considered now, the level of private investment is pushed up to the point at which it provides effective demand adequate to secure full employment. It is clear that, if this level exceeds that necessary to expand productive capacity proportionately to full-employment output, there will be a continuous fall in the degree of utilization of equipment and thus a continuous rise in excess capacity. A part of private investment will thus prove abortive.

Moreover, the fall in the degree of utilization of equipment will be reflected in a decline in the rate of profit, which will tend to depress private investment. In order to prevent the fall in the rate of investment, which without compensation by government spending would entail a cumulative slump in output and employment, it is necessary to provide a new stimulus to investment (i.e. to reduce further the rate of interest or income tax, or to replace to an increasing degree the normal income tax by a modified income tax). But after a certain time the trouble will reappear. Another reduction of the rate of interest, or some other measure, will be necessary to stimulate investment. We thus come to the conclusion that to achieve full employment by stimulating private investment only, it may be necessary (if the level of investment creating effective demand is higher than that level of investment which expands equipment *pari passu* with full employment output) to stimulate it in a cumulative way.

The 'deepening' of capital

Some economists may object that to push investment beyond the level necessary to expand productive capacity *pari passu* with full-employ-

ment output will not create excess capacity, but rather lead to more capital being used in relation to labour. And, so they would argue, this will result in an increase in the productivity of labour and consequently in the standard of living.

The idea that the reduction of the rate of interest stimulates the application of more capital per worker is based on the assumption that the planned *output* of the investing entrepreneur is given. On this condition a lower rate of interest makes it profitable to use more capital and less labour. If we assume, however, that the *capital* available to a firm for financing investment is given, the reduction of the rate of interest has no influence on the choice of the method of production when planning investment, because it affects the expected net profits equally whatever the method of production adopted. In fact, the actual conditions are probably represented by something intermediate between these two alternatives, because the imperfection of the market for products limits to some extent the planned output, and the imperfection of the capital market limits the available capital. Thus the reduction of the rate of interest would, in theory, tend to induce more capital-intensive investment, but by no means to such an extent as is frequently assumed. In practice, even this influence is doubtful.

The main stimulus to use more capital per worker is provided by new inventions. The advantage offered by them is usually so high that it will be taken whatever (within a wide range) the level of the rate of interest. This explains why factories built in backward countries, where the rate of interest is high, are usually as modern as in old capitalist countries where the rate of interest is much lower. In such conditions it is doubtful whether moderate reductions in the rate of interest will stimulate the application of more capital per worker to any considerable degree.

We have so far assumed that investment is stimulated by the reduction in the rate of interest. However, it has been previously shown (see p. 366) that this method is not very effective because the long-term rate of interest changes rather slowly and (what is more important) because it cannot be reduced below a certain limit. For this reason we suggested earlier that a more effective way of assisting private investment would be to reduce the pressure of income tax, in particular by replacing it by a modified income tax or a capital tax (see p. 367). It is now easy to see that, if investment is stimulated in this way, there is no influence upon its capital intensity whatsoever. Indeed, whether the output planned by investing entrepreneurs or the capital available for financing investment is given, the reduction of income tax pressure will not affect the choice of type of equipment. For the method of production which yields the highest profit before taxation will also yield the highest profit net of income tax.

We have tried to show above that a reduction of the rate of interest or of the pressure of income tax is not likely to contribute significantly to the 'deepening' of capital. An acceleration of the increase in the productivity of labour can be achieved, however, by subsidizing the modernization of equipment, for instance, by granting cheap credit for projects submitted for the approval of a government agency. Nor is this the only way to achieve the required modernization. Modern state-owned establishments may be created, in order to force, through competition, an improvement in the methods of production of private firms. But such activities should not be governed merely by the wish to achieve full employment through investment in the private sector. It is only to the extent that the acceleration of technical change has a social priority over public investment (in the strict sense) and subsidies to consumption that such schemes should be put into operation.

The deficiencies of the method

The difficulties encountered in achieving full employment by stimulating private investment reflect the fundamental error of this conception. The proper role of private investment is to provide tools for the production of consumer goods, and not to provide enough work to employ all available labour. There is a close analogy between this problem and the question of public investment versus subsidizing consumption in a government spending programme. Both public and private investment should be carried out only to the extent to which they are considered useful. If the effective demand thus generated fails to provide full employment, the gap should be filled by increasing consumption, and not by piling up unwanted public or private capital equipment.

In addition to this fundamental point, a technical but important disadvantage of this method should be mentioned. Government spending can never fail to achieve immediately the desired employment effect if it is on a sufficiently large scale, because it generates effective demand directly. The effects of stimuli to private investment depend, however, on the reaction of entrepreneurs, and it is quite possible that when they are in a very pessimistic mood they may not

respond even to considerable inducements. This may happen, for instance, if they do not feel confidence in the political situation.

We thus conclude that, both for fundamental and for technical reasons, a policy which attempts to achieve full employment in an industrial country exclusively by stimulating private investment cannot be regarded as satisfactory.

3. Redistribution of Income

Redistribution and effective demand

Redistribution of income is the third way frequently suggested to achieve full employment. The underlying idea is that when income is shifted from higher- to lower-income earners, total consumption is increased, because the poor have a higher propensity to consume than the rich. If, for instance, we increase the income tax on the rich and at the same time reduce indirect taxation on necessities or semi-necessities to the same extent, or pay an equal amount of family allowances, we increase the average propensity to consume.

The complicating factor which is often left out of consideration is the depressing influence of the rise in income tax upon private investment. We shall take account of this effect in the subsequent argument.

It should be noted that, if the proceeds of the increased income tax are used, not for subsidizing private consumption, but for public investment, this also increases effective demand, provided private investment is not affected. For while a part of the income affected by the new tax was saved, all proceeds of the tax are spent on investment goods. Thus demand for investment goods increases more than the demand for consumer goods falls.

The use of the 'modified' tax

We start our considerations from the fact that we know in advance what should be the level of private investment in full employment. It must be such as to raise the capacity of capital equipment *pari passu* with the increase in population and in the productivity of labour. It is now easy to see that two conditions must be fulfilled in order for full employment to be achieved by the imposition of a higher income tax: (i) Income tax on higher incomes must be fixed at such a level that its stimulus to effective demand, in conjunction with the level of private investment as specified above, produces full employment. (ii) In order

to maintain private investment at the specified level, either the rate of interest must be fixed sufficiently low, or rather—as this may be difficult—a sufficient part of the income tax must be put on a modified basis (or replaced by a capital tax). Imagine, for instance, that the joint increase in population and productivity of labour is 2.5% per annum. Thus our target in private investment must be such that it expands the capacity of capital equipment by 2.5% per annum. Imagine further that, this level of private investment being in existence, an income tax of 10*s*., out of which 5*s*. in the £ are put on a modified basis, will establish effective demand adequate to secure full employment. Moreover, the 'modification' of income tax to the extent of 5*s*. will, let us suppose, allow for the maintenance of private investment at the required level. It is clear that in such a case our problem is solved.

The limits of taxation

We see that a sufficiently high income tax provides a workable solution of the full employment problem, on condition that an appropriate part of it is put on a 'modified' basis (or replaced by a capital tax). It should be noted that the amount of government expenditure necessary to create full employment is *ceteris paribus* higher under the income tax system, as compared with the case where deficit spending is applied. For taxation, as opposed to deficit spending, tends to reduce the consumption of the people taxed, and thus stimulates effective demand only to the extent to which it falls upon savings.

The advantage of the income tax system over a budget deficit policy can be seen in the fact that it not only secures full employment but at the same time renders the distribution of incomes (after taxation) more egalitarian. But precisely for this reason, a policy of full employment through taxation is likely to encounter a much stronger opposition than a budget deficit policy. One cannot, therefore, make any definite choice between the budget deficit and the income tax method. Income tax may be pushed as far as practically possible, but after this has been done, one should not hesitate to have in addition such a budget deficit as is still required to achieve and maintain full employment.

The wage question

The problem of wage increases in excess of the rise in the productivity of labour is, in a fully employed economy, closely connected with the matters discussed in this section.

Imagine that we start from a position where, in addition to the influence of the existing income tax, some budget deficit is necessary to maintain full employment. Imagine further that an increase in wage rates greater than the rise in productivity of labour has taken place. In order that prices should remain stable, subsidies to offset the rise in wage costs are granted. These subsidies are financed by income tax. It is easy to see that there will nevertheless be some increase in consumption. For the consumption of wage-earners will increase more than the consumption of high income-earners (affected by income tax) will be reduced, because the propensity to consume of the latter is lower than that of the wage-earners. In other words: the redistribution of income from higher- to lower-income classes increases effective demand. On the other hand, the supply of consumer goods can be increased in a fully employed economy only at the expense of investment which, however, may be assumed to have been fixed at the level considered necessary for the normal progress of the economy. Thus, in order to counteract the tendency of consumption to increase, the new income tax must be higher than is necessary to finance the subsidies alone; and to the extent of this excess the budget deficit will fall. The increase in wages with prices maintained at a constant level will cause a shift from the budget deficit policy to the income tax system. The increase in income tax must, of course, be accompanied by measures to prevent private investment from being affected.

This discussion shows that wage bargaining is likely to change its character in full employment. It will have to be linked with 'bargaining' for higher income tax on larger incomes, and thus will relate the policy of trade unions more closely to general economic policy. We shall see below that this is also true when prices are kept constant, not by subsidies, but by price control.

The squeezing of profit margins

We have so far considered the redistribution of incomes by taxation. However, it is also possible to redistribute income before taxation by price control. If prices of consumer goods are reduced, while wages remain constant, there will be a shift from real profits to real wages, roughly equivalent to that which would obtain if prices of consumer goods were constant and wages correspondingly increased. Thus such a policy, provided it is accompanied by measures to maintain private

investment at an appropriate level, will be as effective as income tax in achieving full employment. Applied, however, as a *general* policy this method will, from the administrative point of view, be inferior to the redistribution of incomes by taxation, which settles the problem at one stroke. On the other hand, if industrial monopolies come under price control there will be ample opportunities for reducing their profit margins, which—as far as it happens in the sector of consumer goods—contributes towards the solution of the problem of full employment. The task left to income tax and government loan expenditure in securing full employment will then be correspondingly smaller.

Profit margins may be cut, not only by price reductions, but also by raising wages while prices are kept constant. On pp. 373–4 we considered the problem of wage increases in a fully employed economy and assumed that prices were kept constant by subsidies financed by income tax. An alternative is to keep prices constant by price control. Its disadvantage is that pressure for higher wages is not likely to be restricted to industries where profit margins are relatively high, and therefore to keep prices constant, without subsidizing them, may frequently be difficult. We can imagine, however, a mixture of the two policies, and it is therefore important to see what will be the implications of wage increases with prices kept constant in a fully employed economy.

As in the previous case, where prices were maintained by subsidies financed by income tax, a redistribution of income from higher- to lower-income groups will take place: wages will rise and profits will fall *pro tanto*. This will tend to increase effective demand and therefore, under full employment, it will be necessary to curtail the consumption out of higher incomes. Thus, in addition to the shift from profits to wages, an appropriate income tax must be imposed which will reduce *pro tanto* the budget deficit. There is here a perfect analogy with the alternative case of subsidies offsetting the wage increases. To the shift from payers of income tax (by which the subsidies are financed) to wage-earners there corresponds, in the case now considered, a direct shift from profits to wages. To the *excess* of new income tax over the level necessary to finance subsidies, there corresponds the imposition of income tax in *addition* to price control. In either case the budget deficit is reduced by the amount of extra income tax which has to be imposed in order to offset the effect of redistribution of income upon consumption. The present case also involves linking up trade union

bargaining with general economic bargaining. For (i) prices must be prevented from rising by price control, although costs have risen; and (ii) income tax must be imposed in addition.

Conclusions

Government expenditure on public investment and subsidies to mass consumption, either in the shape of deficit spending or financed by an increase in income tax, is always capable of securing full employment. The expenditure must be larger in the latter case because of the pressure upon the consumption of income tax-payers. In practice, income tax-financed expenditure—which has the advantage not only of securing more employment but also of reducing the inequality in the distribution of incomes (after taxation)—should be pushed as far as politically possible, and, if this is not enough to secure full employment, expenditure should be expanded as much as is necessary by means of borrowing. Cutting profit margins—either in the form of price reduction of consumer goods or wage increases with constant prices—undertaken within the framework of price control will also increase effective demand and thus make the task of government expenditure to secure full employment easier.

Private investment must be pushed up to the level sufficient to expand the productive capacity of capital equipment *pari passu* with the increase in population and productivity of labour. This may be done by making a part of income tax subject to a modification which eliminates its adverse influence upon net profitability (or by replacing a part of income tax by a capital tax).[12] Moreover, it may be advantageous or even necessary for the government to take a hand in investment in the private sector (e.g. slum clearance).

Government expenditure on public investment and subsidies to mass consumption (financed by income tax or borrowing) must be such as to create full employment in combination with this level of private investment. The division of government spending between public investment and subsidizing consumption should be based on the principle of social priorities.

[12] We do not, of course, exclude the possibility that the government may have to keep private investment *down*, by restrictive measures.

Full Employment by Stimulating Private Investment?[1]

(1945)

I

1. In current discussions the view is frequently advanced that full employment may be maintained by stimulating private investment. The stimuli in question may be 'cheap money', the reduction of income tax, or subsidies to firms undertaking investment (which may be given, for instance, by deducting from taxable profits the full amount of new investment, or a percentage of it). The purpose of this paper is to show that, to maintain full employment, these measures must be applied not once only—as the authors of the proposals in question seem to assume—but cumulatively. That means that the rate of interest must *continuously* fall, the income tax must be *continuously* reduced, or the subsidies to investment must *continuously* rise. This procedure is, moreover, compared in the second part of the paper with that of maintaining full employment by public investment or by subsidizing consumption.

We shall consider throughout the argument a closed economy. This, however, is done only for the sake of simplicity, and does not affect our final conclusions.

2. Our subsequent argument will focus on two levels of the rate of private investment. One is the level of gross private investment (net investment + depreciation) which creates effective demand adequate to maintain full employment. We denote it by I_f. The second is the level of gross private investment I_c which is just sufficient to expand the stock of capital proportionally to the increase in population and in the productivity of labour. In other words, I_c is the level of gross investment which expands the stock of capital *pari passu* with 'full-employment output', which increases in the long run as a result of the rising population and technical progress. It follows that, if productive capacity increases proportionally to the stock of capital, I_c expands productive capacity *pari passu* with full-employment output; thus, if in this case full employment is maintained, the utilization of equipment

remains constant in time. But if, as may well be the case, technical progress involves a rise of capital in relation to productive capacity, the increase in the latter (with investment I_c) will fall short of 'full-employment output'; thus investment at a rate of I_c while full employment is maintained will then involve an increase in the utilization of equipment. Up to the last section we shall consider only the first case, i.e. we shall assume that productive capacity increases proportionally to the stock of capital.

3. Throughout the paper we shall limit our enquiry to the case where $I_f > I_c$. For, as we shall try to show below on the basis of empirical data, it is this case that is relevant to our discussion.

Let us start from the fact that, in modern capitalist economies, I_f, the gross private investment necessary to maintain full employment, appears to be over 2.5 times as much as depreciation. In the USA in 1929, net investment was about $7.5 milliards and depreciation about $9.5 milliards (of business assets and residential buildings). Following Professor A. H. Hansen, we assume that to achieve something like full employment in 1940 it was necessary to have in that year a real national income higher than in 1929 by about $25 milliards at 1929 prices.[1] With a multiplier of 2 to 2.5[2] this means an increase in investment of over $10 milliards. Thus net investment would have to be $17.5 milliards and gross investment $27 milliards, which is more than 2.5 times the depreciation level.

In the UK, net private investment in 1938 was about £350 millions[3] and depreciation about £350 millions as well. It may be estimated that investment would have had to be about £200 millions higher to establish full employment (on the assumption that the budget was balanced). Net investment would then be £550 millions and gross investment about £900 millions, which is more than 2.5 times the depreciation level.

[1] *Fiscal Policy and the Business Cycle*, New York and London, Norton, 1941. Prof. Hansen estimates the 'full-employment national income' in 1940 at $98 milliards at a price level 10–15% above the 1940 level. This amounts roughly to $108 milliards at 1929 prices, while the national income in 1929 was $83 milliards.

[2] Cf. my *Essays in the Theory of Economic Fluctuations*, pp. 270–2 above. By multiplier is meant here the ratio of changes in *real* national income to those in *real* investment.

[3] After elimination of the influence of changes in the value of inventories resulting from the fall in prices in that year.

4. Let us next consider I_c, the rate of gross private investment just sufficient to expand capital equipment proportionally to the increase in population and productivity of labour. The rise in total labour power in the USA in the last 13 years has been estimated at about 1.5% p.a. and the rise in the overall productivity of labour at 2.5%.[4] These figures will hardly be surpassed in the future in developed capitalist countries, and it therefore seems safe to assume that the net investment corresponding to I_c will be no higher than 4% of the stock of fixed and working capital.

Further, according to the US statistics of national wealth and depreciation, the ratio of annual depreciation to the total value of fixed and working capital (exclusive of land) was in 1923 about 4%. A similar relation may be assumed for other developed capitalist countries. It follows that I_c may be assumed to be equal to or lower than 8% of capital, or 2.0 times depreciation. As it has been shown that I_f is equal to or higher than 2.5 times depreciation, it may be assumed in our discussion of the problem of full employment that $I_f > I_c$.[2]

II

1. Imagine now that the policy of maintaining full employment by stimulating private investment has been put into operation by, say, a sufficient reduction of the rate of interest. Thus the rate of investment has been pushed to the level I_f which leads to full employment. The corresponding gross national income we denote by Y_f. The position in this initial period is represented in Fig. 28 by point A with the abscissa $Y_{f,1}$ and the ordinate $I_{f,1}$. As time goes by the 'full-employment gross national income' Y_f increases as a result of the rise in population and in productivity of labour. (By Y_f we understand here the 'real' gross national income, i.e. gross national income expressed in prices of the initial period.) The gross private investment I_f necessary to establish full employment must thus increase as well. (The value of I_f is also understood to be expressed in prices of the initial period.) And indeed it will probably rise more than proportionally to the national income Y_f, for the national income per head increases as a result of rising productivity and thus saving is likely to increase more than in proportion to income; and the investment necessary for this national

[4] Cf. S. Morris Livingston, 'Post-War Manpower and Its Capacity to Produce', *Survey of Current Business*, Apr. 1943.

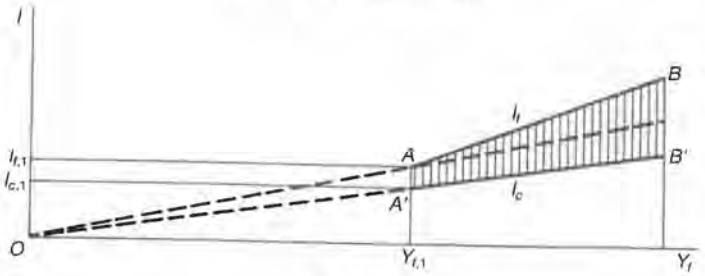


FIG. 28

income to be achieved must be equal to the corresponding saving. In other words, the higher the national income Y_f the higher is likely to be the proportion of saving out of this income, and thus the higher in proportion to Y_f the level of investment I_f necessary to maintain it. Thus the curve AB, representing the rise of I_f necessary as a result of the rise in population and in productivity of labour, lies above the straight line $0A$ connecting point A with the zero point.

There now arises the question whether the initial reduction of the rate of interest is adequate not only to reach the level $I_{f,1}$ in the initial period but also to secure the rise of I_f along the curve AB. We shall argue that this is not the case by comparing I_f with I_c.

2. Point A' on Fig. 28 shows the level of I_c in the initial period, i.e. the level of investment necessary to expand the stock of capital proportionally to 'full-employment output', i.e. proportionally to Y_f. According to the assumption made in section I, I_c is taken to be lower than I_f. It is easy to see that if investment followed the line $A'B'$ the capital stock would increase proportionally to Y_f. Indeed, in the first short period the rate of investment is equal to I_c, and thus according to the above it expands the capital stock proportionally to the 'full-employment national income' Y_f. In the second short period, the rate of investment would be higher in the same proportion in which Y_f and the capital stock have risen, and thus would be again equal to I_c (we assume here a uniform increase in population and productivity of labour). Thus the capital stock would again rise proportionately to Y_f, and so on.

As, further, we assume until the last section that productive capacity increases proportionally to capital, it follows that productive capacity

would rise proportionately to Y_f. In other words, a uniform trend in Y_f, capital stock, productive capacity, and I_c would ensue. Thus, if investment followed the line $A'B'$ and full employment were maintained at the same time, the degree of utilization of equipment and the distribution of gross national income would remain constant. Thus profits and capital would change proportionally to Y_f and consequently the rate of profit would be constant.

But the actual private investment necessary to secure full employment follows the line AB, which lies above $A'B'$. Thus capital will accumulate at a higher (and even increasingly higher) rate than that which corresponds to the line $A'B'$. Consequently, the rate of profit must fall rather rapidly and therefore a continuous (and rather rapid) reduction of the rate of interest will be necessary to make investment follow the line AB.[5]

3. It should perhaps be added that if private investment is stimulated, not by a 'cheap-money' policy, but by other devices, for instance, by the reduction of income tax, the issue is a little more complicated. For if the reduction in income tax is financed by incurring a budget deficit, consumption—mainly that of the rich—will also be stimulated, and this will contribute to the rise in employment. This effect, however, has nothing to do with the policy of securing full employment by stimulating private investment as such. And if it has been decided to achieve full employment by increasing consumption, this may be done in a more direct way, and it is not the consumption of the rich that should be increased. We shall deal with this problem in the next section.

[5] The following complication has not yet been taken into account. If investment follows the line AB, the productive capacity of equipment increases relatively to the national income, i.e. the degree of utilization of equipment falls. This may result in a 'shift from profits' which will increase the propensity to consume and thus cause a shifting downwards of the line AB. There will, however, be a limit to this movement; for after all firms reach the position where they are working below their full capacity, a further fall in the degree of utilization is unlikely to cause any significant shift from profits (the influence of diminishing returns being no longer important). Thus AB will reach a position where the shifting down will cease. Now it may be shown that this position will, on our assumptions, still be above $A'B'$ and thus our preceding argument remains valid.

Indeed, the lowest position of the line AB is such as would prevail if, in the initial period, bottle-necks in equipment were of no importance. Now our estimate of I_f in s. II was based on extrapolation from the range of real national income where bottle-necks in equipment are of no great importance. It follows that A in the lowest position of the line AB is still above A'.

III

1. We have shown in the preceding section that if effective demand adequate to secure full employment is created by stimulating private investment, the devices which we use for it must cumulatively increase to offset the influence of the falling rate of profit. We shall now examine what is the position, if, in solving the problem of full employment, we do not rely upon encouraging private investment, but upon the direct creation of effective demand by the government through public investment or through subsidizing mass consumption. In this case the government would undertake construction of objects which do not fall into the sphere of private enterprise, and thus do not compete with private capital equipment (otherwise public investment would tend to reduce the rate of profit on this equipment and thus involve the same difficulties as are involved in the policy of stimulating private investment). Or, alternatively, the government would increase mass consumption by granting family allowances, old-age pensions, etc., by reducing indirect taxation, and by subsidizing the prices of necessities. In either case the additional expenditure (or the fall in revenue) would be financed without increasing the existing taxes, so that the rise in public investment and subsidized consumption would not be offset by the fall in private investment and unsubsidized consumption; the resulting budget deficit would have the same repercussions upon employment as a rise in private investment with a balanced budget.

2. Imagine that by any method we establish such conditions in the initial period that, with profits corresponding to full employment, the entrepreneurs invest at a rate I_c (denoted in Fig. 28 by point A'). Further, the budget deficit incurred for the sake of public investment or increasing private consumption is fixed at the level $I_f - I_c$ (i.e. AA'). In this way full employment is achieved because the budget deficit makes good the amount by which I_c falls short of I_f. (To achieve such a position may require, of course, some measure of trial and error.) In the subsequent period the same policy is pursued. The budget deficit (in real terms) always covers the difference of the ordinates of the line AB and $A'B'$. In this way continuous full employment is assured, and private investment follows automatically the line $A'B'$ because this is the line of the constant rate of profit. This secures an increase in the productive capacity proportional to the rise of 'full-employment national income' Y_f.[6]

[6] If the rate of risk falls as time goes by, the rate of interest or income tax must be increased in order to prevent private investment from rising over the line $A'B'$.

3. If this method of maintaining full employment is adopted, no cumulative stimulation of private investment is necessary.[7] The productive resources are fully used, but private investment is limited to the level necessary to increase the capacity of equipment proportionally to the national income. The remaining resources are devoted to consumption and public investment. A few words must be added on the subject of their distribution between these two uses.

If public investment, i.e. construction of objects which do not compete with private capital equipment, is carried out on an excessive scale, a point will be reached where further public investment will be nearly useless. Two bridges over a short stretch of a river may be useful, but to construct a third, fourth, and fifth merely to provide employment is absurd. The problem involved is in a way analogous to the difficulties of maintaining full employment by stimulating private investment. Public investment should be undertaken only to the extent to which it serves a reasonable purpose, and the excess of government expenditure necessary to maintain full employment over this reasonable level of public investment must be devoted to consumption.

Thus, what seems to be a rational way of achieving full employment should be based on the following principles. (i) The government spends so much on public investment and subsidizing consumption of the poorer sections of the population that this secures full employment, in combination with that private investment which is necessary to increase the productive capacity of equipment proportionally to the rise in the 'full-employment national income'. (ii) Public investment is carried on at the rate actually required for satisfying the needs of the community, while all government spending above this level is devoted to subsidizing mass consumption.[8]

[7] The budget deficit required to finance public investment or 'additional' personal consumption is increasing as time goes by, but only in conjunction with the increase of the gap between the lines AB and $A'B'$. The subsidies to private investment necessary to achieve full employment must rise cumulatively, if there is *any* discrepancy between AB and $A'B'$. The increasing discrepancy between the two lines means an *accelerated* increase in the size of these subsidies.

[8] This regime involves a rising national debt. If its rate of increase is not higher than that of national income, no difficulty arises in financing interest on it. If the national debt does increase more quickly than the national income, taxes may easily be constructed which finance the additional burden of the interest on it without causing any disturbance in output and employment (cf. M. Kalecki, 'The Burden of the National Debt', *Bulletin of the Oxford Institute of Statistics*, 515, 1943. [cf: *Collected Works*, vol. vii; cf. also 'Three Ways to Full Employment', pp. 362–4 above.]

Full employment may be maintained without resorting to budget deficits by redistributive taxation. In this article we confine ourselves for the sake of simplicity to the consideration of 'loan-expenditure' policy as a means to full employment.

It follows clearly from the above argument that under such a regime there is no reason for *cyclical* fluctuations of the rate of private investment because the factors determining private investment activity—mainly the rate of profit—are *grosso modo* stable. *Minor* fluctuations in private investment, which may arise for all sorts of reasons, can be best neutralized by an appropriate distribution of public investment over time.

IV

1. So far we have made the assumption that productive capacity increases in the long run proportionally to the stock of capital. We must still consider the more complicated case mentioned on p. 378, where technical progress involves a rise in capital in relation to productive capacity.

If private investment follows in this case the line $A'B'$, i.e. if it expands the stock of capital proportionally to full-employment output Y_f and full employment is maintained, the utilization of equipment must increase, because productive capacity expands more slowly than capital. This causes—from a certain point onwards—a shift to profits which thus increase more quickly than Y_f. And as the stock of capital rises in proportion with Y_f, the rate of profit tends to rise. As a result, private investment at full employment maintained by government spending will be above the level set up by the line $A'B'$.

Private investment, however, will be below that level which would increase the productive capacity proportionally to 'full-employment national output' Y_f. For if productive capacity *did* increase proportionally to Y_f, utilization of equipment would be constant while capital stock would expand more quickly than productive capacity; thus Y_f would fall relative to the capital stock while there would be no reason for a shift to profits, and consequently the rate of profit would fall as well, and this would depress investment.

It follows that in the case considered the maintenance of the rate of profit must be accompanied by a rise in the utilization of equipment. But this must lead finally to a situation where equipment is short as compared with the available labour. Thus unemployment will arise, not as a result of insufficient effective demand, but owing to the shortage of productive capacity.

If this state of affairs is to be avoided, a cumulative stimulation of private investment (by reduction of interest, etc.) becomes necessary to

maintain private investment at the level required to increase productive capacity *pari passu* with the population and productivity of labour; i.e. with 'full-employment output' Y_f. This stimulus to private investment is required here *not* to produce effective demand adequate for maintaining full employment, but to prevent the shortage of productive capacity which would otherwise arise.

2. It has been tacitly assumed above that the degree of market imperfection and oligopoly remains constant, and therefore that a shift to profits must involve a rise in the utilization of equipment. If, however, the degree of market imperfection and oligopoly increases sufficiently to offset the influence of the rise in capital relative to productive capacity upon the rate of profit, the latter may remain constant with constant utilization of equipment. But the continuous shift to profit (caused by a continuous increase in market imperfection or oligopoly) will continuously reduce the population's propensity to consume; thus, to maintain full employment, the government will have to increase cumulatively the subsidizing of mass consumption. And this will in fact amount here to an indirect cumulative stimulation of investment.

3. It is interesting to consider the difficulties arising here from a general point of view. The government spending policy—as described in section III—permits the overcoming of one contradiction in the capitalist system: that of insufficient effective demand. But if technical progress causes productive capacity to increase more slowly than the accumulation of capital, i.e. if the capital intensity of production increases, there comes into the picture another contradiction of the capitalist system formulated by Marx in his law of the falling rate of profit. It is this second contradiction which—even though the problem of effective demand has been solved—makes it still necessary to grant cumulative subsidies to private enterprise in order to induce it to expand its productive capacity to keep pace with the increase in population and productivity of labour.

The logical solution of this problem is that the function of private enterprise should in this case be partly taken over by the government. If private enterprise—even after government intervention has guaranteed markets sufficient for full utilization of its resources—is unable to fulfil the task of supplying new equipment at the rate required by the increase in population and productivity of labour, then state-owned factories should be built to fill the deficiency in private investment.

Thus investment in what has been the sphere of activity of private enterprise will increase proportionally to full-employment output, in spite of the falling rate of profit. And because of this fall the share of private enterprise in this investment will continuously diminish and that of the government continually increase. Thus state-owned factories will constitute an ever-increasing share of industrial equipment, which will be a symptom of the inability of private enterprise to fulfil its part in the regime of full employment.

It should be stressed that throughout the argument account has been taken only of the *economics* of full employment. The *political* problems involved in achieving full employment under a capitalist system fall outside the scope of this paper.[3]

The Maintenance of Full Employment after the Transition Period: A Comparison of the Problem in the USA and the UK[1]

(1945)

A number of enquiries have recently been made into the conditions necessary for maintaining full employment in the USA and the UK after the transition period. They all point to the fact that the problem of post-transitional employment is likely to be much more formidable in the former country. With rates of taxation, roughly speaking, midway between pre-war and war-time levels, the loan-financed government expenditure required to maintain full employment will be much higher in relation to the national income in the USA than in the UK. The purpose of this article is to examine the factors which account for this difference. It will be convenient to compare, first, the empolyment situation in the USA and the UK before the war, and then to pass to an analysis of the prospective position in the two countries after the transition period. But before the examination of the relevant data (or estimates), it is necessary to discuss briefly a few points of a general character.

Expenditure, Income, and Employment

In order to put the problem of employment into a proper perspective, we shall have first to draw up a 'national balance sheet' of income and expenditure. The expenditure on goods and services in a given country may be subdivided into four components: (i) personal expenditure on consumption; (ii) gross private expenditure on investment, i.e. expenditure on new fixed capital (plant, machinery, buildings, etc., inclusive of dwelling houses), whether for the replacement or for the extension of fixed capital, plus the increase in working capital and stocks; (iii) public expenditure on goods and services; (iv) expenditure by foreigners, i.e. exports. Now the price of any goods or services bought for personal consumption, for private investment, or by public authorities is accounted for fully by: (i) wages, salaries, rent, interest, and profits; (ii) depreciation; (iii) indirect taxes, if any; and (iv) the cost

of imported commodities used in the production of the goods considered. For instance, the price of cigarettes in Great Britain is accounted for fully by: (i) wages, salaries, rent, interest, and profits earned from the manufacture and distribution of cigarettes; (ii) depreciation of machinery and buildings; (iii) tobacco duties;[1] (iv) cost of imported raw tobacco.

It follows directly that the aggregate expenditure on goods and services in a given year is equal to the sum of the following items taken for the same year: (i) aggregate wages, salaries, rent, interest, and profits, which is, in fact, the national income; (ii) depreciation; (iii) indirect taxes; (iv) value of imports. We thus have:

Personal consumption	National income
Gross private investment	Depreciation
Public expenditure on goods and services	Indirect taxes
Exports	Imports
Aggregate expenditure	*Aggregate expenditure*

Let us now deduct from both sides depreciation and imports. The remaining part of aggregate expenditure may be called the net national product: net, because we deduct depreciation, namely that part of investment which serves to make good wear and tear and obsolescence; national product, because we deduct that part of expenditure on goods and services which is covered by imports. If we denote by net investment the excess of gross investment over depreciation, we obtain:

Personal consumption	National income
Net private investment	Indirect taxes
Public expenditure on goods and services	
Exports minus imports	
Net national product	*Net national product*

The national income is the sum of wages, salaries, rent, interest, and profits *before* direct taxation. On the other hand, part of the expenditure of public authorities is devoted, not to goods and services, but to so-called transfers—pensions, benefits, allowances, etc. It follows that the right-hand side of the balance sheet may be represented

[1] Plus, strictly speaking, employers' contributions to social insurance.

as income net of tax (inclusive of transfers) plus direct and indirect taxes minus transfers. Taking into consideration that the item 'taxes minus transfers' represents the part of tax revenue available for public expenditure on goods and services, and that a part of income net of tax is consumed and the rest saved, we can write the final result as follows:

Personal consumption	Income net of tax	Personal consumption
Net private investment		Savings
Exports minus imports		
Public expenditure on goods and services		Taxes available for public expenditure on goods and services
Net national product		*Net national product*

It should be added by way of explanation that exports and imports are meant here to include not only goods but services as well. In particular, exports include interest and dividends on capital invested abroad, and imports include interest and dividends on foreign capital invested in the country considered. Moreover, savings cover both personal savings and undistributed company profits.

The table arrived at above, which permits us to look at the national product from two different angles, provides a good starting-point for the discussion of the problem of employment. On both sides of our balance sheet we see personal consumption. If the public expenditure on goods and services is equal to the revenue available for its financing, that is to say, if the combined budget of all public authorities is balanced, savings are equal to net private investment plus export surplus. It is now clear that, with a balanced budget, a given level of employment can be maintained only if savings at that level are in fact offset by investment plus export surplus.

If, at the existing level of employment, savings are 'too high', this results in the first instance in an increase in the stocks of consumer goods. This will be included in our balance sheet in private investment; the offset to 'excess savings' will thus be provided automatically. However, the accumulation of stocks will continue over a short period; firms will soon start to cut employment, which will fall to the level where savings will be fully offset by investment (which no longer includes the accumulation of unsold goods) and export surplus.

More generally, an analysis of the type of investment forthcoming in a given period and of the export surplus (if there is an export deficit,

this, of course, exerts a *negative* influence upon employment) can shed light on the question of what chance there is that the existing high level of employment will continue. If, for instance, a large part of investment consists of an increase in stocks of a speculative character, while there is not much chance of an increase in investment in fixed capital or in export surplus,[2] a fall in employment may be expected in the near future. The same is true if the level of investment in fixed capital is so high that the existing productive capacity increases quickly while the national product tends to be stationary; or when the export surplus is due to some special factor which is not likely to last long.

So far it has been assumed that the combined budget of public authorities is balanced. It will be seen from our balance sheet that, if public expenditure on goods and services exceeds the revenue available to finance it, savings are equal to private investment plus export surplus plus the excess of public expenditure over revenue, i.e., plus the budget deficit. Thus the budget deficit is an offset against savings also. The gap between what persons and firms choose to save at a given level of employment, on the one hand, and the offsets of private investment and export surplus, on the other, can thus be filled by a public expenditure on goods and services which has no counterpart in revenue. In other words, a given level of employment can be maintained even though private investment plus export surplus falls short of savings, provided the difference is made up by a budget deficit.

This brief theoretical discussion provides us with a framework for a comparison between the employment situation in the USA and in the UK.

Comparison of the Pre-War Situation

We choose for the comparison of the employment situation the last pre-war year in the UK, 1938, and 1940 in the USA. The reason for the latter choice is that, although the USA was not at war until the end of 1941, rearmament in that year was already on a considerable scale. Moreover, just like 1938 in the UK, 1940 in the USA was a year of moderately high employment as compared with the employment levels of the late 1930s. However, the percentage of unemployment was

[2] It should be noted that a country can maintain an excess of exports of goods and services over its imports only if other countries are willing to deplete their stocks of gold and of the currency (or securities) of that country, or if that country, by foreign lending, provides the means for purchase of its products.

greater in the USA in 1940 than it was in the UK in 1938. Indeed if people engaged on public-emergency projects in the former country are counted as unemployed (as is the case in the Bureau of Census statistics published since 1940), the percentage of unemployed in relation to the total available labour force in 1940 was about 14%. In the UK the proportion of registered wholly unemployed[3] to the number of workers insured against unemployment was in 1938 about 9%; there is no doubt that the unemployment percentage for the whole of the available labour force was lower. It follows that the British unemployment percentage in 1938 was substantially lower than the American figure of 14% for 1940. It should be remembered here that the normal working hours were 40 per week in the USA and 48 in the UK. The actual average working hours in manufacturing were somewhat shorter: 38.5 per week in the USA in 1940, and 46.5 in the UK in 1938.

We shall show that not only was employment in the USA in 1940 lower in relation to the available labour force than it was in the UK in 1938, but that in addition its basis was more precarious. To maintain the level in the longer run would require a higher budget deficit in relation to national product than to maintain the 1938 employment level in the latter country. We shall conduct our analysis by means of the pattern elaborated in the preceding section. Tables 25 and 26 give the balance sheet of net national product for the USA in 1940 and for the UK in 1938. It should be noted that the 'net private investment' component is subdivided into 'investment in fixed capital' and 'change in the value of working capital and stocks'.[4]

As will be seen from Table 25, savings in the USA in 1940 amounted to $9,400 millions, while private investment in fixed and working capital plus export surplus was $7,900 millions. The gap of $1,500 millions was made up by the excess of public expenditure on goods and services ($14,200 millions) over the revenue available for its financing ($12,700 millions).

Similarly, in the UK in 1938 savings were £370 millions, while investment in fixed and working capital minus export deficit was £150 millions, and the gap of £220 millions was covered by the excess of

[3] The 'temporarily unemployed' are left out of consideration because a roughly corresponding category is excluded from the US statistics of unemployment.

[4] The latter item reflects not only the quantitative change in working capital and stocks, but also the change in prices at which they are valued.

Table 25. *Net National Product of the USA in 1940 ($ 000 m.)*

Personal consumption[a]	65.7	Income = 75.1	Personal consumption[a]	65.7
Net private investment in fixed capital	3.9		Savings	9.4
Change in value of working capital[b]	+2.5		Taxes available for public expenditure on goods and services[c]	12.7
Export surplus	+1.5			
Public expenditure on goods and services[c]	14.2			
Net national product[a,c]	87.8		Net national product[a,c]	87.8

[a] Excluding imputed income from houses used by owners.
[b] Including increase in monetary stock due to home production of gold and silver (i.e. increase in monetary stock minus net import of gold and silver).
[c] Excluding interest on national debt paid to persons and firms, which is treated as a transfer payment; also excluding wages of workers on public-emergency projects (who are counted, as unemployed), such wages being treated as transfers.

Source: M. Gilbert and G. Jaszi, 'National Income and National Product', *Survey of Current Business*, Apr. 1944, pp. 12–14.

public expenditure on goods and services (£940 millions) over the revenue available for its financing (£720 millions).

To be able to compare the structure of the net national product in the two countries, we shall express, in Table 27, all the items of Tables 25 and 26 as percentages of the respective values of aggregate income net of tax (which is equal to the sum of personal consumption and savings; since the national product is the sum of these two items and taxes available for public expenditure on goods and services, the percentage for the net national product is in each case higher than 100).[5]

It seems at first glance that the position with regard to maintaining the existing level of employment without government intervention by means of a budget deficit was less favourable in the UK than in the USA. Indeed, the budget deficit in the USA was 2% of aggregate income, while in the UK the corresponding figure was 4.9%. A closer

[5] The items in the two tables are only roughly comparable. In particular, as stated in Table 25 n. (a) and Table 26 n. (a), the imputed value of income from houses used by owners is excluded from the American and included in the British figures of personal consumption and national product. This, however, does not affect significantly the *percentages* shown in Table 27.

Table 26. *Net National Product of the UK in 1938 (£ 000 m.)*

Personal consumption[a]	4.15	Income = 4.52	Personal consumption[a]	4.15
Net private investment in fixed capital	0.26		Savings	0.37
Change in value of working capital[b]	0.04		Taxes available for public expenditure on goods and services[c]	0.72
Export surplus	0.07			
Public expenditure on goods and services[c]	0.94			
Net national product[a,c]	5.24		Net national product[a,c]	5.24

[a] Including imputed income from houses used by owners.
[b] Excluding interest on national debt paid to persons and firms, which is treated as a transfer payment.

Source: *White Paper on National Income and Expenditure 1938–44*, London, HMSO, Cmd. 6623.

Table 27. *Net National Product of the USA in 1940 and of the UK in 1938, Expressed as Percentages of Aggregate Income*

	USA	UK			USA	UK
Personal consumption	87.5	91.8	Income = 100	Personal consumption	87.5	91.8
Net private investment in fixed capital	5.2	5.7		Savings	12.5	8.2
Change in value of working capital	+3.3	−0.9				
Exports surplus	+2.0	−1.5		Taxes available for public expenditure on goods and services	17.0	16.0
Public expenditure on goods and services	19.0	20.9				
Net national product	117.0	116.0		Net national product	117.0	116.0

examination shows, however, that the reverse is true. Both the change in the value of working capital and the export surplus were at an unusually high level in 1940 in the USA. A correction for these 'abnormalities' would reduce the level of private investment plus export surplus from 10.5% of aggregate income to a level not substantially exceeding 7%. On the other hand, the change in the value of working capital and the export surplus were particularly low in 1938

in the UK, where the correction for abnormality would raise the proportion of private investment plus export surplus to aggregate income from 3.3% to something like 6%. As a result, the budget deficit necessary to maintain the existing level of employment would be of the order of 5% of aggregate income in the USA and 2% in the UK. This difference would be due to the fact that, while the 'corrected' level of investment in relation to aggregate income was assumed above to be only a little higher in the USA than in the UK, the percentage saved out of income was substantially larger in the USA: 12.5% (in 1940) as compared with 8.2%, in the UK (in 1938).

It follows from the above analysis that: (i) employment in the USA in 1940 was lower in relation to the available labour force than in the UK in 1938; (ii) that if the special factors operating in the years considered are eliminated, the budget deficit necessary to maintain the existing level of employment was higher in relation to aggregate income net of tax in the USA than in the UK, and this was due to the higher percentage of income saved in the first country.

There is yet another aspect of Table 27 to consider. It will be seen that the ratio of tax revenue available for financing public expenditure on goods and services was about the same for the two countries (17% and 16% respectively). This is important, because this ratio has some relevance to the level of employment. If, for instance, the US ratio were, not 17% of aggregate income net of tax, but, say, 10%, this would make the employment problem more difficult. Indeed, with the same offsets to savings and the same percentage saved out of aggregate income net of tax, such income would be bound to be unchanged. However, the national product would then be, not 117%, but 110% of aggregate income, and thus employment would be correspondingly smaller. The fact that the percentages in question are about the same means that this factor is *not* responsible for the difference in the employment situation of the two countries.

The main difference in the structure of the national product in the USA and the UK is seen to be the higher percentage of income saved in the former country at the same level of employment. This percentage was substantially higher in the USA in 1940 than in the UK in 1938, although the level of employment was lower in relation to the available labour force. If employment were as high as in the UK, the discrepancy in the percentage of income saved would be even greater, since this percentage increases with the level of employment. Roughly speaking,

the problem of employment is more difficult in the USA than in the UK because the percentage of income saved at the same degree of empolyment of the available labour force is substantially higher, and because this percentage is not normally offset by a correspondingly higher ratio of private investment plus export surplus to incomes. This situation prevailed, as was shown above, in the pre-war years; it will be seen below, in the section relating to the post-transition period, that this discrepancy is likely to be even greater in that period. But before comparing the post-transition employment problem in the two countries, we shall discuss here the reasons for the higher 'savings ratio' in the USA.

One reason for the discrepancy is certainly that the savings shown in the tables are the figures after deduction of death duties, which are higher in relation to aggregate income in the UK than in the USA. To obtain the amounts *currently* saved, death duties must be added back. The ratio of current savings (i.e. after the adding back of death duties) to aggregate private income was about 13% in the USA in 1940 and 10% in the UK in 1938, as compared with the 12.5% and 8.2% for savings net of death duties shown in Table 27. There still remains, however, a substantial difference, which, as indicated above, would be even greater if the degree of employment of the available labour force were as high in the USA in 1940 as it was in the UK in 1938.

Another possible reason for a higher savings ratio in the USA might be a divergence in the distribution of aggregate income net of tax as between wages, salaries, pensions, relief payments, etc., on the one hand, and profits, interest, rent, etc., on the other. The percentage saved out of wages, salaries, etc., is lower than that out of profits, interest, etc., both because a part of profits is saved by companies in the form of 'undistributed profits' and because a greater percentage is usually saved out of high than out of medium and low incomes. Thus, if the relative share of wages, salaries, etc., in aggregate income net of tax were lower in the USA than in the UK, this would explain, at least in part, the higher savings ratio in the first country. It appears, however, from the figures given below that such is not the case.

The relative shares of wages, salaries, etc., in aggregate income should be calculated for our purpose as follows: wages, salaries, pensions, relief payments, etc., net of taxes except death duties, should be divided by aggregate income net of taxes except death duties (because the percentages of income currently saved that we analyse here are the ratios of savings before payment of death duties in relation

to aggregate income net of all taxes except death duties). As, however, the taxes paid out of aggregate wages, salaries, etc., were relatively very small in both countries, the comparability will not be significantly affected if in both cases we calculate the ratio of wages, salaries, etc., *before* taxation to aggregate income net of taxes except death duties. We obtain 72% for the USA in 1940 and 69% for the UK in 1938. Thus the relative share of wages and salaries in aggregate income appears to be somewhat higher in the first country than in the second. The figures require a correction, however, to be quite comparable, because the imputed value of income from houses used by the owners is excluded from income in the USA but included in the UK. The correction for this factor would make the American figure about equal to the British. We thus see that the higher savings ratio in the USA *cannot* be explained by a higher share of profits, etc., in aggregate income. This discussion accounts for only one aspect of the distribution of aggregate income. It is not at all impossible that the distribution of income in the USA, in spite of the approximate equality in the proportion of profits, etc., to the aggregate income net of tax, is such as to result in a higher savings ratio. Little that is positive can be said, however, on this subject, for lack of comparable statistics.

One important point is to know what is the ratio of undistributed company profits to the aggregate income net of tax. Although the relevant British data are not quite comparable with the American, it may be shown that the difference between the respective percentages caculated on a comparable basis cannot be great, and that therefore it is the difference between the percentage saved out of personal incomes that is responsible for the higher savings ratio in the USA. Now, as mentioned above, we do not know enough about the comparative distribution of incomes to say whether this accounts at least partly for a higher savings ratio. What we do know, however, is that the real personal income per head is substantially higher in the USA than in the UK,[6] and this is likely to be a factor which makes for a higher percentage saved out of personal incomes. Even this statment, however, requires qualification. From the available statistics it seems that

[6] Taking as a basis, in the first place, the income net of tax per head in the USA in 1940 and in the UK in 1938; secondly, the relative purchasing power of the $ and the £ in the period 1925–34 as given by Colin Clark in *The Conditions of Economic Progress*, London, Macmillan, 1940, p. 40; and, thirdly, the subsequent changes in the cost-of-living indices—it can be calculated that the real income net of tax per head in the USA in 1940 was about one third higher than in the UK in 1938.

the savings out of lower incomes are very small in both countries. It is probably the fact that 'the rich are richer' in the USA than in the UK which accounts, at least partly, for the higher savings ratio in the former country.

Comparison of the Post-Transition Situation

In order to compare the post-transition employment situation in the two countries, we shall give, in Tables 28–30, the relevant items of the national product estimated on the assumption of full utilization of the anticipated labour force; in both cases an unemployment of only about 3% is assumed. Working hours are assumed to be the same as before the war.

For the USA, we use estimates by Arthur Smithies (variant B) of the national product and its components in 1950.[7] The assumptions of variant B with regard to the tax system are that the excess profits tax will be repealed; that present federal excise taxes will be reduced by 50%; that income tax rates for companies and individuals will be established at 1941 levels; and that other tax rates will be left unchanged. The national product and its components are evaluated at 1943 prices.

For the UK, the writer's own estimates of the national product and its components in 1951 are used.[8] The underlying assumptions with regard to foreign trade are that the terms of trade will be the same as in 1938 and that foreign trade in goods and services will be balanced. With regard to the tax system, it is assumed that the standard rate of income tax will be 8*s*. in the £ (approximately midway between the pre-war and the present rate); that the exemption limit and personal and family allowances will be increased proportionally to wage rates as compared with 1938, and that the percentage allowance for earned income and the ratio of reduced rate to standard rate will be restored to the 1938 level; that the surtax system will be such as to result in the same proportion between income tax and surtax yield as in 1938; and, finally, that aggregate indirect taxation will increase as compared with 1938 in the same proportion as the value of the national product.[9]

[7] Arthur Smithies, 'Forecasting Postwar Demand', *Econometrica*, Jan. 1945.

[8] M. Kalecki, 'Employment in the United Kingdom during and after the Transition Period', *Bulletin of the Oxford Institute of Statistics*, 6 16/17, Dec. 1944. [See *Collected Works*, Vol. vii.]

[9] More precisely, home national product, i.e. national product minus net income from abroad (interest, dividends, etc.).

Table 28. *Forecast of Net National Product of the USA in 1950 ($ 000 m. at 1943 prices)*

Personal consumption	127	Income	Personal consumption	127
Net private investment in fixed and working capital	10	=1.52	Savings	25
Export surplus	2		Taxes available for public expenditure on goods services[a]	26
Public expenditure on goods and services[a]	39			
Net national product[a]	178		Net national product[a]	178

[a] These figures differ from those that follow directly from the source owing to the exclusion of interest on national debt paid to persons and firms.

Source: A. Smithies, 'Forecasting Postwar Demand'. The concepts of the particular items are the same as in Table 25.

Table 29. *Forecast of Net National Product of the UK in 1951 (£ 000 m. at 1938 prices)*

Personal consumption	5.33	Income	Personal consumption	5.33
Net private investment in fixed and working capital[a]	0.40	=5.83	Savings	0.55
Export surplus	0		Taxes available for public expenditure on goods and services	1.07
Public expenditure on goods and services	1.22			
Net national product[a]	6.95		Net national product[a]	6.95

[a] These items differ from those given in the source because allowance has been made here for the fact that a part of investment, especially in housing, will be carried out by public authorities, and that thus private investment will be reduced and public expenditure on goods and services will be increased by an equal amount.

Source: M. Kalecki, 'Employment in the United Kingdom during and after the Transition Period'. The concepts of the particular items are the same as in Table 26.

Both forecasts (like other estimates of this type) have been made in the following way. First, the future labour force is estimated and reasonable assumptions are made about the future productivity of labour. On this basis the value of the national product at a given price level may be roughly estimated. Next, on the basis of the assumed tax system, a rough estimate of the tax revenue may be made. Future transfer payments are estimated on the basis of existing or promised

legislation. It is then possible to divide the national product into aggregate income net of tax and tax revenue available for financing public expenditure on goods and services.[10] Next, on the basis of pre-war relations between savings and personal consumption, plausible assumptions are made as to how much will be saved and consumed out of aggregate income net of tax in the future. It is further roughly estimated what level of investment may be expected to take place continuously without causing over-capacity in the longer run.[11] Finally, the export surplus is assumed to be zero in the case of the UK,[12] while for the USA a figure equal to a reasonable amount of foreign lending is adopted. In this way all elements necessary to analyse the structure of the national product in the same way as was done in Tables 25 and 26 are available. The results are presented in Tables 28 and 29.

We now express all items of Tables 28 and 29 as percentages of aggregate income net of tax (i.e. of the sum of personal consumption and savings) and thus obtain Table 30, corresponding to Table 27.

It will be seen that the comparative structure of the full-employment national product in the two countries shows basically the same features as were apparent in our pre-war analysis. The percentage of private investment plus export surplus is a little higher in the USA than

Table 30. *Forecast of Net National Product of the USA in 1950 and of the UK of 1951, Expressed as Percentages of Aggregate Income*

	USA	UK			USA	UK
Personal consumption	83.5	90.6	Income =100	Personal consumption	83.5	90.6
				Savings	16.5	9.4
Net private investment in fixed and working capital	6.6	6.8		Taxes available for public expenditure on goods and services	17.2	18.2
Export surplus	1.3	0				
Public expenditure on goods and services	25.8	20.8				
Net national product	117.2	118.2		Net national product	117.2	118.2

[10] See above, p. 389.

[11] However, in the estimates for both countries allowance has been made for the arrears in residential building, which will probably not have been made good by 1950.

[12] See above p. 397.

in the UK, but not much. The percentage of tax revenue available for public expenditure on goods and services is not very different either. On the other hand, the percentage saved out of income net of tax is again considerably higher in the USA, the difference being much greater even than that between the corresponding figures for the USA in 1940 and the UK in 1938 (12.5% and 8.2% respectively). This increased divergence may be partly the result of the fact that the techniques applied in making the estimates are different; the prospective savings in the UK may very well have been underestimated. It is, however, natural that the percentage of income saved at full employment should show a higher increase in the USA as compared with 1940 than in the UK as compared with 1938, and this for two reasons:

1. Unemployment was higher in relation to the available labour force in the USA in 1940 than in the UK in 1938. If the degree of utilization of the available labour in the first case had been as high as in the second, the percentage of income saved in the USA would even at that time have been greater than it actually was (see above, p. 394).

2. The increase in the productivity of labour, and consequently in real income per head, is anticipated to be considerably higher than in the UK, and this is another factor making for an increasing divergence between the American and the British savings ratios (see above, p. 396).

It will be seen from Table 30 that the divergence between the savings ratios results in a much higher budget deficit at full employment in the USA than in the UK. The difference between public expenditure on goods and services and the tax revenue available for such expenditure is 8.6% of the aggregate income net of tax in the USA and only 2.6% in the UK. It should be added that the UK budget deficit is due almost entirely to the expected participation of the public authorities in residential building. In the source we use, where this type of investment is included under the heading of private investment (because it is undertaken on a more or less commercial basis), the budget of public authorities is approximately balanced.

We see thus that the solution of the problem of employment after the transition will require a much more unorthodox policy in public finance in the USA than in the UK. The latter will certainly experience serious difficulties in the sphere of foreign trade, because it will have to increase its volume of exports considerably over the pre-war level in order to obtain means for paying for the necessary imports (mainly

because of the loss of foreign investments). However, the financial problems involved in securing a national expenditure adequate to maintain full employment is likely to be of a much smaller order than in the USA.

It is true that the budget deficit necessary for the maintenance of full employment in the USA may be diminished by a variety of factors. Working time may be reduced somewhat below 40 hours per week; the system of taxation may be shaped in the future in such a way that it will redistribute income from the higher- to the lower-income groups to a greater extent than is done in the system assumed above, and thus will tend to increase personal consumption beyond the anticipated level; finally, a vigorous policy of foreign lending may provide a higher export surplus. But it seems unlikely that all these factors would enable the USA to maintain full employment after the transition period without a substantial budget deficit.[13]

As long as the resulting rate of increase in the interest on public debt is not higher than the rate of increase in the national income, no rise in the burden of the debt would take place; and there is no reason why a development of this type should be in any way harmful to the economy. If the budget deficit is so high that the burden of the debt does increase, the problem is more complicated but by no means insoluble.[14] A detailed discussion of this problem is clearly beyond the scope of this article.

It should finally be added that a substantial budget deficit need not necessarily be associated with a very high level of public expenditure on goods and services; for the government can increase its expenditure on transfers such as old-age pensions, family allowances, etc. In our tables this will be reflected in a reduction of the item 'taxes available for public expenditure on goods and services' (because this item represents the total tax revenue minus transfers). If the transfers benefit mainly people with low incomes, any addition made to them will very largely be spent on consumption, and in this way the budget deficit will contribute to the increase in national expenditure without a rise in public expenditure on goods and services.

[13] The gap cannot be filled by stimulation of private investment. For if investment is above the level at which productive capacity increases *pari passu* with the expansion of full-employment output that results from increasing population and higher productivity of labour, it creates over-capacity. This tends to depress investment in the longer run; and thus stimulation of private investment above a certain level will eventually prove a self-defeating measure.

[14] See, for instance, 'Three Ways to Full Employment', pp. 363–4 above.

A Comment on 'Monetary Policy'[1]
(1946)

Professor Mints's programme for maintaining full employment consists of three points:

(i) increasing effective demand when it is deficient by means of open-market purchasing operations and reduction in income tax, or decreasing it when it is excessive by opposite measures;
(ii) financing the budget deficit resulting from the reduction of income tax by issue of currency;
(iii) flexibility of prices and wages based on free competition of businessmen and workers.

These points are frequently interlinked in Professor Mints's conception, but we prefer to deal with them one by one. Indeed, some may agree with his methods of increasing effective demand and financing the budget deficit, but may consider the condition of flexibility of prices and wages impracticable or even undesirable. Others may prefer different methods of increasing effective demand, and at the same time may subscribe to financing of the budget deficit by issue of currency, and so on.

I

1. As pointed out above, Professor Mints suggests two methods for increasing effective demand:

(i) an open-market policy, i.e. the buying of government securities by the central bank;
(ii) raising income tax exemption limits, and financing the loss in revenue by budget deficit.

Professor Mints himself is not very confident of the effectiveness of the open-market policy. It is, I think, still useful to discuss briefly its repercussions. The purchase of securities and the consequent increase of cash balances of the public *as such* would not contribute to the increase of effective demand (as Professor Mints seems to assume), for any single individual or firm could have sold securities and used the proceeds for consumption or investment without open-market operations. Thus the only channel through which open-market policy could stimulate consumption and investment is the consequent fall in the rate of interest, and in particular in the long-term rate.

The fall in the rate of interest would probably tend to stimulate consumption mainly through inflating capital values of the existing assets; feeling richer, the owners might consume more out of their income. This effect would be significant, most probably, only if the fall in the rate of interest were considerable, which would require open-market operations on a very large scale. Even when effective, this seems to me the wrong way, from the social point of view, to increase employment because the method boils down to the stimulation of capitalist consumption.

The reduction of the long-term rate of interest would stimulate investment by increasing its net profitability. Here again, a substantial fall in the rate of interest is necessary in order to make the effect significant. Nor, as we shall show, is this effect desirable in all circumstances.

Professor Mints maintains in another context that the numerous recent estimates of the future 'deflationary gap' in the USA have no real significance for the discussion of the problem of employment in this country. I disagree with this entirely. For instance, it emerges as a very important conclusion from these estimates that the deflationary gap is likely to be considerable in the USA even when the rate of investment is *not* at the depression level but at a level which corresponds roughly to the long-run trend line. It follows that filling the deflationary gap, so defined, by stimulating private investment would in the long-run create 'over-investment', i.e. reduce the rate of profit and thus prove a self-defeating measure. It also would create overcapacity, which is a sheer waste of resources.

It follows that the open-market policy is justified as a method of fighting unemployment only in the case where investment is below the 'trend level'. But in order to be effective, open-market operations would have to be on a very large scale, and might still be slow in causing recovery.

2. The method on which Professor Mints would mainly rely for increasing effective demand is that of raising income tax exemption limits. This would be done without increasing any other taxes, so that a budget deficit would result. This method would certainly stimulate consumption, because the income net of tax of people benefiting from

the increase in exemption limits would rise, and as a result their consumption would expand.

This is, however, by no means the best way of stimulating consumption, either from a social or from an economic point of view. People below the exemption limit at the moment of the application of the measure, that is, the poorest, would not benefit from it. Moreover, with the reduction of income tax revenue achieved by stepping up the exemption limits, the rich would share in tax reductions to an increasing extent. Apart from the social aspect, this would gradually diminish the effectiveness of the tax reduction because people in higher income brackets spend a smaller part of the addition to their income. The larger the reduction of income tax revenue, the lower in relation to it would be the consequent increase in consumption.

3. It follows from the above that it would be greatly preferable, from the point of view both of social justice and of effectiveness, to increase income tax exemptions only up to a certain level, and in addition to grant old-age pensions, family allowances, etc., also financed by a budget deficit. (Such payments, however, could be used only to cover the long-run deflationary gap.) There are still other methods of stimulating consumption which would benefit the poor, such as the reduction (or even abolition) of contributions to social insurance. I also subscribe to the method of stimulating consumption put forward by Professor Mints as a possible supplement to his scheme of income tax reductions. He suggests a reduction of prices of consumer goods by means of subsidies financed by a budget deficit. But whereas he contemplates a *general* sales subsidy, I should advocate, for the reasons stated above, a subsidization of the prices of mass consumer goods only.[1]

Thus a part of the long-run deflationary gap might be covered by expansion of mass consumption, which might be achieved by the measures discussed above. The other part of the gap might be filled by the expenditure of public authorities on health services, education, housing, and other public investment. Indeed, there are so many urgent tasks to be tackled by public authorities, as Professor Hansen points out in his paper, that they would raise public expenditure to a level exceeding the probable tax revenue, even if we leave aside from

[1] This method of stimulating consumption was put forward in my essay, 'Three Ways to Full Employment' (p. 357 above).

government expenditures those for stimulating consumption described above.

It should be pointed out that, in so far as wages would rise in relation to prices in the transition period, and the consequent shift from profits to wages would be maintained after that period, the deflationary gap would be reduced, because a higher percentage is saved out of profits than out of wages.

We have dealt so far with filling the long-run 'gap'. As for offsetting the *fluctuations* in the rate of private investment, this should be done by compensatory changes in the rate of public investment. As Professor Hansen points out, the occupational transfers of labour would be much smaller, if this method were applied, than in the case where fluctuations of private investment are offset by opposite changes in the volume of consumption. (This should be kept as stable as possible for social reasons also.) Compensatory changes in the rate of public investment involve, of course, certain administrative difficulties which, however, might be overcome.[2] It should be added that if a policy of maintaining full employment were consistently enforced so that national income would not fluctuate, the fluctuations in private investment would be much smaller than under *laissez-faire*, and the regular investment cycle would probably disappear altogether. Thus, after the full employment regime had been in operation for some time, much smaller compensatory changes in public investment would be required.

II

Professor Mints suggests financing the budget deficit by the issue of currency in order to avoid the increase in the interest on public debt. Presumably the government would obtain the currency from the central bank by way of interest-free loans. A large part of the currency issued would find its way into the private banks, but the banks would be under the obligation to 'sterilize' the additional cash. The procedure would have two repercussions where there is a substantial long-run deflationary gap and thus a substantial permanent budget deficit:

(i) The 'cash ratio' of banks would rise continuously. This would make the banks increase the charges on demand deposits and reduce

[2] See B. Higgins, 'Problem of Planning Public Works', in Seymour E. Harris (ed.), *Postwar Economic Problems*, New York and London, McGraw-Hill, 1943, pp. 196–201.

the interest rate on time deposits. In fact, the increase in the cost of servicing the public debt would not be eliminated but would be, at least partly, levied by the banks on the depositors.

(ii) The rates of interest would fall continuously as a result of the continuous increase in deposits in relation to other liquid assets in the hands of the public. This would cause a decline in the yield of the assets of the banks as the respective securities or loans mature. This in turn would make the banks increase charges on demand deposits and reduce interest on time deposits still further.

A much simpler solution, akin to that of Professor Mints, is to finance the budget deficit by issuing short-term securities while the short-term rate of interest is maintained by the central bank at a low but stable level. (Whether the securities would be bought by the banks or by the public would depend on the demand of the latter for deposits.) It is true that the interest on public debt would then increase continuously; but the percentage rate of increase would be so slow (because of the low cost of borrowing) that even with a very substantial permanent budget deficit it is unlikely that it would exceed the long-run rate of expansion of the national income. Thus the relation of the interest on public debt to national income would not be likely to rise, and consequently it would be possible to finance it at stable (or even reduced) rates of taxation. No special arrangements with private banks would be required by this method. The only factor which would affect the business of the banks would be the fall in medium- and long-term rates of interest as a result of a higher proportional rate of accumulation of short-term assets than of medium- and long-term assets (cf. p. 405).

It should be pointed out that if the permanent budget deficit were not too high in relation to national income, the interest on public debt would not increase at a higher percentage rate than the long-run rate of expansion of the national income, even though the budget deficit were financed not only by short-term but also by medium- and long-term loans. Even if the interest on public debt were to increase more quickly than the national income, a solution of the problem other than short-term borrowing could be achieved by means of a method which I indicated elsewhere,[3] based on financing part of the interest on public debt by an annual capital tax.

[3] Ibid., p. 363.

III

Professor Mints considers free competition of businessmen and workers to be an integral part of his conception of full employment for two reasons:

(i) Price and wage flexibility will reduce frictional unemployment in a dynamic economy.

(ii) It also will prevent the continuous tendency of wages and prices to rise in full employment.

Let us deal first with the problem of frictional unemployment. Imagine that the demand for the products of some industry declines (which, according to the assumption of maintaining global effective demand, will be associated with an increase of demand for other products). The prices of the products affected would normally not fall initially (except in agriculture), but the industry concerned would reduce its output. This would reflect the fact that, because of imperfect competition and oligopolies, price is *not* equal to marginal cost. Indeed, in order to enforce this textbook pattern it would be necessary to put a price inspector into every enterprise.

The fall in output would result in some unemployment; if wages were 'flexible' they would fall, and only this would cause a fall in prices. If the demand for the products in question were fairly inelastic, which is frequently the case, in particular in the short period, the fall in wages would have to be considerable in order that the unemployed should be to a large part reabsorbed. The low wages would then induce some workers to move to other industries, and as a result the wages would finally be restored to the previous level, with an altered structure of output.

It is perfectly clear that the reduction of frictional unemployment would be achieved here at the expense of considerable hardship to *all* workers in the industry affected.[2] It is indeed fortunate that trade unions exist to prevent this type of adjustment. And is it not simpler, if the global effective demand is maintained, to offer retraining to the unemployed, accompanied by a reasonable allowance, while the industries for whose products the demand has increased would work overtime in the intermediate period?

The second problem is the possible tendency of trade unions to raise wages in full employment, thereby causing a rise in prices. It should first be pointed out that if the annual increase in wage rates does not exceed the increase in the productivity of labour, the price level will not

tend to rise. It is very difficult to say whether in fact wage increases would be at a higher rate than this, and, if so, what means would be found to keep prices stable. This would depend on the institutional arrangements of the regime of full employment. It is no good to conjecture too much about the future functioning of such a regime. Let us have it and try it out.

Multilateralism and Full Employment[1]

(1946)

The problem of multilateral international trade looms large in the present plans for the new world economy. The International Monetary Fund and the International Bank for Reconstruction and Development, as well as the agreement underlying the US loan to the UK, aim at establishing a workable system of multilateral international trade. Roughly speaking, the principle of multilateralism requires that each country should be guided in its purchases in other countries solely by the price and quality of goods, without taking into consideration whether the supplying countries are or are not buyers of the produce of the country in question. It will be seen that the operation of such a system in balancing foreign trade may create serious difficulties for those countries which pursue a policy of maintaining full employment. Each country at full employment will require a certain volume of necessary imports. Now it is by no means obvious that it will be able to secure, under a multilateral trade system, a level of exports which will provide it with a sufficient amount of foreign exchange to pay for the volume of imports required at full employment. The country concerned may thus tend to achieve more security in its foreign trade by concluding a series of bilateral agreements with other countries, in some way relating imports from and exports to those countries. Or it may enter, together with other countries, into a regional block, expecting, on the basis of the economic characteristics of the participants, to be able to secure within the block a large part of the required imports in exchange for its exports. (The trade within the block would be operated on a multilateral basis, while the exchange proceeds from exports to countries outside the block would be pooled and allocated to the member countries of the block according to a certain schedule.)

There is no doubt that world multilateralism can secure a better utilization of world resources than bilateralism or regional blocks (although in the latter case the difference may not be so great). Nor does multilateralism raise the political issues which may be involved in the formation of regional blocks. It is therefore superior to other systems provided it is workable, i.e. provided that it is operated under conditions of such a kind that no difficulties in balancing imports of

goods and services with exports arise for full-employment countries. The purpose of this article is to enquire into the conditions for the successful functioning of the multilateral system of international trade.

For the sake of simplicity, no account is taken at the first stage of the argument of international long-term lending. This factor will be introduced later on.

Multilateralism and Levels of Employment

It is frequently maintained that it full employment is assured all over the world, no country will experience difficulties in balancing its foreign trade. Strictly speaking, this view is not correct. Indeed, some countries may have full employment based on a substantial export surplus contributing, in addition to domestic expenditure, to the effective demand for their products. Other countries will then have export deficits and, in order to maintain full employment, will have to offset the influence of these deficits upon effective demand by increasing their domestic expenditure. As a result, the exchange position of the export deficit countries will continuously worsen and that of the export surplus countries will continuously improve. The former will be losing gold and foreign balances, or will be increasing their short-term debts (as pointed out above, long-term loans are not taken into account at this stage of the argument); the latter will be acquiring gold and foreign balances, or will be reducing their short-term debts.

It may be shown, however, that the 'all-round full-employment condition' for the successful operation of multilateralism is correct if it is reformulated in the following way: no country will experience difficulties in balancing its foreign trade if all countries maintain their expenditure on goods and services at a level adequate to secure full employment with no export surplus in existence. Indeed, imagine that in every country full employment is maintained as a result of adequate domestic effective demand, consisting of private expenditure on consumption and investment and government expenditure. Suppose, further, that in some country exports nevertheless tend to exceed imports. This would create an inflationary situation, because domestic expenditure alone is adequate to maintain full employment, and thus the additional effective demand resulting from export surplus will tend to push up prices. To curb inflation, the country in question may apply two methods: (i) reduce domestic expenditure—which would be, however, against our assumption that this expenditure should be at the

level adequate, by itself, to maintain full employment; (ii) increase imports or reduce exports, or both, by means of a reduction of import duties, by currency appreciation, or even by the imposition of export duties. Each country will in this way wipe out the export surplus once it appears. Thus, as no country will have an export surplus, none can have an export deficit either.

(It may be asked why all the burden of adjustment is put on the 'surplus countries'. This is implicit in the rule that all countries must maintain full employment which is not based on an export surplus as a component of effective demand. Once this rule is adopted, the surplus countries wipe out their surplus, not in order to make multilateralism workable, but in order to prevent inflation; and no sacrifice, except that of maintaining full employment by domestic expenditure, is involved. Moreover, if the adjustment were carried out by the deficit countries, it would be by no means certain of success, as demonstrated below.)

The above condition for the smooth working of multilateralism, which consists of all-round full employment based on domestic expenditure, is sufficient. It is, however, not necessary. It can very well happen that, although some countries are not fully employed, no difficulties in balancing foreign trade will arise for full-employment countries. For the imports of not fully employed countries may be at a level high enough to provide the 'full-employment countries' with sufficient means to purchase their necessary imports from the former, so that the full-employment countries do not experience any shortage of currencies of the not fully employed countries. Whether that will be the case or not will depend on the level of employment in the not fully employed countries and on their propensity to import, i.e. on the relation between the level of national income and that of imports. The higher the employment in the not fully employed countries, and the higher the level of their imports corresponding to a given level of national income, the greater the chance that the full-employment countries will experience no difficulty in balancing their foreign trade. It is conceivable, however, that these difficulties will persist until full employment (based on domestic expenditure) is achieved in not fully employed countries. It is also obvious that if employment in the latter countries is subject to significant fluctuations, difficulties in balancing foreign trade in full-employment countries are bound to arise from time to time.

It may still be asked whether an adverse position in the trade situation of the full-employment countries caused by unemployment in

other countries cannot be adjusted by various measures, such as a change in the relative value of currencies or changes in custom duties. It is unlikely that the adjustments will be carried out by the not fully employed countries; they will not be willing to increase their unemployment themselves by a reduction in import duties or by currency appreciation. The adjustments will have to be undertaken by those full-employment countries whose foreign trade is unbalanced.

One way would be to reduce imports by an increase in import duties or by direct measures, such as licensing of imports according to a certain schedule of priorities, which should be connected with appropriate internal controls to prevent the rise in prices of imported goods in short supply. (In devastated or underdeveloped countries, such a system may be in operation independently of the situation discussed in order to supply the most vital needs of the country—which, by the way, would be fully compatible with multilateralism as long as the controls determined the structure of imports in terms of commodities but not in terms of importing countries. In the case under consideration, this system will be used to cut down imports below the level which the country would maintain provided it had a sufficient outlet for its exports.) It is clear, however, that the necessity for such restrictive measures in foreign trade will mean the failure of multilateralism to secure the international division of labour. Another way is depreciation of currency of the full-employment country affected, which tends to reduce the volume of imports and to increase the volume of exports. The success of this measure in balancing the foreign trade of the country concerned is by no means certain. With high tariff protection for finished goods, the volume of their imports, and thus the value of imports in terms of foreign currencies, is not likely to be much reduced by a moderate depreciation. Nor is such a depreciation likely to reduce significantly the volume of raw-material imports. On the other hand, the value of exports in terms of foreign currencies will not necessarily increase. Their volume and their value in home currency will certainly rise, but, because of depreciation of home in relation to foreign currency, this does not necessarily mean an increase in the value of exports in terms of the latter. If, for instance, exchange depreciation causes a fall in export prices quoted in foreign currency by 15% and as a result the volume of exports rises by 5%, the proceeds of foreign exchange from exports will remain unchanged and the balance of trade will not improve. The result depends obviously on the elasticity of demand for the exports of the country considered, i.e. on the level of the

percentage increase in the volume of its exports corresponding to a given reduction of its export prices quoted in foreign currency. The situation will probably be aggravated by retaliation of the not fully employed countries, who will tend to prevent a rise in unemployment by increasing their import duties and by competitive devaluation.

The possibility of an impasse in the situation discussed above is clearly recognized in the Agreement of the International Monetary Fund whereby rationing of scarce currencies is prescribed to remedy the situation arising out of a persistent surplus in foreign trade of some countries. The measure amounts obviously to liquidating that surplus by cutting down the exports of the surplus countries and permitting other countries to discriminate in foreign purchases against the surplus countries. This obviously means a suspension of full multilateralism, and the creation of a 'regional multilateral block' among the countries whose currencies are not scarce. It may be argued that the advantage of such a solution is to give full multilateralism a chance and, provided it fails, to restrict multilateral trading to those countries whose currencies have not become scarce. But the obvious difficulty is that the new pattern of foreign trade within the multilateral area cannot be improvised overnight, because it requires changes in the structure of production. As a result, countries within that area may experience a scarcity of imported goods over relatively long periods. The situation will be particularly grave if employment in the not fully employed countries is not only 'too low' but also unstable. Fluctuations in its level will make the required adjustments in the world structure of production not only very difficult but in some cases impossible.

We can conclude from the above analysis that multilateralism is certain to realize its advantages only if full employment based on domestic expenditure is maintained in all countries. It is certainly unworkable if employment in major industrial countries is subject to fluctuations. We have, however, so far excluded from our argument international long-term lending. We shall now take this factor into consideration.

Multilateralism and International Long-Term Lending

If we take into consideration international long-term lending, our preceding argument must be modified, because if the deficit of a country in its foreign trade is covered by foreign long-term loans, no immediate difficulties in its exchange position arise. It is true that such

difficulties may arise in the future, in connection with interest and amortization payments. Anticipation of these future difficulties may limit the volume of long-term loan transactions on the part both of lenders and of borrowers. At a given moment, however, the problem of an 'export deficit country' may be considered solved if its negative balance of payments on current account is offset by obtaining a foreign long-term loan.

Our condition for the smooth working of multilateralism can now be reformulated in the following way: all countries should maintain full employment based on domestic expenditure and on foreign net expenditure financed by long-term loans. Thus each country must maintain such a domestic expenditure that this expenditure plus export surplus financed by foreign lending (or minus export deficit financed by foreign borrowing) is adequate to assure full employment. Indeed, if a country has an export surplus which is not financed by foreign long-term lending, and if, in accordance with our assumption, it will not do so out of its domestic expenditure, the effective demand will exceed the full employment mark and an inflationary situation will arise. To deal with it, the country will have to increase its imports or to reduce its exports, or both. In this way, the surplus which is not financed by foreign long-term lending will be eliminated. If, however, no country will in this way be able to maintain an export surplus which is not financed by foreign long-term lending, none will have an export deficit which is not covered by foreign long-term borrowing.

If some countries are not fully employed, this does not mean that the full-employment countries will necessarily experience difficulties in balancing the proceeds and outlays of foreign exchange. The imports of not fully employed countries plus their foreign lending may provide the full-employment countries with foreign exchange adequate to cover their imports from the former countries. However, this may not be the case, and then an impasse similar to that discussed in the preceding section will arise. Nevertheless, the existence of long-term lending, which we have now included in our consideration, offers a method of dealing with this impasse. It will be easily seen that an expansion of long-term lending by not fully employed countries will help to overcome the impasse.

Three cases may be distinguished here: (i) A fully employed country uses the proceeds of the loans for the reduction of its current deficit of foreign exchange. In this case the loan helps directly to overcome the existing exchange difficulties. (ii) The proceeds of the loans are spent in

full-employment countries. Here again the full-employment deficit countries will benefit eventually (because none of the full-employment countries is able to maintain a surplus of exports on the one hand over imports minus foreign long-term borrowing on the other; indeed, if such a situation arose it would have either to cut its domestic expenditure, which would be against the fundamental rule, or face inflation). (iii) The proceeds of the loans are spent on increasing imports from not fully employed countries. There is no direct easing of the exchange position in full-employment countries in this case. However, as a result of the spending of proceeds of loans, employment and income in not fully employed countries increase; this tends to raise their imports from full-employment countries, and to this extent alleviates their foreign exchange difficulties.[1]

With a sufficient level of current long-term lending from not fully employed countries, the problem of workable multilateralism may be solved. It is conceivable, however, that if the proceeds of the loans are spent largely in not fully employed countries, so that it is mainly effect (iii) that is to be taken into consideration, the long-term lending from those countries will have to expand to the level necessary for establishing in them full employment.

However, the solution of the problem of multilateral foreign trade by means of an adequate level of current long-term lending has a serious defect. The volume of long-term international lending is limited by anticipation, on the part both of the lender and of the borrower, of future difficulties arising in connection with interest and amortization payments, by the unwillingness of the borrower to absorb foreign loans on the terms attached to them, etc. As a result, it may be impossible to expand international long-term lending to a point where it is adequate to overcome difficulties in the functioning of multilateralism. Moreover, in case employment in the major industrial countries is subject to fluctuations as well, the level of current international lending will have to vary counter-cyclically to entire a satisfactory functioning of multilateralism. The higher, on average, and the more stable the employment in not fully employed countries and the greater their propensity to import (i.e. the higher the level of their imports

[1] The so-called tied loans, i.e. loans subject to the condition that the proceeds of the loan are spent in the borrowing countries, fall under categories (i) or (iii). Actually, tied loans are inconsistent with the principles of multilateralism, although some supporters of the latter seem not to notice this.

corresponding to a given level of national income), the greater the chance that the achievable level of international long-term lending will be adequate for the solution of the problem.

Conclusions

It follows from the above that there are two alternative conditions which ensure the smooth functioning of a multilateral system of international trade: (i) that each country should maintain full employment based on domestic expenditure, and on net foreign expenditure financed by international long-term lending; (ii) that the level of current long-term lending from not fully employed countries should be sufficiently high (this alternative may in some cases coincide with the first one, i.e. the long-term lending from not fully employed countries may have to be at the level which, in combination with domestic expenditure, establishes full employment in those countries).

The second alternative may prove impracticable, because a number of limiting factors may make impossible the expansion of current international long-term lending up to the level necessary to make multilateralism a workable system. The higher, on average and the more stable the employment in not fully employed countries and the higher their propensity to import, the greater the chance that the achievable level of current long-term lending will be adequate for the solution of the problem of multilateral trade. An ideal basis of multilateralism, however, will be the maintenance throughout the world of a volume of domestic expenditure which, in combination with foreign net expenditure financed by long-term loans, is adequate for securing full employment.

If this condition is not fulfilled, full-employment countries may experience difficulties in balancing proceeds and outlays of foreign exchange, and this will always be the case if employment in major industrial countries is subject to significant fluctuations. If, further, these difficulties in such a case are not overcome by an expansion of current international long-term lending from not fully employed countries, a breakdown of pure multilateralism and its replacement by another system of international trade is unavoidable.

A Note on Long-Run Unemployment[1]

(1951)

1. Unemployment arising in depression is frequently considered as resulting merely from cyclical *fluctuations* in effective demand. However, if there is unemployment in some phase of the business cycle, it follows directly that the average unemployment over the cycle is also >0. This simple fact leads up to the problem whether, and under what conditions, the depressional unemployment is tantamount to a long-run deficiency in effective demand.

2. We shall denote by E actual employment, and by E_f full employment at a given time. The concept of employment has a clear-cut meaning only in a developed economy. In an underdeveloped economy, the problem is complicated by widespread disguised unemployment. We shall confine ourselves here to the consideration of developed economies. In line with this, we assume that unemployment does not arise as a result of inadequate productive equipment. In the first approximation, we also neglect frictional and seasonal unemployment, which is rather small when effective demand is high. Thus, when actual employment E is less than full employment E_f, the unemployment $E_f - E$ is assumed to be accounted for by inadequate effective demand, in the sense that with sufficiently high effective demand E would reach the level E_f.

3. We shall denote by 'demand-determined employment' E_d the level of employment which would be reached at a given level of demand provided the supply of labour were adequate. Thus when actual employment E is below the full employment level E_f, the demand-determined employment $E_d = E$. This is the case of deficiency of effective demand which is characterized by the inequality $E_f > E_d = E$. The case of full employment will arise when $E_f = E_d = E$.

When demand-determined employment E_d exceeds the full employment level E_f, actual employment $E = E_f$. This will be clearly the case of scarcity of labour, which is thus characterized by the inequality $E_d > E_f = E$.

4. The case of scarcity of labour or overemployment may arise, for instance, if, at full employment of a given labour force working with a

given productivity, the demand for investment goods is increased. The production of investment goods may then not be increased because of labour shortage, and their prices will rise or orders will be 'stretched'. Or labour will be drawn from consumer goods industries into production of investment goods; and this will result in the reduction of supply of consumer goods, which will lead to the rise in prices of these goods and to the fall in real wages. Thus scarcity of labour will be reflected in the scarcity of investment or consumer goods and in increases of the respective prices.

The state of 'scarcity of labour' in developed capitalist economies seems to have appeared in only exceptional instances. It is only in times of war or in immediate post-war periods that inflations associated with labour shortage have arisen.

One reason for this may be a certain elasticity both in E_f and E_d at a given level of high demand which tends to eliminate the gap $E_d - E_f$. The total labour force E_f may increase under the pressure of demand through immigration or through the increase in gainful employment of women, etc. On the other hand, labour shortage will induce an increase in productivity through application of labour-saving devices. This will reduce employment E_d required to satisfy the demand for a given level of output. In particular, migration from country to town may take place in these circumstances, accompanied by increased productivity in agriculture.

We shall leave aside the case of labour shortage, thus confining ourselves to what seems to be the normal situation in developed capitalist economies.

5. We are thus left with the condition:

$$E_f \geqslant E_d = E$$

which covers the case of full employment, or of a deficiency of effective demand causing unemployment. Throughout this note, it is assumed that in depressions there is unemployment, i.e.

$$E_f > E_d = E$$

If we denote the respective averages over the cycle by $\bar{E}_f$, $\bar{E}_d$, and $\bar{E}$, it follows directly:

$$\bar{E}_f > \bar{E}_d = \bar{E}$$

This means that on our assumptions the unemployment arising in depressions is tantamount to the existence of a deficiency in effective demand over the whole period of a cycle.

To sum up, we have postulated the following features of a developed capitalist economy:

(i) productive equipment adequate to achieve full employment;
(ii) no shortage of labour during booms;
(iii) unemployment in depressions.

It followed directly that an economy subject to such features is of necessity characterized by a long-run deficiency in effective demand.

6. The question now arises: how would the business cycle be affected by the disappearance of long-run deficiency in effective demand? If the average effective demand over a long period were adequate for the maintenance of full employment, does it mean that cyclical fluctuations would be virtually eliminated? It can be shown that this need not be the case.

First, it is feasible that in some instances our assumption about there being no scarcity of labour in the boom would not then be any more valid. Effective demand over the cycle may in such a case be adequate for the maintenance of full employment, but nevertheless there may be unemployment in depressions and scarcity of labour in the booms.

Let us assume, however, that scarcity of labour does not arise for any length of time because it itself engenders forces which tend to increase the supply of labour E_f and reduce the demand for labour E_d as described in section 4. If this is the case, labour supply and

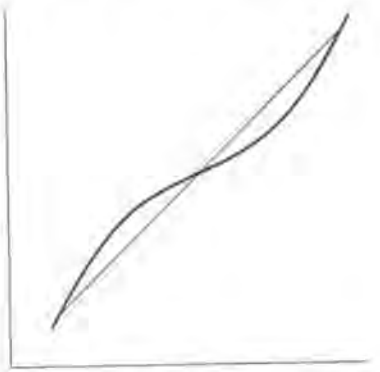


FIG. 29

productivity will be higher in booms and lower in depressions in relation to the long-run trend. In such a case, the adequacy of effective demand over the cycle will exclude the possibility of unemployment in depressions. Nevertheless, there will be fluctuations of output and employment in relation to the long-run trend. Depression, although not involving unemployment, will be characterized by a lower level of output and employment in relation to long-run trend as shown on Fig. 29. Such a type of business cycle might have been encountered in the earlier stage of capitalism.

EDITORIAL NOTES AND ANNEXES

PART 1
First Theoretical Studies

On Activating the Balance of Trade

[1]

First published as 'W sprawie aktywizacji bilansu handlowego', *Przemysł i Handel*, 10/30, Warsaw, 1929, 1295–7 (a weekly founded on the initiative of the Ministry of Industry and Commerce in 1920; from 1924 published with the participation of the Treasury, and later with the Ministry of Railroads and the Ministry of Communication; from 1930 it appeared under the name *Polska Gospodarcza*; Kalecki collaborated with the journal in the years 1929–35).

Although this is Kalecki's first theoretical essay, he takes up a problem of great practical importance for the Polish economy of that time. He returned to the question of activating the trade balance account in 'Consequences of Dumping' (also in this volume). In subsequent studies on the theory of the business cycle Kalecki maintained the conclusion that followed from both these papers, i.e. that, unless based directly on new foreign markets, every upswing in the business cycle leads to a worsening of the balance of trade.

Already in his first essay on economic theory Kalecki was using the balance sheet of the national income as a basic tool of economic analysis. One can trace the sources of his analytical approach in his earlier interests. In his student years he was already pondering the possibilities of applying mathematical tools to economic analysis. Józef Zagórski recalls that long before publication of the *Essay on the Business Cycle Theory* in 1933, Kalecki told him that he wanted to formulate economic laws similar to the laws of thermodynamics in physics. If the laws of thermodynamics are interpreted as defining the balance sheets of energy inflows and outflows, there is a close analogy between energy balance sheets and Kalecki's method for the national income balance sheets. (More general analogies between economics and physics were sought at the time also by Ragnar Frisch; see J. C. Andvig, *Ragnar Frisch and the Great Depression*, Oslo, Norsk Utenrikspolitisk Institutt, n.d., p. 48.) The national income balance sheet method soon came to underlie Kalecki's theory of the business cycle. Subsequently it became his favourite method of analysis for capitalist, socialist, and developing economies.

Besides the macro-economic method for national income balance sheets, the essays contained in pt. 1 of this volume also have in common the line of argument that investments are determined by savings (called capitalization, in accordance with the contemporary terminology). This argument is con-

sistently followed in both articles on activating the balance of trade, leading to the conclusion that if, in a given country, the level of investments is higher than the level of domestic savings, the gap is filled by foreign savings, appearing in the passive trade balance of that country. An increase in social 'capitalization' makes it possible to substitute domestic savings for foreign savings, thereby reducing the passive trade balance or even changing it into an active one. One can find this same argument on investments and savings in 'Influence of a Price Reduction in Industrial Consumer Goods upon the Course of the Business Cycle', in this volume.

About two years after publication of this paper, Kalecki was completely to change his position on this matter, arguing that, in the capitalist economy, investments (together with capitalist consumption) determine profits and hence also the savings which they require, and not the reverse (see pts. 2 and 3). From this point of view Kalecki's proposition of 1933, that 'investments finance themselves', separates him not only from the economic theory of the time but also from his own first theoretical studies.

Kalecki became interested in economic problems while a student at the Gdańsk Polytechnic (Engineering College). After he left the Polytechnic in 1925, shortly before graduation, one of the many jobs he took was working for a credit-rating company in Łodź. This job was Kalecki's first training in economic analysis. The attempt to found a trade periodical, *Koniunktura Włókiennicza*, in Łódź ended with the publication of the first issue. After moving to Warsaw in 1927, Kalecki began working as a journalist for the periodicals *Przemysł i Handel* and *Przegląd Gospodarczy*.

Kalecki's first economic publications were mainly devoted to an analysis of market conditions for individual commodities (he wrote about 50 business reviews on non-ferrous metals alone) and to an account of the structure and operations of large Polish and foreign companies. In these publications he not only described various commodity markets, but also examined monopolistic links, as well as trends towards cartelization of production and their domestic and international consequences. Kalecki wrote for these journals until 1936.

Kalecki did not begin his scholarly career with university studies in economics. He was very mistrustful of the economic doctrines of his day. His friends and colleagues recall that in his analyses he never accepted other authors' theoretical conclusions without checking them first (see G. D. N. Worswick, 'Kalecki at Oxford, 1940–44', *Oxford Bulletin of Economics and Statistics*, 35/1, 1977, special issue: Michał Kalecki Memorial Lectures, pp. 19–29; see also E. Lipiński 'Michał Kalecki', ibid., pp. 69–77). He limited his readings in economics to what was essential for an overall idea of the state of knowledge at that time. He thought with mathematical precision and wrote in a similar way (he studied mathematics for one year at the University of Warsaw). His economic publications seem rather as though they were written

for mathematical journals, where the author limits himself to a brief presentation of the conclusions from his own argument alone.

All these circumstances make it very difficult to give an account of Kalecki's economic reading preceding his first economic publications. If a little information and a few hypotheses and guesses are nevertheless given here, it is mainly because they shed some light on the origin of Kalecki's theory at an early stage in the formation of his views.

From Kalecki's later publications, and his recollections reported in the mid-1960s to T. Kowalik, it is known that, while still an engineering student, probably around 1922, he read *Osnovy politcheskoy ekonomii* (Principles of Political Economy) by N. Tugan-Baranovsky (St Petersburg, Pravo, 1909). This book introduced him to Marx's schemata of reproduction (and could have been, next to physics, another source of inspiration for Kalecki in his economic analyses of the national income, or in his national product balance sheet approach). In the 1920s he read Lenin's study on imperialism and the works of J. A. Hobson (then much translated and popular in Europe). At Gdańsk Engineering College he attended E. Bernstein's lectures, and he must have been familiar with the well-known debates on Bernstein's theory. He probably read R. Hilfering's *Finance Capital* and Rosa Luxemburg's *The Accumulation of Capital*, among others, but he certainly did not study them at that time. (Kalecki from early youth had a good command of Russian and a fair one of German; his French, however, was rather limited to the language of mathematics; in 1914 and 1915, when the schools were closed under the German occupation, Kalecki studied mathematics, absorbing C. Jordan's *Cours d'analyse* in 3 volumes and C. J. de la Vallée Poussin's *Cours d'analyse infinitésimale* in 2 volumes. After receiving a Rockefeller scholarship in 1935, he began to learn English.)

From Kalecki's recollections it appears also that he returned to at least some of these readings in the 1930s, this time studying them from the angle of his own theory of the business cycle. Knowing his critical attitude to Polish economic thought at that time, it is likely that he was less familiar with Polish authors. Perhaps the books he read attracted him mainly because of their careful examination of reality (for example, the history of crises in Tugan-Baranovsky's book, or the enquiry into monopoly capitalism in Hobson's and Lenin's works).

Influence of a Reduction in the Prices of Industrial Consumer Goods on the Course of the Business Cycle

[1]
First published as 'Wpływ zniżki cen artykułów przemysłowych do konsumpcji na przebieg koniunktury', *Polska Gospodarcza*, 11/43, 1930,

pp. 2089–90 (until 1929 this journal appeared under the name *Przemysł i Handel*—see p. 423 above).

In Dec. 1929 Kalecki joined the Instytut Badań Koniunktur Gospodarczych i Cen (ISBCP), founded in 1928 by the Ministry of Industry and Commerce. The Institute was headed by Prof. Edward Lipiński, who shortly after Kalecki's arrival set up for him a special job of cartel monitoring (from 1935 he directed the department of general economic research of the ISBCP).

In the initial stage of his work in the Institute, Kalecki participated in ongoing research and investigated various aspects of business conditions in Poland and abroad; but first and foremost he learned, especially about statistical methods of enquiry into business fluctuations. Next to Lipiński, a prominent role in these studies was played by Ludwik Landau, Stanisław Pszczółkowski, and Jan Wiśniewski. They were all highly qualified and talented scholars whose experience in the field dated back as far as 1922, and who, at the Central Statistical Office in Warsaw, formed the first team to study business fluctuations in Poland. Kalecki published the results of his studies in the ISBCP's bulletin, *Koniunktura Gospodarcza*, and in other journals.

[2]
In the initial phase of the 1929–33 crisis the prices of manufactured consumer goods remained almost constant (in the 3rd quarter of 1929 they fell only by 0.2 points and rose by 0.1 points in Jan. 1930; see *Koniunktura Gospodarcza*, 3/3, 1930, table 9, p. 115). They began to fall more sharply in Feb. 1930. In the period examined here by Kalecki, Jan–Sept. 1930, the ISBCP general index of industrial consumer goods fell from 99.2 to 94.4 (1928 = 100), i.e. by 4.8 points (and by the end of the year by 9.1 points). The decline in prices continued throughout the following year (see *Koniunktura Gospodarcza*, 4, 1931, table 4b, p. 123, and table 7c, p. 299).

Consequences of Dumping

[1]
First published as 'Konsekwencje dumpingu', *Koniunktura Gospodarcza*, 4/4, 1931, pp. 108–12.

PART 2
Towards the Theory of Business Cycles

The World Financial Crisis

[1]
This article, published as 'Światowy kryzys finansowy' under the pseudonym 'Henryk Braun' in the first issue of *Przegląd Socjalistyczny* (*PS*), 1/1, 1931, pp. 1–3, opens a new phase in Kalecki's scholarly career in which he moves from empirical research to theoretical studies. His theoretical works of this period were influenced by two groups of factors.

The most important in the first group was Kalecki's active collaboration with *PS*, a revolutionary journal addressed to the intellectual left. The paper was not an organ of the Polish Communist party, but rather followed the programme of the British Independent Labour party. It was edited by a philosopher and economist, a pupil of Tadeusz Kotarbiński, Antoni Pański, and his brother Jerzy (writing in *PS* under the pseudonym Jerzy Stefanowski). Artur Salman (now Stefan Arski) and Stefan Purman were also among its contributors. Oskar Lange, in a speech on the occasion of Kalecki's honorary doctorate at the University of Warsaw, recalled that one of his first meetings with Kalecki occurred during the preparation of an edition of *PS* (see 'Prof. Oskar Lange's Conferring Speech', *Życie Gospodarcze*, 25, 1964 (in Polish)). The first number of *PS* appeared in Dec. 1931; the next 14 numbers appeared in 1932, following which it was suspended by the government commissioners.

The character of *PS* was well reflected in the declaration of its programme in the first issue (in a sense Kalecki's article which immediately followed was a development and substantiation of this programme). It declared among other things:

> Whenever the present crisis ends and whatever its final act will be, the terrible object-lesson of capitalism which fate has given humanity must bear its fruits. . . . We see the moral suicide of the system. No matter how long its decay is still to last, people's thoughts will turn ever more unhesitatingly and impatiently toward a system in which society controls its economy in a planned fashion and in which there is no place for the primary motive of today, the entrepreneurial profit—that is, toward socialism.
>
> Our journal will serve the cause of socialism in the way we believe is most effective. We believe that socialism first and foremost requires bold deeds, but it also requires courageous thinking. We believe that it will gather strength, looking squarely at the truth and guided in the analysis of reality more by common sense than by the intellectual constructs of authorities, which are often an impediment rather than a help in understanding the mechanism of the phenomena in question.

We believe our tasks are to examine critically the most important events in the economic and social life of capitalist countries, to follow the development of the socialist movement in all its forms, to elucidate the problems it faces, and to record the stages in the building of socialism wherever it has been introduced. As far as we are able, we hope to cover everything which can and should be of interest to the socialist movement.

As people who knew Kalecki in the 1920s later recalled, from the time he left Gdańsk Engineering College he held quite radical views and was associated with the political left. He was a Communist sympathizer (though he did not join the party, since—as he said—he wished to retain his independence).

At the beginning of the 1930s, Kalecki was strongly involved in his journalistic career in the fight against capitalism. He was convinced that capitalism must fall, though he was aware that bringing this about would not be easy. In his articles published in *PS*, the formal side of his arguments may occasionally appear to have been subordinated to this conviction.

Kalecki's ideas and activities—like those of Lange and a group of young Polish socialist intellectuals gathered in the Union of Independent Socialist Youth—were also influenced by the continuing crisis, whose effects, especially in 1931, could easily have been taken as symptoms of the impending collapse of capitalism. (Radicalization of views was common then in the political left, not only in Poland, but also in Germany, England, France, etc.—see e.g. the views of the English socialist G. D. H. Cole on the prospects of capitalism, quoted by Kalecki in his paper 'Is a "Capitalist" overcoming the Crisis Possible?', p. 48, in this volume; see also Lange's article of 1933, 'From Crisis to Stabilization of Capitalism', in O. Lange, *Dzieła*, vol. i, Warsaw, PWE, 1973, pp. 62–8 (in Polish). On the movement towards some kind of reformist planning ideology, widespread among European social democratic parties at the time—e.g. in Belgium, Holland, and Norway—and its sources of inspiration in the Soviet industrialization drive of the early 1930s, see Andvig, *Ragnar Frisch and the Great Depression*, pp. 374–5.

Moreover, Kalecki began writing on economic theory during the great crisis of the 1930s, which therefore disposed him from the outset towards critically assessing existing theories against reality. Thus he rejected orthodox neo-classical theory; but (as Lange emphasized in the speech mentioned above) Kalecki was also far from dogmatic in following Marxist theory (his debate with Varga is typical; see pp. 50–2 and p. 432, n. [1]).

Kalecki's publications were also influenced by the development in Germany of National Socialism, whose danger he stressed in many articles; see Bibliography in *Collected Works*, vol. vi, and 'On the Papen Plan', 'Stimulating the World Business Upswing', 'The Business Cycle and Welfare', and 'The Business Cycle and Armaments', this volume; see also Lange, *Dzieła*, vol. ii, Warsaw, PWE, 1973, pp. 536–7.

The second group of factors influencing the character of Kalecki's publications in this period is related to the elaboration of his own theory of the

business cycle, on which he worked intensively at the Institute for the Study of Business Cycles and Prices. Though the articles in pt. 2 of this volume were merely a by-product of Kalecki's major studies on the business cycle, they nonetheless show how far these studies had advanced and allow us to trace the subsequent development of his theory. They indicate that its basic outline existed as early as the spring of 1932 (see 'Is a "Capitalist" Overcoming of the Crisis Possible?', this volume); that in the summer of that year Kalecki—following J. Tinbergen—had already considered the influence on the business cycle of the period of constructing capital equipment (see '"New" Industries and the Overcoming of a Crisis', this volume); that shortly thereafter work on its formulation was essentially completed (see 'On the Papen Plan', this volume). At the end of 1932 Kalecki published the first in a series of papers on the mechanism of stimulating the business upswing and the theory of capitalist reproduction; the argument put forward in these papers rests heavily on the theses of his *Essay on the Business Cycle Theory* (see 'The Business Cycle and Inflation', this volume).

From the spring of 1932 onwards Kalecki clearly points to the possibility of overcoming the crisis through the inflationary financing of public works (see 'Is a "Capitalist" Overcoming of the Crisis Possible?', and 'The Influence of Cartelization on the Business Cycle', this volume). The term 'inflationary financing of public works' is Kalecki's. In his later studies in the theory of the business cycle, however, he dropped it, reserving the term 'inflation' for processes of expansion accompanied by rising price levels, and showing that with unemployment and idle capital equipment inflation need not arise. This followed from his rejection of the hypothesis of an automatic increase in prices with an expansion of output, i.e. the assumption of free competition (see p. 467 n. [2]).

[2]

Germany's economic situation in 1931 was aggravated by currency and finance problems, which manifested themselves in a passive foreign trade balance and currency restrictions, as well as in a tight credit market, especially for short-term loans (despite a declining interest rate). An additional factor impeding improvement in the foreign trade balance was war reparation payments. Heinrich Brüning (1885–1970; in 1930 and 1931 the chancellor of the Reich and a leading figure in the German Catholic Centre party) made many efforts to reduce and defer these payments. In June 1931 he announced a suspension of war reparation payments on account of Germany's economic difficulties. In this situation the Hoover administration (the major creditor of Germany as well as of the European allied countries) temporarily postponed payments of all international obligations to ward off a general financial crisis. Despite this, in July 1931, a few days after the announcement of the Hoover moratorium, one of the largest German banks, the so-called Donatbank (Darmstädter und Nationalbank, after 1931 under government control),

suspended payments. Its collapse was followed by the collapse of other German banks and the temporary closing of the stock exchange.

Reduction of Wages during Crisis

[1]
First published as 'Obniżka płac w czasie kryzysu', under the pseudonym 'Henryk Braun', in *Przegląd Socjalistyczny*, 2/2, 1932, pp. 1–2.

The problem of the effects of wage reductions on the course of the business cycle was very real, since at that time, during the crisis phase of the cycle, wage reductions did take place. In 1931 the major Polish industries demanded drastic reductions in social-security spending and this was granted by parliament. While a frontal attack aimed at industry-wide wage reduction was considered at the time politically unwise, it was particularly favoured by export businesses. Less than two years later, in 1933, the spokesman for the major Polish industries asked parliament to include overall wage reductions in government economic measures to fight the crisis.

Kalecki addressed the problem of wage reduction again in the article 'Is a "Capitalist" Overcoming of the Crisis Possible?', then in the *Essay on the Business Cycle Theory*, both in this volume, and in his paper 'Money and Real Wages' (see *Collected Works*, vol. ii). In the *Essay* he investigated more thoroughly the problem touched on here of changes in the relative share of wages in the social income during the cycle. This problem (next to the theory of capitalist reproduction) became the main subject of Kalecki's subsequent studies on the distribution of national income.

[2]
Formally speaking, it would follow from the above argument that the consumption of workers would decline from 60 to 54 units, and this due to the assumption that the increase in capitalist profits would make them expand their consumption by 6 units. Only if we accept Kalecki's assumption in the *Essay* that, in the short run, changes in capitalists' profits have no influence on their consumption will the accumulation of unsold consumer goods increase by 12 units (and not by 6), causing such a fall in their prices that workers for their 48 money units will be able to purchase the entire 60 units of consumer goods. This modification has no effect on Kalecki's further argument, however.

Mr Keynes's Predictions

[1]
First published as 'Przewidywania p. Keynesa', under the pseudonym 'H. Br', in *Przegląd Socjalistyczny*, 2/6, 1932, p. 4.

At the end of 1931 J. M. Keynes made many statements on the condition of the British economy, the continuing world crisis, and ways of overcoming it. In particular he was concerned about the deepening financial crisis, for which he argued that the best remedy would be a large supply of cheap money which would stimulate greater investments and start an economic upswing (see *The Collected Writings of John Maynard Keynes*, vol. xxi, London, Macmillan, 1982). These statements were widely quoted and commented upon in the English and foreign press.

On 4 Feb. 1932 Keynes contributed to a lecture series organized by the Halley-Stewart Trust under the general title *The World Economic Crisis and the Way of Escape*. Following numerous press reviews, Keynes's lecture was published by the London *Christian World* of 11 Feb. Later it was published by the trust in a volume under the same title.

Unfortunately, it has proved impossible to identify the original sources of Kalecki's quotations from Keynes, which are not given in Kalecki's paper. Most probably he based his paper on the text of Keynes's lecture as reported in the continental press. This would explain some slight difference between his quotations and the text of Keynes's lecture as reprinted in Keynes's *Collected Writings*, vol. xxi, pp. 50–62.

[2]
In Keynes's *Collected Writings*, vol. xxi, p. 58, the quoted fragment reads: 'the setting into motion of natural forces which are certain in course of time to undermine and eventually destroy the creditor position of the two leading creditor gold countries'.

[3]
Ibid., pp. 58–9.

[4]
In ibid. 58 this sentence reads: 'The cessation of reparation receipts, the loss of tourist traffic, the competitive disadvantage of her export trades with non-gold countries, and the importation of a large proportion of the world's available gold will, between them, do the work.'

[5]
Ibid., p. 58.

Is a 'Capitalist' Overcoming of the Crisis Possible?

[1]
First published as 'Czy możliwe jest „kapitalistyczne" wyjście z kryzysu?', under the pseudonym 'Henryk Braun', in *Przegląd Socjalistyczny*, 2/10, 1932, pp. 1–3.

G. D. H. Cole was a socialist, J. A. Hobson a liberal reformer, and E. S. Varga a well-known Marxist economist. In analysing the chances of overcoming the crisis, Kalecki and Varga differ from the first two by seeing the attitude of the working class and its political actions during the crisis as of fundamental importance. More significant from the point of view of the further development of Kalecki's theory, however, are his disagreements with Varga.

In dealing with the business cycle and its crisis phase (leaving aside problems of the 'structural' crisis of capitalism), Marxist economics of that time generally limited itself to a rather mechanical explanation. The main weakness of this approach was inconsistency in rejecting Say's Law. Differences between Varga's views quoted here by Kalecki and his own position can be clearly seen in the evaluation of the effects of wage reductions on overcoming the crisis. Varga takes a position consistent with the theory of under-consumption: a reduction in wages deepens the crisis, since it limits the domestic market. However, underlying his opinion that wage reductions are at the same time one of the most important stimuli to the re-employment, replacement, and expansion of capital equipment is the assumption that what workers do not consume on account of wage reductions will be 'purchased' by capitalists in one form or another; hence the reduction in labour costs will increase profits, which will stimulate the upswing. Indeed, if Varga's argument is taken to its logical conclusion, the problem of realization does not arise here.

Kalecki opposes this by claiming that wage reductions will be accompanied either by a corresponding fall in prices (in which case the entire production will be sold, but neither capitalist profits nor profitability will change, and hence there will be no incentive to increase economic activity) or (with no, or insufficient, price reductions) by an accumulation of unsold stocks, which also will not stimulate the upswing. The gist of the critique of Varga's position is Kalecki's belief that the course of the business cycle is determined by investment activity, which in turn is affected by factors influencing the expected profitability of investments.

The thesis at the end of the article—that all previous crises ended not so much as a result of the 'automatic' mechanism of the business cycle but as a result of some external factors—was more fully developed in Kalecki's *Theory of Economic Dynamics* (1954). In this work he went even further and argued that, leaving out such semi-exogenous factors as technological progress, overcoming the crisis cannot be taken for granted (see *Collected Works*, vol. ii). As regards the second 'external' factor mentioned by Kalecki ('wartime boom'), it has been sometimes argued that in the USA 'the great crisis of the thirties never ended but only melted away in the great mobilization of the forties' (J. K. Galbraith, *American Capitalism*, Cambridge, Mass., Houghton Mifflin, 1952, p. 69).

The 'synthetic' stimulation of the upswing through the inflationary financing of public works (see terminological note on p. 429) was not Kalecki's original idea (see E. Lipiński's introductory article, 'On Economic Development', in the first number of the bulletin of the ISBCP, *Koniunktura Gospodarcza*, 1/1, 1928, 5 (in Polish); similar views were also expressed at the time by K. Studentowicz and others, though deflationary views were dominant in economic papers). Kalecki's contribution was to stress that, with capital equipment lying idle, such an operation leads not only to a rise in prices but also to a rise in production and employment.

[2]
The source of the quotation has not been identified.

[3]
J. A. Hobson, *Imperialism: A Study* (New York, James Pott, 1902).

[4]
Internazionalle Presse Korespondenz, 13, 15 Feb. 1932, pp. 327–64 (see esp. p. 345).

[5]
In these early works Kalecki used the term 'constant capital'; in later editions of these works, however, he always replaced it by the term 'fixed capital'. Hence the term 'constant capital' here has also been replaced by 'fixed capital'.

[6]
See 'Mr Keynes's Predictions', this volume.

[7]
See M. Kalecki, 'The Swedish Match Trust', *Przegląd Gospodarczy*, 9/3, 1928, pp. 101–4 (in Polish) (also in *Collected Works*, vol. vi); 'The Match Trust and the Soviets', *Przegląd Gospodarczy*, 9/20, 1928, pp. 1027–8; 'Ivar Kreuger', *Przegląd Socjalistyczny*, 9, 1932, p. 12.

'New' Industries and the Overcoming of a Crisis

[1]
First published as '„Nowe" przemysły a wyjście z kryzysu', under the pseudonym 'M. Kal', in *Polska Gospodarcza*, 13/31, 1932, pp. 907–8.

The Influence of Cartelization on the Business Cycle

[1]
First published as 'Wpływ kartelizacji na koniunkturę', *Polska Gospodarcza*, 13/32, 1932, pp. 932–3.

Kalecki's first economic publications in 1927 and 1928 dealt with the structure and operations of large Polish and international concerns, such as

the American copper cartel, the European linoleum trust, monopolistic tendencies in the German steel industry, the Swedish match trust, and the international steel cartel (see Bibliography in *Collected Works*, vol. vi). In fact, on the strength of these articles Prof. Lipiński offered him a job in the ISBCP.

The economic crisis accelerated cartelization of Polish industry. Whereas in 1926–9 an average of 24 new cartels were established annually, during the crisis on average twice as many were formed each year. By 1929 there were 100 cartels controlling nearly 40% of industrial production, and the number rose to 266 by the end of 1936. The number of international cartels in which Polish companies participated grew even faster. In 1928 there were 23 of them and in 1935 four and a half times as many. The economic role of cartels was hotly debated during the crisis. They were accused of maintaining rigid prices instead of lowering them. The policy of the cartel-supporting organization 'Lewiatan' (the Central Union of Polish Industry, Mining, Trade, and Finances—the leading organization of large-scale capital in inter-war Poland) was accused of greed, egoism, and short-sightedness. The ISBCP took a strong anti-cartel (and anti-Lewiatan) position and played an important role in this fight. The fiery anti-cartel speeches of Edward Lipiński, as spokesman of the Ministry of Industry and Commerce, were a celebrated feature of the trial that led to the dissolution of the cement cartel. Shortly thereafter a new cement cartel was formed, but it reduced the prices of cement by nearly half. Feeling threatened, other cartels also lowered their prices. Jan Wiśniewski's wholesale price index, published by the ISBCP, contained a separate price index for cartelized goods.

On the Papen Plan

[1]

First published as 'Na marginesie planu Papena', *Polska Gospodarcza*, 12/39, 1932, pp. 1157–8.

Franz von Papen was the chancellor of Germany from May 1931 to Nov. 1932 and the vice-chancellor in 1933 and 1934 during the first period of Hitler's chancellorship. Von Papen was well known as a representative of the Junker right, financiers, and industrial capital.

The Papen plan was put forward on 4 Sept. 1932, against the background of a particularly severe crisis in Germany. Industrial production in 1932 reached only 54% of the 1928 level; the production of steel, 39%; employment in heavy processing industries, 64% (5 million unemployed were recorded in Germany in 1932); nominal wages in industry, 83%; wholesale prices, 67%; and the stock market index, 19%. The crisis was deepened by the obligation to repay war reparations: see pp. 429–30 n. [2].

For some later discussions of the Papen plan see C. W. Guillebaud, *The Economic Recovery of Germany*, London, Macmillan, 1939, and K. E. Poole, 'German Financial Policies 1932–1939', *Harvard Economic Studies*, 66, 1939. The plan was reprinted in G. Bombach *et al.* (eds.), *Der Keynesianismus II*, Berlin, Springer, 1976, pp. 152–9. For a discussion of the relation between the Papen plan and Ragnar Frisch's treasury bills scheme, see Andvig, *Ragnar Frisch and the Great Depression*, pp. 362–4.

PART 3
Outline of the Business Cycle Theory

Essay on the Business Cycle Theory

[1]

The *Essay* was published as 'Próba teorii koniunktury' in July 1933 by the ISBCP. Later that year Kalecki presented an abbreviated version at the 3rd European conference of the Econometric Society (Leyden, 30 Sept.–2 Oct. 1933). An English translation of this paper (by B. Winawer), 'A Macrodynamic Theory of Business Cycles', was published in *Econometrica* (see pp. 120–38 above). At about the same time a French version of the *Essay* (also translated by B. Winawer), 'Essai d'une théorie du mouvement cyclique des affaires', appeared in *Revue d'économie politique*, 49/2, 1935, pp. 285–305; reprinted in the centenary volume of this journal, 100/6, 1987, pp. 867–87 (followed by a commentary by M. Lutfalla, pp. 888–98).

These two abbreviated journal versions of the *Essay* partly overlapped. In the French 'Essai', Kalecki shortened the 'Introduction' and 'Assumptions' of the original pt. I, omitted the entire mathematical pt. II, and also some fragments of pt. III ('The Role of the Government in the Distribution of Social Income' and 'The Business Cycle and Cartels'); on the other hand, he added an important supplement on the money market. As is easily seen, besides numerous abbreviations and revisions in pt. I, and omissions in pt. III, the 1935 *Econometrica* paper differs from the *Essay* in that its mathematical argument is more rigorously presented.

In 1962 fragments of pt. I of the *Essay* (with some minor revisions), entitled 'Outline of a Theory of the Business Cycle', appeared (in Polish) in a collection of Kalecki's papers, *Prace z teorii koniunktury 1933–1939*, Warsaw, PWN, 1962, pp. 9–26. The 'Outline' also contained the supplement on the money market that first appeared in the 'Essai'. *Prace* subsequently appeared in several translations: English (*Studies in the Theory of Business Cycles 1933–*1939, Warsaw, PWN/Oxford, Basil Blackwell/New York, A. M. Kelly, 1966 and 1969); Spanish (*Estudios sobre la teoría de los ciclos económicos*, Caracas and Barcelona, Ariel, 1970); and Italian (*Studi sulla teoria dei cicli economici 1933–1939*, Milan, Il Saggiatore, 1972). The 'Outline' was also included in Kalecki, *Selected Essays on the Dynamics of a Capitalist Economy, 1933–1970*, Cambridge, Cambridge Univ. Press, 1971, pp. 1–14. This collection has been translated into Italian (*Sulla dinamica dell'economia capitalistica: saggi selecti 1933–1970*, Turin, Einaudi, 1975); Spanish (*Ensayos escogidos sobre dinámica de la economía capitalista, 1933–1970*, Mexico, Fondo de Cultura Economica, 1977); Hungarian (*A tökes gazdaság müködéséről: válogatott tanulmányok 1933–1970*, Budapest, Közgazdasági és Jogi Könyvkiadó, 1980). A German translation of the 'Outline', 'Umrisse einer Theorie des Konjunkturzyklus', appeared in Kalecki, *Werkauswahl*, Neuwied, Luchterhand, 1976, pp. 41–56, and in Kalecki, *Kriese und Prosperität im Kapitalismus: Ausgewählte Essays 1933–1971*, Marburg, Metropolis, 1987, pp. 31–44. A Portugese translation, entitled 'Esboço de uma Teoria do Ciclo Econômico', appeared in Kalecki, *Crescimento e ciclo das economias capitalistas*, São Paulo, Hucitec, 1977; 2nd edn., São Paulo, 1980. The French 1935 'Essai' was translated into Spanish ('Un ensayo teórico sobre el ciclo económico', *Economía y Administración*, 16, 1970, pp. 23–38, University of Concepción, Chile).

In the present volume the original text of the 1933 *Essay* is published with only minor editorial corrections. The additions and revisions which Kalecki introduced in the French 'Essai' and in the 'Outline' are indicated in editorial notes to the appropriate parts of the *Essay*.

The articles in pt. 2 of this volume help us to reconstruct the final stages of development of the *Essay*. Kalecki's article published at the end of 1932, 'The Business Cycle and Inflation', already contains the basic elements of the argument presented in the *Essay*, except for consideration of the effects of the time-lag in the construction of investment goods. (However, in the context of this article the time-lag problem is less important; also, Kalecki had already considered this factor in one of his earlier articles—see '"New" Industries and the Overcoming of a Crisis'.) Thus it appears that the basic outline of his theory of the business cycle was ready by the spring of 1932. Indeed, the late Professor Józef Zagórski, one of Kalecki's colleagues from ISBCP, recalled in a private communication to the editor of this volume, a discussion on the *Essay* (its earlier draft?) in the Institute, with St. Pszczółkowski—another of Kalecki's ISBCP colleagues—taking an active part in the debate; this, Zagórski believed, must have been before Nov. 1931, when Pszczółkowski left the Institute. It has proved impossible to reconstruct what happened to the *Essay* from the autumn of 1931 to July 1933. At that time the printing of a booklet of that size took no longer than a month. On the other hand, it is common knowledge that Kalecki would not discuss a paper until shortly before its completion at the earliest; and it is hard to believe that he worked on the final version of the *Essay* for that long.

Kalecki studied various aspects of business fluctuations from the very beginning of his economic career. He started with empirical analyses of business conditions in individual commodity and regional markets (see. p. 424 above); later—as a member of the ISBCP—he began his theoretical investigations into business cycles. ISBCP, modelled on the Harvard Economic Service, was at the time possibly one of the foremost business research centres

in Europe. Kalecki became acquainted there with the modern economic research techniques and statistical methods.

In the orthodox economic theory of that time, Say's Law and Walras's concept of general equilibrium ruled. Following these fundamental premisses, mainstream empirical studies of business fluctuations concentrated on examining equilibrium conditions in 4 basic markets: stocks and bonds, commodities, labour, and money. Hence they focused on fluctuations of commercial paper prices, commodity prices, wage rates, and interest and discount rates, which were largely studied independently of one another. The Harvard Barometers method, pioneered by Warren M. Persons, was based on such an approach, as was the work of ISBCP (see E. Lipiński, 'On Business Development', *Koniunktura Gospodarcza*, 1/1, 1928 (in Polish)).

Yet ISBCP differed from Western business research centres in that from the outset one of its aims was to investigate the structure of production costs and prices, organizational structures in industry, problems of cartelization, etc. On the initiative of Ludwik Landau (an outstanding Polish economist and statistician) and Kalecki, estimates of the Polish national income and its distribution were started there somewhat later. Thus the institute combined investigations of business conditions with macro-economic and structural studies. The scope of the Institute's work, combined with its intellectual atmosphere, also contributed to the development of Kalecki's macro-economic theory of the business cycle.

Turning to the theoretical background of Kalecki's *Essay*, it is obvious that it was not inspired by the contemporary mainstream of orthodox economics. This lagged far behind empirical research, which registered important achievements as early as 1913 (see e.g. W. C. Mitchell, *Business Cycles*, Berkeley, Calif., NBER, 1913). In the field of economic theory, the main difficulty seems to have arisen from the incompatibility between the above-mentioned fundamental principles of Say's Law and Walrasian equilibrium on the one hand and endogenous business fluctuations on the other. Thus the scene was dominated by Anglo-Saxon theories, which saw the reason for business crises in purely monetary terms (the main spokesman of this school being R. C. Hawtrey), or, as an offshoot of this monetarist theory, the so-called 'over-investment theory' (F. Hayek, F. Machlup, L. Mises, and L. Robbins; see G. Haberler, *Prosperity and Depression*, Geneva, League of Nations, 1938, pp. 31–68).

Kalecki's theory seems to follow rather from two trends in the theory of crises which developed at the periphery of these enquiries: from the so-called 'heretic' trend (whose main spokesman was J. A. Hobson), but first and foremost from Marxist economics (whose best theorists of crises were N. Tugan-Baranovsky and Rosa Luxemburg), which was largely ignored in the West. (Kalecki's theory has sometimes been considered to belong to the

'under-consumption' school of thought; for a rejection of this claim see M. F. Bleaney, *Under-Consumption Theories: A History and Critical Analysis*, London, Lawrence & Wishart, 1976, and M. C. Sawyer, *The Economics of Michal Kalecki*, London, Macmillan, 1985, pp. 83–6). For a long time, indeed, Tugan-Baranovsky's theory inspired original research in this field. His ideas were developed at the beginning of the 20th century by A. Spiethoff, A. Aftalion, M. Bouniatian, and, to some extent, also by G. Cassel.

Tugan-Baranovsky was possibly the first interpreter of Marx's schemes of reproduction to stress investments as the main engine of capitalist economic development in Marx's theory. According to Tugan-Baranovsky, with the appropriate inter-industry proportions, the development of capitalism did not depend on sales outlets. Even the lowest level of consumption could be offset by correspondingly increased investments. Tugan-Baranovsky believed that capitalism was not a 'harmonious' but an 'antagonistic' system. Hence he did not regard as absurd the assumption that capitalism is based on investments that serve only further investments. For in an antagonistic system consumption is neither the ultimate goal nor the criterion of economic activity. Production which only serves further production is entirely justified, providing that it is profitable.

This role of investments as the main factor of reproduction in capitalism was the second element of Kalecki's theory (next to the introduction to Marx's schemes of reproduction—see p. 425 above) which he owed to Tugan-Baranovsky. Many years later, in 1967, Kalecki wrote that he regarded Tugan-Baranovsky's argument on problems of realization in capitalism as his lasting contribution to the analysis of how capitalism functions in its various phases (see 'The Problem of Effective Demand with Tugan-Baranovsky and Rosa Luxemburg', *Collected Works*, vol. ii).

Kalecki's other source of inspiration was probably the animated contemporary debates about the theory of capital accumulation put forward by Rosa Luxemburg, who emphasized the difficulties of realizing production because of the insufficient absorption capacity of markets, which she believed was a barrier to expanded reproduction under capitalism. Kalecki himself several times pointed to his ties with Luxemburg's theory and, through it, with the Marxist school of thought. As early as 1939, when developing the interdependencies between investments and income originally presented in the *Essay*, he drew attention to the links between his theory of the business cycle, the Marxist theory of reproduction, and Luxemburg's theory (see pp. 254–5 above). He also emphasized, in later papers, the similarity between his own approach and Marxian schemes of reproduction and the theory of Rosa Luxemburg and Tugan-Baranovsky (see 'The Marxian Equations of Reproduction and Modern Economics' and 'The Problem of Effective Demand with Tugan-Baranovsky and Rosa Luxemburg', *Collected Works*, vol. ii; from

Kalecki's recollections as transmitted to Tadeusz Kowalik, however, it appears that Kalecki only studied Luxemburg's *The Accumulation of Capital* thoroughly after the publication of the *Essay*).

The following general features of the *Essay* testify to its Marxian background: (i) a macro-economic analytical approach; (ii) the use of Marxian reproduction equations; (iii) the concept of the class nature of the capitalist society, with two major social classes distinguished on the basis of their respective ownership of the means of production; (iv) the idea of fundamental contradictions and instability in the capitalist system. There are also many specific similarities between Kalecki and Marx (e.g. wage determination, the role of the 'reserve army of the unemployed', and the treatment of technical innovations and of financial and monetary aspects of capitalist reproduction; for a comprehensive discussion of Kalecki and Marx, see M. D'Antonio, 'Kalecki ed il marxismo', *Studi storici*, 19/1, 1978, and Sawyer, *The Economics of Michal Kalecki*, ch. 8).

Kalecki also told T. Kowalik that the discussion among Polish communists and socialists on the so-called 'problem of Luxemburgism' had a certain influence on his views too. The nature of this controversy is perhaps best reflected in the debate between two Marxists and leading organizers of the workers' movement in Poland, Franciszek Truskier and Henryk Lauer. Lauer underestimated the question of markets and effective demand, while Truskier expressed views close to the theory of under-consumption (see F. Truskier (pseud. M. Fiedler), *The Economic Background of the May Coup d'État*, Cracow, Młynarski, 1927; H. Lauer (pseud. E. Brand), *Economic Elements in the May Coup d'État and in the Policy of the Present Government*, Warsaw, Książka, 1927 (both in Polish)).

In the introduction to the *Essay* and in its final part (see pp. 67, 104–5), Kalecki mentions the similarities and differences between his theory and Aftalion's. In the 'Essai' Kalecki, in addition to Aftalion, also mentions Bouniatian as a leading representative of the theory of trade cycles (based on periodic fluctuations of investments due to the time-lag between the construction of capital equipment and its start-up). Among bourgeois economists, A. Spiethoff presented similar theories in the mid-1920s, and among Marxists, R. Hilferding too wrote about the importance of construction time for cyclical fluctuations in investments. According to J. Zagórski, however, Aftalion's work was not one of the *Essay*'s sources of inspiration; Zagórski remembers that it was only during the discussion in ISBCP of the earlier version of the *Essay* that St. Pszczółkowski called Kalecki's attention to the fact that Aftalion had presented a similar theory. Kalecki subsequently read Aftalion's book and saw that he differed from Aftalion in the basic assumption about the rate of employment of capital equipment throughout the cycle.

The last, most direct and important inspiration for the *Essay* was J. Tinbergen's paper, 'Ein Schiffbauzyklus' (*Heltwirtschaftliches Archiv*, 34/2,

1931, pp. 152–64). From this work Kalecki derived the idea of constructing a modern model of the cycle and also the mathematical techniques used in the *Essay*.

J. Tinbergen in his 1931 paper presented a model of an endogenous cycle in shipbuilding. Tinbergen's probable intention was to construct—in addition to the already familiar hog-raising cycle—yet another example of what was then called an 'elementary trade cycle', though he might have been aware that his model could also be used for constructing a more general theory of business cycles.

In Tinbergen's model, fluctuations in the number of ships constructed are represented by fluctuations in increments of total tonnage. This increase depends on the tonnage of sea cargoes transported. This is an inverse relationship, however. The greater the volume of cargo at a given time, the smaller (lagged in time) was the total tonnage. Increases in the latter appear about a year after a large volume of cargo has been transported, since this is an average period for building a ship. On the basis of these relationships Tinbergen concludes that the increase in tonnage is an inverse function of total tonnage two years earlier, i.e. $f'(t) = -af(t-\upsilon)$, where $a > 0$, $\upsilon \approx 2$ years, $f(t-\upsilon)$ denotes total tonnage in period $t-\upsilon$, $f'(t)$ is the increase in tonnage in time t, and a is the coefficient of intensity of tonnage reaction to changes in its volume. In Tinbergen's model the time-lag υ, together with the coefficient of intensity of reaction a, generate cyclical changes in the number of ships built. Only these two factors of his model are responsible for cyclical fluctuations, and the unrestricted specification of the functions considered by Tinbergen leads to an equation of a cycle with constant, explosive, or dumped amplitude.

Kalecki applied Tinbergen's method to examining macro-economic cyclical changes in investments, profits, aggregate production, and employment. As with Tinbergen (and also Aftalion, Bouniatian, and others), in Kalecki's model the construction period of investments is of primary importance. As with Tinbergen, the volume of tonnage determines its increase, so with Kalecki the volume of total capital affects its increase (the volume of investments). Unlike in Tinbergen, however, this leads to cyclical fluctuations only in combination with changes in current capital accumulation. The most important difference between Tinbergen's and Kalecki's models concerns something else, however. With Tinbergen the increase in tonnage is a function of its total volume, and the automatism of this process makes the decisions of the individual entrepreneur secondary (investment decisions are not distinguished from investments here). On the other hand, Kalecki in the *Essay* distinguishes gross investments from the investment decisions of individual capitalists, and includes the function of these decisions in his model (they are an increasing function of present gross accumulation and a decreasing function of the volume of capital equipment).

Thus Kalecki's macro-economic model of the business cycle, which explains the latter by means of endogenous variables, represents a synthesis of elements of Tugan-Baranovsky's and Luxemburg's theories, of developments of Tugan-Baranovsky's theory by Aftalion, Bouniatian, and other followers of the theory of over-investment, and of Tinbergen's analytical techniques and mathematical tools. Kalecki's theory at the same time was preceded by his 'detailed, painstaking, and extraordinarily labour-consuming inquiry into the world and Polish economic policies' (E. Lipiński, 'Michał Kalecki', *Oxford Bulletin of Economics and Statistics*, 39/1, 1977, p. 62).

The core of the *Essay* was a modern theory of the business cycle. Overshadowed by this main theme was a secondary one, for which the first gave a natural background: a general theory of reproduction and employment in capitalism. It was perhaps more apparent in Kalecki's earlier publications, in which he presented methods for a 'synthetic' stimulation of the business upswing by means of inflationary financing of public works (see 'Is a "Capitalist" Overcoming of the Crisis Possible?' and 'On the Papen Plan', this volume). The *Essay* itself, limited to a theoretical analysis of the business cycle, offered only an analytical foundation for economic policy measures suggested in those papers.

Owing to immediate problems of economic policy in those years, however, economic research concentrated on problems of current business conditions, which were understood rather narrowly, and analysis centred mainly on fluctuations in prices. The elaboration of a theory of a business cycle underlying these conditions was a less popular and more demanding enterprise. Though mathematical economics was widespread (mainly mathematical developments of Walras's theory of general equilibrium and of the neo-classical theory as a whole), such works as Tinbergen's paper on the shipbuilding cycle and especially those of Ragnar Frisch, which went in a similar direction (see Andvig, *Ragnar Frisch and the Great Depression*) were only pioneering attempts to formulate a *theory* of the business cycle. In mainstream economics there was little interest in and work on the business cycle theory in this sense. Crisis was regarded as a necessary measure to eliminate disproportions of production (financial or material). Therefore, despite different opinions of individual schools on the causes for depression, it was generally agreed that a crisis had to run its course, that one only had to wait until prices, wages, production, and employment fell enough. When the crisis completed its purgatory role, eliminating the exuberances of the previous boom and excessive inventories, and reducing the costs of production to the new levels, the upswing would start automatically.

This partially explains why immediately after publication the *Essay on the Business Cycle Theory*—which, notwithstanding its original Polish title, instead of a theory of business conditions understood in the narrowly empirical sense, offered a theory of the business cycle—attracted little

attention and understanding. It may also explain why the first critics in Poland did not address Kalecki's basic ideas, but instead discussed problems that were marginal to his theory, and which were either connected with the formal aspects of his analysis, or opened up the field for easy and spectacular debates (such as the influence of changes in money wages on the course of the cycle). This was the nature of the polemical article by Aleksander Rajchman (professor of mathematics at Warsaw University and member of the Polish Communist party, who died in Sachsenhausen concentration camp in 1940), 'Critical Remarks on one of the Mathematical Theories of the Business Cycle' (*Kwartalnik Statystyczny*, 10/2–3, 1933, pp. 325–37 (in Polish); for Kalecki's rejoinder, see pp. 109–19 above); the same attitude underlay a later polemic against Kalecki by Samuel Fogelson (statistician, lecturer at the Open University in Poland, and member of the Polish Communist party) and A. Rajchman, 'Another Comment on one of the Mathematical Theories of the Business Cycle', *Kwartalnik Statystyczny*, 11/4, 1934, pp. 562–94 (in Polish); Kalecki did not respond to this rather ill-tempered article; the specific criticisms by these authors of Kalecki's theory are discussed in the editor's comments which follow.

Antoni Pański had this criticism in mind when, as the first person to speak up for the Marxian background of Kalecki's theory, he wrote in 1937: 'Kalecki's works have been criticized in Poland by Marxists; this criticism is largely a misunderstanding and mainly concerns the external, mathematical arguments of the author which are not essential to his idea. It is interesting that at the same time the critics have not noticed the clear genetic link between the essence of Kalecki's theory and Marx's schemes of reproduction' ('Marx's Economic Theories in the Perspective of Time', *Przegląd Socjologiczny*, 5/3–4, 1937, p. 745). Pański attempted to reinterpret Marx's views in the light of Kalecki's theory, which he saw not only as a theory of the business cycle but also as the foundation for a general theory of capitalist dynamics.

Even in Kalecki's closest circle, understanding of his theory met with resistance and came slowly. The new theory of the business cycle was most quickly absorbed by Kalecki's friend Ludwik Landau, who was not handicapped by orthodox economic thinking. His review of the *Essay* (*Ekonomista*, 3, 1933, pp. 126–9) showed a thorough understanding of Kalecki's theory and also noted that this work 'in its basic assumptions provides completely new methods for approaching problems of economic development' (ibid., p. 128).

Recalling Landau's review many years later, Kalecki (in an interview with Kowalik) said that at that time Landau saw more in the *Essay* than he himself did. Kalecki probably had in mind the following part of the review:

> This does not mean, of course, that entrepreneurs consciously determine their profits; they are swayed in their investment decisions—in Kalecki's scheme exclusively and absolutely—by profitability, and in this way their decisions become a factor that by necessity affects the business cycle in a definite direction. Let us imagine, though, that

they make a decision that goes beyond the automatic course of the business cycle (or that the government makes such a decision—public works!). This would cause corresponding changes in capitalist profits and, along with them, in the volume of production and social income. Here the significance of the method of analysis goes beyond the framework drawn by the author, i.e. the endogenous business cycle; a foundation is created for analysis of economic development in general. (Ibid., pp. 128–9.)

In the ISBCP Kalecki's theory was received with goodwill. The director of the institute did not share Kalecki's views, nor Landau's later, but he promoted their works and gave them support. Shortly after publication of the *Essay* he organized a lecture for Kalecki at the Association of Polish Economists and Statisticians to enable a public discussion of his theory. The attitude of other staff members of the institute was similar (see Lipiński, 'Michał Kalecki', p. 71). The views prevalent in the institute did not change until the appearance in 1936 of J. M. Keynes's *General Theory of Employment, Interest, and Money*.

As regards the reception of the *Essay* abroad, the first instance is anecdotal. Kalecki told T. Kowalik that towards the end of 1932 he translated the *Essay* into German and sent it to a German economist and editor, a socialist. In 1933, however, the latter was forced to flee the country to escape from the Nazis. (It has proved impossible to identify the person, but the strongest candidate is E. Altschul, who was head of the Frankfurter Gesellschaft für Konjunkturforschung, and the editor of a series of studies on business research. His work and publications were well known in Poland. In 1933 he fled to the USA.) So at the beginning of 1933 Kalecki sent the German translation of the *Essay* to Keynes at Cambridge. As a secretary at the ISBCP at the time, Mrs B. Winawer recalled in a conversation with the editor that, some time later, Kalecki got the manuscript back with the note: 'I'm sorry, but I don't read German'. By that time Keynes had published a few reviews of German books in the *Economic Journal*; however, as he wrote: 'in German I can only clearly understand what I know already: so that *new* ideas are apt to be veiled from me by the difficulties of language' (*Collected Writings*, vol. v, London, Macmillan, 1971, p. 178 n. 2); for a discussion of the possible reasons for Keynes's reply, see A. Bhattacharjea and N. Raghunathan, 'Keynes, Kalecki and the Question of Priority', *Economic and Political Weekly*, 2 July 1988.

At the third European meeting of the Econometric Society in Leyden (30 Sept.–2 Oct. 1933), 3 papers were devoted to the problems of the business cycle. Tinbergen's paper on the applicability of the theory of harmonic oscillations to the study of business cycles partially referred to his theory of the shipbuilding cycle, and listed a catalogue of problems requiring solution in a general theory of the business cycle. The model of cyclical fluctuations in Frisch's paper ('Some Problems in Economic Macrodynamics') was based (like Tinbergen's and Kalecki's models) on the time-lag between the placement and the completion of investment orders, and on the cumulative effects of random perturbations (based on the works of the Soviet economist and mathematician, E. Slutsky).

Kalecki read a paper, 'Essai d'une théorie des mouvements cycliques construite à l'aide de la mathématique supérieure'. In his report from this meeting J. Wiśniewski wrote as follows about Kalecki's paper:

> This paper, especially in the context of Frisch's theory, aroused general interest and a lively discussion. One of the points debated was how long to estimate the average construction time of capital equipment. Kalecki's estimate was 0.6 years; Frisch's 3 years. With such different estimates both theories give a length of the business cycle similar to each other and to reality, namely 8.5–10 years. If we equalize construction time, the numerical conclusions of the two theories would surely differ considerably. (*Kwartalnik Statystyczny*, 10/4, 1933, pp. 548–9)

Kalecki's contributions to the Leyden conference were also reported by J. Marschak in *Econometrica*, 2, 1934, pp. 185–203. In the discussion of Tinbergen's paper Kalecki argued that profits, and not prices, determine entrepreneurs' decisions; he also disagreed with Tinbergen's assigning a relatively low importance to changes of the total stock of fixed capital throughout the cycle. In the discussion of F. Divisia's paper on the theory of duopoly, Kalecki emphasized the importance of under-utilization of productive capacity which, though ruled out under the perfect competition assumption, nevertheless was a fact.

In the discussion of Kalecki's paper, several points were made (apart from that already mentioned by Wiśniewski): (i) that the price of the product was apparently not required as a link between capacity utilization and profits (Tinbergen); (ii) that the rate of replacements was assumed to be constant in the course of the cycle (Tinbergen); (iii) that a credit inflation was necessarily implied by Kalecki's explanation of the business cycle (Machlup); (iv) that the uniqueness proof presented by Kalecki was unsatisfactory (Frisch); and, perhaps most importantly, (v) that one must not assume a priori such values of the parameters of the business cycle equation as to render cyclical fluctuations of a constant amplitude, to the exclusion of damped or explosive fluctuations (Frisch).

These discussions were followed by R. Frisch's and H. Holme's article (see Annex 1), and many remarks about Kalecki's model in Tinbergen's review of quantitative theories of the business cycle (see Annex 2).

Frisch and Holme demonstrated the correctness of Kalecki's assertion that his basic differential equation for the volume of investment has at most one cyclical solution for a longer period than the average construction time of fixed capital. Their article, which is an important addition to the formal argument of the *Essay*, served as a basis for many interpretations of Kalecki's model: see *inter alia* T. C. Koopmans, 'The Degree of Damping in Business Cycles', *Econometrica*, 8/1, 1940, pp. 79–80; R. G. D. Allen, *Mathematical*

Economics, London, Macmillan, 1965, ch. 8.4–8.6; O. Lange, *Dzieła*, vol. i, Warsaw, PWE, 1973, pp. 156–86, and vol. v, 1977, pp. 530–8 (both in Polish); for an assessment of the Frisch and Holme article by mathematicians, see R. L. Bellman and K. L. Cooke, *Differential–Difference Equations*, New York, Academic Press, 1963, pp. 444–6.

ANNEX 1

The Characteristic Solutions of a Mixed Difference and Differential Equation Occurring in Economic Dynamics[1]

R. FRISCH, H. HOLME

Introduction

In his lecture at the meeting of the Econometric Society at Leyden in 1933, Mr Kalecki presented a highly interesting macro-dynamic study of an economic system. His paper will appear in a later issue of *Econometrica*. It is seen that his analysis leads up to the mixed difference and differential equation

$$\dot{y}(t) = ay(t) - cy(t-\upsilon), \tag{1}$$

where y is the unknown function (in Kalecki's notation $J(t)$), a and c non-negative constants, and υ a given (positive) lag. This type of equation is apt to occur in various kinds of dynamic economic problems. It deserves, therefore, the attention of econometricians. The present paper attempts to give a somewhat detailed discussion of its characteristic solutions.

In Kalecki's problem the constants a and c are to be empirically determined. They are equal to

$$a = \frac{m}{\upsilon},$$

$$c = \frac{m + n\upsilon}{\upsilon}, \tag{2}$$

where m and n are the empirical non-negative constants discussed in Kalecki's paper. Using available statistics and smoothing the constants in such a particular way that the main cyclical solution of (1) becomes *undamped*, Kalecki obtains the values

$$m = 0.95 \qquad n = 0.121 \qquad \upsilon = 0.6 \text{ (years)} \tag{3}$$

The imposition of the condition that the solution shall be undamped is in my opinion not well founded. It is more correct, I think, to be prepared to accept any damping which the empirically determined constants will entail, and then explain the maintenance of the swings by erratic shocks. This would

[1] *Econometrica*, 3/2, 1935, pp. 225–39. The publishers' permission to reproduce this article is gratefully acknowledged.

be an explanation along the lines indicated in my paper in the Cassel volume.[2] If this is done, the amount of damping of the theoretical solution of (1) will be an additional feature which may later, in a more detailed analysis, be used to explain the degree to which the observed cycles are *irregular* with respect to length. In the following, no assumption will be made, therefore, about the solution of (1) being undamped.

At the Leyden meeting a discussion arose regarding the question of whether the period $T=10$ years obtained by Mr Kalecki was the only solution, or whether other periods could also be found. Since the equation (1) is a mixed difference and differential equation, it is clear that its characteristic equation will be transcendental and probably give an infinity of roots. Kalecki contended, however, that all these roots would correspond to periods shorter than υ, except the one solution $T=10$ years which he had found. More generally, he contended that there would always exist at most one solution with a period longer than υ (provided the empirical constants m and n were non-negative). He maintained that this proposition was an immediate consequence of the similar proposition which Tinbergen had developed regarding the special equation obtained from (1) by putting $a=0$. In the discussion, the objection was raised that, even though it be true that Kalecki's equation can by a suitable transformation be reduced to Tinbergen's, at least it was not obvious why the proposition in question should hold for the solutions of Kalecki's equation simply because it holds for those of Tinbergen's. In the version of his paper, which will appear in *Econometrica*, Kalecki does not go into any further analysis of this matter, but has asked me to do so. One of the results which follows from the present analysis is that Kalecki's contention is right; there actually exists at most one root giving a period longer than υ.

In the present paper the problem is treated by starting directly from equation (1) as it stands, without transforming it to the Tinbergen form. This has the advantage that the role played by the coefficients of equation (1) is recognized more directly.

A greater part of the mathematics involved in the present note has been worked out under my direction by Mr Harald Holme, assistant at the University Institute of Economics, Oslo. The paper is, therefore, presented as written in joint authorship.

Ragnar Frisch

1. *The Characteristic Equation and the Function*

$$f(u)=\frac{u}{\operatorname{tg}u}+\operatorname{Log}\frac{\sin u}{u}$$

[2] See R. Frisch, 'Propagation Problems and Impulse Problems in Dynamic Economics', in *Essays in Honour of Gustav Cassel*, London, Frank Cass, 1933.

If a function of the form

$$y(t)=e^{\rho t}, \tag{4}$$

where ρ is a constant, shall satisfy (1), ρ must be a root of the characteristic equation

$$\rho=a-ce^{-\rho\upsilon} \tag{5}$$

This is verified simply by differentiating (4) and inserting into (1).

Writing ρ in the form

$$\rho=\beta+i\alpha, \quad i=\sqrt{-1}, \tag{6}$$

where α and β are real, the equation (5) takes the form

$$\beta+i\alpha=a-ce^{-\beta\upsilon}(\cos\alpha\upsilon-i\sin\alpha\upsilon)$$

Separating the real and imaginary parts of this equation, and putting for brevity

$$u=\alpha\upsilon, \qquad v=\beta\upsilon, \tag{7}$$

we obtain the two equations

$$\frac{\sin u}{u}=\frac{1}{c\upsilon}e^{v} \tag{8}$$

$$\cos u=\frac{a\upsilon-v}{c\upsilon}e^{v}, \tag{9}$$

where all the quantities involved are now real.

From the two equations (8) and (9) we may eliminate v by means of elementary functions. From (8) we get indeed $v=\operatorname{Log}c\upsilon+\operatorname{Log}\sin u/u$, where Log stands for the natural logarithm. Inserting this expression for v into (9), we get

$$\cos u=\left(C-\operatorname{Log}\frac{\sin u}{u}\right)\frac{\sin u}{u}$$

that is,

$$f(u)=C, \tag{10}$$

where $f(u)$ is the function

$$f(u)=\frac{u}{\operatorname{tg}u}+\operatorname{Log}\frac{\sin u}{u} \tag{11}$$

and the constant C is equal to

$$C=a\upsilon-\operatorname{Log}c\upsilon. \tag{12}$$

It is important to notice that the function $f(u)$ may be tabulated and plotted once for all, since it does not depend on any of the empirical coefficients a, c, and υ, which define the differential equation (1). The shape of the function $f(u)$, as well as numerical tables of its ordinate, will be given later.

Thus, in the present case the determination of the characteristic roots is reduced to the solution of *one* real equation instead of two simultaneous equations. This simplifies the problem considerably.

In order that a real exponential function shall be a solution of (1), it is necessary and sufficient that its exponent ρ be a real root of equation (5), and in order that a (damped) sine curve shall be a solution of (1), it is necessary and sufficient that its frequency α, i.e. the parameter

$$\alpha = \frac{2\pi}{T}, \text{ where } T \text{ is the period} \tag{13}$$

shall be $\alpha = u/\upsilon$, where u is a real root of (10).

2. *The Criterion for the Existence of Real Exponential Solutions*

The equation (5) may be written

$$\frac{a}{c} - \frac{w}{c\upsilon} = -w \tag{14}$$

where

$$w = \rho\upsilon \tag{15}$$

In a rectangular system of axes let us draw the two curves whose abscissa is w and whose ordinates are respectively $a/c - w/c\upsilon$ and e^{-w}; the first of these curves is a straight line and the second an exponential (see Fig. 30). These two curves may have no, one, or two points of intersection.

If $a > c$, the straight line crosses the ordinate axis in a point above that in which the exponential crosses the ordinate axis. Since the slope of the straight line is negative, there exist in this case always two points of intersection between the two curves of Fig. 30, namely, one with a positive and one with a negative w. The case $a > c$ is, however, of no great interest in the present case; by virtue of (2) we may indeed assume

$$a < c \tag{16}$$

This being so, let us first determine the condition that must be fulfilled in order that the two curves in Fig. 30 shall have exactly one point in common when $a < c$. Since the slope of the straight line is negative, this is equivalent to determining the condition for tangency between the two curves. The slope of the straight line is $-1/c\upsilon$ and that of the exponential is $-e^{-w}$, the condition for tangency consequently $e^{-w} = 1/c\upsilon$, that is,

$$w = \operatorname{Log} c\upsilon \tag{17}$$

Inserting this in (14), we obtain the equation $C = 1$. Thus, if there is tangency between the two curves, we must have $C = 1$. The reciprocal is also true. Indeed, suppose that $C = 1$ and let us consider the points on the two curves that have the common abscissa $w = \operatorname{Log} c\upsilon$. It is easily found that these points must also have the same ordinate on the two curves and the same slope; consequently, there must be a point of tangency; $C = 1$ is, therefore, the necessary and sufficient condition for tangency. Obviously, at most one point of tangency can exist. Such a point of tangency means that (14) has two coinciding solutions, which in turn means that the two time functions $e^{wt/\upsilon}$ and $te^{wt/\upsilon}$ are both solutions of the differential equation (1), w being the abscissa of the point of tangency in Fig. 30.

Now suppose that $C > 1$. By keeping c and υ constant and *decreasing* a—if necessary down to minus infinity—it will always be possible to reduce C from its original value, which was above unity, to some value below unity. Since C is continuous in a, it must consequently pass $C = 1$. But reducing a, while c and υ are kept constant, means *lowering* the point P in Fig. 30 where the straight line crosses the ordinate axis, but keeping the slope of the straight line unchanged. In other words, if $C > 1$, we get tangency by lowering P and keeping the slope unchanged. This means that in the original position the straight line must have *intersected* the exponential. Since the exponential is always curved upwards and extends to infinity in both directions, exactly *two* points of intersection must have existed in the original position.

On the other hand, if originally $C < 1$, it is always possible by increasing a, and keeping c and υ constant, to bring C up to 1. It is even possible to do this without letting a surpass c. Indeed, for $a = c$, C becomes equal to $c\upsilon - \operatorname{Log} c\upsilon$

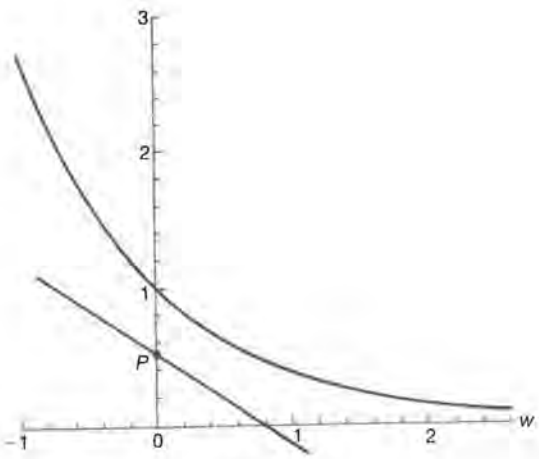


FIG. 30

and it is well known that this difference is always larger than unity when $c\upsilon$ is positive. Thus, if $C<1$, we get into a situation of tangency by *raising* P, which means that originally the straight line did *not* intersect the exponential.

This shows that (if $a<c$) *the equation* (1) *has no, one, or two (different) real exponential solutions, according as* $C<1$, $C=1$, or $C>1$. In the case $C=1$, there further exists a solution which is t times an exponential.

3. *The Criterion for Existence of Cycles*

To each real solution in u of the equation (10) corresponds a cycle in the form of a sine curve that may either be damped, undamped, or 'explosive'. The existing solutions are immediately indicated by plotting the function $f(u)$ and noticing the points where this curve intersects the horizontal drawn at the height C. Figure 31 and Table 31 indicate the shape of the function $f(u)$.

Since $f(u)$ is an even function in the argument u, it is sufficient to study it for positive u. This is only another expression for the fact that imaginary roots of the characteristic equation must always occur in conjugate pairs. This is seen by noticing that the left members of (8) and (9) are even functions of u, so that, if a given u satisfies the characteristic equation, the same u with its sign reversed (and with the same v) must also satisfy.

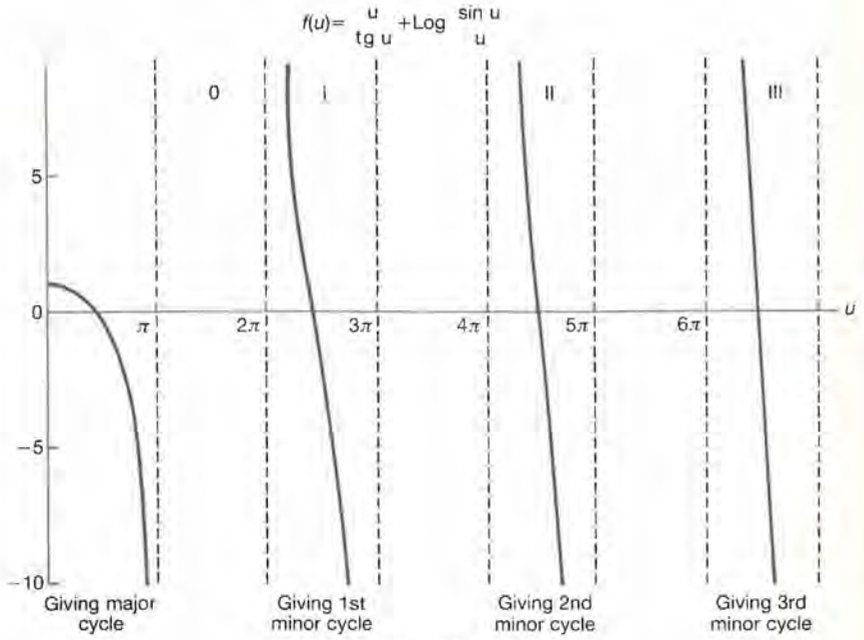


FIG. 31

Table 31. *Table of* $f(u)=(u/tg\,u)+Log(\sin u/u)$

0 $0\leqq u\leqq\pi$		I $2\pi\leqq u\leqq 3\pi$		II $4\pi\leqq u\leqq 5\pi$		III $6\pi\leqq u\leqq 7\pi$	
u/π	$f(u)$	u/π	$f(u)$	u/π	$f(u)$	u/π	$f(u)$
0.00	1.0000	2.00	∞	4.00	∞	6.00	∞
0.02	0.9979	2.125	13.26				
0.04	0.9920	2.25	4.766	4.30	6.999	6.30	11.18
0.06	0.9822						
0.08	0.9682	2.37	1.128	4.37	3.235	6.41	2.807
0.10	0.9504	2.38	0.8754			6.42	2.141
0.12	0.9283	2.39	0.6268				
0.14	0.9024	2.40	0.3793	4.40	1.815	6.43	1.485
0.16	0.8718	2.41	0.1346	4.41	1.356	6.44	0.8350
0.18	0.8372	2.42	−0.1088	4.42	0.9016	6.45	0.1884
0.20	0.7981	2.43	−0.3508	4.43	0.4529	6.46	−0.4529
0.22	0.7546	2.44	−0.5920	4.44	0.0081	6.47	−1.096
0.24	0.7063	2.45	−0.8340	4.45	−0.4357	6.48	−2.952
0.26	0.6533	2.46	−1.076	4.46	−0.8767		
0.28	0.5953					6.6	−9.819
0.30	0.5320	2.625	−5.605	4.5	−2.649	7.0	$-\infty$
0.32	0.4636	2.75	−11.74	4.6	−7.416		
0.34	0.3891	3.00	$-\infty$				
0.36	0.3090						
0.38	0.2226						
0.40	0.1298						
0.42	0.0296						
0.44	−0.0780						
0.46	−0.1934						
0.48	−0.3179						
0.50	−0.4516						
0.60	−1.296						
0.70	−2.598						
0.80	−4.912						
0.90	−10.91						
1.00	$-\infty$						

Note: The inaccuracy of the above values of $f(u)$ amounts to about 1 or 2 units of the last digit given.

From Fig. 31 it is seen that no real branch of the function $f(u)$ exists over the intervals from π to 2π, from 3π to 4π, from 5π to 6π, etc., while in each of the other intervals a branch exists that decreases monotonically from $+\infty$ to $-\infty$, except in the interval from 0 to π, where the branch only extends from $+1$ to $-\infty$. This latter branch of the curve is also given in a larger scale in Fig. 32.

This indicates immediately what sorts of cycles will exist for a given C. If $C<1$, exactly one root u will exist in each of the intervals

$$2k\pi \leqq u \leqq (2k+1)\pi \quad (k=0, 1, 2\ldots) \tag{18}$$

If $C>1$, no root will exist in the first of these intervals while exactly one root will still exist in all the others. This means that if $C<1$ the equation (1) will have exactly one cyclical solution in each of the period ranges

$$\frac{\upsilon}{k+\frac{1}{2}} \leqq T \leqq \frac{\upsilon}{k} \quad (k=0, 1, 2\ldots) \tag{19}$$

(T = period)

while if $C>1$ it will have no solution in the first of these ranges (i.e. for $k=0$), but exactly one solution in all the other ranges. In the period ranges $\upsilon/k < T < \upsilon/(k-\frac{1}{2})$ $(k=1, 2, \ldots)$, there can never occur any solution.

The solution in the first range, i.e. for

$$2\upsilon \leqq T \leqq \infty \tag{20}$$

we shall call the major cycle, the others we shall call the minor cycles. All the latter are shorter than the lag υ, while the first is larger than υ. From Fig. 31 it is even seen that it is larger than 2υ.

In the limiting case $C=1$, we may still say that (10) has a solution, but it is a degenerate one, namely $u=0$, which means that the corresponding cycle has an infinite period; in other words, it is nothing but an exponential. Thus, we retrieve here the result of section 2, namely, that in the case $C=1$ there exists an exponential solution.

The various possible cases are summarized in Table 32.

4. *Calculation of the Roots*

Each of the real roots, if they exist, may be determined to a first approximation w_1 by a graphical reading from Fig. 30 and then improved to a second approximation w_2 either by the formula

$$w_2 = \upsilon a - \upsilon c e^{-w_1} \tag{21a}$$

or by

$$w_2 = \mathrm{Log}\, c\upsilon - \mathrm{Log}(a\upsilon - w_1) \tag{21b}$$

If necessary, the process can be repeated, inserting each time in the second member the new approximation found for w.

The formula (21a) is obtained by writing (14) in the form $w=g(w)$, where $g(w)=\upsilon a - \upsilon c e^{-w}$, and then replacing w in the left member by w_2 and in the right member by w_1. Similarly (21b) is obtained by writing (14) in the form $w=g^{-1}(w)$, where g^{-1} is the inverse function of g. In other words, (21b) may be looked upon as obtained by solving (21a) with respect to w_1 and then interchanging the subscripts 1 and 2.

It is well known that the condition for convergency of an iteration process based on an equation of the form $w=g(w)$ is that[1] the absolute value of the derivative $g'(w)$ be less than unity over the interval where the iteration takes place. Since the derivative of the inverse function is one divided by the derivative of the function itself, it will in some cases be best to use (21a) and in others (21b). In practical work a few tentative calculations will soon indicate which one of the two procedures is the best.

The convergency of the process will as a rule be greatly improved by using the powerful formula of Steffensen[2]

$$w' = w_1 - \frac{(\Delta w_1)^2}{\Delta^2 w_1} \tag{22}$$

Here, w' is the improved value of w; w_1, w_2, and w_3, being three successive

Table 32. *Nature of the Solutions of Equation* (1), *when* $a \leqq c$

	Exponentials	Major cycle (with a period longer than the lag υ)	Minor cycles (with periods shorter than the lag υ)
$C>1$	2 exponentials with different exponents	No major cycle	Exactly 1 minor cycle in each of the period ranges
$C=1$	1 pure exponential and 1 exponential multiplied by t (time). The exponents in these 2 time functions are equal.	No major cycle	$\frac{\upsilon}{k+\frac{1}{2}} \leqq T \leqq \frac{\upsilon}{k}$ $(k=1, 2, 3,\ldots)$
$C<1$	No exponential	Exactly 1 major cycle. Its period must be equal to or larger than 2υ.	No cycles in the period ranges $\frac{\upsilon}{k} < T < \frac{\upsilon}{k-\frac{1}{2}}$ $(k=1, 2, 3,\ldots)$

[1] C. Ruange, *Praxis der Gleichungen*, Berlin, Goschens Lehrbücherei, 1921, p. 48.
[2] *Skandinavisk Aktuarietidskrift*, 1933, p. 68. See also the paper by Harald Holme, ibid., 1932, p. 229.

approximations found by the original process, that is, in this case by equations (21a) or (21b). The difference symbols in (22) are defined by

$$\Delta w_1 = w_2 - w_1 \tag{23}$$

$$\Delta^2 w_1 = w_3 - 2w_2 + w_1 \tag{24}$$

If a still greater accuracy is desired, the process defined by (22) may, of course, be iterated. The formula of Steffensen is in many cases capable of producing convergency even though the original process does not converge.

For the cyclical components, the parameters u and v can be determined as follows. If the frequency is not very small, one starts by determining a first approximation to u by a graphical reading from Fig. 31 (or, for the major cycle, better from Fig. 32). The corresponding value of v is determined from the equation

$$v = \mathrm{Log}\left(c\upsilon \frac{\sin u}{u}\right) \tag{25}$$

which is only another form in which to write (8). Inserting the value of v thus determined into the right member of (9), we get a new value of u, which again may be inserted in the right member of (25). Continuing in this way, closer and closer approximations to the numbers u and v will usually be obtained. This is the method that has been used for the numerical computations in Tables 28, 29 and 30. An alternative procedure would be first to determine the solution of the one variable equation (10) to the accuracy desired, using a similar method to that indicated in (21a), (21b), and (22), and then finally to determine v by (25).

If the root u in question is small, the graphical reading from Fig. 32 becomes difficult. In this case one may start by finding an approximation to v. For this purpose we consider the formula

$$v = a\upsilon - \frac{u}{\mathrm{tg}\, u} \tag{26}$$

which is obtained by eliminating e^v between (8) and (9). When C is close to unity, u for the major cycle is very small and, hence, $u/\mathrm{tg}\, u$ close to unity. Consequently, if C is close to unity, v will be approximately equal to

$$v = a\upsilon - 1 \tag{27}$$

Incidentally, this is the value of v that maximizes the right member of (9).

When a first approximation to v is determined by (27), (9) and (25) may be used alternately, as before, to determine closer and closer approximation to the set (u, v) in question.

In most practical cases the parameter C will probably lie between 0 and 1, which by the criteria of section 3 means that all the solutions are cycles. If we assume that C lies in this interval, it is possible to indicate a much sharper

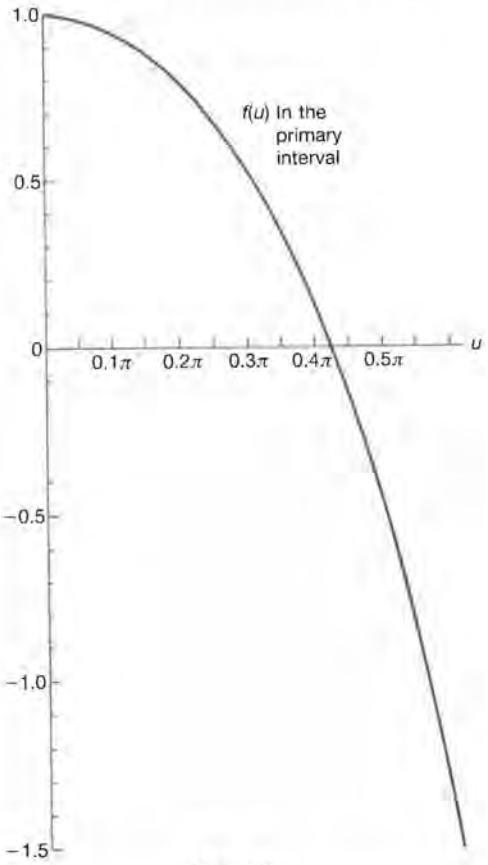


FIG. 32

lower limit for the period of the major cycle than the one given in (20), and it is further possible to indicate a very narrow range for each of the minor periods. Since, as is seen from Fig. 31, the function $f(u)$ is monotonically decreasing, the limits in question are obtained by putting in (10) $C=0$ and $C=1$ respectively. The ranges thus determined become more and more narrow, as we consider shorter and shorter cycles. The successive curve-branches to the right in Fig. 31 indeed pass zero (and unity) with greater and greater steepness. Table 33 indicates the period limits thus obtained for the major cycle and the first few minor cycles. For the still shorter cycles, the periods will even be given with good accuracy by the following limit

$$\frac{\upsilon}{k+\frac{1}{2}} < T \quad (\text{when } 0<C) \tag{28}$$

$$(k = 0, 1, 2\ldots)$$

Table 33. $0<C<1$ (*and Consequently All Solutions are Cyclical*), *the Ratios between the Periods and the Lag* υ *Must Lie between the Following Limits*

	Lower limit	Upper limit
Major cycle	4.706	∞
1st minor cycle	0.828	0.843
2nd minor cycle	0.450	0.453
3rd minor cycle	0.310	0.311

In order to prove this, we first notice that in each of the possibility intervals $f(u)$ is monotonically decreasing. This is obvious from Fig. 31 and may be proved in general as follows. The derivative of $f(u)$ is

$$f'(u)=\frac{df(u)}{du}=\frac{u\sin 2u-(u^2+\sin^2 u)}{u\sin^2 u} \tag{29}$$

We are only considering the intervals $2k\pi<u<(2k+1)\pi$; here the denominator of (29) is positive and the numerator is negative for $u>0$. Indeed, the function

$$\phi(u)=u\sin 2u-(u^2+\sin^2 u) \tag{30}$$

is zero for $u=0$, and its derivative

$$\phi'(u)=2u(\cos 2u-1)=-4u\sin^2 u \tag{31}$$

is negative for $u>0$.

This being so, let us consider the value of $f(u)$ in the *middle* of each of the possibility intervals, that is, for $u=(2k+\frac{1}{2})\pi$. Here we have

$$f=-\operatorname{Log}(2k+\tfrac{1}{2})\pi \tag{32}$$

which is negative for all non-negative k. Thus, the point where $f(u)$ vanishes must be situated in the *left* half of each of the intervals. This in connection with Fig. 31 shows that the point where $f(u)$ vanishes approaches from the left towards the midpoint of the interval as we consider intervals situated more and more to the right.

The goodness of the approximation (28) is illustrated by comparing it with the lower limits for the first few cycles given in Table 32.

5. *The Periods and the Damping Exponents as Functions of the Empirical Constants*

In his first paper, Kalecki gives some examples of how the length of the major period changes with changes in some of his empirical constants, under the assumption that the constants must always be such that the major cycle turns out to be undamped. For the reasons previously given, it seems to be more significant to ask how the length of the major cycle and the damping exponent will both vary when certain unconditional changes are made in the empirical constants. In particular, it is interesting to see what changes will be entailed if Kalecki's constants $m=0.95$ and $n=0.121$ are maintained unchanged but the lag υ varied. The result is as indicated in Table 35 and Fig. 33.

Table 34. *Limits of Cycles when* $C>0$ *and on the Basis of Equation* (28)

	Exact lower limit when $0<C$	Lower limit by (28)
Major cycle	4.706	4.000
1st minor cycle	0.828	0.800
2nd minor cycle	0.450	0.444
3rd minor cycle	0.310	0.308

Table 35. *The Period* T *and the Damping Factor as Functions of the Lag* υ *when* $m=0.95$ *and* $n=0.121$

Lag	Empirical constant C	Period of major cycle T	Damping factor per period $e^{2\pi\beta/\alpha}$
0.01	1.0000	∞	0
0.012	0.9997	3.08	0.0000
0.02	0.9987	2.56	0.0019
0.05	0.9949	3.14	0.0526
0.1	0.9886	4.21	0.1656
0.2	0.9761	5.76	0.4288
0.4	0.9516	8.10	0.7016
0.6	0.9277	9.95	0.9725
0.8	0.9043	11.54	1.224
1.0	0.8814	12.98	1.461
1.4	0.8372	15.56	1.925
2.0	0.7744	18.95	2.609
3.0	0.6777	23.90	3.768
4.0	0.5895	28.38	4.968
5.0	0.5085	32.57	6.241
6.0	0.4336	36.57	7.584
7.0	0.3639	40.38	8.962
8.0	0.2987	44.15	10.43
9.0	0.2376	47.78	11.94
10.0	0.1799	51.35	13.49

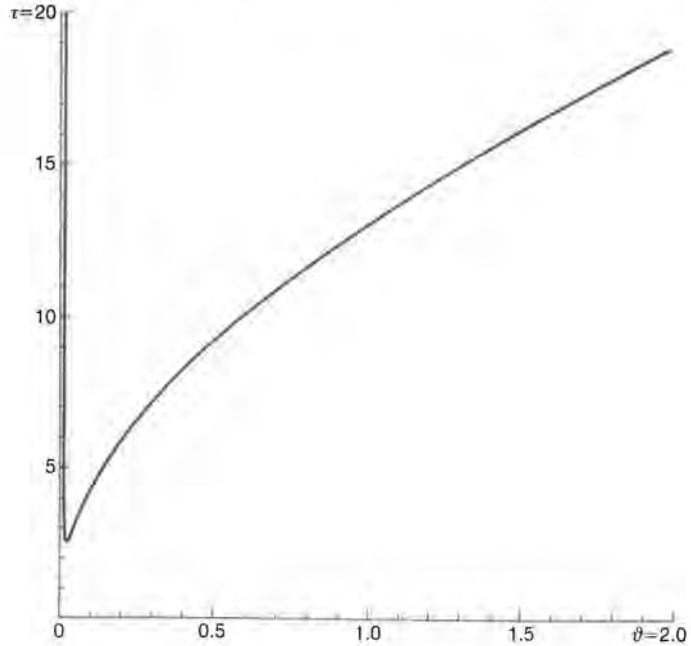


FIG. 33

It is seen that the period, roughly speaking, changes proportionately to υ, until υ comes down to about 0.02. From here on the period shoots up almost perpendicularly, if υ becomes still smaller.

It will further be noticed that there is actually a damping of the major cycle when υ is less than approximately 0.6, that is, the value adopted by Kalecki. And there is 'anti-damping' when υ is larger. We only need to make a slight change in υ from Kalecki's value in order to have an 'anti-damping' which is absolutely unrealistic. This is another fact which seems to point out that there is something artificial in fixing, by convention, the values of the constants in such a way as just to obtain an undamped solution.

The variation of the minor periods with υ is described rather closely already by the limits indicated in Table 34 and by formula (28). It is seen that all these periods change virtually proportionally to υ, no matter how the empirical constants are determined, provided only that $0 < C < 1$; the first and second minor periods are, for instance, always about 0.83 and 0.45, respectively, times the lag υ.

In Annex 2 we reproduce from Tinbergen's article an excerpt devoted to Kalecki's trade cycle model.

ANNEX 2

Annual Survey: Suggestions on Quantitative Business Cycle Theory[1]

J. TINBERGEN

12. *The Mathematical Theories*

I now turn to a discussion of some business cycle theories that form macro-dynamic closed systems and are formulated mathematically. The first publication of this sort was a paper in Polish by Kalecki in *Próba teorii koniunktury* (Warsaw, 1933).[1] A few months later appeared Frisch's 'Propagation Problems and Impulse Problems'. Both theories were presented at the Leyden meeting of the Econometric Society in 1933. Kalecki draws our attention chiefly to the following concepts.

Let $I(t)$ be the physical volume of investment orders at moment t. Then, assuming a *constant period of production* for investment goods, deliveries of newly produced investment goods, $L(t)$, will be equal to:

$$L(t) = I(t - \upsilon) \tag{12a}$$

Assuming, further, a *constant volume of replacement* U, the *increase* K' of the total volume of capital goods present (the volume itself being K) will be:

$$K'(t) = L(t) - U \tag{12b}$$

On the other hand, we get, starting again from $I(t)$, an expression for the total volume of unfilled orders for investment goods (supposing each order is immediately put in hand) or of the total work in execution at t:

$$W(t) = \int_{t-\upsilon}^{t} I(\tau)d\tau \tag{12c}$$

The productive activity in investment goods industries will be proportional to this expression: $A = W/\upsilon$.

At this point, the most important assumption of Kalecki's system comes in. It is supposed that the volume of investment orders, $I(t)$, is determined by an equation of the type

$$I(t) = C' + mA(t) - nK(t) \tag{12d}$$

[1] *Econometrica*, 3/3, 1935, pp. 268–70, s. 12. The publishers' permission to reproduce this excerpt is gratefully acknowledged.

[1] For an English version of Kalecki's theory, see 'A Macro-dynamic Theory of Business Cycles' in this issue of *Econometrica* [see pp. 120–38 in this volume].

where C', m, and n are constants; C' is here written with a prime because it is not exactly the same as Kalecki's C. The justification of equation (12d) is given by Kalecki by introducing it in the form:

$$\frac{I(t)}{K(t)} = m' \frac{C'_0 + W(t)}{K(t)} - n \qquad (12e)$$

indicating that the relative investment (relative to capital already present) is governed by the expression on the right side representing a linear function of relative profits.

It is easily seen that equations (12a–d) lead to a mixed difference and differential equation. Kalecki shows that one of the components which this system may show—and the one which economically is the most important—is a periodic movement with a period which, assuming realistic values for the constants, turns out to be 10 years.[2]

The reader will observe that there are two dynamic features in Kalecki's system, viz. the production lag and the appearance of K—which has an integral character—in equation (12d). These features have been mentioned in section 4; they are essential to this theory in so far as the omission of one of them would lead to a non-oscillatory system. My impression is that the supposed influence of K is rather questionable.[3] A happy feature of Kalecki's system is the fact that he places capital goods production in the centre. A very remarkable feature is that the very small number of variables included is sufficient to get a 'closed system'. The fact that other much-discussed concepts do not appear explicitly in it does not mean that they would not show any business cycle. For money rates, Kalecki states *expressis verbis* that they are assumed to be parallel to $W(t)$. The same thing might be assumed about prices which, remarkably enough, do not appear at all in his theory. Although general economic theory is accustomed to give the central place to prices and although I myself, in an attempt to give business cycle schemes, did so too, I do not consider this feature of Kalecki's system a great disadvantage. In many cases, statistical investigation leads to the suggestion that the role of prices is not so important as we have become accustomed to think. It is, in fact, quite possible that investment activity is predominant, a fact recognized and emphasized by many modern authors.

Like many other mathematical schemes, Kalecki's system will hold good even when quite different assumptions are taken as a base. Thus, the term with

[2] A fuller discussion of these numerical results is given in Kalecki, 'A Macrodynamic Theory of Business Cycles', and by Frisch and Holme [see Annex 1].

[3] This is illustrated by the way in which revival generates in this scheme. Although profits are still decreasing, it is by the decrease in capital that percentage profits increase and, in Kalecki's argument, investment is stimulated again. Is this sufficiently realistic?

K in equation (12d) might be interpreted by pointing to the influence of productivity on profits (cf. s. 4).

A striking difference from one of the schemes to be discussed further on, in section 18, consists in the assumption of constancy of replacement. The schemes later to be mentioned assume just the opposite, i.e. that replacement demand after the lifetime of equipment has elapsed is the principal factor in the new revival. It is interesting to note that these schemes do not need the two dynamic features that are essential in Kalecki's system.

The Kalecki solution is, in one sense, of restricted value; he chooses such a solution as has zero dampening. As Frisch points out,[4] the solutions of the Kalecki equations, particularly their dampening characteristics, are very sensitive to variations in the data; it is an interesting question whether this is in accordance with facts. On the other hand, the period is not so sensitive, and this is an advantage in comparison with my own schemes.

To conclude, the structure of Kalecki's system entails certain difficulties of great practical importance. It is not clear, for example, how a price stabilization should be represented by it. What constants will be changed by price stabilization, or what additional terms will appear in the equations? How should other disturbing factors, such as changing crops, react on them?

The reader will have remarked, nevertheless, that there are important features in the theory, and that the exact form in which it is presented creates the possibility of a clear and fruitful discussion.

After the 'Essai' was published, Kalecki sent a copy to Aftalion, from whom he received the following letter (the French original is in Kalecki's private papers):

11 June 1935

Dear Sir,

Thank you very much for sending me your article. I sincerely congratulate you on such a marvellous study. Your constructions are clever, and the conclusions correctly drawn. The whole seems very penetrating and convincing.

Yours sincerely,
A. Aftalion

Kalecki's paper in Leyden and the publication of the English and French versions of the *Essay* quickly brought him recognition among a narrow circle of specialists in the theory of the business cycle. Nevertheless, Joan Robinson's claim that Kalecki's theory made little impact on the broader economic community, because 'he had published an article in French which nobody

[4] Op. cit. (n. 2).

read and a mathematical article which nobody understood' (J. Robinson, *Collected Economic Papers*, vol. iv, Oxford, Blackwell, 1973, p. 87; see also her preface to Kalecki, *Studies in the Theory of Business Cycles 1933–39*, p. x) is certainly correct—as evidenced also by Kalecki being recognized many years later as possibly the most neglected economist of his time. The same can be said for the reception of the original version of the *Essay* in Poland. Kalecki's exposition of his theory of the business cycle in the *Essay* was not read because it seemed dry and difficult to follow. The theory of employment and the principles of generating a business upswing, which followed from it, with very few exceptions did not begin to attract attention until much later, and generally in connection with the publication of Keynes's *General Theory* in 1936. In 1939 O. Lange wrote: 'M. Kalecki entirely independently created a theory of employment similar to the one developed in Cambridge and on its basis constructed a theory of the business cycle ('The Neo-Classical School in Economics', in O. Lange, *Dzieła*, vol. iii, Warsaw, PWE, 1975, p. 68 (in Polish)).

Until the publication of his *General Theory*, Keynes himself most probably did not know those works of Kalecki that preceded his book, though they were known in Keynes's immediate circle. The first mention of these works was made by E. A. G. Robinson in his reminiscences of Keynes ('John Maynard Keynes, 1883–1946', *Economic Journal*, 57/1, 1947). In 1951 Lawrence R. Klein wrote:

> Recently, after having re-examined Kalecki's theory of the business cycle, I have decided that he actually created a system that contains everything of importance in the Keynesian system, in addition to other contributions. Kalecki does not deal at all with liquidity preference and the interest rate; yet I believe that he has a theory of employment that is the equal of Keynes's. Kalecki's theory attracted attention for reasons largely unrelated to its revolutionary statement of the theory of employment, and he certainly lacked Keynes's reputation or ability to draw world-wide attention; hence his achievement is relatively unnoticed.
>
> Some aspects in which Kalecki's model is superior are that it is explicitly dynamic; it takes income distribution as well as level into account; and it makes the important distinction between investment orders and investment outlays. ('The Life of J. M. Keynes', *Journal of Political Economy*, 59/3, 1951, pp. 447–8.)

Discussing Kalecki's model in the context of post-war econometric models, the same author wrote in 1964:

> The Marxian schemes of reproduction and accumulation and the Keynesian models of effective demand are the fore-runners of the present theoretical model building. It is often not adequately appreciated how the Kalecki model, constructed in the Marxian spirit, actually pre-shadowed all essential ingredients of the Keynesian system that have made the later system so popular among the present generation of Western economists. ('The Role of Econometrics in Socialist Economies', in *Problems of Economic Dynamics and Planning: Essays in Honour of M. Kalecki*, Warsaw, PWN, and Oxford, Pergamon, 1964, p. 189; see also the same author's *The Keynesian Revolution*, London, Macmillan, 1966, pp. 224–5.

According to Joan Robinson, Keynes succeeded in combining his theory of money, his theory of wages, and Kahn's multiplier into a coherent theoretical system only during the summer of 1934. On this basis she argued:

> Michał Kalecki's claim to priority of publication is indisputable. With proper scholarly dignity (which, however, is rather rare among scholars) he never mentioned this fact. And indeed, except for the authors concerned, it is not particularly interesting to know who first got into print. The interesting thing is that two thinkers, from completely different political and intellectual starting points, should come to the same conclusion. ('Kalecki and Keynes', in *Collected Economic Papers*, vol. iii, Oxford, Blackwell, 1965, p. 95)

It is not exactly true, however, that Kalecki never mentioned publishing his theory before Keynes. He discreetly implied this in 1936, in notes to his review of Keynes's *General Theory* (in Polish; see also pp. 228 and 229 in this volume) and (in English) in notes to the essays 'A Theory of the Business Cycle' and 'Money and Real Wages', both in his *Essays in the Theory of Economic Fluctuations*, this volume; it is quite another matter that the implications of these notes were overlooked by readers. Moreover, Kalecki's review of Keynes's book could have been interpreted as laying claim to being first, as well as showing the similarities and differences between his own theory and Keynes's *General Theory*.

In this context it is also worth citing the opinion of Kalecki's American biographer, G. R. Feiwell, who writes as follows:

> Because of his dignified silence about his priority of publication at the time Keynes's *General Theory* appeared, and in general his distaste for 'promoting' or 'advertising' his ideas, Kalecki has always been regarded as a very modest man. He believed a man's worth will sooner or later be recognized by others, and that real dignity lay in waiting for that recognition rather than in demeaning oneself to prod it along. That for him the recognition came later rather than sooner, however, made him quite bitter and generally disenchanted. He was totally free of false modesty, but knew his worth and was resentful when it was not acknowledged by others. (G. R. Feiwell, *The Intellectual Capital of Michał Kalecki*, Knoxville, Tenn., Knoxville, Univ. Press, 1975, p. 15.)

In the early 1980s the question of Kalecki's priority over Keynes was revived by Don Patinkin, who concluded that neither the Stockholm School nor Kalecki had anticipated Keynes (see *Anticipation of the General Theory and Other Essays on Keynes*, Chicago, Ill., Univ. of Chicago Press, 1982; see also Bhattacharyea and Raghunathan, 'Keynes, Kalecki and the Question of Priority'). This conclusion was subsequently shown to depend heavily on Patinkin's rather restrictive definition of the 'central message' of the *General Theory* (see A. Asimakopulos, 'Anticipation of Keynes's General Theory', *Canadian Journal of Economics*, 16/3, 1983), as well as on forcing Kalecki's theory into the strait-jacket of Keynes's static unemployment equilibrium and treating Kalecki as a Keynesian. When this procedure is reversed, however, wholly different conclusions follow with respect to the priority question;

unfortunately, either procedure is bound to overshadow important differences in the main subject-matter of the *General Theory* and the *Essay*, their respective theoretical backgrounds, and their conceptual frameworks (see J. Osiatyński, 'Don Patinkin on Kalecki and Keynes', *Oeconomica Polona*, 1, 1985). While Osiatyński and Asimakopulos both emphasize the difference between Kalecki's and Keynes's main subjects of investigation, Asimakopulos eventually reaches this conclusion:

> That Kalecki's analytic framework can be used very effectively to demonstrate the possibility of continuing involuntary unemployment, is clear from the way it was used by Kalecki (and Robinson) for this purpose after the *General Theory* had been published. But that framework was developed by Kalecki to explain the business cycle, and in this connection he simply assumed the existence of involuntary unemployment. . . . It is this difference in the main concerns of Kalecki and Keynes that justifies Patinkin's . . . claim that Kalecki did not anticipate the *General Theory*. (A. Asimakopulos, 'Kalecki and Robinson: An "Outsider's" Influence', mimeo, 1987, pp. 7–8.)

The main subject of the *Essay* is a theory of the business cycle (on account of which Kalecki from the outset deals with dynamics). The theory of employment and the mechanism of the business upswing derived from it are treated marginally in the *Essay*, while the *General Theory* is primarily a theory of unemployment equilibria; the problem of regular cyclical fluctuations hardly appears in Keynes's book. As Joan Robinson wrote: 'Kalecki did not approach the theory of employment through the multiplier, which makes his version in a way less rich than Keynes's, though not less forceful. On the other hand, he went straight to a theory of the trade cycle, on which Keynes was very weak' ('Kalecki and Keynes', p. 95). These basic differences in starting-points largely determine the interrelationship between the two theories.

Most authors and reviewers writing about Kalecki's theory mention Keynes's theory, and point to similarities in the two approaches. However, a systematic comparison (based mostly on the version of Kalecki's theory presented in his *Essays in the Theory of Economic Fluctuations*) has for many years been made only by Joan Robinson (see 'Kalecki and Keynes'; 'Michał Kalecki: A Neglected Prophet', *New York Review of Books*, 4 Mar. 1976; and 'The Second Crisis of Economic Theory', *American Economic Review*, Mar. 1972; see also Feiwell, *The Intellectual Capital of Michal Kalecki*, pp. 47–86). In these comparisons Joan Robinson claimed that from the outset Kalecki's theory was richer and indeed more general than Keynes's *General Theory*, and emphasized that Kalecki filled in several gaps in Keynes's argument (see also pp. 501–2 below)

For more recent comparisons of Kalecki's and Keynes's theories, see e.g. Feiwell, *The Intellectual Capital of Michal Kalecki*; M. C. Sawyer, *Macro-Economics in Question: The Keynesian–Monetarist Orthodoxies and the Kaleckian Alternative*, Brighton, Wheatsheaf, 1982; by the same author, *The Economics of Michal Kalecki*; and Bruce McFarlane, *Radical Economics*, London, Croom Helm, 1982, ch. 3. The new wave of interest in Kaleckian and Keynesian theories is reflected in many publications, especially in the *Journal of Post-Keynesian Economics*, and perhaps best in the proceedings of the conference held in Perugia, 22–4 Apr. 1986, on 'Kalecki's Relevance Today' (ed. M. Sebastiani, Macmillan, forthcoming); see also P. J. Reynolds, *Political Economy: A Synthesis of Kaleckian and Post-Keynesian Economics*, Brighton, Wheatsheaf, 1987.

[2]
In the *Essay* Kalecki assumed 'free competition to rule unhindered in our economic system'; therefore, as in reality, not only production, employment, profits, and investment, but also prices, were subject to cyclical fluctuations. On the last pages of the *Essay* Kalecki relaxed the assumption about free competition and showed that his conclusions on cyclical changes in production, employment, investments, and profits still remained valid. But it was not until the 'Essai' that Kalecki noted that in a partially cartelized economy the general level of prices 'also depends on the policy of cartels and "members" of monopolistic groupings' (see p. 479 n. [40]).

From this time Kalecki quickly moves away from the framework of free competition to conclude, as early as 1939, that 'A world in which the degree of monopoly determines the distributions of the national income is a world far removed from the pattern of free competition. Monopoly appears to be deeply rooted in the nature of the capitalist system: free competition, as an assumption, may be useful in the first stage of certain investigations, but as a description of a normal state of capitalist economy it is merely a myth' (p. 252, this volume).

Since the assumption of free competition (as he showed in the chapter on the business cycle and cartels) did not affect the mechanism of cyclical fluctuations of the other variables but only their amplitude, relaxation of this assumption did not disturb the *mechanism* of cyclical fluctuations. Hence, from his 1937 'Theory of the Business Cycle' onwards, the automatic cyclical fluctuations no longer included changes in the prices of industrial goods. One consequence was that Kalecki, when preparing his 'Outline of a Theory of the Business Cycle' for publication, either replaced 'cyclical fluctuations of prices' with 'cyclical fluctuations of profits per unit of output' or removed it altogether.

[3]
This footnote was omitted in the 1962 'Outline'.

[4]
In the 'Outline' a footnote was added here: 'The national income is equal on the one hand to the sum of profits and wages, and on the other, to the sum of: (1) the reproduction and expansion of fixed capital and the increase in

inventories A; (2) the consumption of capitalists; and (3) the consumption of workers. Since the latter is equal to wages, profits are equal to $C+A$.'

[5]
In the 'Essai' (op. cit., p. 286) the next two sentences are put into a footnote and the rest of the section on 'Gross real profits' is replaced by a sentence: 'One may therefore conclude that in our system the increase in inventories is equal to zero, and thus gross accumulation A is equal to the production of investment goods.'

In the 'Outline' the above sentence reads: '*For the sake of simplicity we assume that aggregate inventories remain constant throughout the trade cycle.*' Then a paragraph follows which ends the section on 'Gross real profits': 'It follows from the above assumptions that the real profits P are proportional to B_0+A, where B_0 denotes the constant part of the capitalist consumption, and A the gross accumulation which is equal to the production of investment goods.'

It should also be noted that in all later versions of the *Essay* the distinction between the gross profits of 'plants' and total gross profits in the economy, which follows in the next paragraph of the original version of the *Essay*, was abandoned.

[6]
On the basis of data on changes in all commodity inventories in Germany in 1924–31, this assumption was called into question by Fogelson and Rajchman in their 'Another Comment', p. 567.

[7]
In the 'Essai' (p. 287) Kalecki supplied an additional footnote here: 'It should be noted that I, A, D, as well as P and C, are all expressed at constant prices; for instance, I represents the value of orders for capital equipment per unit of time expressed at constant prices, and therefore changes in I represent only changes in the volume of I.'

[8]
In the 'Essai' Kalecki added here: 'K does not include capital equipment under construction; in other words, we take into account only the capital equipment which already exists.'

[9]
In the 'Outline', both in the text and in equation (5), the symbol K', which suggested that increments of the value of the function with respect to infinitely small increments of the variables t were taken into account, was replaced by $\Delta K/\Delta t$, which better corresponds to the examination of changes in the value of the function in the time interval equal to υ.

[10]
This assumption, together with one which immediately follows, that the depreciation rate β used by capitalists in calculating the profitability of new investments is also approximately constant during the business cycle, was criticized by Fogelson and Rajchman. They wrote that when Kalecki speaks about the constancy of replacement needs during the cycle:

> he has in mind not proportional but absolute constancy. Regardless of the level of production of capital assets, regardless of their value, the value required each year to replace worn-out capital assets is a constant sum, the same in the good year of boom and in the worst years of crisis.
>
> At the same time, Mr Kalecki assumes in the calculations of the capitalist . . . a constant annual depreciation *rate*, hence depreciation is assumed constant in not absolute but in relative terms (in relation to the value of capital equipment existing at a given moment).
>
> Thus in Kalecki's system the book-keeping depreciation allowances have nothing in common with the wear and tear of capital equipment; the wear and tear of the capital equipment has nothing in common with actual production.
>
> On the other hand, if we assume that the depreciation rate reflects real replacement needs, a new, strange conclusion follows from these two assumptions, namely, *constancy* over time of *capital equipment* itself. Indeed, if both *absolute* replacement needs as well as the *relation* of these needs to the value of capital equipment are constant, then the value of capital equipment must also be constant. In other words, there are no new investments, since investment activities are confined to evenly wearing out capital equipment. ('Another Comment,' p. 566.)

This criticism, however, seems to overlook Kalecki's assumption in the *Essay* that a static economy is being considered, i.e. one with zero average net investments over the business cycle.

[11]
In the 'Outline' this section also incorporates the next two.

[12]
As already mentioned (see n. [5] above), Kalecki later abandoned the distinction between gross profits of plants and total gross profits, and therefore in the 'Essai' (p. 290) and in the 'Outline' the corresponding fragment reads: 'We have already denoted the volume of capital equipment at a given time by K, and the aggregate gross profit by P; consequently the gross profitability of existing plant is P/K.'

[13]
Kalecki subsequently significantly revised and abbreviated this sentence, as well as the whole section on the rate of interest which follows. (For the debates on the interrelationship proposed there by Kalecki, see pp. 112 and 141 above, and n. [15] below.) Ultimately the corresponding fragment in the 'Outline' reads:

It is known that in the course of the trade cycle the rate of interest rises

in the upswing and falls in the downswing. When we come to develop our theory, we shall try to explain this connection (see page 15). At the moment we shall accept it a priori, and on this basis we shall make the following simplifying assumption. The rate of interest i is an increasing function of the gross profitability P/K.

From this assumption and equation (7) it follows that I/K is a function of P/K:

$$\frac{I}{K} = F\left(\frac{P}{K}\right) \tag{8}$$

Let us also assume that the rate of interest increases sufficiently slowly in relation to the gross profitability P/K for F to be an increasing function.

Since, as we shown above, the gross profit P is proportional to $B_0 + A$ where B is the constant part of capitalist consumption and the gross accumulation A is equal to the production of investment goods, P/K is proportional to $(B_0 + A)/K$ and equation (8) may be written as follows:

$$\frac{I}{K} = \psi\left(\frac{B_0 + A}{K}\right) \tag{9}$$

where ψ is an increasing function.

[14]
Assumption (2) was strongly criticized by Rajchman ('Critical Remarks'); for Kalecki's rejoinder see p. 113 above.

[15]
This conclusion was questioned by Rajchman, who wrote:

> Kalecki assumes that the ratio of 'volumes' of investment orders to the volume of capital equipment I/K is an increasing function of profitability P/K and a decreasing function of the interest rate i . . . .
>
> Further, Kalecki assumes that i is an increasing function of profitability P/K and concludes from this that I/K is an increasing function of $(B_0 + A)/K$, that is an increasing function of P/K.
>
> This line of argument is false. We can see this in the following trivial counter-example. Let:
>
> $$\frac{I}{K} = \left(\frac{P}{K}\right)^a : i^b, \qquad i = \left(\frac{P}{K}\right)^c$$
>
> After substituting it follows that:
>
> $$\frac{I}{K} = \left(\frac{P}{K}\right)^{a-bc}$$

> If a, b, c are any positive values fulfilling inequality $bc > a$, then I/K is an increasing function of P/K and a decreasing function of i; i is an increasing function of P/K, but I/K is not an increasing but a decreasing function of the variable P/K. Thus the proposition that I/K is an increasing function of P/K, hence also an increasing function of $(B_0 + A)/K$, cannot be regarded as a correct conclusion from Kalecki's other assumptions. We can only accept this proposition as a new assumption. ('Critical Remarks', p. 329)

In 'A Rejoinder' Kalecki wrote that 'this assumption is so obvious that it need not have been stated formally at all' (see p. 112 above), which inspired many further critical comments in Fogelson and Rajchman's next article (see 'Another Comment', pp. 570–2), where they showed in which intervals, and when, Kalecki's $I/K = \psi(P/K)$ is an increasing, and in which a declining, function.

Kalecki provided an economic interpretation of the assumption that ψ is an increasing function in a discussion with Tinbergen on the place of prices in his theory (see Annex 2).

[16]
In the 'Outline' n. 7 was omitted.

[17]
The above proof of the positive value of coefficient n was questioned by Rajchman ('Critical Remarks', p. 331), who in conclusion accepted the condition $n > 0$ as an additional assumption by Kalecki. In his rejoinder Kalecki tried to demonstrate in greater detail that n must be positive (see pp. 115–6). In the 'Outline', Kalecki asserts only that the constant m is positive, but adds that a necessary condition for his equation on investment decision to have a cyclical solution is the positive value also of the coefficient n. Fogelson and Rajchman ('Another Comment', pp. 574 ff.) also point out that in Kalecki's argument the value of coefficient n is subordinated to an a priori assumption of the existence of the business cycle. (On the demonstration of the positive value of n given in Kalecki's 'A Rejoinder', see p. 481, n. [2] below.)

[18]
In the 'Outline' the word 'prices' was omitted.

[19]
In the 'Outline' the phrase 'profit per unit of output' was subtituted for 'prices', the part in brackets was omitted, and n. 8 was given the wording: 'We assume here that aggregate production and profit per unit of output rise and fall together, which is actually the case. This results, at least to some extent, from the fact that a part of wages consists of overheads.'

[20]
In the 'Essai' (p. 296) and in 'A Macro-dynamic Theory' (see p. 136 above), Kalecki added a note here: 'We take for granted that there is a reserve army of unemployed.'

[21]
In the 'Outline' this sentence was omitted.

[22]
In the 'Outline' the phrase 'profits per unit of output' was substituted for 'prices'.

[23]
In the 'Outline' the words 'and prices' were omitted.

[24]
In the 'Outline' the phrase 'the profits per unit of output' was substituted for 'prices'.

[25]
In the 'Essai' (p. 297) and in 'A Macro-dynamic Theory' (p. 137 above), this and preceding sentences have the wording:

Disregarding the technical side of the money market, e.g. the variable demand for means of payment, we may say that these outlays are 'financing themselves'. Imagine, for instance, that some capitalists withdraw during a year a certain amount from their savings deposits, or borrow the amount at the central bank, in order to invest it in the construction of some additional equipment. In the course of the same year that amount will be received by other capitalists in the form of profits (since, according to our assumptions, workers do not save), and again put into a bank as a savings deposit or used to pay off a debt to the central bank. Thus the circle will close itself.

[26]
In the 'Essai' (pp. 298–9), and subsequently also in the 'Outline', this sentence reads: 'In actual fact, however, credit inflation is inevitable owing to the "technical" elements of the money market mentioned above.' Then the original text of the *Essay* until the end of pt. II is replaced by a supplement on the money market (to which Kalecki referred in the 'Outline', promising that it would explain why the rate of interest rises in the upswing and falls in the downswing—see n. [13] above). The supplement, which omits altogether the first cause of the credit inflation mentioned above, and elaborates only on the second, reads in the 'Outline' as follows:

This is connected with the fact, discussed above, that the increase in production of investment goods or in the capitalist consumption, i.e. in real profits, must be reflected in the increase in aggregate production. This increase (together with the usual rise of prices which accompanies it) engenders a higher demand for money in circulation, i.e. cash and current accounts, which is met by credit inflation.

Thus the demand for money in circulation increases during the upswing and falls during the downswing. The rise and fall in the rate of interest follow suit. This is the basis of our assumption that the rate of interest i is an increasing function of the gross profitability P/K (which is only a crude approximation). This assumption enables us to pass from equation (7):

$$\frac{I}{K} = f\left(\frac{P}{K}, i\right) \tag{7}$$

where f is an increasing function of P/K and a decreasing function of i, to the equation (8):

$$\frac{I}{K} = F\left(\frac{P}{K}\right) \tag{8}$$

Moreover, we assumed that i raises sufficiently slowly in relation to the gross profitability P/K for the stimulating effect of the increase in the latter upon investment to outweigh the restraining influence of the rise in the rate of interest i. If this rate were to increase sufficiently fast for the influence of the increase in gross profitability to be fully offset, an upswing would prove impossible. There is thus a close connection between the phenomenon of the business cycle and the response of the banking system to the increase in demand for money in circulation, at a rate of interest which is not prohibitive to the rise in investment.

[27]
In an interview given to Tadeusz Kowalik, Kalecki recalled that the inspiration for his idea that investments finance themselves was an article by T. Sławiński that appeared at the beginning of the 1930s in *Przegląd Gospodarczy*. Sławiński, one of the co-editors of this journal (in which Kalecki published much and had a bi-weekly column in the section 'Commodity Markets'), a specialist on banking and finance, was an outspoken supporter of the gold standard, balanced State budgets, stability of exchange rates during crisis, and other canons of 'sound finance'. None the less, familiarity with banking practice led to him often to emphasize that, when short-term credits are generally tight, the issuing of banknotes creates a base for financing turnover and investments many times greater than the value of this issue, provided that the newly created money is put into circulation.

[28]
Kalecki's approach to financing investments, and to finance in general, gave rise to a number of publications in the early 1980s. They focused on comparisons of the position of finance in Keynes's and Kalecki's theories (see

e.g. V. Chick, *Macroeconomics after Keynes*, Cambridge, Mass., MIT Press, 1983; A. Asimakopulos, 'Kalecki and Keynes on Finance, Investment and Saving', *Cambridge Journal of Economics*, 7/3–4, 1983; a discussion of Asimakopulos's views, in *Cambridge Journal of Economics*, 10/1, 1986, pp. 77–80, and 10/3, 1986, 191–201; A. Asimakopulos, 'Finance, Liquidity, Saving, and Investment', J. A. Kregel, 'A Note on Finance, Liquidity, Saving, and Investment', and P. Davidson, 'Finance, Funding, Saving, and Investment', all in *Journal of Post Keynesian Economics*, 9/1, 1986; J. Kregel, 'Savings, Investment and Finance in Kalecki's Theory', in Sebastiani (ed.), *Kalecki's Relevance Today*.

Asimakopulos points out that, in order for Kalecki's 'circle' to 'close itself', the assumption of short-period equilibrium is necessary. In that equilibrium the full multiplier effects of any change in investment (or other autonomous expenditure) that might occur would be completed in the period considered. In this context Asimakopulos observes 'Kalecki and Keynes', p. 225):

> Kalecki's analysis dealt with a comparison of positions of short-period equilibrium, and he did not pay sufficient attention to the time required for the operation of the full multiplier in order to 'restore' the liquidity position of the banking system. In his statement of the multiplier he noted that it attains its full value 'eventually', even though he provided no analytical justification for the use of this adverb. . . .
>
> Kalecki's treatment of finance, investment and saving was also flawed because of his neglect of the need for long-term financing. Investing capitalists should replace their bank loans by long-term bonds that are a better 'match' for the expected life of the capital assets that they have acquired. Borrowing 'short' to invest 'long' can be very dangerous for a business enterprise.

Next Asimakopulos finds Keynes's concept of a 'revolving fund of liquid finance' to be not only akin to Kalecki's 'circle' but founded on even more extreme assumptions than those made by Kalecki (since Keynes's 'interim period' is much shorter than Kalecki's 'year'). For Keynes must in fact assume that the full multiplier operates instantaneously. In Asimakopulos's opinion, both Kalecki and Keynes underestimated the time required before the banks' liquidity could be restored after additional investments were financed by 'credit inflation'.

Kregel agrees with Asimakopulos that 'if the debts and credits cancel within the period then the incomes also occur within the period: no "time" is required for Kalecki's multiplier to work, it is instantaneous within the defined period. Neither finance, nor time are required.' Kregel also shares the view that the key variable limiting investment is the movement of the rate of interest as a result of decisions to increase investment. The disagreement between Kregel and Davidson on the one hand and Asimakopulos on the other refers to the question of whether it is the supply of savings relative to the supply of bonds or the liquidity preference of the banks and the public which produces the tendency for the interest rate to rise. While Asimakopulos argues that a 'real

factor', i.e. the supply of private savings, exerts an influence upon the long-term interest rate that the banking system, manipulating the monetary instruments, cannot offset, Kregel and Davidson argue that the interest rate, as a purely monetary phenomenon, could be adjusted by the banking system.

Moreover, having examined Kalecki's 'double-sided relation between profits and investments' (current investment expenditure, based on past investment decisions, is an important determinant of current profits which, in turn, influence current investment decisions and therefore future investment expenditure), Asimakopulos observes that the one-way causation between current capitalist expenditure and their current profits (as put forward in the *Essay* and in the later writings of Kalecki) is unsatisfactory, unless in a short-period equilibrium position; in a more general case there would be a mutual interdependence between capitalist profits and expenditure (see A. Asimakopulos, 'Kalecki on the Determinants of Profits', in G. Fink *et al.* (eds.), *Economic Theory, Political Power and Social Justice: Festschrift Kazimierz Laski*, Vienna and New York, Springer, 1987; (see also the same author's 'A Kaleckian Profits Equation and the United States Economy, 1950–82', *Metroeconomica*, 35, 1983).

Kazimierz Laski notes, however (in a private communication to Asimakopulos), that any *reasonably* long 'short period' would satisfy Kalecki's profit equations. Laski demonstrates that if the 'short period' is a quarter of a year and wages are spent with a lag of one week, the difference between the volume of profits derived from Kalecki's and Asimakopulos's formulae respectively will be less than 7%, and this only because of the assumption that wages are spent with a time lag. This undermines Asimakopulos's criticism.

For a more detailed discussion of Kalecki's theory of profits, see the editorial comment on his 1942 'Theory of Profits' in *Collected Works*, vol. ii.

[29]

For a different way of deriving equation (19), see 'A Macro-dynamic Theory'.

[30]

This limitation of the analysis to the case of fluctuations of a constant amplitude was criticized by Rajchman ('Critical Remarks'), then during the Leyden conference, and in the paper by Frisch and Holme (see Annex 1) Kalecki's early response to this criticism (see pp. 118 and 143) has on the whole been rejected, and his selection of his parameter values in his business cycle equation continues to attract criticism even today (see e.g. T. Haavelmo, 'The Inadequacy of Testing Dynamic Theory by Comparing Theoretical Solutions and Observed Cycles', *Econometrica*, 8/4, 1940; Andvig, *Ragnar Frisch and the Great Depression*, pp. 102–4; R. M. Goodwin, 'Kalecki's Economic Dynamics: A Personal View', in Sebastiani (ed.), *Kalecki's Relevance Today*). An interesting comment by Andvig about the side-effects of Kalecki's specific selection of parameter values will be apposite here:

In one of the few recent studies on the formal macro-dynamics of the 1930s, Feiwell's book on Kalecki, . . . the question is asked if Schumpeter knew about Kalecki's work in macro-dynamics, since Schumpeter barely mentioned Kalecki's work in his *History* [*of Economic Analysis*]. The question of why Kalecki was generally neglected until fairly recently is implied. One may safely assume that Schumpeter knew Kalecki's work well, because he had a long discussion of it in his *Business Cycles* (vol. i, pp. 185ff.); however, he was not much impressed. One of the major scientific reasons why Schumpeter, leaning himself on the group of mathematical economists who developed the dynamic models in the thirties, neglected Kalecki, was, I believe, precisely the way Kalecki manipulated the parameters in order to achieve exactly undamped cycles, thereby also trying to achieve more direct empirical relevance for the model that was appropriate. Frisch has done much the same, but his result did not rely on it to the same extent. More importantly, Frisch's model was already by then considered mainly as a methodological contribution. Hence, it did not matter so much whether its economics was less convincing or whether Frisch manipulated its parameters in order to make it appear realistic. Few except Frisch would consider the model as realistic anyway.

I think this reaction to Kalecki is overdrawn, but interesting from a historical point of view. It indicates how occupied the early group of econometricians and mathematical economists were with the mechanical characteristics of their models of business cycles compared to the economics of the problems. It was precisely this way of finding a satisfactory solution to the problem of how to reconcile the accepted empirical fact of undamped business cycles with the model requirement of linear equation systems which made Frisch's 'Propagation Problems' and not Kalecki's 'Macro-dynamic Theory' have greater appeal to this group of mathematically oriented economists on whose opinion Schumpeter relied. That the political tastes reflected in Kalecki's work were at odds with the majority opinion among economists at the time should, however, be added to any explanation of neglect. (*Ragnar Frisch and the Great Depression*, p. 103.)

[31]
See p. 467, n. [2].

[32]
Kalecki himself took up these problems in articles published in 1932 and 1933 ('The Business Cycle and Inflation' and 'On Foreign Trade and "Domestic Exports"', this volume).

[33]
See Kalecki's explanation of fluctuations in the interest rate during the course of the business cycle, which he supplemented in the 'Essai' and then included in the 'Outline' (pp. 472–3 above), yet whose main ideas appear to have been taken from this fragment of the *Essay*.

[34]
In the 'Essai' (pp. 299–301) from this paragraph to the end of the section 'Profit margins and employment', Kalecki revised the text as follows (numeration of equations as in the *Essay*):

Thus one can show that, under free competition, profit per unit of output is an increasing function of the employment of capital equipment. Indeed, when prices fall in relation to wages, the unit gross profit P/Y declines. At the same time 'marginal' output, in the production of which gross profit per unit of output is very small, is eliminated from the market. This reduces the rate of employment of capital equipment, i.e. Y/K declines. Hence the gross profit per unit of output and the rate of employment of capital equipment rise or fall together, changing in the same direction as their product P/K (see equation (37)). This means that the rate of employment of capital equipment and the gross profit per unit of output are increasing functions of gross profitability, and that all three magnitudes increase during the upswing and fall during the downswing.

In a completely or partially controlled economy, i.e. in the case of a cartel or where the entire economy or one of its sectors consists of oligopolies, there is no definite functional relationship between unit gross profits and the rate of employment of capital equipment.

There follows a footnote: 'Owing to the policy of cartels, there is generally a considerable deviation from Cournot's point.' Then Kalecki continues:

It follows that one cannot present this relationship as a function of gross profitability P/K. All one can say is that, in a completely or partially controlled economy, the gross profit per unit of output P/Y is very 'inelastic'. This means that weaker fluctuations of the gross profit per unit of output correspond to the same fluctuations of gross profitability P/K, and hence there are stronger fluctuations in the rate of employment of capital equipment than under free competition. As regards a completely controlled economy, this is quite obvious and requires no further comment. As regards a partially controlled economy, one must distinguish between the controlled sector and the free-competition sector. In the controlled sector the gross profit per unit of output is more 'inelastic' and fluctuations in gross profitability weaker than in the free-competition sector. The result is that, with the same fluctuations of average gross profitability, fluctuations of gross profitability in the free-competition sector are stronger than if free competition were ruling throughout the economy. The same applies to fluctuations in the rate of employment of capital equipment in this sector. Since both sectors constitute one and the same economic system, the rate of employment of capital equipment in the controlled sector will also display greater fluctuations than under free competition. One can say that in the partially controlled economy the same fluctuations in average gross profitability P/K are attended by

stronger fluctuations in the rate of employment of capital equipment than under free competition.

[35]
In the 'Essai' (p. 301), Kalecki added here: 'under free competition'.

[36]
In the 'Essai' (p. 301), Kalecki added here: 'under free competition'.

[37]
This proposition was severely criticized by Rajchman and then by Fogelson and Rajchman. In his 'Critical Remarks' (p. 330), Rajchman cites Kalecki's conclusion and asks: 'And the struggle for wages? If today all capitalists force a wage reduction on all workers, what will happen?' And after examining Kalecki's thesis, he concludes: 'In this business cycle determinism there is no room for an effective (i.e. reducing capitalist profits) fight for wages.'

In 'A Rejoinder', Kalecki in fact merely repeated the argument of the *Essay*, and recalled that in a completely or partially cartelized system (rather than under free competition) the struggle for wages will affect the relative shares in the output (see pp. 108 and 111 above). One of the effects of this controversy was the qualification—repeated many times by Kalecki, e.g. in the 'Essai' — that the above conclusion applies only under free competition.

This fragment of 'A Rejoinder', together with the original conclusions of the *Essay*, became the subject of further attacks by Fogelson and Rajchman ('Another Comment', p. 563ff.). Their criticism also centred on the formal aspects of Kalecki's analysis rather than on the essence of his theory, and led them to the conclusion that 'Kalecki's theory . . . is completely unable to explain the existence of the business cycle' (ibid., p. 590).

These charges by members of the Polish Communist party were understandable in the light of the ongoing class struggle, which concentrated on the fight for higher wages, and were motivated by the fear that Kalecki's theory would undermine it. However, this criticism overlooked a significant difference between Kalecki's theory on the one hand, which assumed that the volumes of production and employment change with the volume of autonomous (i.e. capitalist) expenditure, and orthodox neo-classical and Marxist economics on the other hand, which assumed constancy of output and employment (which meant, from the point of view of Kalecki's critics, that a change in the wage fund would have to lead to an offsetting change in profits and vice versa). Only a few Marxists (Rosa Luxemburg among them) saw that an increase in money wages could not improve the workers' position, though the fight for wages is an important factor in increasing the consciousness of the working class. (Keynes was arriving, in the early 1930s, at a similar conclusion from another angle, arguing that an overall cut in money wages will merely reduce the purchasing power of the community as a whole; see 'The Great Slump of 1930', in *The Collected Writings of John Maynard Keynes*, vol. ix, London, Macmillan, 1972, p. 128.)

[38]
In the 'Essai' (p. 302) Kalecki added here: 'under free competition'.

[39]
In the 'Essai' (p. 303) Kalecki added here: 'under free competition'.

[40]
In the 'Essai' (pp. 304–5) the text was considerably revised. Kalecki changed the remaining part of the section 'Price changes' and the entire section 'The curve of aggregate production' which in the 'Essai' is entitled 'Production'. The text of the 'Essai' ends as follows:

All these points concerning price changes are valid only under free competition, for only here is there a strict functional relation between the gross profit per unit of output P/Y and the rate of employment of capital equipment Y/K. It follows that profit per unit of output is a function of gross profitability P/K, and hence is determined by the mechanism of the trade cycle. As regards an economy in which there are some limitations on free competition, the level of prices also depends on the policy of cartels and 'members' of oligopolistic groupings, which within certain limits can be regarded as an independent factor. Here we can only state as before (see pp. 476–8) that with the same fluctuations in gross profitability per unit of output P/Y shows greater stability than under free competition. In such a cartelized economy, the same fluctuations in gross profitability and in the level of wages are attended by smaller fluctuations in consumer goods prices than in a free-competition system.

Production

It was shown above (p. 477) that under free competition P/Y increases during the upswing and declines during the downswing. In other words, profits P rise during the upswing and fall during the downswing more sharply than aggregate production. Hence fluctuations in gross profits are more intense than fluctuations in aggregate production Y. It follows that fluctuations in the real income of workers $Y-P$ are less severe than fluctuations in production Y.

Gross profits P are proportional to the sum $B_0 + A$, where B_0 is the constant part of capitalist consumption and gross accumulation A is equal to the production of investment goods. It follows that the production of investment goods A fluctuates more severely than gross

profits P and aggregate production Y. As a result, the production of consumer goods $Y-A$ changes more slowly than aggregate production Y.

If we denote the relative amplitude (the ratio of the amplitude to the average value) by $a(P)$, $a(Y)$, etc., these conclusions can be presented as follows:

$$a(P) > a(Y) > a(Y-P)$$
$$a(A) > a(Y) > a(Y-A)$$

Gross profits P fluctuate more sharply than the real income of workers $(Y-P)$. The production of investment goods A fluctuates more intensely than the production of consumer goods $(Y-A)$.

There follows a footnote here:

Though by a completely different path, A. Aftalion in his *Les Crises périodiques de surproduction* also arrives at the conclusion that the production of investment goods fluctuates more intensely than the production of consumer goods. But his ingenious remarks are based on the assumption of a constant rate of employment of capital equipment—an assumption from which it follows that an increase in production is always linked with the expansion of capital equipment. In our approach, however, changes in the rate of employment of this equipment play a crucial role.

Then the text of the 'Essai' ends as follows:

All this holds under free competition. In a cartelized economy P/Y may remain constant. In that case profits and workers' income would fluctuate with equal intensity. However, changes in the production of investment goods would then also be sharper than changes in the production of consumer goods.

'Critical Remarks on one of the Mathematical Theories of the Business Cycle' by Aleksander Rajchman: A Rejoinder

[1]
First published as 'Odpowiedź na „Uwagi krytyczne o jednej z matematycznych teorii koniunktury" Aleksandra Rajchmana', *Kwartalnik Statystyczny*, 10/4, 1933, pp. 497–502. Rajchman's critique appeared in the previous issue of the quarterly. Rajchman, together with Fogelson, took up the discussion with Kalecki in *Kwartalnik Statystyczny*, 11/4, 1934, pp. 562–94.

[2]
Formally speaking, the proof still seems unconvincing. The negative value of n in the rearranged equation (10a) is determined, not by how small, but by how large investments orders I can be. From the condition $m > 0$ it does not follow whether $0 < m < 1$, though this inequality is in fact obtained by Kalecki in his empirical estimates. We may then ask whether $I > m(B_0 + A)$ is possible, i.e. if and why the volume of investment orders cannot be greater than the mth part of the sum of a constant part of capitalist consumption and accumulation.

[3]
Kalecki's empirical findings were examined first by Rajchman ('Critical Remarks', p. 336), who pointed out that the numerical concurrence between Kalecki's calculations of the period of the business cycle and its observed length in practice was not yet a confirmation of his theory. Kalecki's explanation in his rejoinder did not convince Fogelson and Rajchman, who strongly criticized Kalecki's procedure and his empirical estimation of the coefficients m, n, and υ ('Another Comment', pp. 579–94). They pointed out that one could find such positive values for these coefficients as to comply with Kalecki's initial assumptions and yield a T equal to 100 or more years. Furthermore, they criticized Kalecki's hypothesis that fluctuations in capitalist consumption are four times smaller than fluctuations in their gross profits:

> Why Kalecki's capitalists have such inflexible appetites he does not explain, since the only justification for this inflexibility is that it helps him to obtain $T_0 = 10$ years.
>
> For, as we have previously pointed out, when B_0/K_0 is sufficiently small, T_0 will be arbitrarily large. Here let us only mention that if we assume, as indicated above, $K_0 = 245$ bil., and that the elasticity of capitalist consumption is twice as great, $B_0 = C/2$, we obtain:
>
> $$I_0/K_0 = 0.023, \quad B_0/K_0 = 0.033, \quad T_0 = 19.8 \text{ years}$$
>
> that is, a business 'cycle' with a period twice as long as Kalecki's. (Fogelson and Rajchman, 'Another Comment', p. 592.)

A Macro-dynamic Theory of Business Cycles

[1]
Econometrica, 3/3, 1935, pp. 327–44. The publishers' permission to reproduce this article is gratefully acknowledged.

The original publication was preceded by a note: 'Paper presented at the meeting of the Econometrica Society, Leyden, October 1933.' As all Kalecki's pre-1936 papers perished in Poland during the war, we are unable to establish whether the published version of Kalecki's paper differed from his original contribution to the Leyden conference.

Since for a long time Kalecki's *Essay on the Business Cycle Theory* was not available in English (see pp. 436–7 above), his 'Macro-dynamic Theory of

Business Cycles' has been commonly considered as his first and classic contribution to the theory of business cycles, and as such it was widely discussed and quoted by, among others, J. Schumpeter, R. D. G. Allen, and Oskar Lange. Various mathematical aspects of Kalecki's analysis attracted attention too (see, e.g. 3 papers by R. W. James and M. H. Beltz: 'On a Mixed Difference and Differential Equation', *Econometrica*, 4, 1936; 'The Influence of Distributed Lags on Kalecki's Theory of the Trade Cycle', *Econometrica*, 6, 1938; 'The Significance of the Characteristic Solutions of Mixed Difference and Differential Equations', ibid.; see also Bellman and Cooke, *Differential–Difference Equations*).

Comments on the Macro-dynamic Theory of Business Cycles

[1]
First published in *Econometrica*, 4/4, 1936, pp. 356–60. The publishers' permission to reproduce this article is gratefully acknowledged.

[2]
For a detailed discussion of 'neutral' and 'non-neutral' money systems, see 'Three Systems', this volume.

PART 4
The Mechanism of the Business Upswing

The Business Cycle and Inflation

[1]
First published as 'Koniunktura a inflacja', *Polska Gospodarcza*, 13/48, 1932, pp. 1411–15.

While working on his *Essay on the Business Cycle Theory*, Kalecki published a number of articles which roughly fall into two categories: (i) empirical studies of the successive stages of the 1929–33 crisis (see 'Comments on Hitlerism and "Economic Spheres"', and 'On German Events', both in *Collected Works*, vol. vi; 'Sources of the Manchurian Conflict' (pseud. H. Br.), *Przegląd Socjalistyczny*, 2/2, 1932, pp. 6–8 (in Polish); 'War in the East' (pseud. Henryk Braun), *Przegląd Socjalistyczny*, 2/5, 1932, pp. 1–2 (in Polish); 'Inflation and War' (pseud. Henryk Braun), *Przegląd Socjalistyczny*, 2/13, 1932, pp. 1–2 (in Polish); (see also p. 429 above); and (ii) papers on various aspects of the business upswing (see pt. 2 of this volume). From the end of 1932, having probably already finished work on the *Essay*, Kalecki concentrated on developing the mechanism of the business upswing and a theory of employment and capacity utilization, which were both implied by and sketched out in the *Essay*. The articles in pt. 4 of the present volume (with one exception) are devoted to this subject of research.

The main feature of these papers (with two exceptions) is their inseparable link with empirical enquiry: Kalecki attempts here to explain the actual course of the business cycle on the basis of his trade cycle theory, and at the same time to test the latter against the observed facts. Consequently, along with these papers he published further empirical studies on the business cycle (e.g. 'The Fate of Experiments' and 'The German Experiment', both in *Collected Works*, vol. vi; and 'The Present Phase of the World Crisis', *Polska Gospodarcza*, 14/1, 1933, pp. 9–11 (in Polish)).

Together with Kalecki's studies of business conditions in individual commodity markets, his publications on the methodology of business cycle research, and his (and Landau's) estimates of the social income in Poland (see *Collected Works*, vol. vi), such works were quickly bringing him to a more general theory of employment and business fluctuations. In order to write it up, Kalecki decided to take advantage of a Rockefeller Foundation grant which he received in 1935. In Feb. 1936 the Kaleckis set out for Sweden, a country which in the eyes of many seemed likely to be the first to break out of the strait-jacket of economic orthodoxy.

Part 4 of the present volume ends with a paper, 'Three Systems', which attempts to define the relation of Kalecki's own approach to the problem of capitalist reproduction to approaches based on Say's Law (as Kalecki puts it, to models where 'the principle of preservation of purchasing power is pushed to the extreme'), and a model in which, though the possibility of 'creating' and 'losing' purchasing power exist, no unemployment is allowed for. Hence this paper sets out Kalecki's early ideas in comparison with some fundamental concepts of contemporary academic economics.

[2]
In later works Kalecki no longer assumed free competition and automatic changes in the prices for manufactured goods (and hence in real wage rates) with business fluctuations (see p. 467 above).

[3]
J. M. Keynes advocated public works as a remedy for unemployment as early as 1924 (see his article 'Does Unemployment Need a Drastic Remedy', *The Nation*, May 1924). When, in 1929, Lloyd George put forward a large public works project in order to reduce unemployment, Keynes supported it with the rather ambiguous argument that an increase in investment would generate a rise in saving, and that therefore no credit squeeze would affect the financing of private investments (see J. M. Keynes and H. D. Henderson, *Can Lloyd George Do It?*, London, 1929). In late 1929 Keynes was appointed a member of the Macmillan committee on finance and industry under the second Labour government. During sessions of that committee Keynes developed the argument he put forward in support of Lloyd George. Keynes also advanced similar ideas at the economic advisory council which advised the prime minister and the Cabinet on economic questions. In June 1931, at the University of Chicago, he gave three lectures on 'An Economic Analysis of Unemployment', where a shift of emphasis towards changes in output and some hints of his later concept of equilibrium at less than full employment may be noted (see *The Collected Writings of John Maynard Keynes*, vol. xiii, London, Macmillan, 1973, pp. 343–67). Nevertheless, all these pronouncements were couched in terms of the neo-classical assumptions of his *Treatise on Money*, and a consistent theoretical foundation for his support for public work was still lacking.

Public works were also considered at that time in other European countries as well as in the USA, and in fact in Germany they were soon undertaken.

In the United States economists such as Professor Paul Douglas, Henry Simon, and even Jacob Viner, all of whom were at the University of Chicago, advocated what would now be called expansionary fiscal policies well before *The General Theory* appeared. Before Herbert Hoover was President of the United States he was Secretary of Commerce. As such he sponsored Commissions and Reports which advocated a budget that was balanced over the business cycle rather than annually, i.e. under his auspices contra-cyclical fiscal policies were advocated. However, these economists and politicians did not have and hold a theory of the behaviour of capitalist economies which gave credence to their policies: their policy advice was divorced from their theory. (H. P. Minsky, 'The Financial Instability Hypotheses: A Restatement', *Thames Papers in Political Economy*, autumn 1978, p. 8)

However, this assertion does not seem to apply to Kalecki's argument put forward at the time.

[4]
Kalecki took up the problem of the worsening of a country's balance of trade with an increase in output and employment as early as 1929, and again in 1931 (see 'On Activating the Balance of Trade' and 'Consequences of Dumping', both in this volume). Comparing Keynes's theory with Kalecki's, Joan Robinson wrote: 'Keynes's *General Theory* was worked out in terms of a closed system. It was left to me to sketch its extension into the theory of foreign trade in slump conditions. Here also Kalecki's work claims priority'. ('Introduction' to M. Kalecki, *Studies in the Theory of Business Cycles 1933–1939*, p. xi; Robinson implicitly refers here to her 'Beggar-my-Neighbour Remedies for Unemployment', from her *Essay in the Theory of Employment*, London, Macmillan, 1937.)

[5]
For a more detailed analysis of this question, see 'On Foreign Trade and "Domestic Exports"', this volume.

[6]
See 'The Business Cycle and Armaments', this volume.

Stimulating the World Business Upswing

[1]
First published as 'Nakręcanie koniunktury światowej', *Polska Gospodarcza*, 14/37, 1933, pp. 1111–15.

[2]
President Roosevelt's 'brains trust', headed by a number of professors at Columbia University and including politicians, economic experts, and businessmen, prepared Roosevelt's election platform as well as specific New Deal policies during his presidency.

[3]
See 'The Influence of Cartelization on the Business Cycle' and the final chapter of the *Essay on the Business Cycle Theory*, this volume.

[4]
In 1932 Kalecki wrote three articles on the Manchurian War for *PS*: 'Sources of the Manchurian Conflict', 'War in the East', and 'Inflation and War' (see

p. 483 n. [1]). He showed there that, for Japan, this was a war for foreign markets and to secure supplies of raw materials threatened by China's expansion. He examined this war against the background of Russian–Japanese and American–Japanese relations and Japan's active preparations for war with the USSR. Finally, he discussed similarities between the 'war booms' in Japan and Germany, arriving at this conclusion: 'Hitler is betting on both horses—inflation and war. Like Germany, a chain of events is pushing Japan along the "road to glory", and for more than half a year now it too has been betting on both horses—inflation and war.' ('Inflation and War', p. 2)

[5]
See 'The Business Cycle and Welfare', this volume.

On Foreign Trade and 'Domestic Exports'

[1]
First published as 'O handlu zagranicznym i „eksporcie wewnętrznym"', *Ekonomista*, 3, 1933, pp. 27–35.

This article, with small editorial changes and abbreviations, was reprinted in a volume of Kalecki's essays *Prace z teorii koniunktury 1933–1939* (for translations of this volume, see p. 436), and in Kalecki's *Selected Essays on the Dynamics of a Capitalist Economy* (for translations of this volume, see pp. 436–7). The German translation of this article appeared in Kalecki, *Herkauswahl*, pp. 57–69, and in Kalecki, *Kriese une Prosperität*, pp. 45–55.

In the present volume we follow the English translation published in Kalecki's *Selected Essays on the Dynamics of a Capitalist Economy*, pp. 15–25. The publishers' permission to reproduce this article is gratefully acknowledged.

For a more extensive analysis of the mechanism of creating additional purchasing power, see the *Essay on the Business Cycle Theory* and 'Three Systems', both in this volume.

[2]
In the second and later editions of this paper, Kalecki replaced, here and throughout the rest of the original text, the phrase 'rise in aggregate production and prices' with the phrase 'rise in aggregate production and in profit per unit of output' (see p. 467 n. [2]).

[3]
In subsequent discussions it has been pointed out, however, that, on account of factors not considered by Kalecki, 'even balanced foreign trade may give rise to new industries, new technology, or new products that may stimulate additional investment' (P. Baran, *The Political Economy of Growth*, New York, Monthly Review Press, 1962, p. 109).

The Business Cycle and Welfare

[1]
First published as 'Koniunktura a dobrobyt', *Polska Gospodarcza*, 15/50, 1934, pp. 1531–4.

See also 'Influence of a Reduction in Prices for Industrial Consumer Goods on the Course of the Business Cycle' and 'Reduction of Wages during Crisis' (this volume), in which Kalecki examines, not the influence of the business upswing on consumption, but the influence of wage reduction on the business cycle.

The Business Cycle and Armaments

[1]
First published as 'Koniunktura a zbrojenia', *Polska Gospodarcza*, 16/22, 1935, pp. 701–3.

The Essence of the Business Upswing

[1]
First published as 'Istota poprawy koniunkturalnej', *Polska Gospodarcza*, 16/43, 1935, pp. 1320–4.

This article was reprinted, with some minor editorial revisions and abbreviations, in a collection of Kalecki's papers: *Mechanizm poprawy koniunkturalnej*, Warsaw, Główna Księgarnia Wojskowa, 1936, and, under the title 'The Mechanism of the Business Upswing', in another volume of his essays: *Prace z teorii koniunktury 1933–1939* (for later translations of this volume, see p. 436); that version was further edited by Kalecki, in particular by removing from the argument automatic price changes accompanying output changes in the course of the business cycle—see p. 467 n. [2]. The article was reprinted (with a few additional abbreviations) in Kalecki's *Selected Essays on the Dynamics of a Capitalist Economy* (for translations of this book, see pp. 436–7). The German translation of this article, 'Der Mechanismus des Konjunk-turaufschwungs', appeared in Kalecki, *Werkauswahl*, pp. 70–9, and in Kalecki, *Kriese und Prosperität*, pp. 56–63.

In the present volume we follow the version from *Selected Essays on the Dynamics of a Capitalist Economy*, pp. 26–34. The publishers' permission to reproduce this article is gratefully acknowledged.

In the English translations Kalecki replaced the original title of this paper with one which he borrowed from the above-mentioned collection of his articles: 'The Mechanism of the Business Upswing'; the original title is restored here.

[2]
This argument was questioned by A. Asimakopulos (see his 'Patinkin on Kalecki and Keynes on the Principle of Effective Demand: A Comment', in

Sebastiani (ed.), *Kalecki's Relevance Today*; see also pp. 473–5 n. [28]). However, both Kalecki and Asimakopulos agree that the new position of equilibrium, at a reduced level of wages, will *not* be realized, the additional profits taking the form of unwanted accumulation of stocks.

[3]
In the first two Polish versions of this paper this sentence ended: 'and the increase in the relation of prices to wages occurs in this case due to a rise in prices.'

[4]
In the last English edition of this paper Kalecki omitted the words 'drawing on their reserves' at the end of this sentence.

[5]
In the first two Polish versions this sentence reads: 'Prices of these goods rise, making it possible to put to work idle equipment and unemployed labour.'

[6]
In the first two Polish versions Kalecki wrote here about rising prices and employment.

[7]
In the last English edition Kalecki omitted the following sentences: '. . . whose reserves are thus restored. This makes it possible to draw on them again in order to grant credits for the continuation of investment associated with the new invention. As a result of this accelerated money circulation. . .'

[8]
In the first two Polish versions Kalecki wrote here about rising prices and turnover.

[9]
In the first two Polish versions Kalecki continued in this sentence: '. . . which will also be accompanied by an increase in the relation of prices to wages, since without the latter the operation of plants or their parts hitherto idle would be unprofitable.'

[10]
In the first two Polish versions this sentence ends as follows: '. . . and the ratio of prices to costs will be lower'.

[11]
In the first two Polish versions Kalecki wrote here about a fall in prices as well.

[12]
In the last English edition Kalecki omitted the following phrase at the end of this sentence: '. . . which draw on their cash reserves to buy the issue.'

[13]
In the last English edition Kalecki omitted here the following sentence: 'In this way the money lent to the government is restored to the banks, which enables them to discount the next issue of treasury bills, and thus to continue the financing of railway construction.'

[14]
In place of the last two paragraphs of this article, the original version included another section containing a polemic with other views on the essence of the business upswing. Here is the text of this section, which Kalecki had already omitted by the time of the 1936 edition:

One often hears that neither public investment nor deficit financing is able to stimulate the business upswing, since they reduce credits available for private investments, thereby only exchanging 'productive' investments for 'unproductive' ones. This assumes in advance, however, what one wishes to prove. It assumes no creation of additional purchasing power, but only a reshuffling of the sums spent. This would be the case if the Government's discount on treasury bills caused an increase in the rate of interest to a level at which present investments would be displaced by the same amount as credits raised by the Government. Obviously, however, the possibility of stimulating the business upswing is based on the assumption that the banking system, especially the central bank, will be able to expand credits without such a considerable increase in the rate of interest. If the banking system reacted so inflexibly to every increase in the demand for credit, then no boom would be possible on account of a new invention, nor any automatic upswing in the business cycle. For then there would be a change only in the structure of investments made, not in their volume. Investments would cease to be the channel through which additional purchasing power, unquestionably the *spiritus movens* of the business upswing, flows into the economy.

Here we might reflect on the real role of 'unproductive' government investments. The above points have already shown convincingly enough that, as regards the direct effects of investments on the business cycle, what is essential is not the purpose of these investments but the fact that they are financed with additional purchasing power. Now as regards the effects of investments, not during their construction, but after they have been completed and begun to produce, analysis of the natural course of the business cycle has shown that this productivity of investments at first damps the rate of the business upswing and finally brings it to an end, initiating a decline that brings the economy into a recession. Though it may seem strange, financing public investments through additional purchasing power causes a stronger upswing than would private investments. The former open up the value for an increase in demand, and thanks to their 'unproductivity' do not create additional supply in the next period.

Obviously, as soon as public investments are relieved by private investments, the phenomenon we described in section 4 takes place. The pace of upswing is damped by an expansion of this capital equipment of industry.

In our analysis of the business upswing we have tacitly assumed a closed economy. In countries which have to purchase certain goods abroad, these processes can disturb the balance of trade, thereby setting rather narrow limits for the upswing or distorting its course. We discuss these questions in greater detail in a separate article. [See 'The Business Cycle and Balance of Payments', this volume.]

The Business Upswing and the Balance of Payments

[1]

First published as 'Koniunktura a bilans płatniczy', *Polska Gospodarcza*, 16/45, 1935, pp. 1385–7.

This article was reprinted, with some minor abbreviations, in a collection of Kalecki's papers, *Mechanizm poprawy koniunkturalnej*, and in his *Prace z teorii koniunktury 1933–1939* (for translations of this volume, see p. 436). The German translation 'Konjunkturaufschwung und Zahlungsbilanz', appeared in Kalecki, *Werkauswahl*, pp. 80–7, and in Kalecki, *Kriese und Prosperität*, pp. 64–70; and the Portuguese, 'Conjuntura e balanço de pagamentos', in J. Miglioli (ed.), *Kalecki Economia*, São Paulo, Atica, 1980, pp. 68–74.

The first two Polish editions contain additional data on Japan's export and import prices which were omitted from the 1962 *Prace* edition and from all translations; apart from this, in both Polish editions and in all the translations the original text in the last section, after its first paragraph, was changed.

In the present edition we follow the version in *Studies in the Theory of Business Cycles 1933–1939*, pp. 34–9. The publishers' permission to reproduce this article is gratefully acknowledged.

[2]

In the original version of this article Kalecki continued, until the end of his argument, as follows:

We shall first do it for a simplified economic model. Let us imagine a fictional country in which all branches of industry require inputs of foreign raw-materials in the same proportion. In these conditions the volume of output is strictly determined by the volume of raw-material imports. Let us further assume that in this country the upswing is stimulated through the inflationary financing of public investments, and that increased imports cause an outflow of gold reserves, which in turn limits the import of raw-materials to the previous level. If the stimulation of the upswings is then not abandoned, the reduced supply of all commodities, whose production had to fall in the same proportion as the import of raw materials, will cause an increase in prices. One can easily see that workers' consumption will then be smaller than if the stimulation had not been undertaken at all. To be sure, the import of raw materials, hence also production, have returned to the level before the upswing, but the relation of prices to wages has increased. The result is a fall in workers' consumption and an increase in capitalists' profits.

Any real economic system differs considerably from the above fictional one in three respects:

1. The share of foreign raw materials in individual branches of industry varies considerably; e.g., in Poland the share of foreign raw materials in the production of fabrics is quite high, but in housing construction it is minimal.
2. There are possibilities, limited, to be sure, of producing a given article with less raw materials and greater labour input (e.g. one can produce a cotton fabric of the same strength by using a smaller input of cotton thanks to thinner yarn and a different method of weaving).
3. There are possibilities, though again limited, of more intensive exploitation of domestic sources of raw materials and of producing synthetic raw materials.

These three factors make possible an increase in domestic production with limited imports of foreign raw materials. When there is a rise in the prices of goods which have a considerable foreign raw-material component, consumption will shift from these goods to ones with a small foreign raw-materials component, and whose prices therefore have not risen much (e.g. the demand for textile goods may decline while the demand for housing increases). Furthermore, an increase in the prices of goods with a considerable foreign raw-material component will be an incentive to produce these goods with a smaller input of raw materials and greater input of labour, as well as to exploit domestic marginal supplies of raw materials and to produce synthetic ones. The stronger demand reacts to an increase in the prices of some articles, shifting to others, and the greater the substitutability of foreign raw materials in a given kind of production, the greater the possibilities of increasing production at a given volume of imports of raw materials.

Thus in reality import limitations with stimulation of the business upswing will cause an effect intermediate between the one which would take place in the fictional model described above, in which the volume of output is proportional to the imports of foreign raw materials, and the favourable situation that would arise if feeding the increase of output with foreign raw materials encountered no obstacles. In reality, aggregate production increases despite import limitations, but at the same time prices of goods with a considerable foreign raw-material component rise even more sharply, causing a sharp decline in the relative share of workers' incomes in the national income. Hence one cannot predict whether in the course of such a lop-sided boom there will be any increase in the consumption of the broad mass of the population.

An excellent example of this type of upswing is the stimulation of the business upswing in Germany, which we examine in a separate article. [See 'The German Experiment', *Collected Works*, vol. vi.]

Three Systems

[1]

First published as 'Trzy układy', *Ekonomista*, 3, 1934, pp. 54–70.

The leading idea of this paper—of 'creating' and 'destroying' purchasing power—was subsequently used by Kalecki in defence of the investment decisions function which he adopted in the *Essay on the Business Cycle Theory* (see p. 141 above).

It is interesting to note a close affinity between the ideas Kalecki puts forward in this paper and those of Ragnar Frisch and the Stockholm School.

While Myrdal–Lindhal and Frisch in his Wicksell interpretations had used models where banks endogenously supplied money to the economy at given interest rates, the Swedes had considered that assumption mainly as an analytical fiction, useful in order not to worry about the impact of money stocks. Frisch, on the other hand, felt deeply that it was this money creating (and destroying) power of the commercial banks that was at the bottom of cumulative processes in the economy. (Andvig, *Ragnar Frisch and the Great Depression*, p. 198.)

[2]

In later works Kalecki abandoned the assumption of increasing marginal costs within the existing capital equipment, and assumed instead that the curve of average prime cost is of the reversed L-shape, i.e. that until full

employment of capital equipment is reached, it runs horizontally up to the abscissa axis and then sharply rises (see p. 239 above and *Collected Works*, vol. ii, pt. 1).

[3]
It may seem puzzling that Kalecki, who in the *Essay on the Business Cycle Theory* and in other works from this period (as well as in later) did not attribute much influence on investment decisions to the rate of interest (attributing such influence rather to the gross profitability of the already existing plants), gives it such great importance in this essay. This can possibly be explained by the fact that his analysis is limited here to positions of short-period equilibrium, within the already existing capital stock, but this is merely a speculation.

[4]
This argument and Kalecki's concept of 'quasi-equilibrium' are very close to the argument of bk.v of Keynes's *General Theory*, and his short-period 'unemployment equilibrium' concept.

[5]
Kalecki's essay was criticized by A. M. Neuman (*Ekonomista*, 4, 1934, pp. 94–7). Kalecki's rejoinder to this criticism follows below as Annex 3.

ANNEX 3
Rejoinder[1]
M. KALECKI

Every new work in economic theory produces, above all, new . . . misunderstandings. The critique of my respected opponent is in many places a perfect illustration of this thesis.

At the outset I am criticized for an excessive number of assumptions. A careful reading of a few pages of any book on economics which is not completely sterile, especially on the theory of money and the theory of the business cycle, will unquestionably reveal a mass of assumptions that are hardly any more realistic than mine. On the contrary, I believe that my simplified picture of the economy reflects reality rather well. First and foremost, I clearly define the productive processes under consideration, and I limit myself to examining their course within existing capital equipment. On the other hand, many, if not most, authors examine production in the abstract; they do not clearly distinguish changes taking place in the volume and structure of

[1] First published as 'Odpowiedź', *Ekonomista*, 4, 1934, pp. 97–100.

production within existing capital equipment from those which follow the reconstruction of such equipment, and do not adequately stress the long duration of that reconstruction.

Let us return, however, to the simplifications in my picture of the economy. I assume, above all, that workers do not save, and that capitalists' standard of living (their real consumption) does not depend on their income. Both of these assumptions sharply emphasize tendencies which are unquestionably real.

The most difficult assumption to accept, no doubt, is the omission of inventories. I do emphasize, though, that this assumption is required only to simplify the argument, and that abandoning the former would not greatly affect my conclusions. I make use of it in two ways: I assume on its basis (i) that the equivalent of savings is accumulation of fixed capital only (omitting changes in inventories), and (ii) that interest charges on circulating capital have no significant effect on employment of capital equipment. In fact, many economists argue along similar lines. When they speak of savings and investments, they have in mind mainly investments in fixed capital; when they examine the influence of the rate of interest, they consider the repercussions for the volume of investments, regarding changes in current costs of production as a secondary factor.

The charges of my critic regarding my assumptions about the progression of marginal costs boil down mainly to accusing me of assuming free competition. I admit committing this sin, which I share with the majority of economists who deal with the theory of money.

I must point out, though, that by free competition I understand here a system in which changes in the supply of one entrepreneur do not influence the market; however, this competition is not perfect, in the sense that I examine processes taking place within existing capital equipment (i.e. with a given volume and structure of fixed capital), whereas perfect competition materializes only when this equipment is reconstructed. Thus in my model prices equal marginal costs, and at the same time a price may be higher or lower than that determined by the point of intersection of marginal and average cost curves. (When the price is below this point, the firm is operating at a loss, i.e. it is not earning enough to cover full depreciation and interest on fixed-capital charges, though production is not suspended as long as something is being earned to defray these expenses. The firm will be closed as unprofitable only when the price no longer covers even current expenses for labour, raw-materials, etc.) Obviously, the curves of

marginal and average costs are conceived of here as drawn at given capital equipment (buildings, machines, etc.) of firms.

My opponent still doubts whether my assumptions about increasing marginal costs are essential to my further argument. My intention here was to show that, with an increase in the relation of output prices to the prices of necessary inputs, production from the existing capital equipment will be stepped up either by more intensive employment of plants already in operation or by starting up factories which were previously unprofitable and therefore idle [see pp. 202–3], an assertion which is essential for the examination of all processes discussed in my essay. (Regarding rising marginal costs on the night shift, it is quite unnecessary for my opponent to inform me that marginal cost is calculated, not per extra hour, but per extra unit of output, for it is clear that, when speaking about the night shift, I had in mind the output produced on this shift.)

Finally, regarding my distinguishing of two departments where capital equipment is employed—production of consumer goods and production of investment goods (not only fixed capital, such as machines but also the necessary raw materials are respectively included into these departments)—my opponent apparently has doubts as to the meaning of the term 'raw materials'. I believe, however, that it is quite common to use it to mean e.g. cotton for the production of textiles, or metals for the production of machines. Some raw materials, coal for instance, are obviously used by both departments, but leaving them out does not seem to be such a great offence. My opponent has showed great diligence in devising a complicated hypothesis on the structure of my two departments, which he could have avoided by understanding the term 'raw materials' in the common sense.

As regards other charges, my assertion that the rate of employment of *already existing* capital equipment does not depend directly on the relation of the prices of consumer goods to the prices of investment goods is hardly a new assumption but something obvious. Whether someone who owns a cotton mill employs it or not and, if so, the rate of its employment does not depend on the prices of investment goods, for he does not need new machines for this purpose. (I clearly emphasized at the very beginning of my essay that by investment goods I mean elements of fixed capital.) Likewise, the interest charges on existing fixed capital have no bearing on the level of its employment. A factory *already exists*, and interest has to be paid on it whether it is operating or not. The rate of interest will directly affect the rate of employment of existing capital only through interest charges on circulating capital, whose influence, as I mentioned earlier, I ignore as a factor of secondary importance.

Moving on now from assumption to the development of my argument, my respected opponent makes the following charges. Above all, he states that 'an increase in the velocity of circulation does *not* cause an increase in the rate of interest; if it causes anything at all, it is (under the *ceteris paribus* assumption) a fall in the rate of interest.' If I am not mistaken, my opponent has in mind here an increase in velocity of circulation on account of a change in the technique of circulation, such that less cash reserves are used to sustain the same volume of turnover. In such a case the rate of interest will indeed fall. I am examining exactly the opposite case, however, when, with a constant volume of cash reserves (and the assumption that techniques of circulation will remain unchanged), turnover increases: in that case the rate of interest will unquestionably rise. A twofold increase in turnover with an unchanged volume of money in circulation is exactly what we mean by 'stringency' in the money market. I doubt whether my opponent really believes that in this case the rate of interest will fall.

Dr Neuman further states that a reduction in wages causes 'a *smaller* and not greater volume of investments, and hence greater outlays for labour'. He seems to be referring to my argument that in System I, i.e. where purchasing power is preserved, a fall in wages on account of an increased supply of labour in the market will generate an increase in the total volume of investments. More labour and less capital will in fact be used in individual newly built factories, but so many more of these factories will be built that the total volume of investments will increase. For capitalist profits will increase on account of the fall in wages [see p. 204], which, assuming their unchanged consumption and preservation of purchasing power, means increased demand for investment goods.

In conclusion, Dr Neuman discovers *circulus vitiosus* in my definition of the equilibrium rate of interest. I introduced this definition (in System I) as follows. I show that, at a given composition and volume of capital equipment, the available supply of labour force R and the volume of capitalist consumption S together determine the volume of output of investment goods i (through capitalist savings from profits):

$$i=f(R, S) \qquad (1)$$

I further show that the volume of projects passing the profitability test

can be presented as the function of R and S, determining the relation of prices to wages, and of the rate of interest p. Since the volume of investment i has already been determined by equation (1), we can now obtain the rate of interest:

$$\psi(R, S, p) = i \qquad (2)$$

My opponent finds a vicious circle in the reasoning, for p determines i, and i influences p. As we see, however, i has been introduced here as a function of p, but since i is determined on a different route by equation (1), we can find p if we know the values of R and S. Using my opponent's 'method', one could also find a vicious circle in the common argument that prices are determined by supply and demand. Supply is a given function of the price, demand is a different function of the price, and comparing these two functions with each other we determine the price (the point of intersection of the supply and demand curves). Here, in my opponent's view, we could also have '*circulus vitiosus*, which is inadmissible in reasoning', since 'the price determines supply and demand, while supply and demand influence the price'. Indeed, it may be worth noting that equations (1) and (2) are but modified equations of the supply of savings and the demand for them (i is in fact the physical equivalent of savings).

With respect to my opponent's question on the definition of 'new production combinations', I use it in Schumpeter's sense, having in mind a new method of applying factors of production at their given prices, in connection with a technological invention.[2]

[2] See pp. 206–7; cf. J. A. Schumpeter, *The Theory of Economic Development*, New York, Harvard Univ. Press, 1934, ch. 2.

PART 5
Confrontation with the Keynesian Theory

Some Remarks on Keynes's Theory

[1]

First published as 'Parę uwag o teorii Keynesa', *Ekonomista*, 3, 1936, pp. 18–26. Translations: Italian, in A. Chilosi (ed.), *M. Kalecki, Antologia di scritti di teoria economica*, Bologna, Il Mulino, 1979, pp. 203–15; repr. in M. Kalecki, *Saggi sulla teoria delle fluttuazioni economiche*, ed. V. Denicolo and M. Matteuzzi, Turin, Rosenberg & Sellier, 1985, pp. 177–89; English (by B. Kinda-Hass), by permission of *Australian Economic Papers*, 21/32, 1982, pp. 245–53; Spanish, 'Algunas observaciones sobre la teoría di Keynes', *Investigación económica—Revista de la Faculdad de Economía de la Universidad Nacional Autonóma de México*, 166, 1983, pp. 41–51; German, 'Einige Bemerkungen zur Theorie von Keynes', in Kalecki, *Kriese und Prosperität*, pp. 262–72. The permission of *Australian Economic Papers* to reproduce their translation is gratefully acknowledged.

On the turn of 1933, on the initiative of Edward Lipiński, Kalecki applied for a Rockefeller Foundation fellowship in the social sciences. In this connection Ragnar Frisch was approached by the foundation to give an opinion on Kalecki's capacity for independent research and the importance of his publications. In a letter of 23 Mar. 1934 to a Rockefeller Foundation official, Frisch wrote:

> I have only met Mr Kalecki once, namely, at the meeting of the Econometric Society in Leyden last fall. My general impression of him was that he was a very alert man with quite an aptitude for independent thinking. On a few occasions my impression was that he was perhaps a little too quick at getting his conclusions, but on the whole I believe he is a thorough worker. He presented a paper at Leyden which aroused considerable interest. I think it right to say that it was one of those papers which were discussed most. This paper was published in Polish, and as I do not master this language I must base my impression on what I heard from his lecture in Leyden and several conversations with him. Without having formed my final opinion I may say that my impression so far is that it would be justifiable to award him a Fellowship.

And in a letter of 14 Nov. (1935?) Frisch added that Kalecki published a paper in *Econometrica* on the business cycle theory which was good, and that a new manuscript which Kalecki submitted for publication in *Econometrica* confirmed Frisch's good impression. (I am grateful to J. C. Andvig for providing me with copies of this correspondence, and to Mrs Ragna Frisch Hasnaoui for her permission to reproduce Frisch's letter.)

Having received, at the end of 1935, a Rockefeller Foundation fellowship, in February of the following year Kalecki went to Sweden with the intention of writing a book, which (one can surmise) would be a synthesis of his theory of the business cycle with elements of a general theory of capitalist reproduction and the mechanism of the business upswing, which he had been developing since the end of 1932.

He chose Sweden for several reasons. At the beginning of the 1930s the theory of crises was especially popular there based on Knut Wicksell's ideas of the natural and the market rate of interest (G. Myrdal's *Monetary Equilibrium* was perhaps the clearest exposition of the so-called neo-Wicksellian theory, but E. R. Lindahl, B. Ohlin, and others were following in the same direction). The theory of crises was also being developed in Norway by Ragnar Frisch. During 1932–4 Frisch and Ohlin identified the distinct character of savings and investments as co-determinants of economic activity, and also the influence of increased demand for investment or consumer goods on stimulation of the upswing (for a discussion of the Swedish School during these years and some of its economic policy and political implications, see L. Klein, *The Keynesian Revolution*, 2nd edn., New York, Macmillan, 1966, pp. 49–50, 224–6; Andvig, *Ragnar Frisch and the Great Depression*; E. Lundberg, 'The Rise and Fall of the Swedish Model', *Journal of Economic Literature*, 23/1, 1985). Kalecki could, therefore, expect his ideas to be most easily understood in this environment. He also wished to make a closer study of the effect of random shocks on the business cycle, a problem on which Frisch was working in Oslo. Besides, at this time Kalecki was still not proficient in English, which inclined him to postpone his trip to England for a few months (P. N. Rosenstein-Rodan in a letter of July 1980 to the editor writes that, having read one of the early papers of Kalecki, at the turn of 1935 he invited him to come to London).

Kalecki's fellowship programme, dated 28 Feb. 1936 and kept in the files of the Rockefeller Foundation (and reproduced by Patinkin in his *Anticipation of the General Theory*, p. 93), is as follows:

> Business cycle theory, particularly from standpoint of Wicksell's money theory. Will visit a number of Business Cycle Institutes in various European countries but will carry out the main part of his program in the *Scandinavian countries* (with *Prof. G. Myrdal* in *Stockholm* and *Prof. R. Frisch* in *Oslo*) and in England (Cambridge) under direction of *Prof. J. M. Keynes*. [original emphases]

During the next two and a half months in Sweden, Kalecki met with Myrdal, Ohlin, and Lindhal, although he did not at that time see Frisch. In a letter to Frisch dated 13 Mar. 1936 Kalecki wrote:

Dear Professor [Frisch],

I write in German because I still find it rather difficult to write a long letter in English. I was very sorry to learn that you will come here not

in the middle of March but at the end of April, because I planned to leave Stockholm and go to Oslo at the beginning of April. Now I am not certain that this plan makes any sense because you may be busy making arrangements for your trip. Thus, perhaps it is better for me to go to England in April and to visit you in the summer or in the autumn, whenever it suits you best. I look forward to hearing your suggestions.

I read your paper published in the *Review of Economic Studies* with great interest. It is noteworthy that in the last year I worked in a similar direction, and I am taking the liberty of sending you a copy of my paper, which I have discussed here with Professor Myrdal and some of his students. In my paper the idea of equilibrium rate of interest comes very close to yours (this becomes especially clear on pp. 7–10 [of the [MS]).

When I read your paper it appeared to me that it might be better, in your definition of the 'normal' values, to assume that always $m=n$, then to impose k conditions, to cancel certain k equations in the original system of equations, and thereby to derive a system of all variables which (in their instantaneous form) correspond to the 'specific' equilibrium. For instance, let us imagine that in the original system of equations the money rate of interest is given by the equation:

$$p = \text{constant}$$

(say, the central bank maintains the money rate of interest at a constant level). In order to obtain 'money equilibrium' we cancel this equation, and add instead the following:

$$S_t = I_t$$

and from the new system of equation we derive money equilibrium values of all variables for any given point of time, and especially we get the value of p, which is the equilibrium rate of interest. (It is clear that several variables may assume the same values which they had in the original system of equations.)

I would also like to note that in the enclosed paper I denotes the real value of investments, while A denotes the real value of savings, as in my *Econometrica* paper. Hence investments orders I are investments *ex ante*, and production of investment goods A is investment *ex post*, equal thereby to the real value of savings. At the points of intersection of these two curves (i.e. where $i = A$), at the top of the boom and at the bottom of the slump approximately, the value of the money rate of

interest equals the equilibrium rate. They are therefore the two points of time which you mention at the end of your *Review* paper.

I am indebted to J. C. Andvig for sending me a copy of this letter; the original is kept with Frisch's papers in the archives of the University of Oslo. Kalecki refers here to Frisch's article 'On the Notion of Equilibrium and Disequilibrium', *Review of Economic Studies*, 3/2, 1936, and probably to an MS of his article 'A Theory of the Business Cycle'—see Annex 4.

A few weeks after arriving in Sweden, Kalecki received from his colleague at ISBCP, Dr Józef Zagórski (then on study leave in London), information about Keynes's book, which appeared in Feb. 1936, and on the discussions surrounding it; shortly thereafter he received a copy of the *General Theory of Employment, Interest and Money*. Some of Kalecki's biographers believe that the *General Theory* in its general outline was the book which Kalecki himself intended to write; that Kalecki's book would probably have contained a no less general theory of reproduction and employment than Keynes's theory, even though it would surely also have differed from it in many basic points, which can be seen in Kalecki's earlier and later works (see e.g. Feiwell, *The Intellectual Capital of Michał Kalecki*). In any case, after familiarizing himself with the *General Theory*, Kalecki for the time being gave up his idea of making his own synthesis of the theory of the business cycle and reproduction in capitalism.

'Some Remarks on Keynes's Theory' is one of the few early reviews of the *General Theory* (next to those of A. P. Lerner in *International Labour Review*, 1936, and W. B. Reddaway in *Economic Record*, 1936) which showed a good understanding of Keynes's book, exposing both the lines of development of Keynes's ideas as well as the weak points of his argument. Keynes's book at the time caused great confusion, among Polish economists as well as elsewhere. When the book appeared, *Ekonomista* devoted two separate articles to it in the same number. In one, Kalecki heralded from London 'a turning-point in the history of economics', while, in the other, Władysław Zawadzki (a pupil of Walras and Pareto, and a pioneer of applications of mathematics to economics in Poland) consoled himself and his readers that Keynes at least twice before had changed his views, and hence that the *General Theory* was quite probably not his final word.

In subsequent years many Polish economists studied thoroughly Keynes's theoretical system and its implications for economic policy. In Nov. 1938 the president of the Association of Polish Economists and Statisticians, Professor Edward Lipiński, approached Kalecki to undertake the translation of the *General Theory* and to obtain Keynes's permission for the Polish edition (see Lipiński's letter to Kalecki of 17 Nov. 1938, in Kalecki's files). Kalecki translated the first four books of the *General Theory*, the final two being

translated by Stanisław Rączkowski shortly after the war, but the translation was not printed until 1956.

Kalecki arrived in England in mid-April 1936 and stayed for a time in London. There he studied Keynes's theory and attended seminars at the London School of Economics run by F. Hayek and L. Robbins. He also met there A. P. Lerner, R. G. D. Allen, John Hicks, and Nicholas Kaldor. In this circle the ideas of the so-called 'Keynesian left' were taking shape. After a short visit to Paris and Geneva, where he had 'discussions about Keynesian theory and problems of business cycle with Dr Haberler' (Rockefeller Foundation files, as quoted by Patinkin, *Anticipation of the General Theory*, p. 93), Kalecki returned to London in early Sept. 1936. Later that month he took part in a meeting of the Econometric Society in Oxford, 'especially in discussion about Keynesian theory. Also discussed with Mrs Robinson in Cambridge the application of this theory to the long run equilibrium problems and the business cycle' (ibid.).

In June 1936 Joan Robinson's 'Disguised Unemployment' appeared in the *Economic Journal*. Many years later she wrote in this connection:

> Soon afterward I received a letter, evidently from a foreigner visiting England, who said that he was interested in my article since it was close to some work of his own. I thought this very strange. Who could claim to be doing work to be close to this—the first fruits of the Keynesian revolution? When Michał Kalecki turned up, I was still more astonished. He had no party manners or small talk (which was quite okay with me); he plunged directly into the subject. He proved perfectly familiar with our new ideas and had even himself invented some of Keynes's own more fanciful conceits, such as the device of burying banknotes in bottles in order to stimulate employment. (Robinson, 'Michał Kalecki: A Neglected Prophet', p. 28)

It is unclear, however, when exactly Kalecki and Joan Robinson first met. From the internal evidence of the correspondence which has survived it may be conjectured that, after he had sent her the letter mentioned in this article, she invited him to visit her in Cambridge, which he did. On this occasion he might have submitted to her for comments the draft of his paper 'A Theory of the Business Cycle' and referred her to his 1935 *Econometrica* paper. This would provide a straightforward context for her letter which has survived in his files:

Cambridge
September 16 [1936?]

Dear Mr Kalecki,

I have had a glance of your paper, and I will take it away with me and go through it carefully. Meanwhile I cannot delay to tell you what a pleasure it is to me to be arguing with someone who is making an advance upon Keynes instead of endlessly disputing with people who have not understood the elementary points. I am now working on a

book in which 'Disguised Unemployment' will reappear, with a number of essays making applications of the General Theory to various problems (including international trade). I think you are one of the ten people in Europe who will understand what I am trying to do.

Your *Econometrica* article makes me ashamed. We ought to have welcomed you long ago as a kindred spirit. Unfortunately mathematics is an insuperable obstacle for me, and I never turned to the statement at the end. It must be rather annoying for you to see all this fuss being made over Keynes when so little notice was taken of your own contribution.

I think it is a pity that you suggest at the beginning of your paper that you are making an attack on Keynes's system, when your real object is to fill a gap in it. I think that you are wrong that he does not allow for a 'self-winding up' process. He is always talking about how a movement 'feeds on itself', but his treatment is vague and incomplete, and something on the lines of your paper is needed to give it precision.

As far as definitions are concerned I think it is possible to dispute about them until doomsday because in the nature of this case no system can be perfect. Keynes's system, as you say, is unrealistic, but yours is troublesome because marginal prime cost as you define it is not equal to marginal revenue, or is only equal to it if entrepreneurs are very foolish. It falls short of m[arginal] revenue by some vague margin corresponding to Keynes's m[arginal] user cost.

The idea of marginal disutility of risk-bearing is subject to the same objection as all utility ideas—that it involves a circular argument.

Why does supply price rise with scale? Because m[arginal] disutility increases. How do you know m[arginal] d[is]u[tility] increases? Because price rises!

However Keynes's method doesn't get out of the difficulty, and it is one of those awkward points in economic theory that there seems no way out of. I think the idea of a rising supply curve of risk-bearing for the individual is very useful, and you might supplement it by a further rise in the general supply curve due to individual difference in willingness to take risks. You then get a composite supply curve exactly analogous with the supply curve of output from land of differing fertility.

This is only an interim report. I will work through your paper and you must come up next term a[nd] have another talk.

Yours sincerely,
Joan Robinson

PS I would be interested to have your opinion of my long-period article. You will find the last section somewhat primitive as I do not allow specifically for the 'self-winding-up'; but I think my treatment is a necessary stage to take people through. We've got to teach the dog to read bit by bit.

(Austin Robinson's permission to reproduce this letter is gratefully acknowledged. In the date of the original letter the year is missing. I am grateful to Don Patinkin for indicating that its internal evidence suggests that the year was 1936. Joan Robinson's book mentioned in the first paragraph of the letter is her 1937 *Essays in the Theory of Employment*, and her article mentioned in the postscript is presumably 'The Long-Period Theory of Employment', originally published in *Zeitschrift für Nationalökonomie* (1936) and reprinted with minor revisions in her 1937 *Essays*.)

In his reply, of 3 Oct. 1936, Kalecki wrote:

Dear Mrs Robinson,

Thank you very much for your solid criticism on my paper. I hope to be able to answer your questions though I am not sure whether you will be persuaded by my arguments.

As concerns your article one can imagine I think, cases when the system does not tend to long-run equilibrium, at any case not in that way as you represent it. Let us examine the simple case (excluded in my previous letter) [*it has not survived*] where the proportion of capitalist savings to capitalist income is constant. In this case [it] is quite possible that investment (and thus capitalist income), equipment, and total output will increase every year in the same proportion whilst prices and the rate of interest remain on at a stable level. If the population grows in the same or greater proportion nothing will stop this development. If the growth of population is slower (or the population is constant) the development will come after a certain time to the end, however not because of the fall of marginal efficiency of capital due to the accumulation of equipment, but because of the shortage of labour. There will be an increase of nominal wages and prices [which] will force the banks to raise the rate of interest. I will not here analyse the further process but it seems to me that it will likely lead to long-run equilibrium with full employment.

Thus it seems to me that if we start from long-run equilibrium and assume that the rate of interest was lowered, the system must not reach the new long-run equilibrium in the way described in [the] last part of your paper, or fluctuate [a]round this equilibrium, but it can also produce fluctuations [a]round the ascending curve.

I shall close discuss with you these and other questions when I shall meet you.

Yours sincerely,
M. Kalecki

The original is kept is Joan Robinson's files, in King's College Library, Cambridge. As a result of Kalecki's comments above, when the article was reprinted in her 1937 book she added a new s. 5 and acknowledged assistance from Kalecki; see her *Essays*, pp. v and 132 n.

Later that month Kalecki came to Cambridge and gave a talk at Keynes's 'political economy club' at King's College. Joan Robinson, who was not a member, was invited to the meeting and introduced Kalecki to the audience. Subsequently she thanked Keynes 'for being kind to my Pole' (*Collected*

Writings of John Maynard Keynes, vol. xiv, p. 140). The presumed discussion between Joan Robinson and Kalecki during this visit was followed by this letter of 5 Nov. 1936.

Dear Mrs Robinson,

I thought some hours about the problem of invention and I came to the regrettable conclusion that [it] is much more complicated than I had imagined. The complication involved is connected with the measurement of capital. If we write the production function

$$f(c, l) = l$$

where c and l are the quantities of capital and labour per unit of output, we consider, I think, the capital measured by [the] value of capital divided by [the] price of investment goods p_c (On[e] could also measure capital in terms of product but then the shape of function f changes with the price of [the] product.) If we denote by p the price of [the] product, by i the rate of interest, and by w the wage unit, we obtain for the marginal productivities of capital and labour:

$$\frac{df}{dc} = i\frac{p_c}{p}, \quad \frac{df}{dl} = \frac{w}{p}$$

If we examine now a *separate* invention—the rate of interest being kept const[ant]—the marginal productivity of capital in the new equilibrium will not be equal to the previous level, but will increase because of the fall of the product price p. If we have a 'neutral' invention the price p will fall in the [same] proportion [as] the marginal productivities have risen and thus equate $i(p_c/p)$ and w/p to the level of these productivities; in the new equilibrium the proportion of labour and capital will be the same as before. If the invention is 'labour-saving' the price p falls more than m[arginal] pr[oductivity] of cap[ital]—and less than m[arginal] pr[oductivity] of lab[our] has been increased, and beside[s] one uses relatively more capital and less labour; in that way the equality between the marginal productivities and $i(p_c/p)$, w/p resp[ectively] is established. Just in that way the Hicksian term 'labour saving' invention is justified. But whether the share of labour will increase or fall depends again also on the elasticity of substitution in the new situation. (In the case of a 'neutral' invention not!) In the case of [a] capital saving invention the opposite movement takes place.

But if we shall examine the results of *technical progress* as a whole, then the processes are [developing] rather so, as described now in your paper. For we can assume [in] the first appro[ximation] that this process affects all prices of consumption and investment goods in the same degree. Thus $i(p_c/p)$ and consequently the m[arginal] pr[oductivity] of cap[ital] must remain unchanged if the rate of interest is kept constant. (The difference between the separate invention and technical progress is due to the fact that an invention in an investment goods industry causes a change in methods used in the industries buying its product.) It is interesting that the technical progress saves labour also if all [the] inventions are not 'labour saving', if they only increase the marginal productivity of capital.

As to the details of your exposition, the word 'initial' is ambiguous and only further on it is interpreted as meaning 'with the same relation of capital and labour'. The end of note 3 on page [?] is not consistent with [the] end of the first passage of this page: if the inventions are assumed 'labour saving' and elasticity of substitution near to unity, the real income of workers will fall under the (long run) influence of technical progress.

As regards the short time effects of invention (the beginning of page 74 and note 1) initially they must, I think, always increase the gross investment expressed in wage units because of the rise of marginal efficiency of capital (the Keynesian I is gross investment).

I should be glad to hear what you think about all this. Thank you very much for asking Mr Keynes about the article on Germany. I certainly did not want to obtain any promise but only to know whether the theme is interesting for him. But I think I shall probably try to write this paper.

Yours sincerely,
M. Kalecki

PS Don't write Dr Kalecki, I have not this degree; 'of Warsaw' is not necessary too. (Joan Robinson's files, King's College Library. See also Robinson, *Essays in the Theory of Employment*, pp. 132–6.)

In London Kalecki made friends with a German refugee, Erwin Rothbart, who became fascinated by Kalecki's approach to the business cycle. Using the mathematical foundation of this approach, Rothbart attempted to formulate a dynamic theory which, besides the business cycle, would also include the trend. Rothbart did not finish his work, because he was killed at the front towards the end of the war. Kalecki later developed and used some of the ideas that had emerged from discussions with Rothbart in subsequent studies of the dynamics of the capitalist economy (see Kalecki's 'The Work of Erwin

Rothbart', *Review of Economic Studies*, 11–12, 1945, repr. in *Collected Works*, vol. vii.)

On 18 Nov. 1936 'for spreading in print untrue speculations and conjectures that could mislead public opinion'—as a communiqué of the Polish telegraph agency announced—two of Kalecki's closest friends and collaborators, Marek Breit and Ludwik Landau, were fired from the ISBCP. The reason was their report in the ISBCP bulletin on Poland's economic situation, in reaction to which the vice-premier and minister of the treasury at that time, Eugeniusz Kwiatkowski, demanded the disciplinary dismissal of the authors. In protest Kalecki announced his resignation from the ISBCP and published the following letter in the press:

Dear Editor

May I request you kindly to publish the following statement in your widely read newspaper.

While on study leave from the Institute for the Study of Business Cycles and Prices (a Rockefeller fellowship), I learned about the firing from the institute of my colleagues, Ludwik Landau and Marek Breit, and the motives for this step. After what has happened, I find it impossible to remain in the Institute for the Study of Business Cycles and Prices and I am hereby submitting my resignation from this position.

Michał Kalecki

London, 22 November 1936

This letter appeared in the following dailies: *Robotnik*, 26 Nov. 1936, p. 2; *Kurier Poranny*, 27 Nov. 1936, p. 6; *Czas*, 26 Nov. 1936, p. 3. A note on Kalecki's letter of resignation also appeared in *Kurier Warszawski*, Nov. 1936.

On account of this announcement Kalecki found himself on a black list, with practically no chance of finding an appropriate job on his return to Poland. Also, many of his friends in Poland urged him not to return on account of political developments. All of this inclined Kalecki to prolong his stay in England.

Towards the end of 1936 his Rockefeller fellowship was extended for another 12 months. Throughout the rest of 1936 and 1937 he continued his studies on the theory of the business cycle and the Keynesian theory in London. In 1937 he spent a few months in Paris studying the economic policy of the Léon Blum Government. His scholarly contacts with Keynes's circle in Cambridge (especially with Joan Robinson, Piero Sraffa, and Richard Kahn) became closer.

Towards the end of 1937 he again met Keynes,

but this meeting did not serve as the beginning of an intellectual exchange, or closer scientific collaboration. Quite apart from the difference in their social attitudes, their personal situations were diametrically opposite. Keynes was absorbed in the search for historical analogies: he was collecting material for a biography of Newton and marvelled that, at first, only people under forty understood Newton's discoveries. Kalecki had completely different worries: he was looking for a job and Keynes offered to help him. (T. Kowalik, 'Biography of Michał Kalecki', in *Problems of Economic Dynamics and Planning: Essays in Honour of Michał Kalecki*, p. 6)

Joan Robinson had the following recollections of the early meetings between Kalecki and Keynes:

When Kalecki came to Cambridge in 1936, we told Keynes about him, but he was not much impressed. His own ideas were in full spate (he was thinking about rewriting the *General Theory* in a completely different way) and he had not patience with anyone else's. He picked on a phrase in the *Econometrica* paper that seemed to him too 'monetarist', though in fact it contained a point of view which he later came to himself. Keynes did not sympathize with Kalecki's political presuppositions and by background and temperament they could not have been farther apart. I commented on this once, saying 'oil and vinegar would not mix'. Some critic objected that they are mixed every day, but that needs constant stirring. Neither of these two characters was easy to stir. However, Keynes took the trouble to get a research project set up to provide Kalecki with a job. (This was just before the war and nothing much came of it.) (*Collected Economic Papers*, vol. v, Oxford, Blackwell, 1979, p. 187.)

By the end of 1937 Kalecki had moved to Cambridge.

Cambridge, November 21 [1937?]

Dear Mrs Robinson,

Many thanks for sending me your book which I find excellent.

I do not know whether Mr Kahn told you in the summer that my wife [would like] to translate it into Polish. (I should of course check the translation.) Must I approach in this matter your publisher?

Yours sincerely,
M. Kalecki

My address is: Poste-restante, Cambridge.

(Joan Robinson's files, King's College Library. The book is Joan Robinson's 1937 *Essays*.)

Kalecki stayed in Cambridge until the summer of 1939. First he received a research grant, from 1 Jan. until 30 June 1938, from the University of Cambridge, to help him finish his *Essays in the Theory of Economic Fluctuations*. When the grant ended, Kalecki found himself without a permanent job. Mrs Kalecki fell ill. They moved back to London. The strain is seen from his letter to Joan Robinson.

34 Coram St., WC1
July 15, 1938

Dear Mrs Robinson,

I like your article, in particular the end of it (pp. 12–14). I am making some suggestions as to minor points (sheet enclosed).

I am not working as yet; I am still a little tired.

Yours sincerely,
M. Kalecki

Mrs Kalecki is not sleeping fairly well.

[*Detailed comments*]

P. 4. The indirect effect consists in the influence upon the expected rate of profit. Would it not be better to say simply that in the first case there is a rise in the rate of interest while in the second it is kept constant[?]

Pp. 7–8. This argument about velocity of circulation is very interesting but I think it must be left out in the case you will shorten the article. (While what refers to that on p. 6 and in [the] first paragraph on p. 7 must be rather maintained.)

P. 10. It is necessary to explain why an 'inflation' started by deficit causes depreciation of exchange—or is stopped by an adverse balance of trade.

P. 12. Add after 'to curb activity'—'because of the rising velocity of circulation'.

I think it is necessary to mention somewhere that in spite of the continuous rise of money wages there was a tremendous fall in real wages and indicate briefly the reasons for it.

I am grateful to Don Patinkin for providing me with a copy of this letter. The article seems to be Joan Robinson's review of the book by Bresciani Turroni, *The Economics of Inflation*, in *Economic Journal*, 48, Sept. 1938.

After a short stay in France the Kaleckis returned in October to Cambridge, where he was offered a research job on a project on the statistical verification of his theory of income distribution, on the basis of British manufacturing industries (for details of this project see *Collected Works*, vol. ii). However, after less than a year the project was terminated, for financial and other reasons. At the end of 1939 Kalecki moved to Oxford, where he joined the Oxford University Institute of Statistics, headed by A. L. Bowley (Cambridge was declared a military zone where no foreigner could stay). The departure from Cambridge ends the period of confronting his own theory with that of Keynes. In the Oxford Institute of Statistics he took up entirely different problems.

Kalecki's review of the *General Theory* shows that, whereas he attempted to make Keynes's argument more precise concerning factors determining short-period equilibrium, his criticism of Keynes's concept of equilibrium and its static nature was fundamental. The review also shows that, in the period after he had familiarized himself with the *General Theory*, Kalecki focused mainly on bringing out the major differences between his approach and Keynes's. One of the consequences of the encounter with Keynes's circle in Cambridge and with Keynes himself was a certain change in this position. This can be clearly seen if one compares the original version of Kalecki's 'A Theory of the Business Cycle' (see Annex 4) with ch. 6 of the *Essays in the Theory of Economic Fluctuations* (see pp. 298–318 above). In a sense, following Joan Robinson's suggestion (see p. 502), Kalecki shifted from criticism of Keynes's theory to a focus on what his theory and Keynes's had in common.

The works included in pt. 5 of the present volume come from the years 1936–9, with the exception of the last item, Kalecki's comments on A. Pigou's 1943 article, the subject-matter of which is closely related to the other papers of pt. 5. These works reflect Kalecki's early reaction to Keynes's theory, his attitude toward it, the complicated evolution of this attitude, and his attempt to define the place of his own theory in relation to that of Keynes. This picture of the evolution is still incomplete, however. There is a gap in Keynes's theory in so far as it contains no theory of income distribution which corresponds with his theory of employment. From 1938 Kalecki wrote much on the theory of income distribution under monopoly capitalism. In Joan Robinson's opinion, 'It was Michał Kalecki rather than I who brought imperfect competition into touch with the theory of employment' (*The Economics of Imperfect Competition*, 2nd edn., London, Macmillan, 1969, p. viii). Kalecki's papers on the theory of income distribution are included in *Collected Works*, vol. ii, pt. 1.

[2]
J. M. Keynes, *The General Theory of Employment, Interest and Money*, in *Collected Writings*, vol. vii, p. 148.

[3]
The English translation of Kalecki's review of the *General Theory* was followed by a 'Bibliographical Note and a Comment' by F. Targetti and B. Kinda-Hass. This contains, among others, a comparison between Kalecki and Keynes with respect to three points: (i) the micro-economic foundations of their respective macro-economic equilibria positions; (ii) investment determination; and (iii) a dual relationship between investment and the rate of interest, and between the level of wages and the level of output and employment. While in points (ii) and (iii) the authors mainly re-emphasize the importance of Kalecki's conclusions with respect to Keynes's analysis, and

show that the former's formulation of the latter's theory made its message even stronger, in point (i) Targetti and Kinda-Hass indicate some important problems faced by Kalecki and Keynes.

First of all, following C. Casarosa ('Un contributo all'analisi dei fondamenti microeconomici della teoria keynesiana della domanda effettiva', *Rivista di politica economica*, Nov. 1978), and S. Parinello ('The Price Level Implicit in Keynes's Effective Demand', *Journal of Post-Keynesian Economics*, 3, 1980), Targetti and Kinda-Hass point out that

> in the Keynesian model it is possible to aggregate expected demand and supply functions of single firms as well as to reach an equilibrium below full employment that is determined by the equalization of aggregate supply, aggregate expected demand and aggregate expenditure only under the assumption that firms produce a single good and all firms have the same price expectations. (p. 257)

Next they turn to Kalecki and—in agreement with Chilosi's 'Introduction' to *M. Kalecki, Antologia*—they write:

> Kalecki in his review of the *General Theory* also deals with a micro foundation of macro equilibrium by means of a[n] upward sloping curve of marginal cost of labour for the firm. However, his attempt to deal with a more general case which includes also imperfect competition is an important advance, but raises some problems. At the micro level the equilibrium is given by equality between marginal revenue and marginal cost. Once the cost of raw-material inputs are subtracted the equilibrium gives also the distribution of value added between profit and wages. However, a serious problem of aggregation arises. If, from an equilibrium point, the capitalist autonomous expenditure grows, the marginal value added curves of firms shift north-east and output and income will grow and a new distribution at the level of firms will take place. At the macro level there must be both equality between autonomous capital expenditures and total profits as well as between these profits and the sum of all profits of all firms; but there is no guarantee that the equilibria at the micro and macro levels will be compatible. . . .
>
> Kalecki in all his subsequent works . . . solves the problem of aggregation by assuming at the micro level constant returns to scale (because of imperfect competition) and a constant degree of monopoly (in the short run). But, unless we are dealing with stationary equilibria, it is difficult to think of a constant degree of monopoly as production grows. However, these assumptions are not less strong than the ones mentioned above which are necessary to solve the problem of aggregation in the Keynesian model. (Ibid.; see also editorial comments to Kalecki's theory of income distribution, *Collected Works*, vol. ii.)

Essays in the Theory of Economic Fluctuations

[1]

First published in 1939, in London by Allen & Unwin and in New York by Farrar & Rinehart; repr. in 1972, in New York (by Russel & Russel). Italian translation: M. Kalecki, *Saggi sulla teoria della fluttuazioni economiche*, pp. 75–176.

Allen & Unwin's permission to reproduce the *Essays* is gratefully acknowledged.

Whatever Kalecki's original plans for the book he intended to write when he left Poland in 1936, the *Essays in the Theory of Economic Fluctuations* are not Kalecki's attempt to develop, in parallel to Keynes, a 'general theory of capitalist reproduction and employment'. Instead, the *Essays* concentrate (i) on filling in the gaps in Keynes's theory and making its argument more precise; (ii) on a statistical verification of Keynes's theory (Keynes had not been much worried about testing his theories or estimating his equations, and his attitude to data 'was much more subjective and aristocratic, for instance, in most cases he trusted his own intuition about quantitative proportions more than he trusted other people's index numbers'. Andvig, *Ragnar Frisch*, pp. 271–2)); (iii) on integrating Keynes's short-period theory with Kalecki's theory of the business cycle.

It is not surprising, therefore, that Kalecki's book (in the introduction to which he thanks three economists from Keynes's closest circle for their assistance) was received by its critics and the profession at large mainly as a supplement to, and empirical verification and popularization of, the *General Theory*.

Mrs Kalecki remembers that Keynes was supposed to write a foreword to the book, but apparently his illness prevented this. Joan Robinson, in conversations with the present author in 1976, remembered that she and Richard Kahn had planned to ask Keynes to write the foreword. It is unclear, however, whether they did not actually approach Keynes, or whether he did not want to commit himself; anyway, there is no reference to the foreword in Keynes's letter acknowledging receipt of the proofs of the book:

> King's College
> Cambridge
> January 7th, 1939
>
> My Dear Kalecki,
>
> Thank you very much indeed for sending me proofs of your book. I have not compared them with the original articles to see how much you have modified them. But I get the impression of immensely improved lucidity. I have found them exceedingly clear and intelligible and most agreeable (and *almost* easy) reading. It will be a most valuable work.
>
> The article which I am writing for the March [Economic] Journal ['Relative Movements of Real Wages and Output', 1939] is mainly concerned with matter you discuss in your first essay. I had been making several references to the [1938] Econometrica version of that, and will now correct these so as to refer to the book. I am also dealing, to a certain extent, with what you discuss in your new essay on Real and Money Wages. But in actual fact, what I am writing does not overlap with that essay nearly so much as the titles suggest. You are considering what happens to real wages when money wages are reduced, so to speak on purpose, other things being equal; whereas I am considering what happens to real wages when there is a change in the output which is what you are dealing with much more in your first essay.

There is, by the way, one small statistical point where perhaps you can help me. On p. 14 [235] you mention that according to Bowley the labour share was 41.4 per cent in 1880. In the Table on page 16 [237] you give a figure comparable to more recent figures for 1911. Is it safe to add the 1880 figure to this table, or does that require some modification in order to be comparable?

Yours sincerely,
J. M. Keynes

[Handwritten postscript]
In the last essay I don't really follow why the fact that only entrepreneurs save makes the system trendless.

Misprints p. 127 [305] sequencies—delete the i; p. 145 [316] cracks (under the diagram)—what is this, it sounds more Polish than English!

I am grateful to Lord Kahn for permission to republish this letter. The original survived in Kalecki's files; if he wrote a reply, it has not survived. Don Patinkin, in his *Anticipations*, pp. 101–2, rightly notes that either Kalecki sent the proofs at too late a stage or Keynes replied too late for any changes to be made—including the addition of a foreword—for the typographical errors pointed out in the postscript to this letter remained uncorrected. They are corrected in the present edition, however, 'kinks' being substituted for 'cracks' on p. 316.

The *Essays* were reviewed, among others, by J. E. Meade in *Economic Journal*, June 1939, S. Kuznets in *American Economic Review*, Dec. 1939, O. Lange in *Journal of Political Economy*, Apr. 1941, and M. Dobb in the *Daily Worker*, 22 Mar. 1939. All the reviewers emphasized the importance of the subject-matter and the originality of Kalecki's thought. The book was strongly recommended for 'any economist who is interested in this type of work' (Meade, p. 301; cf. also Dobb's review). Dobb emphasized that Kalecki's studies represented 'a sharp break with economic tradition in two respects, both of which bring them into closer touch with problems of contemporary capitalism, than traditional economic writings. First, he starts by assuming that capitalists are always monopolists (in some degree). . . . Secondly, he devotes special attention to what Marx called the problem of "realisation of surplus value".'

At the same time both Lange and Kuznets considered Kalecki's handling of statistical data to be wanting. Kuznets, for instance, wrote:

> Under protection of simplifying assumptions and often in cavalier disregard of available evidence that could be utilized in a more circumspect advance upon the problem, the author makes a lightning raid and emerges with a striking conclusion. Careful consideration reveals that the empirical generalizations advanced rest upon limited data and somewhat loose criteria as to what constitutes stability or association; and that the final conclusions are, at most, interesting suggestions of uncertain validity. (pp. 805–6)

Both Meade and Kuznets expressed their hope that Kalecki would pursue his studies 'beyond the range of preliminary hypotheses' (Kuznets, p. 806), and

'develop his argument in a more extensive treatment of his ideas' (Meade, p. 305).

The first and the last essays in the book attracted most attention. While more detailed comments will follow in the editorial material pertaining to them, it may be noticed here that they made the book widely discussed by economists interested in Keynesian economics, and indeed were often considered as Kalecki's classic statements in the field of the theory of income distribution and the business cycle theory respectively (see e.g. R. G. D. Allen's discussion of Kalecki's trade cycle model in *Mathematical Economics*, London, Macmillan, 1957, ch. 8.4, and Lange's 1958 discussion of the same model, in his *Dziela*, vol. i, Warsaw PWE, 1973, ch. 2.4 (in Polish); see also Lange's review of the *Essays* (op. cit.), p. 283).

In 1953 Joan Robinson acknowledged her intellectual debt to Kalecki in general, and to his *Essays* in particular, in the following words:

> Mr Kalecki's discovery of the *General Theory* independently of Keynes was a classic example of the coincidence of science. His version of the analysis led directly (which Keynes's did not) to a model of the trade cycle. Based upon the same conception of short-period equilibrium, his theory fitted naturally into Keynes' scheme, and became absorbed into it in the subsequent development of the General Theory. By now it is impossible to distinguish what one has learned from which. (*The Rate of Interest, and Other Essays*, London, Macmillan, 1953, p. 159.)

And later, in 1964, she had this to say about the importance of Kalecki's 1939 book.

> In his *Essays in the Theory of Economic Fluctuations*, published after he had been a little while in England, he filled in several gaps in Keynes' formulations of the theory of employment.
>
> In Keynes's scheme, the concept of *marginal efficiency of capital* means that, at any moment, there is in existence a schedule of possible investment projects, listed in descending order of their prospective profitability (allowing for risk). The schedule is cut off at the point where the prospective rate of net profit is equal to the rate of interest to be paid for finance. This determines the total value of investment to be undertaken. Kalecki asked the pertinent question: If there are schemes which promise a rate of profit greater than the rate of interest, would not each individual enterprise be willing and anxious to carry out an indefinitely large amount of investment? It was no use to reply that a faster rate of investment would raise the cost of capital goods and so reduce the prospective rate of profit; for the rise in costs would come about as a result of actual investment, *ex post*, while the marginal efficiency of capital concerns investment plans *ex ante*.
>
> Kalecki supplied an answer (drawing upon his model of 1933), first, by making clear the separation between investment decisions and actual investment; and second, by introducing into the argument the obvious fact that no individual enterprise can command an indefinitely large amount of finance at a given rate of interest. He took risk over from the demand side (where it lies rather uneasily in Keynes's scheme) to the supply side, and postulated that the amount of finance that each individual enterprise will commit to investment is an increasing function of the prospective rate of profit,

depending upon the ratio of borrowing to its own capital. Then, with any given distribution of capital amongst enterprises, there is a particular relation between the total amount of investment plans being drawn up at any moment and the level of prospective profits.

The second difficulty was that, though Keynes himself attached great importance to the idea that the present is always over-weighted in forming a view about the future, he treated his schedule of prospective profits as though it was independent of the actual rate of investment. Kalecki showed how a higher level of investment this year than last, means a higher level of current profits, therefore a higher expected rate of profit, therefore enlarged investment plans, therefore a higher rate of investment next year.

A rise in the actual rate of investment cannot go on indefinitely. When the rate of investment ceases to rise, the level of current profit ceases to rise. But the amount of productive capacity competing for sales is steadily growing. The rate of profit is therefore declining, and so the boom will break. Thus prosperity can never last. 'The tragedy of investment is that it causes crisis because it is useful.' He ended the argument with the poignant saying: 'Doubtless many people will consider this theory paradoxical. But it is not the theory which is paradoxical, but its subject—the capitalist economy.'

The third point at which Kalecki tightened up the slack in the *General Theory* was in connection with the relation of prices to wage rates. Keynes relied upon a rather vague sort of Marshallian concept of competition, with short-period diminishing returns, so that an increase in employment is accompanied by a fall in real wages for workers already employed. Kalecki elaborated his original insight into the relation of monopolistic price policy to employment with the analysis of imperfect competition (then in its heyday) to produce his famous short-period theory of distribution—the share of wages in the value of output is determined by the degree of monopoly.

This formulation has been attacked as being merely circular, since the degree of monopoly is defined as the ratio of gross margins to the value of output, and so is identically equal (on the stated assumptions) to one minus the share of wages. The apparent circularity lies only in the way the argument is set out. When by degree of monopoly we mean, not the *ex post* level of gross margins, but the price policy of firms, then, in slumpy conditions, when all plants are working under capacity, it is clearly true that if firms pursue a competitive policy, cutting prices in an attempt to sell more, real wage rates will be higher, and the utilization of existing plant greater, than if they pursue a monopolistic policy, maintaining or even raising gross margins.

These amendments have been incorporated into 'Keynesian' thought; few of the present generation of 'Keynesians' stop to inquire how much they owe to Kalecki and how much indeed to Keynes. ('Kalecki and Keynes', pp. 338–9.)

Moreover, in the Introduction to Kalecki's *Studies in the Theory of Business Cycles, 1933–1939* (Oxford, Blackwell, 1966, pp. viii–ix), Joan Robinson argued that the essence of the Keynesian revolution 'may be summarized in the propositions that the rate of saving is governed by the rate of investment, that the level of prices is governed by the level of money wage rates, and that the level of interest rates is governed by the supply of money'. According to M. C. Sawyer (*The Economics of Michal Kalecki*, p. 180), 'This is significant because it corresponds closely to the features of Keynes which Kalecki stressed in his review of that book [*General Theory*], and which Kalecki indicated he had put forward earlier.'

An outstanding feature of the *Essays* was its attempt to bring together micro- and macro-, or, in modern economic parlance, to provide micro-economic foundations for his macro-economic theory. Has Kalecki succeeded in this? The question has been much debated, both with respect to the link between his micro-economic theory of price determination and his macro-economic theory of the national income distribution and his version of the theory of effective demand, and with respect to the link between his function of investment decisions by individual entrepreneurs and his macro-economic theory of investment determination. These debates will be discussed in some detail in editorial comments relating to his theory of income distribution (see *Collected Works*, vol. ii) and to his theory of investment (see pp. 522–8 below).

[2]
In its original version this article was published under the title 'The Determinants of Distribution of the National Income' in *Econometrica*, 6/2, 1938, pp. 97–112. The revised version of the *Essays* was subsequently reprinted in W. Fellner and B. F. Haley (eds.), *Readings in the Theory of Income Distribution*, Philadelphia, Pa., Blakiston, 1949; London, Allen & Unwin, 1950, pp. 197–217, and in G. C. Archibald (ed.), *The Theory of the Firm*, Harmondsworth, Penguin, 1971, pp. 219–32.

The debates on, and the evolution of, Kalecki's theory of national income distribution are discussed in the editorial matter relating to *Collected Works*, vol. ii, pt. 1.

[3]
In the 1938 *Econometrica* version, Kalecki at this stage supported his argument with a numerical example derived from C. Clark's data for Great Britain in 1934 (cf. his *National Income and Outlay*, pp. 132–3). This partly limited the validity of Kalecki's conclusions. In the 1939 version he substantially revised the text, especially sections 2 and 3 of the present chapter, making his conclusions more general.

[4]
Up until the end of the *Econometrica* version, Kalecki discussed the impact of changes in money wages on the distribution of national income. This problem is discussed in essay 3 of the *Essays in the Theory of Economic Fluctuations*. Ss. 2 and 3 of the present chapter, as well as the 'Final Remarks', were added in the 1939 version.

[5]
Ideas put forward in this essay were further developed in Kalecki's *Theory of Economic Dynamics* (cf. *Collected Works*, vol. ii).

Kalecki's approach to the relationship between investment and income, and especially between investment and savings generated by increased income

and necessary to finance new investment projects (as well as Keynes's approach to the same question), were criticized by A. Asimakopulos. For a discussion of his criticism, which explicitly refers to Kalecki's 1933 and 1935 versions of his theory, see pp. 474–5 n. [28].

[6]

See also M. Kalecki, 'The Problem of Effective Demand with Tugan-Baranovsky and Rosa Luxemburg', in *Collected Works*, vol. ii.

[7]

The Portuguese translation of this essay was published as ch. 7 of J. Miglioli (ed.), *Kalecki Economia*, São Paulo, Editoria Atica, 1980.

This essay should not be confused with a pamphlet which Kalecki published under the same title in 1939, and which is republished in *Collected Works*, vol. ii.

[8]

This article appeared first in *Economica* (NS), 4/16, 1937, pp. 440–6. Its Italian translation was published in Chilosi (ed.), *Kalecki*, pp. 92–102.

The version published in the *Essays*, and reprinted in the present volume, was revised by Kalecki in the light of his discussion with N. S. Buchanan and R. D. Calkins ('A Comment on Mr Kalecki's "Principle of Increasing Risks"', *Economica*, 5/20, 1938). Their criticism mainly concerned two points. First, they argued that Kalecki's reasoning, while correct with respect to a firm operated by a single proprietor with unlimited liability, is inapplicable in case of joint-stock companies which are by far the most dominant form of business organization. Secondly, in their opinion, the 'principle of increasing risk' 'is not capable of being generalized for the economic system as a whole to form a not unimportant link in a theory of business cycles' (ibid. 458; Kalecki's article 'A Theory of the Business Cycle' shortly preceded his 1937 *Economica* paper).

In his 'Reply' (*Economica*, 5/20, 1938, pp. 459–60), Kalecki showed that his argument was applicable to the case of joint-stock companies as well (this fragment of the 'Reply' was later included in the 1939 version of his paper; see pp. 289–90 above); with regard to the second point of Buchanan and Calkins, Kalecki wrote:

> The authors mention in passing that the principle of increasing risk forms 'a not unimportant link in a theory of business cycles' presented in my article in *Review of Economic Studies* . . . . This is not quite precise. The principle of increasing risk is used there [see pp. 306–7 above] only in order to demonstrate the proposition that the rate of investment decisions is a function of the gap between the prospective rate of profit and the rate of interest. This proposition is not new. It has been indeed often used (e.g. in the theory of Wicksellian cumulative process) but so far as I know has not been satisfactorily demonstrated. I attempted to give such [a] demonstration with the help of the principle of increasing risk. Even if this demonstration is considered inadequate it does not mean that the proposition in question is wrong and my theory of the business cycle objectable [*sic*] on this ground. (p. 460)

The importance of Kalecki's 'principle of increasing risk' was noted by the reviewers of the *Essays*, and especially by Oskar Lange, who wrote:

> Another important contribution of Mr Kalecki is his essay on 'The Principle of Increasing Risk'. It is concerned with the problem of the equilibrium of the firm. According to the accepted theory the size of the firm is limited under perfect competition by entrepreneurship acting as a scarce factor which causes the marginal cost curve to rise. Mr Kalecki introduces another reason which limits the size of the firm. This reason (which now is also accepted by Professor Hicks) is the 'principle of increasing risk'. The curve of the marginal rate of risk rises as investment increases because 'the greater the investment the greater is the reduction of the entrepreneur's income from his own capital when the average rate of profit falls short of the rate of interest' [pp. 297–8]. Similarly, creditors regard the risk of investment of their capital lent out to an entrepreneur as the greater the smaller the entrepreneur's own capital relatively to his commitments. They are prepared to lend additional capital to an entrepreneur only at a higher rate of interest. The amount invested by a firm being determined by the equality of the marginal rate of prospective profit to the sum of the rate of interest and of the marginal rate of risk, the size of the firm is thus limited by the capital owned by the entrepreneur. In most cases this limit comes into action long before the marginal cost curve rises on account of entrepreneurship becoming a scarce factor. This explains also the coexistence of firms of different size in a given industry, the inequality of the size of firms being a function of the inequality in the distribution of ownership of capital resources. (op. cit., pp. 282–3)

Kalecki's principle of increasing risk was a development and generalization of the concept of 'costs of transformation' of short-term credits into long-term credits, which, following F. W. Knight and G. Myrdal, was extensively discussed and elaborated by M. Breit (see his 'Ein Beitrag zur Theorie der Geld- und Kapital-markets', *Zeitschrift für Nationalökonomie*, 6/5, 1935). Breit was concerned more with the monetary factors of the business cycle in general and the slump in particular, and he concentrated on the risk of the lender. Kalecki, on the other hand, concentrated on the risk of the borrower. Nevertheless, Breit's emphasis on the intrinsic difference between own and borrowed funds leads directly to the positive influence which savings have on entrepreneurial investment in Kalecki's theory (for more on the relation between Kalecki's and Breit's concepts, see A. Chilosi, 'Breit, Kalecki and Hicks on the Term Structure of Interest Rates, Risk and the Theory of Investment', in M. Baranzioni (ed.), *Advances in Economic Theory*, Oxford, Blackwell, 1982).

Before Kalecki, Kaldor too dismissed the idea that diseconomies of scale at plant level could limit the size of the firm, because the number of plants in

operation could be increased; moreover, he also argued that the limits imposed by management problems referred more to the firm's growth and change than to its size (see N. Kaldor, 'The Equilibrium of the Firm', *Economic Journal*, 44, 1934).

Shortly after the publication of the *General Theory*, Keynes too introduced the availability of funds as a factor additional to expectations of profitability, the rate of interest, productive capacity of industries producing investment goods, and 'animal spirits' (for a first-hand account of Keynes's treatment of finance, see R. F. Kahn, *The Making of Keynes' General Theory*, Cambridge, Cambridge Univ. Press, 1984).

Many theories of investment, old and new, implicitly accept the proposition that the cost of finance to a firm is independent of the source and amount of finance. This proposition rests on the assumption of perfectly competitive capital markets, with uncertainty, transaction costs, and taxation all absent (see F. Modigliani and M. H. Miller, 'The Cost of Capital, Corporation Finance and the Theory of Investment', *American Economic Review*, 48, 1958). This contrasts with the assumptions made by Kalecki.

Kalecki's theory of increasing risk was, in Simons's view, 'merely misleading—implying or assuming that new investment must come from old firms, that prosperous firms will find it increasingly hard to attract new capital as they prosper, and that large firms can acquire new capital only on less favourable terms (including higher flotation costs!) than small ones', (H. C. Simons, *Economic Policy for a Free Society*, Chicago, Univ. of Chicago Press, 1948, p. 305). On the other hand, many empirical studies have found that firms' financial conditions do have a significant impact on the level of investment and therefore that the availability of finance plays a basic role in the determination of macro-economic performance (see e.g. S. M. Fazzari and T. L. Mott, 'The Investment Theories of Kalecki and Keynes: An Empirical Study of Firm Data, 1970–1982', *Journal of Post-Keynesian Economics*, 9/2, 1986–7).

Comparing Kalecki's and Keynes's approach to finance, M. C. Sawyer notes:

> Kalecki clearly saw finance markets as imperfectly competitive in the sense that access to finance is restricted and that the cost of finance rises with the amount borrowed through the principle of increasing risk . . . . In contrast, Keynes adopted an atomistic competitive view . . . , the rate of interest was taken as constant as far as a single firm was concerned, and by implication . . . . [the cost of finance was taken to be] independent of its source (e.g. as between bank loans, internal finance, issue of new shares). Keynes did allow that the risk premium charged by financial institutions would vary between firms, but the risk premium was constant for any particular firm relative to the amount borrowed. This suggests that Keynes thought mainly in terms of external finance for investment whereas Kalecki stressed internal finance. Further, as Kalecki . . . pointed out, Keynes neglected the extent to which the risk premium would rise with the amount borrowed. (*The Economics of Michal Kalecki*, p. 197; see also the comment by Joan Robinson, p. 513 above).

Kalecki's argument that 'a joint-stock company is not a "brotherhood of shareholders" but is managed by a controlling group of big shareholders' seems to underlie the distinction between 'insider' and 'outsider' shareholders, with the former group exercising effective control in the firm (see S. Aaronovitch and M. C. Sawyer, *Big Business*, London, Macmillan, 1975), as well as the possible conflicts between top managers and shareholders (see C. Cowling, *Monopoly Capitalism*, London, Macmillan, 1982, chs. 3 and 4; see also Sawyer, *The Economics of Michal Kalecki*, p. 105).

Recently it has been observed that Sraffa's work might have exerted a wider influence on Kalecki, and especially on his treatment of finance and investment. 'Beyond the idea of imperfect competition to explain production in the short period, Kalecki entered into an analysis of the limits to [a] firm's growth and a theory of investment where demand and market imperfections resemble Sraffa's analysis' (C. Sardoni, 'Some Ties of Kalecki to the 1926 "Sraffian Manifesto"', *Journal of Post-Keynesian Economics*, 6/3, 1984, p. 460). This is supported by P. Sylos Labini ('Sraffa's Critique of the Marshallian Theory of Prices', *Political Economy*, 2, 1986, pp. 61–2) who notes that Kalecki's works from 1938 to 1943 show that, in his concept of monopoly elements as obstacles to entry, he was already following the fundamental criticism of the Marshallian theory contained in Sraffa's 1926 article. Cristina Marcuzzo (in her contribution to Sebastiani (ed.), *Kalecki's Relevance Today*) concludes on this basis that Kalecki

> was working with a framework of analysis which was basically different from Joan Robinson's *Economics of Imperfect Competition*. Consequently it may be the case that Kalecki in 1933 had already a theory of prices which had the ingredients of imperfect competition and that his later critique of perfect competition assumptions was a reflection of Sraffa's argument rather than Robinson's. . . .
>
> In the Thirties the critique of the theory of perfect competition and the critique of the theory the full employment were viewed by Robinson as part of the same methodological revolution against the discrepancy between observations and theory. But the two revolutions of the Thirties dealt with the facts of the day—unemployment on the one hand and market power of firms on the other—with two independent theories which seemed to remain separate even in Cambridge. . . .
>
> My hypothesis is that from their first meeting Robinson saw that Kalecki might be doing what apparently neither Kahn, nor Keynes, nor Sraffa were keen to do, and what she felt unable to do, i.e. to build the theory of effective demand on more 'realistic' grounds that those of the Marshall–Pigou apparatus.

[9]

In the original version of this article Kalecki called ε 'the efficiency of investment', and in the footnote added: 'This definition is identical with that of Keynes's marginal efficiency of an asset' (p. 440).

[10]

In the original version (p. 442), instead of the numerical example Kalecki wrote about yet another cause for the increase of marginal risk:

The second reason making the marginal risk rise with the size of investment is the danger of 'illiquidity'. The sudden sale of so specific a good as a factory is almost always connected with losses. Thus the amount invested k must be considered as a fully illiquid asset in the case of sudden need for 'capital'. In that situation the entrepreneur who has invested in equipment his reserves (cash, deposits, securities) and taken 'too much credit' is obliged to borrow at a rate of interest which is higher than the market one.

[11]

S. 2 was incorporated into the 1939 version of the paper from the corresponding part (p. 459) of Kalecki's 'Reply' to Buchanan and Calkins.

[12]

In the 1939 version of the paper this chapter replaced the original text, which was as follows:

One intricate point is still involved in the matter examined above. We mean the problem of the *rate* of investment decisions per unit of time. But before dealing with it we shall transform Fig. [18] a little. [See Fig. 34. Note that in the original version the line parallel to the abscissa axis in Fig. 18 (p. 288) was called 'marginal net profitability' and not 'marginal rate of profit' as in 1939.]

We subtract from the ordinates of both marginal efficiency curve and $\rho + \sigma$ curve the rate of interest ρ and thus obtain the marginal-net-profitability (marginal efficiency minus rate of interest) curve and the marginal-risk curve. The point of intersection of these two curves gives of course the same value k_0 as above.

Let us divide the time into equal periods Δt short enough to consider the economic situation, i.e. the level of prices, wages, etc., as constant within the period (the change in this situation is thus to be imagined as concentrated at the beginning of the period). In each period the entrepreneur takes as many investment decisions as to equate at the end of the period the marginal risk to the difference between the marginal efficiency and the rate of interest. Thus it would seem that no investment decision at all will be undertaken in a period if the economic situation remains the same as in the preceding one, because the point of intersection of the marginal-risk curve and the marginal-net-profitability curve lies on the ordinate axis at the beginning of the period considered. This is, however, wrong. For one thing *does* change in the position of our entrepreneur: during the period Δt he saves in general a certain amount $s\Delta t$ of his income.

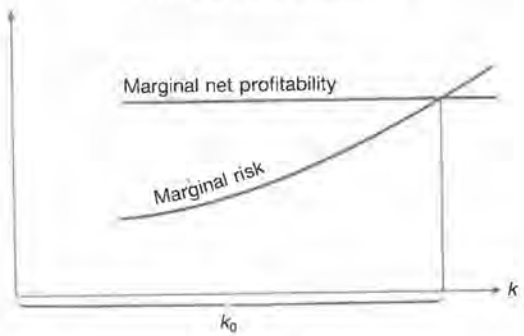


FIG. 34

This accumulation of savings causes a parallel shift of the curve of marginal risk to the right. For the entrepreneur can invest the new accumulated amount without reducing his safety or increasing illiquidity. He may invest even more: if the relation of his net indebtedness (the difference between debts and claims) to his own capital is δ, he can freely invest $s(1 + \delta)\Delta t$. [See Fig. 35. In a footnote Kalecki adds here:]

It is now clear that the marginal-risk + rate-of-interest curve dealt with in the preceding paragraphs must be taken in the position at the end of the period in which investment activity was considered.

[Then he continues:]

Such is then the amount of investment decisions if the situation in the period examined is the same as in the preceding one. If, however, this is not the case and the net-profitability curve has shifted, an amount c due to the change of the economic situation will also be invested (see Fig. [35]). The investment planned during the period Δt consequently amounts to $s(1 + \delta)\Delta t + c$, and thus the rate of investment decisions during the period is

$$d = s(1 + \delta) + \frac{c}{\Delta t}$$

$c/\Delta t$ depends on the velocity of change of marginal net profitability. We denote it by v and thus have:

$$d = s(1 + \delta) + v$$

This equation means that *the rate of investment decisions of a single entrepreneur depends on his capital accumulation and on the velocity of change of marginal net profitability.* (op. cit., pp. 445–7)

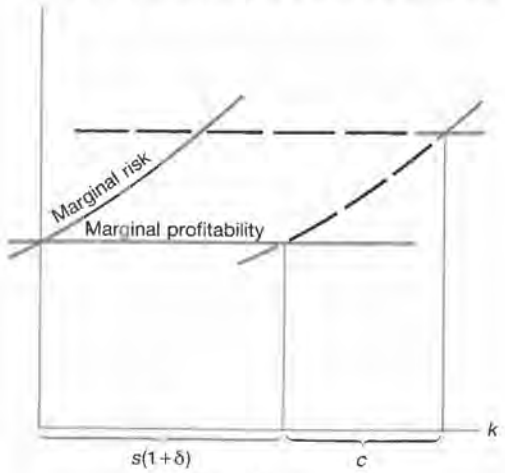


FIG. 35

[13]

Kalecki developed his ideas on the rate of interest in two later articles: 'The Short-Term and the Long-Term Rate of Interest', *Oxford Economic Papers*, 4, 1940, pp. 15–22, and 'The Short-Term Rate of Interest and Velocity of Cash Circulation', *Review of Economic Statistics*, 2, 1941, pp. 97–9; see also chs. 6 and 7 of his *Theory of Economic Dynamics*, in *Collected Works*, vol. ii.

[14]

This essay first appeared in the *Review of Economic Studies*, 4/2, 1936–7, pp. 77–97. This original version is reprinted in Annex 4, below. The version included in the 1939 *Essays* differs so much from the original that one can in truth describe it as a new paper. The structure and wording of the first sections of the 1937 version resemble more Kalecki's 1936 review of Keynes's *General Theory*; when dealing with the determinants of investments, Kalecki emphasizes the differences rather than the similarities between his and Keynes's theory. In the 1939 version, these polemical overtones were moderated. Indeed, they were probably already somewhat moderated in the *Review of Economic Studies* version of Kalecki's theory as compared with its earlier draft which he had sent to Joan Robinson for comments. In her letter of 16 Sept. (1936—see pp. 501–2 above) she wrote to Kalecki that he should not suggest, at the beginning of his paper, that he was making an attack on Keynes's system; and in the first sentence of the published version Kalecki writes that his theory 'is closely allied to the Keynesian theory'. He also took her more specific comments into account. She found his definition of marginal prime cost 'troublesome' and his concept of 'marginal disutility of risk-bearing' unsatisfactory; neither notion is mentioned in the published version of his paper.

There is also no mention of the absence of a 'self-winding-up process' in Keynes's *General Theory*—a criticism which she thought unjustified (for a more detailed discussion of Kalecki's response to her comments, see Asimakopulos, 'Kalecki and Robinson', pp. 5–7).

Moreover, the 1939 version of Kalecki's theory also incorporated two important developments. First of all, in 1938 Kalecki definitely abandoned the theoretical framework of 'free competition', and, making use of A. P. Lerner's concept of the 'degree of monopoly', put forward a theory of distribution of national income in an oligopolistic capitalism. A modified version of this theory of income distribution opens his 1939 *Essays*, and throughout the book Kalecki no longer uses the assumptions of free competition. Consequently, in the 1939 version of his business cycle theory, changes in marginal cost and prices no longer automatically follow changes in output, though this was an important factor responsible for changes in the phase of the cycle in the 1937 version.

Secondly, in the 1939 version Kalecki used the multiplier concept more extensively, making investment decisions dependent on the volume of national income, and not on the rate of investment in an earlier period, as in the original version.

Oskar Lange drew attention to some more specific differences between these two versions:

> The essay in the book contains certain changes as compared with its first form . . . . Besides the time lag between investment decisions and investment activity, another time lag, which was introduced in the essay on 'Investment and Income,' is taken into account . . . between investment activity and its effect on the national income (thus the multiplier involves a time lag in Mr Kalecki's treatment). The sum of the two time lags corresponds to the τ period in the article in the *Review of Economic Studies*. The total lag between investment decisions and their effect on the national income is thought by Mr Kalecki to be seven to ten months. The treatment of the relation between investment decisions and investment is simplified and improved in clarity. In one respect, however, Mr Kalecki has changed the exposition of his theory definitely for the worse. In the fundamental diagram explaining the mechanism of the business cycle [Fig. 43 p. 000] Mr Kalecki now puts on the axis of abscissas the national income, instead of the rate of investment, as he did previously. Since one is an increasing function of the other this makes no difference, of course. But the straight line connecting the points H and F in the diagram changes its meaning. Formerly it had an inclination of 45° and was the locus of points where investment is thus stationary. The points H and F are then the turning-points of the cycle. In the new formulation the line HF represents the relationship between the national income and investment decisions (taken at some previous date). There is no a priori reason why this should be a straight line. . . . Fortunately, his model can be stated without such a restrictive empirical assumption, as Mr Kalecki has done in the analogous diagram in his previous article. (Lange, review of the *Essays*, op. cit., pp. 284–5.)

Shortly after 'A Theory of the Business Cycle' was published in the *Review of Economic Studies*, there followed an exchange of correspondence between

Kalecki and Keynes. In Feb. 1937 Kalecki sent Keynes a manuscript of 'A Theory of Commodity, Income and Capital Taxation' for publication in the *Economic Journal* (see pp. 319–25 above) and the correspondence related mainly to this article (cf. pp. 557–62 below). However, in a letter of 20 Mar. 1937 Kalecki asked Keynes about his opinion on 'A Theory of the Business Cycle'. In reply, on 30 Mar. 1937, Keynes wrote:

You ask me what I think of the above-mentioned article. The first two sections I like very much. But I am not convinced by the section on 'The Inducement to Invest', particularly pages [538] and [539].

In the third complete paragraph on page [538] you seem to be assuming not merely that the current rise of prices will have a disproportionate effect on expectations as to future prices, but that future prices will be expected to rise in exactly the same proportion. Surely this is an extravagant over-emphasis of the effect of the immediate situation on long-term expectations? It appears to me that it is only if future prices are expected to rise *in the same proportion* as present prices that you have established the result that 'equilibrium is not reached and the investment continues to rise.'

In the same way on page [539] you point out that the current increase of wealth does something to diminish the marginal risk. But to establish your conclusion you appear to be making some quantitative assumption that the effect will be just of the right degree, which appears to be unjustified. I might mention, in passing, that the risk relating to prospective profit is already allowed for in my formula for the marginal efficiency of capital.

In general, therefore, I do not feel that you have sufficiently established the conclusion italicized at the bottom of page [540].

In a letter of 4 Apr. 1937, after discussing Keynes's criticism of the article 'A Theory of Commodity, Income, and Capital Taxation', Kalecki wrote (on pp. 4–6 of his letter):

May I yet make some remarks on your criticism of my paper in the 'Review"? I think that my statement in the third complete paragraph on page [538] you refer to is independent of *how much* expectations improve under the influence of the present rise of prices. I state in this paragraph only that the increase of prices of investment goods which equates the marginal efficiency based on the *initial* state of expectations to the rate of interest, does not create an 'equilibrium'; for at the same time expectations improve to some extent and thus investment increases further. I do not deny that this increase may be convergent, and then point A in Fig. [38, p. 543] corresponding to this 'equilibrium' may be reached without increase in the rate of interest [see p. 543]; whilst if the reaction of entrepreneurs to 'the present state of affairs' is strong enough full employment will be reached and then the rise in the rate of interest would perform the task of stopping 'inflation' and create the 'equilibrium' represented by point A.

In any case, however, the process of reaching this equilibrium will be in general spread over many periods. Thus it is interesting to know what determines the rate of investment decisions *during* the process. I sought [to solve] this problem by introducing the 'principle' of increasing risk and this enabled me to describe the course of reaching point A [see Fig. 41].

I think, however, that the reference to increasing risk (or something like that) is necessary also for adequate explanation of various positions of 'equilibrium' (positions in which the rate of investment has no tendency to change). For the facts show the prices of new investment goods are relatively rigid. It follows from the statistics of Mr Kuznets about gross capital formation that the prices of new investment goods have fallen in the USA between 1929 and 1932 only by 15%. Thus it is clear that the gap between prospective rate of profit and the rate of interest was much lower in the depression than in the prosperity. But then something besides the prices of investment goods is required for the formation of 'equilibrium.'

You question also my explanation of why it is the *rate* of investment decisions which is dependent on the gap between prospective rate of profit and the rate of interest. If in [the] first τ period all capitalists have decided to invest, say, £1,000,000,000 the savings of [the] second τ period will be £1,000,000,000 too. Thus precisely this amount can be freely reinvested in the second τ period—if the gap between prospective rate of profit is the same as in the first τ period—because the investment of *new accumulated capital* does not increase the risk. (The existence of pure rentiers creates some complications but does not affect the argument; if the relation of the net indebtedness of an entrepreneur to his wealth is δ and his saving during a given period s—he can invest without increasing risk the amount $s(1 + \delta)$. The sum of [these] amounts is $\Sigma s(1 + \delta) = \Sigma s + \Sigma \delta s$ where Σs is the total saving of entrepreneurs and $\Sigma \delta s$ is the total saving of 'pure' rentiers, or the sum of amounts to be invested without increasing the risk of the total saving S.)

In his letter of 22 Apr. 1937, Keynes continued the discussion.

One word about pages 4 and 6 of your letter. On page 4 your argument seems to me a version of Achilles and the tortoise, and you are telling me at the bottom of the page that even though Achilles does catch the tortoise up, it will only be after many periods have passed by. At the bottom of page 5 I feel that you are making too much of a discontinuity between your periods. I quite agree, however, that the amount of

unexecuted decisions which the entrepreneurs are ready, so to speak, to have at risk, is an important element in holding up the pace of investment and cannot be neglected. It is only the precision of your conclusion which I was criticising.

(One set of this correspondence is kept in Keynes's papers and the other in Kalecki's papers. Lord Kahn's permission to reproduce Keynes's letters to Kalecki from his *Collected Works* is gratefully acknowledged.)

In 1940, in 'A Model of the Trade Cycle', Nicholas Kaldor examined the relation between his theory of the business cycle and that of Kalecki's of 1939. Kaldor focused especially on the problem of damping of the cycle. In his opinion, the stability of short-period equilibrium positions in Kalecki's theory followed from his specific assumption about the nature of the relation between national income and the rate of investment decisions.

In Mr Kalecki's model $d\phi/dY$ is supposed to be smaller than $1/(df/dD)$ throughout, hence all his positions of short-period equilibrium are *stable* positions. In this case, on our assumptions, no cycle would be generated at all; the system would gradually approach stationary equilibrium. He assumes, however, that the time-lag between investment decisions and the corresponding income is large relatively to the rate at which the amount of equipment is increasing—i.e. the movements *along* a ϕ curve and the movements *between* ϕ curves are of comparable speed—in which case the movements towards a stationary equilibrium may 'overshoot the mark'—i.e. the rate of investment decisions can continue to fall, even after it is less than what corresponds to replacement, simply because the fall in income lags behind. Thus the introduction of the time-lag between investment decisions and the corresponding income could explain a cyclical movement even if the underlying situation is a stable one: though, in order that this cycle should not be highly damped (i.e. that it should not peter out quickly in the absence of new disturbing factors), it is necessary to suppose (i) that the effect of current investment on total equipment should be relatively large, so that the equipment added during the period of time-lag has a considerable influence on the rate of profit, and hence on investment decisions; (ii) that the angle enclosed by the f and ϕ functions should be small—i.e. that $1/(dg/dD)$ should but slightly exceed $d\phi/dY$.

At this point Kaldor adds in a footnote: 'Hence the positions of equilibrium in Mr Kalecki's model, though formally stable, posses only a *low* degree of stability.' He continues:

Previous attempts at constructing models of the trade cycle—such as Mr Kalecki's or Professor Tinbergen's—have thus mostly been based on the assumption of statistically stable situations, where equilibrium would persist if once reached; the existence of the cycle was explained as a result of the operation of certain time-lags which prevented the new equilibrium from being reached, once the old equilibrium, for some external cause, had been disturbed. In this sense all these theories may be regarded as being derived from the 'cobweb theorem'. The drawback of such explanations is that the existence of an undamped cycle can be shown only as a result of a happy coincidence, of a particular constellation of the various time-lags and parameters assumed. The introduction of the assumption of unstable positions of equilibrium at and around the replacement level provides however, as we have seen, an explanation for a cycle of *constant amplitude* irrespective of the particular values of the time-lags and parameters involved. The time-lags are only important here in determining the *period* of the cycle, they have no significance in explaining its existence.

Moreover, with the theories of the Tinbergen–Kalecki type, the amplitude of the cycle depends on the size of the initial shock. Here the amplitude is determined by endogenous factors and the assumption of 'initial shocks' is itself unnecessary. (N. Kaldor, *Essays on Economic Stability and Growth*, London, Duckworth, 1960, pp. 191–2.)

In his version of the business cycle theory of 1943, Kalecki took Kaldor's criticism into account, though he did not consider Kaldor's own solution to the problem entirely satisfactory (see *Collected Works*, vol. ii).

According to Lange, Kalecki's theory of the business cycle compared favourably with that of Kaldor.

In the absence of empirical evidence to the contrary, Mr Kalecki's theory seems preferable to that of Mr Kaldor because it does not need to assume inherently unstable equilibria. This theory explains the business cycle in terms of fluctuations of the marginal return on investment resulting from the accumulation and decumulation of capital and from the effect of investment on income. It leads also to a four-phase cycle and has the advantage of great simplicity. Professor Schumpeter's criticism that flexibility of interest rates must stop the Kalecki mechanism [D. A. Schumpeter, *Business Cycles*, 2 Vols., New York, McGraw-Hill, 1939, vol. i, p. 188] is not justified. Such a flexibility presupposes a monetary system different from the actual one, and even if that be granted, uncertainty and elastic expectations may foil the effect.

The choice between Mr Kalecki's (or Mr Kaldor's, or any other) theory and that of Professor Schumpeter can be made only on the basis of empirical investigation. It is necessary to find the concrete functions involved and their parameters, then to investigate what periods, amplitudes, damping, etc. are to be expected from the different theories, and to confront these expected values with empirical data. Only in this way it is possible to choose the 'true' theory from among those theoretically admissible. It is possible, even likely, that the 'true' theory will prove more complex and will have to combine elements of the different a priori theories developed (this is suggested by Professor Tinbergen's work and has also been made clear by Professor Haberler). Among these elements there will be certainly the dominant role of innovations and their effects very much as described by Professor Schumpeter. This is seen immediately by confronting some implications of the theories of Mr Kalecki and Mr Kaldor with the facts. Both theories imply net disinvestment of capital during the depression. As far as our statistical knowledge goes such disinvestment does not happen as a rule (an exception: the USA in 1931–5). Thus some other factor than net disinvestment of capital must raise the marginal return on investment and turn the downswing into an upswing. Most likely this is the higher productivity due to innovations. This raises the question of a possible synthesis between the 'adaptive fluctuations of investment' theories and that of Professor Schumpeter. The cycle in investment activity may prove to be a consequence of both adaptive fluctuations and fluctuations in the rate of innovation resulting from changes in the risk of failure. (O. Lange, review of Schumpeter, *Business Cycles*, *Review of Economic Statistics*, 23/4, 1941, p. 191)

(Lange planned at the time to verify statistically various theories of the business cycle, and those of Kalecki and Kaldor in particular; see O. Lange,

Dzieła, vol. viii, Warsaw, PWE, 1986, pp. 172–3 (in Polish); he never carried these plans out, however.)

In subsequent discussions Kaldor's position was largely vindicated. The debates centred on the problem of damping of the cycle and random shocks which kept it alive. Kalecki clearly thought that the solution put forward by Ragnar Frisch was satisfactory (see p. 318 n. 68). In his *Theory of Economic Dynamics* Kalecki introduced an important revision in the assumed pattern of distribution of random shocks, but their role in maintaining a constant amplitude of the cycle was not changed. Yet the problem appears more complicated.

The problem with Kalecki's and Frisch's 1933 models was that unless a specific combination of parameter values was assumed, they rendered explosive, or damped, fluctuations. In the former case some 'ceilings' and 'floors' are usually imposed, but this is not entirely satisfactory because even at the top of a boom the 'ceilings' are seldom reached. In the case of damped fluctuations, developing the ideas of Knut Wicksell, Johan Åkerman, and Eugen Slutsky, Frisch presented the cycle as the result of exogenous erratic shocks and the endogenous economic mechanism; while the shocks maintained the amplitude of the cycle, the structure of the economy was responsible for the mechanism of business fluctuations; without the shocks the fluctuations would die out. The difficulty with this approach is that: (i) it leaves the theory of the business cycle open in so far as the appeal is made to external factors to account for *regularity* of fluctuations; (ii) if the shocks are relatively large, the changes in output and employment are determined by the shocks rather than by the underlying mechanism of the business cycle.

For these reasons the defence by Frisch and Kalecki of the linear approach to the model-building of dynamic process was later considered 'a mixed blessing, at least for the theoretical study of cycles . . . . For a while it hampered the development of the richer non-linear models, which in many respects could be made more realistic. From a priori considerations it seems inherently implausible to assume that people behave in the same way during booms as in depressions' (J. C. Andvig, 'Ragnar Frisch and Business Cycle Research during the Interwar Years', *History of Political Economy*, 13/4, 1981, p. 721).

The first non-linear models of the business cycle were put forward by N. Kaldor ('A Model of the Trade Cycle'), J. R. Hicks (*A Contribution to the Trade Cycle Theory*, Oxford, Clarendon Press, 1950), and R. M. Goodwin ('A Non-Linear Theory of the Cycle', *Review of Economics and Statistics*, 32/4, 1950). For later developments of non-linear models of the business cycle, see R. M. Goodwin, *Essays in Economic Dynamics*, London, Macmillan, 1982, and J. Blatt, *Dynamic Economic Systems*, Brighton, Wheatsheaf, 1983. It must be noted, however, that since random shocks are a real phenomenon, they must not be assumed away in any realistic model of the business cycle, as they are so far in the non-linear models.

ANNEX 4
A Theory of the Business Cycle[1]

M. KALECKI

Introduction

1. This paper, in which I attempt to give an analysis of investment processes, is closely allied to the Keynesian theory. The latter can be divided into two parts: (i) the determination of short-period equilibrium with a given capital equipment and with a given rate of investment; (ii) the determination of the rate of investment. In the section 'Short-Period Equilibrium' I give a representation of the first part of the Keynesian theory, arriving at its chief theorems in a slightly different way. In the following three sections I deal with the determination of the rate of investment, and there the results are fundamentally different from those of the Keynesian theory. These divergences are due to the important role played in my arguments by the time-lag between investment decisions and investment production, and also to a different treatment of the question of the inducement to invest. In the last section I show that the investment processes necessarily create a business cycle.

2. I assume in the whole paper that workers do not save (or dis-save). For the savings of workers certainly do not play an important part in the economic process, while to take them into consideration can often obscure some essential features of the capitalist economy. Therefore, it seems to me preferable to deal here with a system in which only capitalists (entrepreneurs and rentiers) save—exactly as is usually admitted in the assumption of a closed economy as being justifiable in a first approach. (I assume, also, in the whole paper a closed economic system.)

The second simplifying assumption I make concerns the wear and tear of fixed capital caused by its use in production. I assume that this 'extra wear and tear' is negligible and thus the total wear and tear is due to obsolescence. This assumption, contrary to the Keynesian conception of user-cost, does not imply an underestimation of its importance but is simply made to avoid complications inherent in this subject. I think, however, that this simplification will not affect the results of our analysis much.

[1] *Review of Economic Studies*, 4/2, 1936–7, pp. 77–97. We are grateful for permission to reproduce this article.

With this assumption, the only prime costs are those of labour and raw-materials. If we thus denote by the income of capitalists from an enterprise the difference between the value of its output and the value of prime costs, we find that this income is equal to the value of production minus the cost of labour and raw materials. We shall call the national income the sum of capitalists' and workers' incomes. It is easy to see that the national income is equal to the sum of the value of the output of all enterprises minus the value of the output of raw materials. But, hence, it follows that the national income is equal to the value of consumption, purchases of fixed capital equipment, and increase of stocks. The value of the purchases of fixed capital and the increase of stocks we shall call investment. It is clear that this is gross investment, and also that the income of capitalists means here their gross income, i.e. that from either the supplementary cost is not subtracted.

For both Keynes's theory and this paper, the notion of a given capital equipment is essential. The objection is often raised that it is wrong to assume a given capital equipment within a period, because the investment changes the equipment during this period. The answer is very simple: this period can be made so short that the change in the equipment is small enough not to affect the formation of output and income. For output and income are quantities measured per unit of time and thus are not dependent on the length of the period taken into consideration, whilst the change of equipment is, *ceteris paribus*, proportional to this length.

Short-Period Equilibrium

1. Output with a given capital equipment depends on the quantity of labour employed and on its distribution among the various sections of this equipment. In every enterprise employment is pushed to the point at which marginal revenue is equal to the marginal prime cost.

We shall represent the point of intersection of the marginal revenue and the marginal prime cost curves as follows. We subtract from both price and prime costs the cost of raw materials, and thus we obtain the so-called value added and labour costs respectively. We can now say that the output of an enterprise is given by the intersection of the curves of marginal value added and of marginal labour cost (see Fig. 36). Marginal value added and marginal labour cost are both expressed here in wage units.[1] We shall call short-time equilibrium a state in which the marginal labour cost curves and marginal value-added curves do not move. With a given capital equipment the curves of marginal labour cost are fixed. The establishment of short-time equilibrium with a given equipment will thus consist in the shift of marginal value-added curves.

The area $0ABC$ is the value added of the enterprise expressed in wage units, the hatched area is the income of the capitalists obtained from this enterprise, while the unhatched area is the income of the workers. Thus the sum of $0ABC$—areas of all enterprises—is the national income expressed in wage units, while the sum of the hatched areas is the total income of the capitalists, and that of the unhatched areas the total income of the workers. The national income is also equal to the value of total consumption and total investment, and, as we have

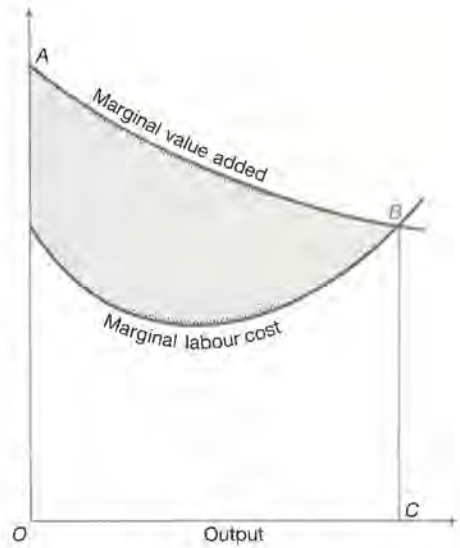


FIG. 36

[1] Keynes defines the wage-unit as follows: 'in so far as different grades and kinds of labour and salaried assistance enjoy a more or less fixed relative remuneration, the quantity of employment can be sufficiently defined for our purpose by taking an hour's employment of ordinary labour as our unit and weighting an hour's employment of special labour in proportion to its remuneration; i.e. an hour of special labour remunerated at double ordinary rates will count as two units. We shall call the unit in which the quantity of employment is measured the labour-unit; and the money-wage of a labour-unit we shall call the wage-unit' (*The General Theory of Employment*, p. 31).

assumed that the workers do not save, the sum of the unhatched areas covers the value of the consumption of the workers, while the sum of the hatched areas is the value of the consumption of the capitalists and of the investment.

We can now make clear the key position of the spending of the capitalists in the formation of short-time equilibrium. In such an equilibrium the marginal value-added curves remain by definition in a certain determined position. As we have just shown, the sum of the hatched areas is equal to the spending of the capitalists on consumption and investment, and the sum of the unhatched areas covers the consumption of the workers. There can be no spontaneous change in the spending of the workers, because they spend, by assumption, as much as they earn, but such changes of spending are quite possible for capitalists. Let us assume that the capitalists spend a given amount more than before per unit of time. Then there will be a shift in the marginal value-added curves until the sum of the hatched areas is equal to the increased spending by the capitalists for consumption and investment. As the sum of the hatched areas is also equal to the total income of the capitalists, the increase of their spending 'forces' their income to rise by the same amount.

It is clear that in the new short-period equilibrium the employment, the income of the workers, and therefore the value of their consumption (measured in wage units) is greater than before. Hence it follows that the demand for all kinds of investment and consumer goods, for both capitalists and workers, has risen, and thus a shift of the marginal value-added curves must have taken place in all industries.

We see now that the spending of the capitalists determines a position of marginal value-added curves such that the sum of the hatched areas, i.e. the incomes of the capitalists, is equal to the amount they spend. In this way the level of the spending of the capitalists (expressed in wage units) is the chief determinant of the short-period equilibrium and particularly of employment and income.

2. We have shown that the spending of the capitalists 'forces' a capitalist income which is equal to this spending. As the spending of the capitalists consists of their consumption and investment, and the income of the capitalists of their consumption and saving, it can also be said that the investment 'forces' saving to an amount which is equal to the amount of this investment. It is clear that in general the same

capitalists do not invest and save: the investments of some create a saved income of an equal amount for others.

We assume now a definite capitalist propensity to consume, i.e. to every level of total capitalist income expressed in wage units there corresponds a definite distribution of this income between consumption and saving. It is clear that, in this way, to every level of saving there corresponds a definite level of capitalist consumption. Hence it can easily be concluded that the amount of investment expressed in wage units determines the total sum of the spending of capitalists; for the amount of investment I forces an equal amount of saving, and if capitalist consumption is, say, lower than the level C corresponding to the amount I of saving, then the capitalists will consume more; in this way they will push their income to the level $C + I$ at which the proportion between consumption C and saving I is in accordance with their propensity to consume.

3. We see now that the total investment I per unit of time expressed in wage units determines, *grosso modo*, the short-period equilibrium. For with a given propensity to consume there corresponds to I definite capitalist consumption C, and thus we have the total spending of the capitalists $C + I$ and its distribution between consumption and investment. To determine the short-period equilibrium in full detail we need, in addition to this, some knowledge of the kind of investments and the tastes of both capitalists and workers. If we assume these tastes as known, the only indeterminate element in the short-period equilibrium corresponding to the given amount I of spending on investments (in wage units) per unit of time is the distribution of this spending amongst various kinds of investment. But we can admit, I think, that the changes in the structure of investment expenses have no great importance for the general employment and national income Y expressed in wage units, and we can write, therefore, without making a considerable mistake:

$$Y = f(I)$$

f is here an increasing function and its shape is defined by the given capital equipment, capitalist propensity to consume, and the tastes of capitalists and workers. The derivative of this function:

$$\frac{dY}{dI} = f'(I)$$

is the Keynesian multiplier. If investment changes from the *given* level I

to the *given* level $I + \Delta I$—where ΔI is a small increment—then income will change from level Y to level $Y + \Delta I \cdot f'(I)$. This is the only question the multiplier answers and no other service can be required from it.

The Dynamic Process as a Chain of Short-Period Equilibrium

1. With given capital equipment, capitalist propensity to consume, and the tastes of both capitalists and workers, the amount of investment I expressed in wage units determines, as we have seen above, almost entirely the short-period equilibrium (the only indeterminate factor being the structure of investment) and particularly the amount of total employment and income. Thus it can now be asked: 'What determines investment?' Here a treatment of the subject called by Keynes 'inducement to invest' might be expected, but we postpone the examination of this problem to the next section, and now we propose to consider the matter from quite different point of view. We wish now to state that the present investment, i.e. the value of present investment output, is a result not of *present* but of *former* investment decisions, for, as we shall see immediately, a certain, relatively long, time is needed to complete the investment projects. This fact is of fundamental importance for the dynamics of an economic system. For the investments at a given moment fail to be a variable dependent on other factors acting at this moment, and become a datum inherited from the past like the capital equipment. (We assume that the investment decision is irrevocable in the course of construction of the particular object.) It is clear that the present phenomena are also a basis for investment decisions, which, however, will be relevant for the formation of investment output only in the future, and so on.

2. Let us now examine more closely the dependence of present investment output on former investment decisions. If it is known that two years, say, are needed to build a factory, then during two years from the moment of the investment decision 1/24 of this factory will be produced monthly. Now it is easily seen that the output of investment per unit of time is determined by the volume of investment orders not yet completed and the corresponding time spaces necessary to finish them. If, for instance, at the beginning of a month the building of a factory worth £1,000,000 is ordered for delivery 20 months hence; and besides this there remains to be completed half a factory the total value of which is £1,200,000 and time of building 12 months; then the value of

orders to be finished is £1,000,000 and £600,000 respectively, whilst the time needed is 20 months and 6 months; thus the monthly investment output is (£1,000,000/20) + (£600,000/6) = £150,000. No difficulty arises in generalizing this formula. If we denote the parts of the investment orders not yet completed (reckoned at prices current at the given moment expressed in wage units) by $o_1, o_2 \ldots$ and the corresponding time needed by $\upsilon_1, \upsilon_2 \ldots$, the present level of investment is:

$$I = \sum \frac{o_k}{\upsilon_k}$$

Let us now denote the sum Σo_k of uncompleted parts of investment orders at a given moment by O. We define as the average time υ a time such as is needed to produce investment goods of the value O at a rate of investment $I = \Sigma (o_k/\upsilon_k)$. Thus we have:

$$\upsilon = \frac{O}{I} = \frac{\Sigma o_k}{\dfrac{\Sigma o_k}{\upsilon_k}}$$

It should be pointed out that υ is not the average time required for the completion of investment decisions (gestation period), but the average time required for finishing the orders, which are in diverse stages of construction; in this way υ is, roughly speaking, half the average gestation period, because at every moment there exist orders whose completion has just begun, is near to the end, or has reached an intermediate position. In reality υ is likely to be equal to a few months; it is certainly not a constant value, but it varies slowly within a narrow range (see the mathematical note at the end of this paper). We shall assume for the sake of simplicity that υ is constant; but it is easy to see that the argument can be reconstructed without any difficulty for the case of slowly varying υ (see n. 2 below). From the above equation it follows $I = O/\upsilon$, thus if υ is assumed to be constant the rate of investment is proportional to the value of the stock of uncompleted orders.

3. Let us now imagine that the time is divided into periods of the length υ, supposing that within every one of these periods the investment I does not change, i.e. that instead of a continuous time-curve we consider a 'stair line' inscribed in this curve (see Fig. 37). In a similar way, we imagine also that the change of capital equipment in a υ-period does not affect the short-time equilibrium in this period but in

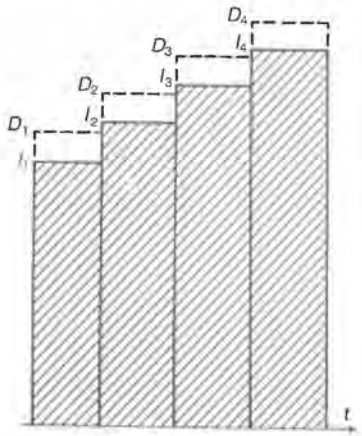


FIG. 37

the next. Thus as investment and capital equipment nearly define the short-period equilibrium output, income and prices also will prevail at a definite level during a υ-period and will change at the end of it.

At the beginning of period 1 we have a certain stock of uncompleted projects. The investment I in that period is equal to its current value divided by υ. Thus the value of investment goods $I_1 \upsilon$ produced in the period is just equal to the value of uncompleted parts of investment orders at the beginning of the period. Consequently the stock of uncompleted investment projects at the end of the υ-period is equal to the amount of investment decisions undertaken during this period.

If we thus denote the investment decisions per unit of time, i.e. the rate of investment decisions in period 1, by D_1 (reckoned at prices current during period 1 in wage units), the sum of uncompleted investment orders at the end of the period is equal to $D_1 \upsilon$. But *the investments per unit of time in period 2 reckoned at prices of period 1* are equal to this carry-over of orders from the first period divided by υ or $D_1 \upsilon/\upsilon = D_1$, i.e. *they are equal to the rate of investment decisions in the first period.*[2] Thus, if (as in Fig. 37) $D_1 > I_1$, the investment in period 2 reckoned at the prices of period 1 are larger than in the period 1. This

[2] The assumption about the constancy of υ was needed in order to demonstrate this proposition. But it is clear that it would be enough to assume that the difference between the length of two υ-periods following each other is negligible. Thus the assumption of the slow variation of υ is necessary but not its constancy. The latter is made only to simplify the exposition.

increased demand for investment goods will increase their prices (by an amount dependent on the state of equipment in investment goods industries) and consequently the value of investments in period 2. I_2 is thus, in turn, greater than D_1. We have, consequently, the inequality:

$$I_1 < D_1 < I_2$$

The difference $D_1 - I_1$ results from the 'real' increase of investment between periods 1 and 2, whilst the difference $I_2 - D_1$ is due to the rise in prices of investment goods.[3] If D_1 were less than I_1 the inequality would have changed its direction, whilst if $D_1 = I_1$ the investment I_2 would also be equal to I_1.

4. It follows from the above that the amount of investment I (measured in wage units) in a given υ-period is determined by the rate of investment decisions in the preceding period. Thus we can now imagine the dynamic process as a chain of short-period equilibria, each of them prevailing during time υ. Suppose we have in the initial υ-period a given amount of investment I_1 expressed in wage units, which on the basis of the capital equipment determines a short-period equilibrium. This state, which can be represented by the set of marginal value-added curves and marginal labour-cost curves of all enterprises, in conjunction with some other factors (principally the rate of interest), defines the rate of investment decisions D_1 in this period. But these decisions in turn determine the investment I_2 in period 2, and in that way also the new short-period equilibrium on the basis of the capital equipment, which has, of course, also changed in general as a result of wear and tear and of investments in the preceding period. Thus there is a new level of investment decisions and a further change in capital equipment caused by its wear and tear and by investments in the second period. As a result, we have again a new short-period equilibrium in the next period, and so on.

To be able to say more about the mechanism of the dynamic process, we must now examine the motives of investment decisions in order to show how the links of our chain are connected.

[3] As the result of changes in the prices of investment goods, a difference between the value of produced investment and the value of the corresponding orders will in general arise. Thus, if the prices have, say, risen, the entrepreneurs, who had given orders and obtain the investment objects at the old prices, make a relative gain, whilst the producers, whose marginal prime cost have undergone in the meantime a rise, suffer a relative loss.

The Inducement to Invest

1. In the Keynesian theory of inducement to invest, the fundamental notion is that of the marginal efficiency of an asset. Keynes defines it as the rate at which the prospective current returns (differences between revenues and effective expenditures) of an asset during its future 'life' have to be discontinued in order to obtain the present supply price of this asset. Keynes assumes that the greater the investment in a certain type of capital per unit of time, the less will be the marginal efficiency of the corresponding assets because of the rise of the supply prices of these assets. 'Now it is obvious that the actual rate of current investment will be pushed to the point where there is no longer any class of capital of which the marginal efficiency exceeds the current rate of interest.'[4] In other words, if at a given moment there is a gap between the marginal efficiency of the various assets and the rate of interest, the investment per unit of time will rise until the increase of the prices of investment goods caused by this will reduce the marginal efficiency of all assets to the level of the rate of interest.

There are two things lacking in this conception. First, it tells us nothing about the rate of investment decisions taken by entrepreneurs faced with *given* market prices of investment goods. It indicates only that, unless the marginal efficiency of all assets calculated on the basis of this level of prices of investment goods is equal to the rate of interest, a change of investment will take place which will transform the given situation into a new one, in which the marginal efficiency of various assets *is* equal to the rate of interest.

But a new trouble now arises. Let us assume that the rate of investment has really, say, risen so much that the new level of investment prices and the *initial* state of expectations give a marginal efficiency equal to the rate of interest. The increase of investment, however, will cause not only the prices of investment goods to rise, but also a rise of prices (or, more precisely, the upward shift of marginal revenue curves) and employment in all branches of trade. Thus, because 'the facts of the existing situation enter, in a sense disproportionately, into the formation of our long-term expectations',[5] the state of expectations will improve and the marginal efficiency of assets appears again higher than the rate of interest. Consequently equilibrium is not reached and investment continues to rise.

[4] *General Theory*, p. 136.

[5] Ibid., p. 148.

We see now that the Keynesian conception, which tells only how great investment will be if the given disequilibrium changes into an equilibrium, encounters a difficulty in this respect also, for it appears that the rise of investment does not lead to equilibrium at all (in any case, not to immediate equilibrium). I shall further try to give an outline of a different conception of inducement to invest which endeavours to find factors determining the amount of investment decisions corresponding to *every* definite state of long-term expectations, prices of investment goods, and rate of interest.

2. We start from the problem of uncertainty, which is also involved in Keynes's arguments. It can be gathered from his exposition that a certain amount has to be subtracted from the marginal efficiency of assets (calculated on the basis of the current prospective returns) to cover risk before comparing it with the rate of interest. We can express the same point in this manner: the gap between the marginal efficiency of assets calculated on the basis of the prospective current returns of these assets, which we shall call the prospective rate of profit, and the rate of interest, is equal to the risk incurred. But here we wish to draw attention to a point not considered by Keynes.

The rate of risk of every investment is greater the larger this investment is. If the entrepreneur builds up a factory, he incurs a certain risk of unprofitable business, and these losses, if any, will be more significant for him the greater proportion the investment considered bears to his wealth. But besides this, in sacrificing his reserves (consisting of deposits or securities) or taking credits, he exhausts his sources of capital, and if he should need this capital in the future he may be obliged to borrow at a high rate of interest because he has overdrawn the amount of credit considered by his creditors as normal. Thus both these aspects of risk incurred by investment show that the rate of risk must grow with the amount invested.

Now, I think we have the key to the problem of amount of investment decisions in a given economic situation in a certain period of time, for instance, in our υ-period. This amount is just so much as will equate the marginal risk to the gap between the prospective rate of profit and the rate of interest, both being given by the economic situation of the period in question. The greater the gap, the greater the sum of investment decisions in the period, for two reasons. First, the number of people undertaking investment increases, including the more timid entrepreneurs; and, secondly, each of them invests more.

3. In all this conception, however, an obscure point still remains. The entrepreneurs in the υ-period considered have taken so many investment decisions that any additional investment decision does not seem to them sufficiently attractive because of the growing risk. Will there, then, be no investment decision at all in the next υ-period if the gap between the prospective rate of profit and rate of interest remains at the same level as before? Certainly this is not the case. For the value of the investment in the second period—as we know from the preceding chapter—corresponds to the investment decisions in the first υ-period; further, the saving in the second period is equal to the investment in the second period; thus the capitalists as a body save in the second υ-period just the amount which they decided to invest in the first υ-period. To the money flow of investments there corresponds an equal money flow of savings, and if investment decisions of an equal amount should not be taken, an improvement in the security of wealth and liquidity for the entrepreneurs (who accumulate reserves or repay debts) would result at the end of the period; hence the marginal risk would be less than the gap between prospective rate of profit and the rate of interest. In this way, if the gap remains as supposed on the same level, a steady reinvestment of the same amount will take place. The flow of investment decisions continuously imposes the burden of risk on some capitalists, but the equal flow of savings relieves other capitalists from this burden.

If the gap between the prospective rate of profit and the rate of interest increases, the investment decisions in a υ-period will be pushed to the point at which the marginal risk is equal to the increased gap. If this gap does not change further, reinvestment of the new higher amount will take place in the following periods.

Thus we can now say that *the rate of investment decisions is an increasing function of the gap between the prospective rate of profit and the rate of interest.*[6]

Two Determinants of the Investment Decisions

1. We have shown that the rate of investment decisions is an increasing function of the difference between the prospective rate of profit[7] and the rate of interest. To find out the determinants of investment decisions we must analyse the factors on which this difference is dependent. We shall divide the analysis into two parts: in the first we assume a given capital equipment, in the second we examine the effects of changes in this capital equipment.

The prospective rate of profit is defined by the long-term expectations of returns and the supply prices of investment goods. It was mentioned above that the point of departure for estimating future returns is the present state of affairs. Thus it is the short-period equilibrium which chiefly determines the prospective rate of profit at the given moment. For in this short-period equilibrium we have given the system of marginal value-added curves, which describes the present state of affairs, while these curves and the marginal labour-cost curves in the investment goods industries give us the level of investment goods prices.

But with a given capital equipment the short-period equilibrium is determined by the rate of investment I, and so, consequently, is the prospective rate of profit. The change in the rate of investment I will affect the prospective rate of profit from two sides in opposite directions: the increase, say, of the investment will raise the marginal value-added curves and consequently improve expectations, but at the same time it will also increase the prices of investment goods. Thus we can say that the prospective rate of profit with a given capital equipment is a function of investment I, but we do not know, a priori, whether this function is increasing or decreasing.

2. We are now going to show that, with certain assumptions, the rate of interest can also be represented as a function of investment I. We know that, with a given capital equipment, both employment and the national income Y expressed in wage units are increasing functions of I. Here we shall also make a justifiable assumption that with the rise of employment the wage unit w increases in a definite way (due to a relative shortage of certain kinds of labour, improvement in the position of trade unions, and so on). Thus income expressed in terms of money Yw will increase in a definite way if the investment I rises. For the rise of I causes a rise of Y, while the increased employment pushes nominal wages to a higher level.

[6] This can also be deduced as follows. It can be concluded from the above that the burden of risk is created only by the existence of unrealized investment decisions. Thus this burden is, *ceteris paribus*, higher the larger the stock of uncompleted orders at the end of a given υ-period, which (see p. 536) is equal to $D\upsilon$. Or the marginal risk increases with the rate of investment decisions D and, consequently, so must the gap between the prospective rate of profit and the rate of interest needed to cover the risk.

[7] It is clear that in general the prospective rates of profit in various industries are not equal. But we can define the general prospective rate of profit as such a rate which, if it were to prevail in all industries, would affect the rate of investment decisions in the same way as the given set of prospective rates of profit.

The greater the money income Yw the greater the demand for cash for transactions, which, with a constant amount of money in circulation, must cause the rate of interest to increase. In general, the amount of money in circulation will not remain constant because the banking system creates new money; but also, in that case, we can assume that this creation will be accompanied by a rise in the rate of interest because of the falling liquidity of banks.

We see thus that the rise of investment I increases the demand for cash and has in that way the tendency to raise the rate of interest. It is, however, not the only way in which the rate of interest is affected by change in investment I. The investment I as we know determines (with a given capital equipment) the short-period equilibrium and thus the general state of affairs. But the better this state of affairs the greater the lender's confidence;[8] and through this channel, therefore, the rise of investment has a tendency to lower the rate of interest.

Probably these two opposite stimuli will cause the rate of interest to fall initially with an increase of investment I, but after passing a minimum the rate will begin to rise when investment further increases. For at a low level of investment I, and thus of income Y, the elasticity of supply of money is high, while an improvement in business much affects the lender's confidence, and thus the rate of interest is likely to fall with the rise of investment. But at a high level of investment and income, as the supply of money has become more inelastic and the lender's confidence is less sensitive to a further rise in business activity, the increase of investment will, rather, cause the rate of interest to rise.

3. We have stated that both the prospective rate of profit and the rate of interest can be represented, with certain assumptions, as functions of investment I. Thus the rate of investment decisions which is an increasing function of the difference between the prospective rate of profit and the rate of interest is also the function of investment I.

$$D = \phi(I)$$

Hence it follows that in a given υ-period it is the level of investment which determines the rate of investment decisions and thus the investment in the next υ-period.

We cannot say a priori whether the function ϕ is increasing or decreasing. For the rise of I improves the expectations of returns, but at the same time raises the prices of investment goods and may also raise

[8] On the lender's confidence, see *General Theory*, pp. 144, 309.

(if I is sufficiently great) the rate of interest. But it is very probable that below a certain level of I this function *is* increasing. For if the level of investment is not relatively high, the marginal prime-cost curve in the investment goods production increases only slightly with output and, consequently, so do the prices of investment goods. The rate of interest, which initially falls with the increasing investment, also, after having passed the minimum within a certain interval, rises only slightly. Thus, before I reaches a certain rather high level it can be assumed that a rise in it affects investment decisions more by improvement of expectations than by raising prices of investment goods and the rate of interest.

We can now discover some further features of the function υ which is represented here in Fig. 38. We shall try to show that the curve MAN representing this function must cut the straight line $0L$, drawn at 45° through the zero point 0, and that the left part MA lies above, whilst the right part AN lies below $0L$. In other words, there exists a value of investment I_A to which corresponds a value of investment decisions D_A equal to I_A, while for investment lower than I_A we have $D > I$, and for investments higher than I_A the opposite, i.e. $D < I$. There are, a priori, three possible positions of the curve ϕ besides that shown in Fig. 38 (see Fig. 39). We shall show that they are unrealistic. It is easy to show that if the curve lies entirely above $0L$, or (which is the same) if D is always greater than I, we shall have an unlimited cumulative upward process. For if in a certain υ-period there corresponds to investment I a higher amount of investment decisions D, then in the next υ-period the investment will be higher; but because the curve ϕ lies above $0L$

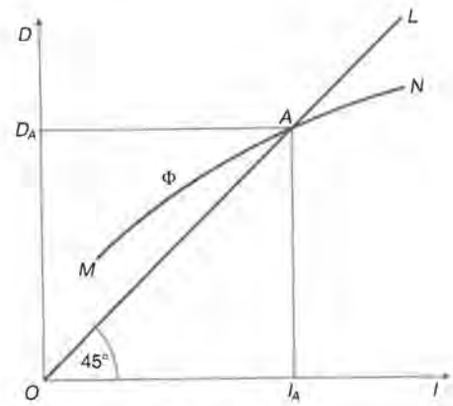


FIG. 38

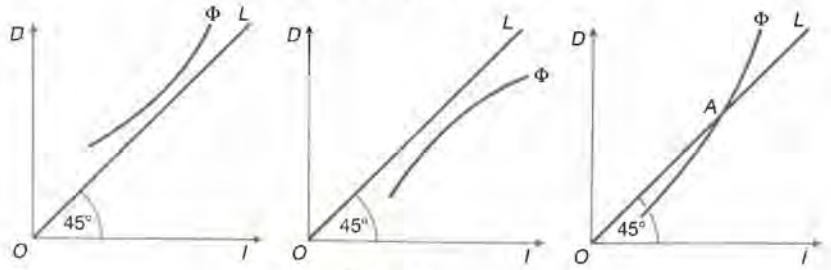


FIG. 39

the investment decisions in the second υ-period are again higher than the investment, and so on. In that way the investment would increase automatically without limit.

This is, however, impossible, for the limited amount of available labour does not permit investment and income to pass a certain level. What is the mechanism by which the cumulative process is stopped? In the neighbourhood of full employment the rise of nominal wages corresponding to every small increase of investment (measured in wage units) will be very sharp. It will cause a rapid rise of nominal income, of demand for money, and thus of the rate of interest. In that way the latter will soon reach the level at which investment decisions are equal to investment and thus there will be no tendency for a further rise of investment. But it all amounts to nothing more than the demonstration of the feature in question of the function ϕ. Because of the rapid rise of the rate of interest with the increased investment in the neighbourhood of full employment, the shape of this function must be such that the curve MAN cuts the straight line $0L$ at a point which cannot lie above the investment level corresponding to full employment. But it is clear that it may lie lower. For the investment in successive υ-periods may form a convergent series even without the restraining influence of the rate of interest.

4. We shall now demonstrate that the curve MAN cannot lie entirely below the straight line $0L$. In that case we should have an unlimited cumulative downward process. For if, in a certain υ-period, there corresponds to investment I a lower amount of investment decisions, it will cause a lower level of investment in the next period; but in that period D is again lower than I, and thus the downward process goes on. But, as in the case of the upward process, and unlimited movement is again impossible, though the factor which determines the limit is of quite a different nature.

The investment I by our definition is the value (expressed in wage units) of the purchases of fixed capital and the increase of stocks per unit of time. Thus it can be negative if the decrease of stocks is greater than the purchases of fixed capital, but, as we shall show at once, this negative value cannot fall below a certain level. We know that the capitalists' income is equal to their spending $C + I$ for consumer goods and investment. This income (from which supplementary costs are not subtracted) cannot be lower than zero, for otherwise the entrepreneurs would not produce at all. Thus we find that $C + I \geqq 0$ and consequently, $I \geqq -C$. Or the curve MAN must cut the straight line $0L$ at a point at which I is not lower than $-C$, where C is the capitalists' consumption in the case when their income is zero.

Now it is easy to see that the third position of the curve is also unrealistic; for if the investment is initially lower than the abscissa of A, we have an unlimited downward cumulative process, and if it is initially higher than the abscissa of A, an upward cumulative process goes on indefinitely. To summarize: we have stated three features of the function ϕ represented by the curve MAN:

(i) The curve MAN is initially ascending.
(ii) This curve cuts at point A the straight line $0L$ drawn through the zero point at 45°. The part MA of MAN lies above and the part AN below $0L$.
(iii) The investment I at this point of intersection A with OL is not higher than the investment level corresponding to full employment and not lower than $-C$, where C is capitalist consumption, when their income is zero.

5. We have up to now examined the dependence of the rate of investment decisions D on investment I assuming a given capital equipment. Now we are going in turn to analyse the influence of changes in this equipment on the investment decisions if the investment is given. In that way we shall be able to describe D as a function of both investment I and capital equipment.

We begin with the statement that, if investment I remains constant (capitalists' propensity to consume assumed as given), so also does total capitalists' spending $C + I$ and, consequently, total capitalists' income, which is equal to their spending. Thus, if the capacity of equipment, say, increases, it is easy to see that the state of affairs becomes worse. For if the same income is earned by capitalists on a greater number of factories the income on every factory is less. The new

factories compete with the old ones, the downward shift of marginal value-added curves reduces capitalist income (hatched area on Fig. 34) in the old factories, and in that way a part of the total income of the capitalists $C + I$—being by assumption constant—is transferred to the new factories.

Thus it is clear that the increase of capital equipment with constant investment I, and thus with constant spending and income of the capitalists, must have a depressing effect on expectations. It is not certain, however, whether the prospective rate of profit will fall; for if the equipment is expanded also in investment goods industries, the prices of these goods will decline, and this may counterbalance the less favourable state of expectations.

We leave this case aside, however, from further exposition for the sake of simplicity[9] and thus assume that with constant capitalist spending the expansion of equipment causes the prospective rate of profit to fall.

The depressing effect of the increase of equipment on the prospective rate of profit stated here is also one of the fundamental propositions of the Keynesian theory. But it is considered there rather as a general principle which does not require to be proved. From our above argument it is clear that this law is valid only on the assumption of constant spending by capitalists (and in that case also with some additional assumption); if this spending increases in the same proportion as equipment, the prospective rate of profit has no tendency to fall.

Our proper aim was to state the influence of the change in capacity of equipment on investment decisions when capitalist spending remains constant. The investment decisions are, as we know, an increasing function of the gap between the prospective rate of profit and the rate of interest. We have stated that (on certain assumptions) the prospective rate of profit falls when equipment is expanding. We have yet to examine what will happen to the rate of interest.

[9] It can be shown that this simplification does not affect the validity of the explanation of the business cycle given in the next section. The case left aside can occur only at the top of the boom when the supply of investment goods may become inelastic, because only on that condition will the increase of equipment producing these goods cause their prices to fall significantly. We should have then a situation in which investment does not rise (because it is the *top* of the boom), equipment expands, and the prospective rate of profit does not fall. This situation, however, could not last long. For the fall of the prices of investment goods would continuously increase the profitability of consumer goods industries at the expense of investment goods industries. Thus there would be a shift of investment activity from the latter to the former, the increase of consumer goods equipment would be accelerated, and that of investment goods equipment retarded; and this would cause the expected returns to fall more strongly than the prices of investment goods. The fall of the prospective rate of profit—which in our representation of the business cycle process in the next section accounts for the breaking down of the boom— would only be delayed; the economic system would stay longer at the top of the boom, to be, however, eventually overcome by the slump.

If the equipment expands with constant capitalist spending, the marginal value-added curves shift down, and the degree of employment in each factory diminishes. But this is accompanied by the fall of the relative share of the capitalists in value added in each factory[10] and, consequently, of the relative share of the capitalists in the national income. Since, however, their income, which equals their spending, is by assumption constant, this means that the national income must increase. Thus expansion of equipment with constant capitalist spending causes a rise of demand for cash, and, consequently an increase of the rate of interest.

From this and the depressing influence on the prospective rate of profit, it may be concluded that the increase of the capacity of equipment with the constant spending of the capitalists causes a reduction of the gap between the prospective rate of profit and the rate of interest, and thus a fall in investment decisions. But if the investment is constant, the spending of the capitalists is constant, too. Or we get: the greater the equipment with a constant investment I, the less the rate of investment decisions D.

The curve representing the function $D = \phi(I)$ is drawn on the assumption of a constant equipment. If the equipment changes, this curve will be shifted. And it follows from the above that it will be shifted down when the equipment increases. The greater the capacity of the equipment, the lower will be the position of the curve ϕ. In that way the family of curves ϕ represents the rate of investment decisions D as a function of two determinants—the rate of investment I and the volume of equipment [see Fig. 40].

The Business Cycle

1. Let us now, again, consider the dynamic process represented as a chain of short-period equilibria, each lasting a υ-period. To simplify the exposition we will examine this process in two stages: in the first we abstract the changes of capital equipment; in the second stage we take

[10] This is not strictly a rule, but the opposite case can be considered exceptional.

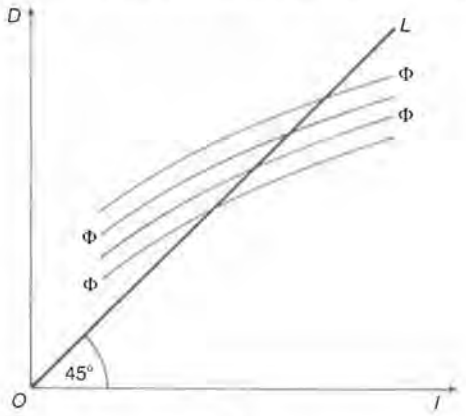


FIG. 40

into account also the influence of the changes which result from investment and wear and tear.[11]

Suppose the level of investment (expressed in wage units) in the first υ-period to be I_1 (see Fig. 41).

The curve ϕ on the left represents the dependence of the rate of investment decisions D on the investment I with a given equipment. Drawing a horizontal on the level I_1, we obtain first the point of intersection P_1 with $0L$, whose abscissa (being equal to the ordinate) is equal to I_1. Drawing the vertical through P_1 we obtain on the curve ϕ the point (I_1, D_1), whose ordinate is D_1—the rate of investment decisions corresponding to I_1—and thus that which will take place in the first υ-period.

The rate of investment decisions in the first υ-period is, as we see, higher than investment (we have so chosen our initial position). We know from the second section that the investment in the next υ-period reckoned at the prices of the first υ-period is equal to D_1. Thus, because $D_1 > I_1$ the real value of investment in the second υ-period is greater than in the first; this causes the prices of investment goods to increase, and we have:

$$I_1 < D_1 < I_2$$

where $D_1 - I_1$ is the real increase of investment from period 1 to period

[11] In the first stage we can imagine, for instance, that both investment and wear and tear are very small in relation to equipment; thus the equipment changes only a little in the course of the process considered.

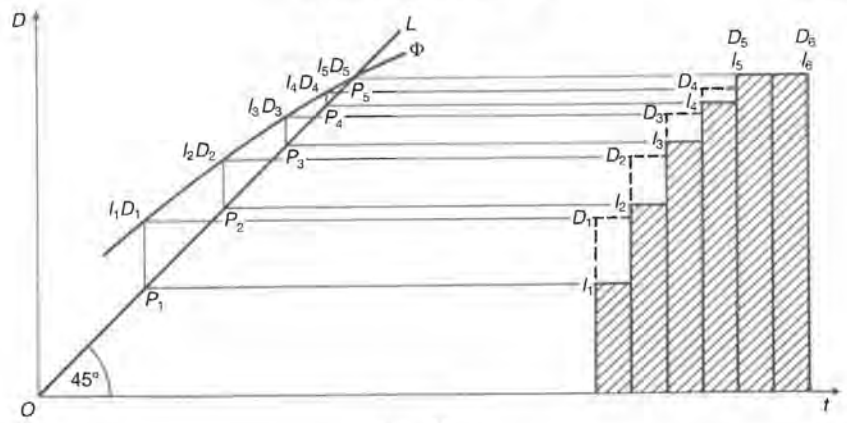


FIG. 41

2, and $I_2 - D_1$ is due to the corresponding rise of prices of investment goods.

Now, with the help of the curve ϕ, we can obtain again the level of investment decisions D_2, which is again greater than I_2 and which causes the increase of investment to the level I_3 in the third period, and so on.

In that way we reach, finally, in the fifth period the level of investment I_5, to which there corresponds on the curve ϕ the point of intersection of this curve with the straight line $0L$, i.e. we reach a position in which $D_5 = I_5$. Thus from this very moment the investment ceases to grow and in the sixth υ-period, the investment remains on the same level, and so also does the rate of investment decisions, which is equal to investment. All the process can be represented by the following scheme:

$$I_1 < D_1 < I_2 < D_2 < I_3 < D_3 < I_4 < D_4 < I_5 = D_5 = I_6 = D_6$$

We see here that the excess of investment decisions over investment in the first period causes a self-stimulating rise of investment, which in its essential nature is identical with the so-called Wicksellian cumulative process. This rise, however, leads to a position in which the investment ceases to grow, remaining afterwards at a constant level. (This maintenance of investment after period 5 takes place only on the assumption of constant equipment; we shall see in the next paragraph that it is precisely the increase of equipment, which disturbs this

equilibrium.) It is easy to see that the equilibrium reached in period 5 is stable; if the investment is lowered beneath the level I_5 we shall have a rise represented above bringing it back to this level. But, also, if it rose above this value a fall of investment would take place and push it again back to the equilibrium level; for it is clear, in general, that if we start from a position in which $D < I$ we shall obtain a downward cumulative process in exactly the same way as we constructed the upward one above.

With a given curve ϕ, the time of adjustment leading to the state of equilibrium is proportional to the length of the υ-period. In general the time of change of investment from one given level to another with a given curve ϕ is proportionate to υ.

In the plane I, D the cumulative upward or downward process is always represented by the movement of point (I, D) along the curve ϕ towards its point of intersection with $0L$.

It is worth noting that these cumulative processes have nothing (at least directly) to do with the Keynesian multiplier. This last answers only the question of how much the national income will increase from a certain υ-period to the next υ-period as a result of the increase of investment; while the mechanism of the cumulative process determines this growth of investment as such. We can represent this by the following scheme:

$$I_1 < I_2 < I_3 < I_4 \ldots$$
$$Y_1 < Y_2 < Y_3 < Y_4 \ldots$$

where the first series represents the cumulative rise of investment and the second one the corresponding rise of national income. The multiplier is the ratio of the increment of income to the increment of investment.

2. We come to the second stage of our analysis of the dynamic process: we have now to consider the influence exerted on this process by changes in the capacity of equipment.

To every state of equipment there corresponds a certain level, W, of investment needed to maintain the equipment's capacity, which in the absence of this investment would shrink on account of wear and tear. If the investment I in a υ-period is equal to W, investment decisions in the next period are not affected by the changes in equipment. If $I > W$, the capacity of equipment increases in this period, which causes, *ceteris paribus*, a fall of investment decisions in the next one. Consequently, if

we have an upward cumulative process and the investment is greater than the level needed for the maintenance of equipment capacity, this process is hampered by the increase of capacity; whilst when $I < W$ the opposite influence operates.

Thus, if the upward cumulative process described above starts from a position in which the investment is lower than the 'level of maintenance' W, the change of equipment stimulates it. But the situation alters when the investment begins to exceed the level of maintenance of capacity. The equipment capacity is expanding and this retards the cumulative process. Or, in other words, the curve ϕ along which the point (I, D) moves shifts upwards at the same time so long as $I < W$, but it begins to shift down when I becomes greater than W.

The influence of increasing capacity has, however, the greatest importance at the point at which investment decisions D become equal to investment I, and at which, consequently, the latter ceases to grow. For the expansion of equipment with constant investment greater than W causes a fall of investment decisions, which thus become in the next υ-period lower than the investment (see Fig. 42). In that way the downward cumulative process sets in.

So long as the investment is greater than the level of maintenance of the equipment capacity W, this capacity is further expanding, thus stimulating the downward cumulative process; but after the investment I becomes lower than W, the shrinkage of the equipment begins to retard it. When the point is reached in which $I = D$ and the investment ceases to decline, the further shrinkage of equipment causes

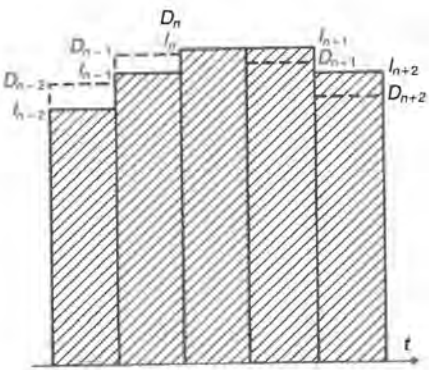


FIG. 42

an increase of investment decisions, and this will be the beginning of an upward cumulative process.

We have shown in section 1 above that a cumulative process with constant equipment leads to a state in which investment decisions are equal to investment and thus the latter remains in the following υ-periods at a constant level. Now we see that this equilibrium is disturbed by the change of capital equipment. After the upward cumulative process has come to an end, the rise of equipment capacity at the peak of prosperity causes a downward cumulative movement, which in turn is followed by an upward process started with the contraction of capacity at the bottom of the depression. The dynamic process consists thus of a series of upward and downward cumulative processes following each other. In other words, it forms a business cycle.

3. It is useful for the understanding of the nature of the business cycle to represent it as a movement of the point in the plane I, D. In Fig. 43 we have the curves ϕ representing the functional dependence of investment decisions D on investment I with various equipment capacities. The greater the equipment capacity, the lower the position of the corresponding curve ϕ.

We shall mark now on every curve the point whose abscissa is equal to the level W of investment needed for the maintenance of the capacity of equipment to which this curve ϕ corresponds. The locus of all these points is the curve EG.[12] For all points on that curve we have $I = W$, for all points on the left of it $I < W$, and for all points on the right $I > W$.

Now, if investment and investment decisions in a certain υ-period are represented by a point (I, D), this point will move along the curve ϕ towards the point of intersection with $0L$, while this curve will shift upwards, downwards, or remain stationary according to whether the point (I, D) lies on the left of curve EG on the right of it, or on that curve.

Let us now assume that to investment and investment decisions in the first υ-period there corresponds the point E. At that point $I = W$, and thus the moving point (I, D), representing the variable investment and the rate of investment decisions in our dynamic process, moves along the curves EA towards A whilst this curve is stationary.

[12] This curve is descending because the lower the position of a curve ϕ the greater the corresponding equipment and the greater the level of investment W by which the capacity is maintained.

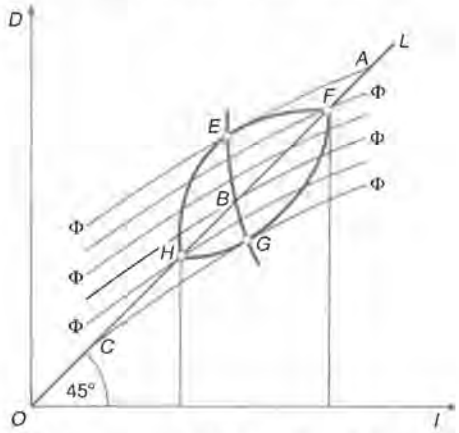


FIG. 43. The 'kinks' of the curve $EFGH$ in F and H are due to discontinuity introduced by division of the process into τ-periods (cf. Fig. 42; point F corresponds to period n).

Investment I increases. Because of this, however, the investment in the next period is higher than the 'level of maintenance' W, and the curve ϕ begins to shift down. Consequently the moving point (I, D) has the trajectory EF, which is the resultant of the movement along ϕ and the downward shift of it. (In point E this trajectory is tangential to the curve ϕ.) At point F the investment I ceases to grow because $D = I$, whilst the curve ϕ shifts farther down; consequently the point (I, D) moves here vertically. In that way it falls below $0L$; the investment decisions are now lower than investment and the latter begins to fall. The point (I, D) now moves along the curve ϕ to the left, whilst this curve shifts farther down because still $I > W$. In that way the moving points meets the curve EG in G. The curve ϕ now ceases to shift down, and the trajectory is here again tangential to GC as before to EA. But soon I, falling further, becomes lower than W and the curve ϕ begins to shift up, whilst the movement along the curve ϕ is further directed to the left because still $D < I$. At point H investment decisions become equal to investment, and the latter ceases to fall, while the curve shifts farther up. The point (I, D) moves here again vertically, but upwards. Thus D becomes greater than I, the movement along ϕ is directed to the right, while the curve ϕ shifts further up. In that way the moving point comes back to point E and the new cycle begins.

It is clear that the moving point cannot stop at any point of the trajectory. At E and G the investment is equal to the level of

maintenance, but investment decisions are higher or lower respectively than the investment. In F and H the rate of investment decisions is equal to investment, and thus there is no tendency for a cumulative process, but investment is higher or lower respectively than the level of maintenance, and the equipment capacity expands or shrinks. The only point in the plane I, D from which there is no tendency to move is B, the point of intersection of EG and $0L$. In that point $D=I=W$, or there is no tendency towards the cumulative process and no change of equipment capacity. It thus corresponds to long-run equilibrium. If the initial position of the moving point does not coincide with B it must move round it. In other words, if, in the first υ-period investment, investment decisions and equipment do not correspond to the point B, there must arise a business cycle.

Clearly it is an arbitrary assumption that the moving point comes back to its initial position E—the trajectory need not be a closed curve but may also be a spiral.

4. We see that the question, 'What causes the periodic crises?' could be answered briefly: the fact that the investment is not only produced but also producing. Investment considered as capitalist spending is the source of prosperity, and every increase of it improves business and stimulates a further rise of spending for investment. But at the same time investment is an addition to the capital equipment, and right from birth it competes with the older generation of this equipment. The tragedy of investment is that it calls forth the crisis because it is useful. I do not wonder that many people consider this theory paradoxical. But it is not the theory which is paradoxical but its subject—the capitalist economy.

Note

We shall try to make tenable that the average time of finishing investment orders υ varies only slowly within a narrow range. Let us define first υ for one kind of investment good with gestation period δ. In the formula $\upsilon(O/I)=\Sigma o_k/\Sigma(o_k/\upsilon_k)$ we can express o_k in terms of the investment good which we deal with, for it is clear that in the above expression the price of this good in the given moment is irrelevant for υ. On Fig. 44 we see the time curve PQ of the rate of investment decisions y (i.e. how much of our type of investment is ordered in a given moment per unit of time). All orders under construction at moment M were given in the time space MN, for all earlier orders are already

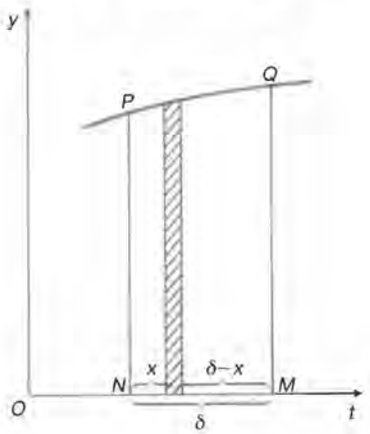


FIG. 44

completed, whilst none of these orders is finished. The order given at moment x (reckoned from N) is equal to $y.dx$; this order was under construction during time $\delta-x$ (because it was given $\delta-x$ time units ago) and thus the time needed to complete it is $\delta-(\delta-x)=x$ and its part to be completed equals $ydx.(x/\delta)$. Consequently, Σo_k expressed in terms of investment good considered is at moment M:

$$\omega=\frac{1}{\delta}\int_o^\delta yxdx$$

For $\Sigma(o_k/\upsilon_k)$ expressed in terms of investment goods—which is nothing else than the 'real' investment i at moment M—we get, if one takes into account that υ_k, the time needed to complete the order $ydx.(x/\delta)$, is here equal to x,

$$i=\frac{1}{\delta}\int_o^\delta ydx$$

It follows that

$$\upsilon=\frac{\omega}{i}=\frac{\int_o^\delta yxdx}{\int_o^\delta ydx}$$

Taking approximately that PQ is a straight line segment, this expression gives:

$$\upsilon=\frac{\delta}{2}\left(1+\frac{a}{6}\right)$$

where a is the relation e/k of the increase of y in the time from N to M to the average of y at N and M. [See Fig. 45.] Now it is clear: (i) if the rate of increase (or decrease) of y during δ is not very great, υ differs slightly from $\partial/2$. (ii) If the rate of increase (or decrease) of y does not change much within a certain time, the change of υ in this time is small.

Let us now come back to our general expression $\upsilon = \Sigma o_k / \Sigma(o_k/\upsilon_k)$. We shall divide the uncompleted projects o_k into groups, each of them including all uncompleted investment orders of a certain type l with gestation period δ_l. The real value of these uncompleted orders of type l is ω_l and the corresponding υ_l-period is equal to $\delta_l/2\,[(1+(a_l/6)]$.

Denoting the price per investment unit at a given moment by p_l, we have now $\Sigma o_k = \Sigma \omega_l p_l$ and

$$I = \sum \frac{o_k}{\upsilon_k} = \sum i_l p_l$$

Thus we obtain:

$$\upsilon = \frac{\Sigma \omega_l p_l}{\Sigma \dfrac{\omega_l p_l}{\dfrac{\delta_l}{2}\left(1+\dfrac{a_l}{6}\right)}}$$

Now it is clear that if: (i) the rates of increase a_l of a single type of investment do not change much within a certain time; (ii) the distribution of the value of uncompleted investment projects among single investment types does not change much, too—the change of υ during this time is small. It is also obvious that, if a_l are not very great, υ differs slightly from half of the average gestation period.

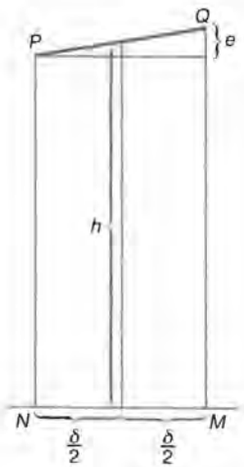


FIG. 45

A Theory of Commodity, Income, and Capital Taxation

[1]

First published in *Economic Journal*, 47/3, 1937, pp. 444–50. In 1971 it was reprinted, with some minor alterations and abbreviations, in Kalecki's *Selected Essays in the Dynamics of a Capitalist Economy*, pp. 35–42. For translations of this volume, see pp. 436–7 above; also translated into German ('Eine Theorie der Güter- und Kapital-besteuerung', in Kalecki, *Werkauswahl*, pp. 172–81 and in Kalecki, *Kriese und Prosperität*, pp. 92–9), and Portuguese ('Uma teoria da tributação da mercadoria, da renda e do capital', in Miglioli (ed.), *Crescimento e ciclo das economias capitalistas*, pp. 63–70).

In the present volume the second English edition is used. The publishers' permission to reproduce this article is gratefully acknowledged.

Kalecki later referred to his concept of capital taxation in 'Political Aspects of Full Employment' (see pp. 348–9) and elaborated on it in 'Three Ways to Full Employment' (see pp. 363–4). In the early 1970s the concept of capital taxation attracted the attention of A. Asimakopulos and J. B. Burbidge, who examined the incidence of taxation in an economy operating below capacity utilization of resources; their investigations, which also took into account Keynes's studies on taxation, were largely an extension of Kalecki's results (See A. Asimakopulos and J. B. Burbidge, 'The Short-Period Incidence of Taxation', *Economic Journal*, 84/2, 1974; see also D. Mair, 'Towards a Kaleckian Theory of the Short-Period Incidence of the Property Tax', *Environment and Planning C: Government and Policy*, 2, 1984, and, by the same author, 'Local Rates and the Experts in Political Economy', *Royal Bank of Scotland Review*, 154, 1987).

Kalecki sent Keynes the early version of this paper with the following letter (neither this nor the subsequent versions of Kalecki's MS have survived):

London, February 4th, 1937

Dear Mr Keynes,

I beg to send you enclosed my paper 'The commodity tax, income tax and capital tax in the light of the Keynesian theory' and to ask whether it might be published in the 'Economic Journal.'

Yours sincerely,
M. Kalecki

PS I tried to do my best as concerns the English but the curve of my 'marginal productivity' in this 'production' is steeply falling.

This gave rise to an exchange of letters, excerpts of which relating to Kalecki's paper follow below.

February 16th, 1937

Dear Kalecki,

I am happy to accept the enclosed, which I find very interesting, for the Economic Journal. The English is not bad, and the corrections required mainly affect the order of the words. The argument would be easier for an English reader to follow if the sentences were somewhat rearranged into our more habitual order. Could you, do you think, pass the article on to some English friend and get him to dictate from it in a more flowing order.

There is only one small suggestion I have to make in the text. I think it would be advisable, in the first part, to make quite explicit your assumption that the consumption of the capitalists is entirely directed to goods other than wage-goods. It is clear to a careful reader that you are assuming this, but since the assumption is a very unrealistic one, it is desirable to make it clearly.

I have been conscious for some time of the relevance of the theory you refer to the choice between income tax and a capital tax, but I had not myself worked out the conclusions as rigorously as you have done.

I return the article herewith for revision. You are too late for the March Journal and in plenty of time for the June one. Yours sincerely,

J. M. Keynes

On 20 Mar. 1937 Kalecki sent a corrected version of his paper to Keynes, together with the following letter:

Dear Mr Keynes,

I beg to send you the revised version of my paper. The style was corrected by one of my friends according to your kind advice. I also acted on your suggestion to state explicitly that the capitalists consume only goods other than wage-goods in putting the footnote on page 4. I consider there besides the probable effect of this assumption's not being fulfilled.

I enclose the reprint of my paper 'A Theory of the Business Cycle' and I should like very much if possible to hear your opinion on it.

Yours sincerely,
M. Kalecki

PS I use the opportunity to thank you for the reprint of your article 'The General Theory of Employment'.

(In the original version of the paper Kalecki acknowledges the assistance of Mr K. M. Spang in improving its English. Keynes's article mentioned in the postscript appeared in *Quarterly Journal of Economics*, Feb. 1937.)

This new version did not disperse Keynes's doubts, however. On 30 Mar. 1937 he wrote:

Dear Kalecki,

Thank you for the revised version of your article, which I now find quite clearly written.

I have, to begin with, one or two passing criticisms, mainly the following:

1. There is something wrong at the bottom of page 2. It looks like a misprint in the last complete sentence.
2. I am not clear that the top of page 5 is quite satisfactory. If the capitalists assume that their income subject to tax will remain the same, the effect of the tax will surely be to reduce their spending. It is only if they have read your article and are convinced by it that their profit will rise by the amount of the tax that they will maintain their spending as before.
3. Your are, I think, assuming throughout that there is a surplus of the factors of production. Modifications might be required as soon as any type of labour or type of equipment is in short supply.

I have, however, one more fundamental point which I should like you to think over. Reading your article again, it appears to me that your assumption to the effect that the consumption of capitalists is entirely directed to goods other than wage-goods goes a good deal further than you have admitted in the footnote at the bottom of page 4. Does not your article require that the factors of production required to produce capitalist consumption goods shall be totally distinct from the factors of production required to produce wage-goods, no substitution of any kind being possible between the two? If so, this is, of course, a hopelessly unrealistic assumption. It may be that capitalists live in quite different sort of houses from workers. But this does not prove that they do not both use bricks and mortar and the services of plumbers and painters. And there is the obvious case of raw-materials.

If this is right, you are obviously in a very strange world. For example, if you are assuming that every factor of production is in surplus supply and that there is no possible substitution between the factors relevant to capitalist consumption and the factors relevant to workers' consumption, it follows that, however much the capitalists consume, their incomes will rise correspondingly. I am well aware that there is an element of truth in this paradox applied to the real world. But your conclusions purport to be applicable to affairs and, if I am not mistaken, you ought to make more emphatic the peculiarities of the assumptions.

Now my impression is that your assumption about the consumption of capitalists, whilst technically convenient for the particular method of exposition you have adopted, is not really required to establish your main conclusions about the effect of various taxes on output. It is required, one the other hand, to establish your conclusions as to the effect of the taxes on the distribution of real income between capitalists and workers. The latter, however, is a matter in which you are only secondarily interested. Will you think it over? My impression is that your conclusions as to the effect of taxes on output could be established without such special assumptions. I am inclined to think that the very pretty technique which you use in the section on short-period equilibrium in your article in the Review of Economic Studies would serve your purpose.

The rest of Keynes's letter referred to Kalecki's article, 'A Theory of the Business Cycle'. (see Annex 4).

Kalecki replied on 4 Apr. 1937:

Dear Mr Keynes,

Thank you very much for yours of March 30. I am very sorry for the bad misprint at the bottom of page 2 which I have now corrected.

Much more difficult is the question of my assumption about the behaviour of capitalists following immediately the introduction of income tax (top of page 5). I do not think they must necessarily read my article in order not to curtail at once their expenditure on consumption and investment. The matter is treated at first on page 3 in connection with commodity tax. After the introduction of new tax the entrepreneurs even if they expect their incomes to fall *cannot* immediately reduce their investment because it is the result of previous investment decisions which require a certain time to be completed. Thus their savings remain unaltered in the first period of new taxation regime. Their consumption remains also unaltered, if their propensity to consume is not changed. This latter *is* of course an additional assumption, for the expectation of future fall of income can influence the present propensity to consume. I think, however, that the capitalists' consumption is rather insensible to *expectations* and that it is only the *actual* fall of their income which can compell [*sic*] them—and this also often only with a time lag—to reduce their standard of living. (I have now added a footnote on this matter.)

I think that this assumption is essential not only for the problems of taxation, but for the whole of the General Theory. If, for instance, the rise of money wages caused the capitalists to reduce immediately their consumption in expectation of future fall of profits, the result would be rather in accordance with the classical theory. Of course, my analysis of taxation problems also must be fundamentally changed if I reject the assumption of insensitiveness of capitalist consumption to expectations of changes in income. The income taxation, for instance, is then unlikely to raise employment.

I wonder whether it is necessary to emphasize the existence of a surplus of the factors of production. I do not need this assumption at all for the case of commodity tax. For the case of income tax (and capital tax) I think I have paid due attention to this problem in discussing the influence of the elasticity of supply of wage-goods (at the bottom of page 6).

I come now to your last question concerning the assumption about capitalists consuming only goods other than wage-goods. I fully agree that this assumption is unrealistic. (As concerns however the problem of connection between prices of wage-goods and prices subject to capitalist consumption through the channel of common raw materials it does not arise if the commodity tax is levied on *finished* wage-goods.

For as I have shown in the paper, the output of these goods is unaffected by such taxation and thus the prices of raw materials remain unaltered.) Therefore I have not only stated in the footnote on page 4 this assumption explicitly but also tried to show what corrections are needed if this special assumption is *dropped*. (I have now altered a little this footnote.)

I think, however, that this whole problem is not so important in reality. The commodity taxes are usually levied not on all wage-goods but only on some articles, e.g. sugar, cigarettes, matches and so on. The effect of such taxes will be similar to the effect of those examined in the paper. The capitalist consumption of these goods—being a small part of total consumption of them—does not interfere much with the process examined. (I have made a corresponding addition to the footnote on page 4.)

The rest of the letter referred to Keynes's criticism of Kalecki's 'A Theory of the Business Cycle' (See Annex 4).

In what appears to be the last letter on this subject, Keynes wrote on 12 Apr. 1937:

Dear Kalecki,

I have your letter of April 4th. We have now got to the point where I must distinguish between what I am entitled to say as editor, and my remarks I am moved to make as a private critic.

From the former point of view, the only essential is that you should state your assumptions quite fully and clearly. In the light of your letter, they seem to be the following:

1. It is assumed that within the period in view the volume of investment is unalterable.
2. It is assumed that the consumption of capitalists is insensible to their expectations as to their future income.
3. It is assumed that there is a surplus of all factors of production.
4. It is assumed that the consumption of capitalists is directed to entirely different articles of consumption from those of workers.
5. In some parts of [the] argument, but not in all, it is assumed that no substitution is possible between factors of production and raw-materials which produce for capitalists and those which produce for workers. I am not sure whether it has to be assumed that factors and raw-materials which are used for investment goods cannot be used for consumer goods.

These points ought to be made quite clear and emphatic in the manuscript.

As a private critic I add the following, though please take no notice of this.

1. I regard the assumption that investment is fixed as unplausible [*sic*]. Firstly, because it ignores the possibility of fluctuation in stocks. Secondly, because it ignores the possibility of altering the pace at which existing investment decisions are carried out, and thirdly, because at best it can be overcome after a time lag, which may be very short indeed.

2. I think it unplausible to suppose that capitalists' consumption is insensitive to their expectations, for the latter are affected by a change in the taxes on their incomes.
3. Much more important than the above, with all these assumptions you can prove something much more drastic and general than you have put down, from which your particular conclusions can be easily derived. But, of course, these more drastic conclusions would not look very plausible if applied to real life.
4. Whilst some of your conclusions may require these assumptions, I do not believe that your main conclusions do require them. The assumptions are mainly brought in to facilitate the exposition. But as long as they are there, and very much impair the generality of the argument.
5. I hope you are not right in thinking that my General Theory depends on an assumption that the immediate reaction of a capitalist is of a particular kind. I tried to deal with this on page 271, where I assume that the immediate reaction of capitalists is the most unfavourable to my conclusions. I regard behaviour as arrived at by trial and error, and no theory can be regarded as sound which depends on the *initial* reaction being of a particular kind. One must assume that the initial reaction may be anything in the world, but that the process of trial and error will eventually arrive at the conclusion which one is predicting.

In the final part of this letter Keynes turns again to Kalecki's 'A Theory of the Business Cycle' (see Annex 4).

[2]
The original version opened with the following paragraph: 'Mr Keynes's theory gives us a new basis for the inquiry into the problems of taxation. The analysis of the influence of various types of taxes on effective demand leads, as we shall see, to quite unexpected results, which may be of practical importance.'

[3]
Asimakopulos considers this conclusion of Kalecki to follow from a confusion between the immediate results of the increased tax and the 'ultimate results' which depend on the full operation of the multiplier:

> The 'immediate result' of the increased tax and the increased expenditures of the unemployed will only increase profits by the profit margins on the goods purchased. It is the resulting increase in output of consumer goods, the hiring of more workers, their increased consumption expenditures, etc. that eventually leads to the increase in profits equal to the increase in taxation on capitalist incomes. Kalecki's analysis of the incidence of taxation is based on the comparison of situations of short-period equilibrium, and there is nothing in the analysis that allows an estimate of the time required to move from one position of short-period equilibrium to the other. (A. Asimakopulos, 'Kalecki on the Determinants of Profits', in G. Fink *et al.* (eds.), *Economic Theory, Political Power and Social Justice. Festschrift Kazimierz Laski*, Vienna and New York, Springer, 1987, pp. 21–2; see also A. Asimakopulos, 'A Kaleckian Profits Equation and the United States Economy, 1950–82', *Metroeconomica*, 35/1–2, 1983, p. 10; for reservations as to the practical importance of Asimakopulos' criticism, see p. 475 above.)

[4]
In the 1971 version the words 'and thus on the inducement to invest' at the end of this sentence were deleted, as were the words 'If liquidity preference does not change', which opened the next paragraph in the 1937 version.

[5]
The words 'which seems probable' were added in the 1971 version.

[6]
In the original version there follows a paragraph here:

> In general such need not be the case. But since 'the facts of the present situation enter in a sense disproportionately into the formation of our long-term expectations' [quoted from Keynes, *The General Theory*, p. 148], the pressure of the income taxation on the investment decisions may be considerably relaxed by the rise of gross profits which immediately followed the introduction of new taxes.

The first sentence of the next paragraph reads: 'Thus the fall of investment will probably be relatively slight, and with given capitalists' propensity to consume the same can be said about their total income $C_0 + I$.'

[7]
The words 'of state officials and to a certain extent of capitalists as well' at the end of this sentence were deleted in the 1971 version.

[8]
In the 1937 version the sentence in brackets reads: '(In the case of income taxation $C_0 + I$ was slightly reduced and the gross profit increased a little less than by the amount of the taxation.)'

The next paragraph reads: 'Whether the real wage-bill increases or falls depends, of course, as in the case of income tax, on the elasticity of supply of wage-goods. The increase is, however, more likely to occur than in the case of income taxation, due to the stronger rise of employment.'

The Lesson of the Blum Experiment

[1]
This article was first published in *Economic Journal*, 48/1, 1938, pp. 26–41; an Italian translation appeared in M. Kalecki, *Sul capitalismo contemporaneo*, Rome, Editori Riuniti, 1975, pp. 13–33. The permission of the English publishers to reproduce this article is gratefully acknowledged.

Kalecki spent the summer of 1937 in Paris examining the consequences of the economic policies of Léon Blum's *Front Populaire*. These studies allowed Kalecki statistically to test his theory of wages, which he exposed in some detail the following year (see his 'Money and Real Wages', pp. 274–85 above and in *Collected Works*, vol. ii), but which he had outlined already in his *Essay on the Business Cycle Theory* (cf. pp. 100–1); interestingly, in the article

Kalecki emphasizes that his investigation may be regarded as an empirical verification of the Keynesian theory.

The importance of Kalecki's article went beyond the pure statistical exercise, however. In Feb. 1936, after winning the elections, a Popular Front government came to power in Spain, where it advanced broad social reforms; the programme was put into operation in the course of a civil war following the fascist coup by General Franco, in July 1936. In France the *Front Populaire* came to power in early June 1936, in the face of a threat of fascist rule, and soon radical social and economic changes were introduced there too, such as 40-hour working week, paid holidays, and collective labour contracts. Moreover, the political situation in Europe seemed to be developing toward anti-fascist movements in other countries as well. As Kalecki pointed out, the Blum government was brought down, by the end of June 1937, by a combination of its own lack of consistency and the opposition of the political right—and of large industrial and financial capital especially. Nevertheless, Kalecki's article—which, next to examining the impact of the above-mentioned reforms on total output and employment, spelled out the main principles and measures of economic policies that were conditions for the success of any popular-front government—also contributed thereby to the development of socialist economic programmes at the time.

Kalecki's analysis of the Blum experiment was strongly criticized by Robert Marjolin (see his 'Reflections on the Blum Experiment', *Economica*, 5/2, 1938). According to him, a long-lasting recession in the French economy in the 1930s was due to an overvalued franc and expansionary government spending financed by inflation (which both led to export of capital and undermined confidence in the stability of the franc); but most importantly, he believed, the introduction of the 40-hour week, paid holidays, etc. brought in a few months a full utilization of all available labour, though output hardly increased. In the light of these conclusions, he questioned three aspects of Kalecki's analysis.

Firstly, according to Marjolin, 'the period examined by Mr Kalecki embraces two quite distinct experiments, affecting the economic indices in quite contrary directions' ('Reflections', p. 188). Between June and Sept. 1936 the economic scene was dominated by an overvalued franc and rising wages, both of which significantly worsened the position of the French economy. The second experiment, between Sept. 1936 and Mar.–Apr. 1937, was distinguished by a devaluation of the franc and the resulting remarkable recovery of the economy. 'Hence a single figure relating to the whole of the period is without significance' (ibid.).

Secondly, Marjolin thought Kalecki had no grounds for considering the French economy in the period in question a closed system, and therefore suitable for testing Keynes's theory of wages: 'For we cannot possibly leave out of account the violent movements in exchange rates and in the export of capital, the fluctuations in the various elements of the balance of payments, which took place in the course of the twelve-month period considered by

Mr Kalecki' (ibid. 189); Marjolin agreed, however, that the net effect of the balance of payments deficit and the budget deficit put together had hardly any impact on total demand.

Finally, Marjolin disagreed with Kalecki's opinion that the success of the Blum experiment would have required much higher budget deficits and significantly less orthodox financial policy, because under full employment such measures would have resulted merely in increased inflation. Marjolin considered the introduction of exchange controls to be incompatible with the institutional framework of the French economy.

There was also another criticism of Kalecki's article, as evidenced by a letter from Keynes of 25 May 1938:

Dear Kalecki,

I have had the enclosed criticism of your Journal article from Mr Wehle of New York. There is already too much criticism in the Economic Journal, and I must resist the efforts now constantly made to send a reply to nearly all the articles which appear! Before I reply to Mr Wehle, however, I should like to have your comments on this. I notice that there has also been a criticism in the current issue of 'Economica'.

I hope I shall be able to find a chance of seeing you before I leave Cambridge, where I am paying a brief visit.

Yours sincerely,
J.M.K.

Mr Wehle's comments have not survived in Kalecki's papers. In his reply of 29 May 1938, Kalecki wrote:

Dear Mr Keynes,

Thank you very much for your letter. I enclose the comment on Mr Wehle's criticism. As regards the criticism in 'Economica' I have written to Prof. Robbins asking whether he is willing to publish my comment on it; so far I have not heard from him.

I should like very much to see you, but I think you are very busy here and I did not want to disturb you.

Yours sincerely,
M. Kalecki

Kalecki's comment on Mr Wehle's criticism has not survived; neither has that on Marjolin's criticism, if it ever was written (the next issues of *Economica* contain no mention of it). In what appears to be the last letter on this subject, of 30 May 1938, Keynes wrote back:

Dear Kalecki,

Thanks for your comment on Mr Wehle. I enclose a copy of my reply to him. In case he may correspond with you further I return a copy of his paper and your reply, which I no longer need.

Yours sincerely,
J.M.K.

(One set of this correspondence is kept in Keynes's papers and the other in Kalecki's papers. Lord Kahn's permission to reproduce Keynes's letters to Kalecki is gratefully acknowledged.)

For a later interpretation of the Blum experiment, see Gunnar Myrdal, 'A Parallel: the First Blum Government 1936—A Footnote to History', in N. Assorodobraj-Kula *et al.* (eds.), *Studies in Economic Theory and Practice: Essays in Honour of Edward Lipiński*, Amsterdam, North-Holland, 1981.

[2]

The estimates were prepared for Kalecki by Norman Bay, a close friend of Kalecki since 1915—they roomed together during their studies at the Gdańsk Engineering College, and worked together in 1927–8 for a construction company in Poland (for more about this 'engineering' adventure, see *Collected Works*, vol. vi). In a letter of 13 Feb. 1980 to the present author, Bay wrote:

> When Kalecki told me that he was working on the comparison of costs before and after the Blum reforms, I offered to provide him with an accurate and representative answer. 'I have just placed a bid', I said, 'for a large housing development—six thousand apartments—and we received the order. The work includes all phases and all construction trades; it is therefore representative. All I have to do is to substitute the pre-Blum unit prices. Kalecki was delighted. Result: an increase of 61%.'

[3]

Among the first economic measures taken by J. Bonnet (finance minister in the Chautemps government) was a large-scale devaluation of the franc and the floating of its rate of exchange (30 June 1937) on the one hand, and a reduction of government expenditure on the other (in 1937 he cut, among others, credits financing public works by 1.5 bln. francs). A rise in import duties increased treasury revenues and reduced the competitive position of imported goods. All this, together with export-promoting policies, was aimed at substituting export expansion and import restriction for budget deficit spending as the instrument for stimulating the business upswing. Indeed, in the second half of 1937 there was a mild recovery in France. It is uncertain, however, to what extent it was generated by these measures and to what extent by other factors: the support by major finance and industry for the new government (soon after it came to power it received an advance of 15 bln. francs from the Bank of France) and these institutions' rising confidence that the Blum government's social reforms would be discontinued.

Professor Pigou on 'The Classical Stationary State': A Comment

[1]

First published in *Economic Journal*, 54/1, 1944 pp. 131–2; an Italian translation was published in Chilosi (ed.), *Kalecki: Antologia di scritti di teoria economica*, pp. 199–201. The permission of the English publishers to reproduce this article is gratefully acknowledged.

Pigou's article, 'The Classical Stationary State', appeared in *Economic Journal*, 53/4, 1943. It represented a theoretical reaction to Keynes's and Kalecki's argument that in crisis a reduction in money wages would cause, under perfect competition, merely a reduction in prices so that real wages and employment would be unaffected. The response to their argument was to invoke what later became known as the 'Pigou effect', which meant that with a fall in money wages and prices the real value of money balances would increase, which would in turn cause increased spending and thereby a tendency towards restoring full employment in the long run.

Having received Kalecki's note, Keynes invited Pigou to reply to Kalecki's criticism, but in a letter to Keynes Pigou expressed no intention of commenting.

In a letter of 22 Feb. 1944, Keynes wrote:

> Dear Kalecki,
>
> Looking through your note on Pigou again, the following point occurs to me. Is there anything in it? I offer it to you, for what it is worth, as a possible addition.
>
> On Pigou's assumption, the *real* rate of interest in Irving Fischer's sense would be constantly rising. This would have two effects:
>
> (a) People would save more, and not less, as Pigou assumes.
>
> (b) If the real value of money is constantly increasing, there will be a strong pressure to repay debts. Thus, at the limit, it would become impossible for the banks to keep the stocks of money constant except in so far as it was backed by gold. Thus, in effect, Pigou is assuming simultaneously two contradictory hypotheses. And would even the creation of more national debt help, since this would increase personal incomes pari passu?
>
> Yours sincerely,
> K.

Don Patinkin, when reproducing this correspondence in his book, notes that the argument put forward in point (b) of Keynes's letter indicates that 'Keynes does not seem to realize that this is precisely the point of Kalecki's note, as the latter makes clear in paragraph (2) of his reply, which follows' (Patinkin, *Anticipation of the General Theory*, p. 102).

Kalecki replied on 28 Feb. 1944:

> Dear Lord Keynes,
>
> Thank you very much for your letter. May I make the following observations on your points?
>
> (1) Your point on the rising *real* rate of interest is valid only in the period of adjustment. Once new equilibrium is achieved the wages and prices stop falling. In the *course* of adjustment the factor you mention *will* tend to reduce employment, but an even more important influence

in this direction will be exerted by wholesale bankruptcy and the resulting 'crisis of confidence' which I mention in my note.

(2) The repayment of bank debts will not affect the situation after the correction I suggest has been introduced: in any case it is only the increase in the real value of *gold* that matters.

(3) If in the initial situation there exists a large National Debt this makes Pigou's adjustment easier because the increase in the real value of the National Debt does mean an increase in the real wealth of firms and persons. (If the interest on Debt is financed by taxation its existence does not affect the aggregate disposable income.)

Yours sincerely,
M. Kalecki

On 8 Mar. 1944 Keynes replied.

Dear Kalecki,

I agree that the real rate of interest would not go on rising for ever. But I should have supposed that at the time when it reached its equilibrium level substantially all bank loans would have been paid off. Thus, I do not see how the banking system is going to maintain the quantity of money constant unless it is prepared to issue national debt as a backing for it. Assuming that interest is paid on this out of taxation, it cannot affect the wealth of the community one way or another. Thus, it seems to me that Pigou is in reality depending entirely on the increase in the value of gold.

The whole thing, however, is really too fantastic for words and scarcely worth discussing.

Yours sincerely,
K.

The view that government debt serviced by taxation is not part of wealth, which Kalecki and Keynes share here, has received increasing attention since the 1960s; see D. Patinkin, *Money, Interest and Prices*, New York, Harper & Row, 1965, ch. 13; J. R. Barro, 'Are Government Bonds Net Wealth?', *Journal of Political Economy*, 82, 1974.

Finally, ending the editorial matter concerning the period of Kalecki's confrontation with the Keynesian theory, the correspondence between Kalecki and Keynes which refers to a paper by Colin Clark, 'Determination of the Multiplier' (*Economic Journal*, 48/3, 1938) should be taken into account here. In Nov. 1939 Henry H. Villard sent Keynes his criticism of Clark's calculation for publication, and Keynes turned to Kalecki, asking him whether Villard's note was publishable. Kalecki replied:

42 Garden Walk, Cambridge
Dec. 17, 1939

Dear Mr Keynes,

Mr Villard's algebra is certainly right and Mr Clark's argument is certainly wrong; but it is wrong not quite in the way Mr Villard suggests.

Mr Clark starts (E.J. Sept. 1938, p. 439) from the equation

$$c+s+m=1$$

where c, s, and m are increments of consumption of home produced goods, savings, and imports respectively, corresponding to an increment of national income by 1. If by home produced consumption goods were meant the value added to foreign raw-materials and by imports only those of these raw-materials or finished consumption goods—this equation would be right. But from p. 440 it is clear that m relates to *all* 'consequential' imports and from the bottom of p. 441 and the top of p. 442 it is clear that c is considered simply as relating to total consumption. With this meaning of c and m the above equation is wrong and the correct equation is simply:

$$c + s = 1$$

(increment of income = increment of consumption + increment of saving). Now, Mr Clark has all the time in mind his wrong equation. Therefore after having obtained the multiplier $r = 1/(1 - c)$ (1.532 for the period 1929–33 and 2.082 for the period 1934–37; p. 442) he does not realise that $r=1/s$ and thus that *this* is the 'Keynesian' multiplier, but he thinks that $r=1/(s+m)$ or $1/s=r/(1-rm)$, and from this formula he obtains his 'corrected' multiplier (2.07 and 3.22 respectively) which he means to be the true 'Keynesian' multiplier.

On the other hand Mr Villard supposes Mr Clark to aim at obtaining in this way a multiplier not for the net increment of investment $(V+X-M_a-M_c)$ but for the 'primary' increment of investment $(V+X-M_a)$ which is larger than the former by the amount of consequential imports (M_c). He is of course quite right that such a multiplier is *smaller* than the 'Keynesian' multiplier and he calculated the former correctly from Clark's figures to 1.216 and 1.538 respectively. The trouble is however that Mr Clark did not attempt to

calculate this multiplier but calculated wrongly the 'Keynesian' multiplier for which all his considerations of 'consequential' imports are in actual fact irrelevant.

Yours sincerely,
M. Kalecki

Keynes passed on Kalecki's note to Villard and received his reply, of 31 Jan. 1940, in which he disagreed with Kalecki's opinions and interpretations. On 26 Feb. 1940, Keynes wrote back to Kalecki:

Dear Kalecki,

I referred to Mr Villard the note on his proposed contribution to the Journal which you kindly sent me. I now enclose his reply together with the previous papers. It looks to me as if he makes out a case. Do you agree? If so, as the note is short, I should be inclined to accept it for the Journal.

I hope you will find the arrangements at Oxford comfortable and to your advantage.

Yours sincerely,
J.M.K.

(Lord Kahn's permission to reproduce Keynes's letters to Kalecki is gratefully acknowledged.)

In what appears to be Kalecki's reply to this letter (notwithstanding the fact that Kalecki's letter carries the date 9 Feb. 1940, which—judging by its internal evidence—seems to be a mistake by Kalecki) he wrote:

314 Banbury Rd, Oxford
February [March?] 9, 1940

Dear Mr Keynes,

I am very sorry to answer your letter so late; only a few day[s] ago I was able to get hold of the copy of E.J. containing Mr Clark's article.

I am afraid that I do not find Mr Villard's argument convincing:

(a) Does he really maintain that not $c+s$ but $c+s+m$ equals 1, if c is for actual consumption and m for all consequential imports?

(b) I do not doubt that Mr Clark obtains c, s, and m which add to 1. This is just his mistake since the actual s is equal $1-c$.

(c) Which multiplier Mr Clark had in mind when carrying out his calculation I do not know. It is however clear from his Table 1, p. 444, that he multiplied by it the *net* and not 'primary' increment of investment: column 5 included all imports and not only the autonomous ones. For net increment of investment however it is the 'Keynesian' multiplier which must be applied.

Yours sincerely
M. Kalecki

PS I am quite satisfied with my job here.

PART 6
Full Employment

Political Aspects of Full Employment

[1]

First published in *Political Quarterly*, 14/4, 1943, pp. 322–31. An abbreviated Polish edition appeared in *Ekonomista*, 5, 1961, pp. 1072–6, and subsequently in 2 collections of Kalecki's essays: *Szkice o funkcjonowaniu współczesnego kapitalizmu* (On the Functioning of Contemporary Capitalism), Warsaw, PWN, 1962, pp. 11–19, and *Z ostatniej fazy przemian kapitalizmu* (The Last Phase in the Transformation of Capitalism), Warsaw, PWN, 1968, pp. 21–9.

The abbreviated version has had several translations: Spanish ('Aspectos politicos del pleno empleo', *Economia y Administración*, 16 (University of Concepción), 1970, pp. 57–61, and in M. Kalecki, *Sobre el capitalismo contemporaneo*, Barcelona, Editorial Crítica, 1979, pp. 25–34); Italian (in M. Kalecki, *Sul capitalismo contemporaneo*, Rome, Editori Riuniti, 1975, pp. 35–42); Swedish (in Kalecki, *Tillväxt och Stagnation*, pp. 45–51); German (in Kalecki, *Werkauswahl*, pp. 182–90, and in Kalecki, *Kriese und Prosperität*, pp. 235–41); and Portuguese (in M. Kalecki, *Crescimento o ciclo das economias capitalistas*, ed. J. Miglioli, São Paulo, Editora Hucitec, 1977; 2nd edn., 1980). The same abbreviated version was published in English, in Kalecki, *Selected Essays on the Dynamics of a Capitalist Economy*, pp. 138–45 (for translations of this collection, see pp. 436–7 above), and in Kalecki, *The Last Phase in the Transformation of Capitalism*, New York and London, Monthly Review Press, 1972, pp. 75–83.

The original English version was reprinted in E. K. Hunt and J. G. Schwartz (eds.), *A Critique of Economic Theory*, Harmondsworth, Penguin, 1972, pp. 420–30.

In the present volume the original edition is followed, while the abbreviations introduced by Kalecki in 1961 are accounted for in subsequent editorial notes. The publishers' permission to reprint this paper is gratefully acknowledged.

At the turn of 1940 Kalecki moved to Oxford to join the staff of the Oxford University Institute of Statistics. With the outbreak of war, the institute gave shelter to a number of economists who were in various degrees refugees from German fascism (including among others F. Burchardt, T. Balogh, J. Goldman, J. Steindl, and K. Mandelbaum). Among the English members of the staff were G. D. N. Worswick and J. N. Nicholson. The institute was directed by a distinguished English statistician, Prof. Arthur L. Bowley. In the next few

years the institute gained international fame for its studies on the British war economy. Kalecki dealt with questions of mobilization of factors of production and manpower for the war effort, financing the war, food rationing, and price controls (Kalecki was the first to put forward, in the institute's bulletin, a plan for rationing expenditure on consumption), distribution of the war burden and national income between social classes, the burden of the national debt, and full employment after the post-war reconstruction (for an account of Kalecki's contributions to the work of the institute, see G. D. N. Worswick, 'Kalecki at Oxford, 1940–44', *Oxford Bulletin of Economics and Statistics*, 39/1, 1977: *Special Issue*: *Michal Kalecki Memorial Lectures*; see also *Collected Works*, vol. vi, and *Studies in War Economics* (prepared at the Oxford University Institute of Statistics), Oxford, Blackwell, 1947).

In Oxford Kalecki also gave lectures in which he reported the results of his research. In 1943 his *Studies in Economic Dynamics* appeared (see *Collected Works*, vol. ii), representing the next step in the development of his business cycle theory; this for the first time included elements of long-run development of a capitalist economy.

Both his studies of war economics and of cyclical and long-run changes in capitalist reproduction influenced Kalecki's publications on full employment. His theory of full employment is rooted in his business cycle theory and his ideas on national income determination; in his papers devoted to full employment, he stressed some more practical aspects of full employment policy, and institutional factors determining its scope and limits. In addition to examining the causes for political opposition to full employment—a question hardly dealt with in his earlier studies—his essays on full employment brought together his ideas on capital and income taxation (see pp. 324–5 above), the burden on the national debt (see *Collected Works*, vol. vi), the structure of total demand and government expenditures (see 'Employment in the United Kingdom during and after the Transition Period', in *Collected Works*, vol. vi), and long-run unemployment in relation to capitalist long-run economic development (see his *Studies in Economic Dynamics*, in *Collected Works*, vol. ii).

Towards the end of 1944 Kalecki resigned his job at the Institute of Statistics. After a short stay in Paris, where he prepared some memoranda for the French government on rationing and economic controls (see *Collected Works*, vol. vii), in Mar. 1945 he left for Montreal. There, until Dec. 1946, he worked for the International Labour Office. His studies at the ILO mainly concerned the problems of post-war reconstruction and of maintaining full employment, as well as the questions of inflation (in that period he gave several lectures and seminars on various aspects of full employment, among others at the University of Chicago, at Columbia and Harvard Universities, and in Ottawa). He continued those studies after he left the ILO and moved to the United Nations, where he worked until the end of 1954 as the Deputy

Director of the Economic Department in the UN Secretariat (for information on Kalecki's work for the UN, see S. Dell, 'Kalecki at the United Nations, 1946–54', *Oxford Bulletin of Economics and Statistics*, 39/1, 1977, and *Collected Works*, vol. vii).

Shortly after 'Political Aspects of Full Employment' was published, Keynes sent Kalecki the following note, dated 20 Dec. 1943 (the original survived in Kalecki's papers):

> I have just read with much sympathy and interest your article on Political Aspects of Full Employment in Pl. Q. An exceedingly good article and very acute. If I have been writing it myself, I might have added as an important influence—[disintegrating (?) *illegible handwriting*] old fashioned sound finance which [resists (?) *illegible*] against any public expenditures and a high deficit [. . . (?) *last word unintelligible*].

In spite of this commendation, Kalecki's article did not arouse wider interest for a long time. The reason could have been that there had been a high employment rate in all countries during the war, and the problem of maintaining full employment in the period of post-war reconstruction and later on did not at that time (1943) attract much attention; nor did the subsequent post-war boom leave much room for his pessimistic forecasts.

None the less, in 1948 S. S. Alexander arrived at similar conclusions with respect to capitalists' opposition to government intervention in the realm of private business, budget deficits, and the maintenance of full employment (see S. S. Alexander, 'Opposition to Deficit Spending for the Prevention of Unemployment', in *Income, Employment and Public Policy: Essays in Honour of Alvin H. Hansen*, New York, Norton, 1948; see also Feiwell, *The Intellectual Life of Michal Kalecki*, pp. 221–6). Andvig notes that Johan Åkerman tried to relate political events and business cycles as early as the 1930s, and that therefore he 'can be regarded as a predecessor, together with Kalecki, to the recent crop of political business cycle theorists' (Andvig, *Ragnar Frisch and the Great Depression*, p. 297).

Twenty years later, in the Preface to his essays on the functioning of contemporary capitalism (*Szkice o funkcjonowaniu . . .*, pp. 7–8) Kalecki had this to say about the forecasts in 'Political Aspects of Full Employment':

> Have my predictions of that time proved correct? I think they have, though—as is often the case with historical predictions, not necessarily in every detail. In my paper, after examining the sources of opposition of big capital against stimulating the business cycle by means of government spending, I foresaw that in future crises will be mitigated in this way but not wholly prevented. I also predicted that this government intervention would give rise to a new phenomenon which I called the 'political business cycle'. It seems that the present course of events corresponds *grosso modo* with those predictions. On the other

hand, in my article the policy of securing full employment by military spending was linked with total fascism. It appears, however, that a fascist coup is by no means necessary for armaments to play an important role in countering mass unemployment. Yet, it must be noted that in the United States, where this process was most intensive, there have indeed appeared some symptoms of fascism.

Joan Robinson was first to stress, in 1964, the relevance of the idea of a 'political business cycle' for understanding post-war capitalist development (see her 'Kalecki and Keynes', and also 'The Second Crisis of Economic Theory', in her *Collected Economic Papers*, vol. iv, Oxford, Blackwell, 1973). However, increased interest in Kalecki's 'Political Aspects of Full Employment' did not appear until the mid-1970s. This followed reprints of Kalecki's paper in 1971–3, in a period of prolonged depression in many developed capitalist economies, and of overall political and social tensions, generated among other things by a 'political business cycle'. Kalecki's concept was discussed and developed at that time by R. Boddy and J. Crotty (see their 'Class Conflict and Macropolicy: The Political Business Cycle', *Review of Radical Political Economy*, 7/1, 1974, and 'Class Conflict, Keynesian Policies and the Business Cycle', *Monthly Review*, 24, 1974), and by W. D. Nordhaus ('The Political Business Cycle', *Review of Economic Studies*, 42, 1975); G. R. Feiwell devoted a chapter of his 1975 monography on Kalecki to this concept (*The Intellectual Life of Michał Kalecki*, ch. 9); and a more recent study is A. Henley, 'Political Aspects of Full Employment: A Reassessment of Kalecki', *Political Quarterly*, 59/4, 1988.

Interestingly, several features of a political business cycle are implied in the editorial 'The Economy in Second Gear' of the *Washington Post*, 22 Oct. 1976, which discussed developments in the American economy in the third quarter of 1976:

> President Ford has certainly resisted—to a fault, you might say—the traditional quadrennial temptation to spritz up the economy for election day. Four years ago President Nixon and his associates seized all the valves that they could reach and turned them up to Full and Hot. Immediately after the election, they turned most of them off again. That surge of pre-election stimulus no doubt contributed to Mr Nixon's re-election, but it also contributed to the economy's subsequent troubles. Mr Ford's performance has been absolutely characteristic. It was a decent and conservative refusal to give the economy a temporary tonic for the campaign season.

A concise comparison of Kalecki's and Keynes's approaches to full-employment policy was given by Joan Robinson in her 'Michał Kalecki: A Neglected Prophet', *New York Review of Books*, 4 Mar. 1976:

> Keynes liked to believe in the power of ideas to influence the course of history. He sometimes maintained that when the principles of employment policy were understood, economic affairs would be conducted rationally, and he even went so far as to predict a happy future in which our grandchildren could devote themselves entirely to the arts and graces of life.
>
> Kalecki's vision of the future was more realistic. In a remarkable article published in 1943 on the 'Political Aspects of Full Employment' he foresaw that when governments understood how to control the commercial trade cycle we should find ourselves in a political trade cycle. . . . This was fairly accurate prediction of what we have experienced, both in the US and in Britain, in the last thirty years of alternating *go* and *stop*.
>
> Kalecki's diagnosis underestimated what turned out to be the effects of the balance of payments in the British case, and the interplay between hot and cold war in the US. He also underestimated the importance of the financial policy and of exchange rates, putting his main emphasis on the role of government spending. But his analysis has certainly turned out to be nearer the mark than Keynes's agreeable daydream.

One sign of the popularity of Kalecki's concept was that it entered some popular textbooks in economics (see e.g. P. A. Samuelson, *Economics*, 10th and subsequent edns.). Indeed, by the late 1970s the concept had started to live a separate life from the rest of Kalecki's theory, its origin being often credited to Nordhaus rather than to Kalecki. (For a review, classification, and critique of several models of the political business cycle, see e.g. B. S. Frey, 'Politico-Economic Models and Cycles', *Journal of Public Economics*, 9, 1978; J. E. Alt and K. A. Chrystal, *Political Economics*, Berkeley, Calif., Univ. of California Press, 1983, ch. 5; for an extension of the concept to socialist economies and for a bibliography of the subject, see D. M. Nuti, 'Political and Economic Fluctuations in the Socialist System', *EUI Working Papers*, 156, 1985.)

There have been many attempts to test the concept empirically too, especially in the version elaborated by W. D. Nordhaus and related to the 'electoral business cycle' hypothesis. On the whole the evidence appears either negative or inconclusive, both for individual countries, big or small. See e.g. F. Breuss, 'The Political Business Cycle: An Extension of Nordhaus's Model', *Empirica*, 2, 1980, and G. Obermann, 'Zur Wahlorientierung in der Wirtschaftspolitik', *Arbeitshefte Wirtschaftsuniversität Wien*, 18, 1979, who reject it for Austria and some other small European countries; W. F. Shughart II and R. D. Tollison, 'Legislation and Political Business Cycles', *Kyklos*, 38, 1985, and J. Sachs and A. Alesina, 'Political Parties and the Business Cycle in the United States, 1948–1984', *NBER Working Paper*, No. 1940, Washington, DC, NBER, 1986, who deny its relevance for the USA. The same appears to be true larger samples of countries (cf. B. H. Soh, 'Political Business Cycles in Industrialized Democratic Countries', *Kyklos*, 39, 1986; see also E. Novotny, 'Politische Aspekte der Vollbeschäftigung—heute', in Fink *et al.* (eds.), *Economic Theory, Political Power, and Social Justice*.

In his concept of the political business cycle, Kalecki concentrated attention on the economic interests of the capitalists and the masses from the viewpoint of the achievement and permanent maintenance of full employment. However, he did not elaborate the actual mechanism of transmission between the economic interests of his two classes on the one hand and the

political and institutional system of the parliamentary democracy on the other. Filling this gap by reference to an electoral process and a replacement of the political by an electoral business cycle (towards which Kalecki himself tended in the original version of his theory) is unsatisfactory, for in the latter concept the distinction between social classes and their respective interests is washed away in pre-electoral manipulations aimed at gaining universal popularity. Moreover, at intervals of 4–5 years between elections, the electoral business cycle does not leave enough time for permanent full employment to influence the 'discipline in the factories' or the power of capitalist bosses; those feedbacks may need more time.

A recognition of the long-term implications of the 'political business cycle' gave rise to the concept of a 'political trend'. It sets Kalecki's explanation of the causes for the capitalists' opposition to permanent full employment into the context of a long period, and seeks to explain a shift in economic policies in the USA and other countries, in the early 1970s, as a pre-determined slow-down of economic growth, and a transition to long-run unemployment; the rise of monetarism and a rebirth of *laissez-faire* doctrines are also explained in those terms (see J. Steindl, 'Stagnation Theory and Stagnation Policy', *Cambridge Journal of Economics*, 3, 1979; A. Bhaduri and J. Steindl, 'A Rise of Monetarism as a Social Doctrine', *Thames Papers in Political Economy*, autumn 1983).

However, the concept of a political trend also faces the problem of a mechanism for transmitting the economic and political interests of various classes under parliamentary democracy. Kalecki entertained the traditional Marxist view on the role of the government, which he saw as a passive instrument in the hands of capitalists. In spite of highly increased shares, in all OECD countries, of the government sector in total output and employment, Kalecki thought government economic intervention to be merely 'an offshoot of a somewhat chaotic interplay between the *laissez-faire* tendencies and government action' ('Theories of Growth in Different Social Systems', in *Collected Works*, vol. iv).

While many agree with Kalecki that the scope and means of the government's counter-cyclical intervention are the result, not of centrally planned and wholly consistent actions, but of an interplay of the contradictory interests of various social classes and their political doctrines, none the less the counter-cyclical policy is merely a part of the government's economic involvement. Moreover, the lack of success of many attempts to reduce the share of government expenditure in national income is evidence that the government is not quite omnipotent in fine-tuning its expenditures, many of which enjoy great autonomy and represent interests that cannot be unequivocally identified as those of the masses or of the capitalists. It is postulated, therefore, that in order to explain changes in government spending, which were possibly one of the main determinants of the crisis and

recovery phases in capitalist reproduction from the early 1970s onwards, a more complex model of government expenditures and their structure may be needed (see J. Osiatyński, 'Kalecki's Theory of Economic Dynamics after Thirty Years', *Oeconomica Polona*, 1, 1986).

[2]
In the abbreviated version of his article, Kalecki replaced all this introductory part with the following text:

The maintenance of full employment through government spending financed by loans has been widely discussed in recent years. This discussion, however, has concentrated on the purely economic aspects of the problem without paying due consideration to political realities. The assumption that a government will maintain full employment in a capitalist economy if only it knows how to do it is fallacious. In this connection the misgivings of big business about maintenance of full employment by government spending are of paramount importance.

[3]
In the abbreviated version this sentence was deleted.

[4]
In the abbreviated version this paragraph reads:

The fact that armaments are the backbone of the policy of fascist full employment has a profound influence upon its economic character. Large-scale armaments are inseparable from the expansion of the armed forces and the preparation of plans for a war of conquest. They also include competitive rearmament of other countries. This causes the main aim of the spending to shift gradually from full employment to securing the maximum effect of rearmament. The resulting scarcity of resources leads to the curtailment of consumption compared with what it could have been under full employment.

[5]
In the abbreviated version, this and the previous sentences were deleted.

[6]
In the abbreviated version included in the 1971 (Cambridge University Press) English translation, this paragraph is omitted (probably by mistake, since it is included in all other abbreviated editions of Kalecki's article). Moreover, in the later editions Kalecki omitted also the whole of the original pt. v. Joan Robinson made the following comment on this latter omission:

These passages today seem pathetically optimistic; they are a painful reminder of what a mixed blessing thirty years of near-full employment has turned out to be. . . . The last

paragraph of Kalecki's article is even more poignant to read today. . . . The failure to develop new institutions and attitudes while maintaining a more or less continuous growth of national income left no way for the workers to get a better deal, other than through traditional wage bargaining. The struggle of people to maintain their share of income, which has now spread to every group in society, is the basic cause of the inflationary stagnation which is threatening to bring the era of high employment and growth to an end. ('Michał Kalecki: A Neglected Prophet', p. 30.)

Three Ways to Full Employment

[1]

First published in *The Economics of Full Employment: Six Studies in Applied Economics prepared at the Oxford University Institute of Statistics*, Oxford, Blackwell, Oct. 1944, repr. Nov. 1944, Mar. 1945, Sept. 1945, Nov. 1946, Sept. 1947, pp. 39–58; trans. into French ('Trois méthodes de réalisation du plein emploi', in *L'Économie du plein emploi*, Paris, Institut National de la Statistique et des Études Economiques, 1949, pp. 47–67); Italian ('Tre metodi per la piena occupazione', in *L'economia della piena occupazione*, Turin, Rosenberg & Sellier, 1979, pp. 68–89); Portuguese ('Três caminhos para o pleno emprego', in J. Miglioli (ed.), *Kalecki, Economia*, São Paulo, Editora Atica, 1980, ch. 6); and German ('Drei Wege zur Vollbeschäftigung', in Kalecki, *Kriese und Prosperität*, pp. 212–34). Basil Blackwell's permission to reprint this essay is gratefully acknowledged.

During the Second World War the theory of employment—at least in the version put forward in Keynes's *General Theory*—dominated university teaching in Britain and formed the basis of official statements of British economic policy. Nevertheless, several practical and important issues, concerning specific measures of such a policy that would not be limited to counter-cyclical government intervention but would secure permanent full employment, remained unsolved. Indeed, these issues were intensely debated at the time at numerous conferences, in the Press, and in government pronouncements (see e.g. *White Paper on Employment Policy* London, HMSO, Cmd. 6527, 1944), but a systematic treatment of the subject was lacking. As observed by Joan Robinson in her review of *The Economics of Full Employment*: 'This is now provided by the economists of the Oxford Institute of Statistics, who themselves have taken a leading part in the debate' (*Economic Journal*, 55/1, 1945, p. 77).

The Economics of Full Employment consists of 6 essays. F. A. Burchardt's study, 'The Causes of Unemployment' discusses the foundations of full employment theory. Next Kalecki shows policy measures that would enable full employment to be maintained in a closed economy. G. D. N. Worswick deals with some problems that would unfold under permanent full employment: a vicious circle of rising wages and prices, and measures that would secure elasticity of output without involving administrative allocation of

labour and other inputs. E. F. Schumacher extends Keynes's *General Theory* into the field of public finance. T. Balogh examines the problems of balance of payments and international trade under full employment. Finally, K. Mandelbaum discusses the German experiment in full-employment policies in 1933–8.

The book aroused great interest, and many reviews recognized Kalecki's essay as its central contribution. In Poland it was reviewed by H. Hagemejer (*Ekonomista*, 1, 1947), and Kalecki's theory of employment contained in the book was summarized by J. Nowicki (*Ekonomista*, 2, 1948). It was reviewed also by H. A. Adler (*American Economic Review*, 35/3, 1945, and by Joan Robinson (op. cit.), who concentrated on Kalecki's and Balogh's essays and pointed out that the internal and international aspects of full-employment policies were not satisfactorily integrated there.

After the publication of the book, Kalecki received the following letter from Keynes, dated 30 Dec. 1944. (The original is kept in Kalecki's papers and a copy in Keynes's papers; it was first published in *The Collected Writings of John Maynard Keynes*, vol. xxvii, London, Macmillan, 1980, pp. 381–3. Lord Kahn's permission to reproduce this letter is gratefully acknowledged.)

Dear Kalecki,

Thank you for the 'Economics of Full Employment', which reached me, as it were, as a Christmas present. I found it a most excellent and instructive volume. When one gets a book like this, one feels that economics is really making progress. With one qualification, mentioned below, I found it all very good indeed, and there is scarcely a thing with which I do not agree.

Your own contribution seems to me most striking and original, particularly pages 44–46 [362–4]; also most beautifully compressed. It is a great comfort to read something so short and so much to the point. I am very much taken with your modified incometax. It will be alleged, I am afraid, that the difficulties of transition would be excessive, since it would mean that a new business might have next to no tax to pay for years, which would appear to give it a great competitive advantage.

Nevertheless, there is, I think, a good answer to this, and such criticism, which would be certain to arise, would be based on a fallacy.

Why don't you apply it, however, to working capital also? That would have the great advantage of mitigating the effects of taxation in impairing real capital when there is an inflation and presenting windfalls when there is a deflation. Indeed, I think you can claim it as an additional merit for your plan that it goes a long way to getting over the inequalities which will arise when the level of prices at the time when depreciation is allowed is different from the level of prices when the outlay was originally incurred.

Apart from your own contribution, there is hardly an article which has not something interesting and even new. The one exception I make to this, as perhaps you will have guessed, is the section on International Aspects. This seems to me a frightful muddle, which leaves the reader more in a fog and stupider than when he began. It does not even make a beginning at the basic analysis needed to tackle this rather difficult and intractable problem. I wish I had time to think it properly through myself. It is not so difficult that it is impossible to write sense about it.

On a point of detail: I have not a copy of my House of Lords speech by me, but I find it difficult to believe that I said any such thing as is attributed to me in the footnote on page 145. I think I might have been given the credit of not being quite so foolish as that! The point I intended to make, and the point which I think I probably did make, was that we should be no worse off with the Plan than without it. If, as is alleged, I said that the International Monetary Plan 'would ensure the conditions necessary to maintain full employment at home, irrespective of conditions abroad and without further direct control of foreign trade', I must have been out of my mind. What is happening to Balogh? He has done some excellent stuff in the past, but much of what I have seen of his lately strikes me as extremely confused.

Yours sincerely,
Keynes

The publication of *The Economics of Full Employment* was only just preceded by 2 other programmes of full-employment policies: W. H. Beveridge's *Full Employment in a Free Society*, London, Allen & Unwin, 1944, and the Government plan (*White Paper on Employment Policy*, op. cit.). In the preface to his report, Beveridge acknowledged 'the help given to me by the Institute of Statistics at Oxford by statistical computation and by preparing the charts', and then continued:

The Institute has done much to keep alive independent expert study of economic problems during the War. Many of the difficult economic problems briefly noticed in this Report are the subject of special study in a volume on the *Economics of Full Employment* prepared by members of the Institute and published . . . almost simultaneously with the Report. (Op. cit., p. 15.)

The main difference between the government's plan and that put forward in *The Economics of Full Employment* is defined in the Foreword to the latter:

The immediate and main objective of the policy proposed in the White Paper is the avoidance of mass unemployment by taking counter-measures at the onset of depression. The studies in this book go beyond this aim. They are not concerned merely with mitigating economic fluctuations, but with the permanent maintenance of a state of full employment, i.e. such a state in which everybody who wants work can find it at established rates of pay. (Op. cit., p. iii.)

The Beveridge Plan was close in content to that of *The Economics of Full Employment*, as was Beveridge's criticism of the *White Paper* (*Full Employment in a Free Society*, pp. 273–4). As compared with Kalecki's 'Three Ways to Full Employment' the Beveridge Plan gave less attention to the importance of income redistribution and defined measures of implementing full employment policies less well. G. R. Feiwell thinks that the Oxford volume 'was a more fundamental and systematic study than the Beveridge book, which enjoyed much greater notority' (*The Intellectual Life of Michal Kalecki*, p. 179). For a critical examination by Kalecki of the Beveridge Plan, see his 'Economic Implications of the Beveridge Plan', in *Collected Works*, vol. vi, where he showed its lack of consistency and the implied high unemployment margins; for a discussion and other criticism of the Beveridge Plan, see 'The Beveridge

Plan for Social Security: An Economic and Statistical Analysis', *Bulletin of the Oxford University Institute of Statistics*, 5, supplement 4, 1943. For a highly critical assessment of the Beveridge programme, and of Kalecki's 'Three Ways to Full Employment', which are considered in this context as 'an admirable, concise statement of hyper-Keynesian doctrines', see H. C. Simons, 'The Beveridge Program: An Unsympathetic Interpretation', *Journal of Political Economy*, 53/3, 1945; repr. in H. C. Simons, *Economic Policy for a Free Society*, Chicago, Ill., Univ. of Chicago Press, 1948.

In the opening paragraph of his essay, Kalecki notes that he examines here only some theoretical issues of full employment, and that the practical difficulties involved in implementing it required a separate study. His projects seem to imply, however, that all social classes are equally committed to achieving full employment, and behave accordingly. Consequently the government is seen as a non-partial institution implementing a policy of permanent full employment. This contrasts with 'Political Aspects of Full Employment', where the government is seen rather as an instrument in the hands of capitalists. The difference may perhaps be attributed to the fact that here he shows how full employment *could* be achieved, while there he shows the political opposition which such a policy would have to encounter in practice.

It is difficult to say to what extent 'Three Ways to Full Employment' reflected an optimistic faith—which surfaced in England towards the end of the war—that in the post-war world there would be more social rationality and justice. In a number of places in his essay Kalecki notes that social priorities must decide the policy measures chosen to secure full employment. At the time this emphasis on social priorities was fairly characteristic of the Keynesian left. They were mainly trade unionists and members of the left wing of the Labour party. They sought to fight business crises and achieve permanent full employment through a wide selection of social-policy measures, such as redistribution of national income in order to increase consumption among the broad masses of the population, development of communal construction programme (cheap housing, schools, hospitals, etc.), and increasing social benefits. All these postulates appear in 'Three Ways to Full Employment', and also—in varying degree—in Kalecki's other publications on full employment written in those years. This might suggest his links with the Keynesian Left in that period.

[2]
This problem was studied in Balogh's essay.

[3]
Labour mobility was examined by G. D. N. Worswick and by K. Mandelbaum (see *The Economics of Full Employment*, pp. 71–9 and 196–203 respectively).

[4]
This process is discussed in some detail in the introductory part of Kalecki's 'Political Aspects of Full Employment', this volume.

[5]
Kalecki examined these questions in his article 'Full Employment by Stimulating Private Investment?', this volume.

Full Employment by Stimulating Private Investment?

[1]
First published in *Oxford Economic Papers*, NS, 7, 1945, pp. 83–92. The publisher's permission to reproduce this paper is gratefully acknowledged.

[2]
This conclusion implicitly answers the criticism put forward by Joan Robinson in her review of *The Economics of Full Employment* that Kalecki did not consider the case when investment demand was excessive and that 'He thus omits to discuss (beyond a passing reference) a problem of both theoretical and practical importance' (pp. 78–9).

[3]
See 'Political Aspects of Full Employment', this volume.

The Maintenance of Full Employment after the Transition Period: A Comparison of the Problem in the USA and the UK

[1]
First published in *International Labour Review*, 52/5, 1945, pp. 449–64. The publishers' permission to reproduce this article is gratefully acknowledged.

In the original version the paper was preceded by the following note:

'The maintenance of high levels of employment during the period of industrial rehabilitation and reconversion' forms the subject of a Resolution adopted by the International Labour Conference at its 27th Session, held in Paris from 15 October to 5 November 1945. But the problem is one which may be expected to extend into the post-transition period and calls for continued analysis. The following article assesses the situation in two countries, the United States and the United Kingdom, in order to account for an anticipated difference in their prospects. For this purpose, the factors determining the level of employment in *any* economy are first briefly discussed, and the framework so obtained is then used to compare first the pre-war, and then the post-transition position of the two countries.

Shortly after the publication of Kalecki's article, its conclusions about the prospects of maintaining full employment in the USA and their methodological foundations were sharply criticized by W. S. Woytinsky ('The Maintenance of Full Employment after the Transition Period: Notes on Mr Kalecki's Models', *American Economic Review*, 36/4, 1946). Kalecki's reply to this criticism follows below, in Annex 5.

Woytinsky was a German statistician and business cycle theorist who moved to the USA in the 1930s. In the 1940s he was chief economic consultant of the Bureau of Employment Security of the Social Security Administration, and later research director of a special project on employment and wages in the USA until 1950. His criticism of Kalecki was also reflected in a chapter on the post-war American economy which Woytinsky contributed to this project. Discussing the dangers of too high a saving propensity in the USA, Woytinsky wrote:

The forecasts of economic collapse and mass unemployment immediately after World War II were largely based on the theory that people in the United States are inclined to save more than the national economy can absorb for investment. This theory has been thoroughly discredited by the course of economic development, but it has not been completely abandoned and remains a cliché in publications of the International Labour Office and some labour unions. . . . This much, however, is fairly certain: the economic history of the United States and of other countries furnishes no example of economic stagnation caused by an excess of savings. (W. S. Woytinsky *et al.*, *Employment and Wages in the United States*, New York, The Twentieth Century Fund, 1953, pp. 18–19)

As examples of the theory which he considered false, Woytinsky referred to *The Maintenance of High Levels of Employment during the Period of Industrial Rehabilitation and Reconversion* (1945) and *Public Investment and Full Employment* (1946), both published by the International Labour Office, Montreal. This clearly implicated Kalecki, who worked for the ILO until late 1946, and whose ideas on the maintenance of full employment in the period following the post-war reconstruction are easy to find in the above-mentioned ILO publications.

The course of economic developments in the next few years does not unequivocally support either Kalecki's or Woytinsky's forecasts, mainly because, in spite of the 1946 Full Employment Act, the USA by no means followed a policy of permanent maintenance of full employment, adopting instead a policy of *ad hoc* government intervention during the crisis. Cyclical fluctuations in output and employment were thereby mitigated, and in this sense Woytinsky's hopes that the economy would revert to conditions resembling the 1940s rather than the 1920s were fulfilled. At the same time, Kalecki's prognosis that the effects of 'deferred demand' would end by 1950 proved correct (in some opinions they had already ended by the fourth quarter of 1948; see A. Szeworski, *Cykl koniunkturalny a interwencja państwa* (Business Cycle and Government Intervention), Warsaw, PWE, 1965, pp. 57–64). More importantly, Kalecki's expectations that in the long run the maintenance of full employment would prove impossible without measures to compensate for the gap of 'excessive savings' appeared rather well grounded (he attempted to test this hypothesis empirically in his lectures on the 'Impact

of Armaments on the Business Cycle after World War II' (see *Collected Works*, vol. ii), as did some of his students; see e.g. Szeworski, *Cykl koniunkturalny*, and H. Flakierski, *Studium o stopie akumulacji w USA w latach 1929–1962* (A Study of the Rate of Accumulation in the USA in 1929–62), Warsaw, PWN, 1966.

In 1946, US government expenditure was sharply reduced (to about 20% of its level at the end of the war), but this was offset by a rise in private investment (the rate of increment in stocks returning to their 'normal' level was particularly high), in consumption expenditure on durables, and in housing construction and exports. This deferred demand ensured that until 1948 national income was rising and full employment maintained. The cause of the business crisis at the turn of 1948 was that the deferred demand was by then already absorbed and, at the same time, the expansion of American exports was severely cut (due to sharp price rises in the USA and the European 'dollar hunger': the fact that some European Allies had already used up credits granted to them immediately after the war prevented the continuation of large-scale European imports of American goods). 1948 is considered to mark the beginning of a 'normal' cyclical development in the American economy after the war.

The 1948 crisis was countered mainly by government spending on benefits for veterans, as well as by credit and other allowances for housing construction undertaken by them.

1950, to which Kalecki's prognosis referred, was already a year of advanced boom (see Kalecki 'Impact of Armaments on the Business Cycle after World War II'). New armaments plans had not yet significantly affected the economy; only towards the end of 1950 did armaments spending slightly increase. Output and employment were at high levels; registered unemployment was about 6% of the total labour force. In the middle of the year output somewhat increased, due mainly to speculative purchases of consumer goods (after plans for military intervention in Korea were announced).

In 1950, net US national product and its structure was as follows (in $ milliards, at current prices; see US Bureau of the Census, *Historical Statistics of the United States, Colonial Times to 1957*, Washington, DC, 1960, pp. 142 and 153–4):

Personal consumption	195.0
Net private investment in fixed capital	18.7
Change in business inventories (windfalls excluded)	1.8
Export surplus	0.6
Government expenditure on goods and services	39.0
Net national product	255.1

At the same time, private savings (i.e. personal savings and undistributed corporate profits) amounted to $26.2 milliards, thus exceeding the sum of net

investments and a rise in business inventories by $5.7 milliards; if the value of export surplus is taken into account, the gap of 'excessive savings' was equal to $5.1 milliards (at a 6% unemployment rate). This might suggest that in 1950 there were deflationary pressures in the USA. However, when gross investments are considered and private savings are augmented by depreciation charges, it appears that in fact there were inflationary pressures. This is seen from the following balance sheet (ibid. 141 and 153; current prices, $ billions):

Domestic gross private investment	50.0	Personal saving	12.64
Export surplus	0.6	Undistributed corporate profits	13.56
		Capital consumption allowances	19.07
Gross private accumulation	50.6	Gross private saving	45.27

The important conclusion of Kalecki's article and of his reply to Woytinsky is that, in order to ensure permanent full employment, budget deficits will be necessary more often than not. This conclusion seems to have been contradicted by the post-war development of Western Europe, where, at the average rate of unemployment of about 2% p.a. until the late 1960s, there were hardly any large budget deficits (see R. Matthews, 'Why Britain Has Had Full Employment since the War', *Economic Journal*, 78, 1968; the discussion in the Mar. 1970 issue of the *Economic Journal*; and A. Pedone, 'Public Expenditure', in A. Boltho (ed.), *The European Economy: Growth and Crisis*, Oxford, Oxford University Press, 1982). However, as pointed out by Steindl, these arguments neglect the fact that 'vastly increased government spending was partly financed by increased profit taxes which cut into company savings and therefore acted much like a budget deficit' (J. Steindl, 'J. M. Keynes: Society and the Economist', in F. Vicarelli (ed.), *Keynes's Relevance Today*, London, Macmillan, 1985, p. 123).

ANNEX 5

The Maintenance of Full Employment after the Transition Period: A Rejoinder to Mr Woytinsky's Note[1]

Mr Woytinsky published in the September issue of this *Review* a note criticizing my article 'The Maintenance of Full Employment after the

[1] First published in *American Economic Review*, 37/3, 1947, pp. 391–7. The publisher's permission to reproduce this article is gratefully acknowledged.

Transition Period: A Comparison of the Problem in the United States and the United Kingdom'.[1] I find it necessary to reply to this criticism for two reasons: (i) it is partly based on misrepresentation of my article, (ii) it raises certain points of general interest which should be elucidated.

Mr Woytinsky starts from the now fashionable gibes at the formula $S=I+E+D$, where S stands for savings, I for net private investment, E for export surplus, and D for deficit of the budget of public authorities. The 'tautological formula', he observes, does not provide 'any insight into the mysteries of the modern economy'. By 'tautological' he probably means that the formula holds good in all circumstances. Now it is useful to remember that not so long ago this *was* a mystery to many economists who believed that the equation held good only if the rate of interest was at its 'equilibrium level' (this really meant that at a *given level of employment* the equation would be fulfilled only at a certain level of the rate of interest, while the process of equating S to $I+E+D$ through *changes* in employment was not considered).

Mr Woytinsky now begins the criticism of what he calls my 'models'. Strangely enough, he classifies as 'models', *inter alia*, a comparative analysis of the national product and its components in the USA in 1940 and in the UK in 1938. This analysis leads me to the conclusion that the problem of employment was already before the war more difficult in the USA than in the UK because the percentage of income saved at the same degree of employment of the available labour force was substantially higher, and because this percentage was not normally offset by a correspondingly higher ratio of private investment plus export surplus to the aggregate income. Mr Woytinsky maintains that this conclusion is based merely on the fact that the sum of the budget deficit and export surplus was 4% of the aggregate income in the USA in 1940 and 3.4% in 1938 in the UK, 'although this trifling disparity falls within the margin of error of the two computations'. Now this is a complete misrepresentation of my argument. After the tabular comparison of the national product and its components (from which Mr Woytinsky took the above figures relating to the sum of budget deficit and export surplus), there follows this passage:

> It seems at first glance that the position with regard to maintaining the existing level of employment without government intervention by means of a budget deficit was less favourable in the UK than in the USA. Indeed, the budget deficit in the USA was 2% of aggregate income, while in the UK the corresponding figure was 4.9%. A closer examination shows, however, that the reverse is true. Both the change in the value of working capital[2] and the export surplus were at an unusually high level in 1940 in the USA. A correction for these 'abnormalities' would reduce the level of private investment plus export surplus from 10.5% of aggregate income to a level not substantially exceeding 7%. On the other hand, the change in the value of working capital[3] and the export surplus were particularly low in 1938 in the UK, where the correction for abnormality would raise the proportion of private investment plus export surplus to aggregate income from 3.3% to something like 6%. As a result, the budget deficit necessary to maintain the existing level of employment would be of the order of 5% of aggregate income in the USA and 2% in the UK. This difference would be due to the fact that, while the 'corrected' level of investment in relation to aggregate income was assumed above to be only a little higher in the USA than in the UK, the percentage saved out of income was substantially larger in the USA. 12.5% (in 1940) as compared with 8.2% in the UK (in 1938).[4]

The conclusion of my analysis to which Mr Woytinsky refers is based on this passage, and on the fact (pp. 390–1) that the percentage of unemployed in relation to the available labour force was higher in the USA in 1940 than in the UK in 1938.

Mr Woytinsky maintains further that my analysis does not take into consideration 'the economic structure of the two countries and business conditions in the selected years'. What he means by difference in 'economic structure' that is relevant to my conclusions, I do not know. As to the selection of years, the matter *is* discussed on p. 390. And the difference in 'business conditions' is accounted for in the passage quoted, to which Mr Woytinsky chose not to refer. Mr Woytinsky was, to put it mildly, not very punctilious in reviewing this part of my article.

Let us now consider Mr Woytinsky's criticism of the second part of my paper. In this I compare the financial problem of maintaining full employment after the transition period in the USA and the UK. As the basis for this comparison I used, for the USA, Mr Smithies' forecasts of the national product and its components in the USA in 1950 (published in *Econometrica*, January 1945); and for the UK my own forecast

[1] *International Labour Review*, Nov. 1948.

[2] Reflecting not only the quantitative change in inventories but the change in the basis of the valuation as well.

[3] See n. 2 above.

[4] Pp. 392–4 above.

of the national product and its components in 1951 (published in the *Bulletin of the Oxford Institute of Statistics*, December 1944). Mr Woytinsky blames me for using uncritically Mr Smithies' estimates:

> Instead of any proof he refers simply to an earlier article of Mr Arthur Smithies on 'Forecasting Post-War Demand', an essentially mathematical article in which general methodological considerations were illustrated by a series of tentative deliberately experimental projections. Whether valid or not, these projections reflected a definite phase of the discussion which was in progress at that time among technicians in the United States but were not intended as a prophecy. To Mr Kalecki, however, these casual figures become a prediction of the economic structure of post-war America and the foundation—the sole foundation—of the policy it should follow to maintain full employment!

If Mr Woytinsky looked carefully through the article of Mr Smithies—or that of another 'technician', Mr [J. L.] Mosak, published in the same number of *Econometrica*—he would see that the articles were not intended as mere exercises in mathematical statistics, but that the authors treated their forecasts sufficiently seriously to draw from them certain conclusions with regard to government full employment policy. (See *Econometrica*, January 1945, pp. 13 and 37.) Mr Smithies' figures did not seem to me 'casual' for three reasons: (i) his method seemed to me fairly reasonable, although I had certain objections in point of detail; (ii) a great majority of 'technicians' who dealt with the same problem arrived at figures of the same order of magnitude; (iii) an estimate made by my own method also confirmed roughly Mr. Smithies' figures.[5] However rough may be Mr Smithies' estimates, I considered and still consider them a sufficient basis for the conclusion deprecated by Mr Woytinsky somewhat pompously in the passage quoted—that the USA is unlikely to be able to maintain full employment after the transition period without having, on average, a substantial budget deficit.

It is against this thesis that Mr Woytinsky now delivers his attack. It follows from Mr Smithies' estimates for Variant B (40-hour week), which I consider most likely, that in the post-transition period, saving at full employment would exceed such rate of private home investment that may be maintained one year after another by 15 billion dollars;

[5] I could not include this calculation in my article because it would then become too technical for the *International Labour Review*. I presented it in my lectures at the University of Chicago in Mar. 1946.

and thus to maintain full employment this 'gap' has to be filled by export surplus and the budget deficit. Mr Woytinsky writes:

> Let us examine the assumption of an over-saving of 15 billion dollars in post-war America. History shows that, except during wars and deep depressions, savings in the United States averaged somewhat less than 10 per cent of the national income and were roughly in balance with its demand for new capital. If this pattern should change drastically in post-war America, there must be some reasons for such a change. What are these reasons? Will veterans returning home from foxholes lose their 'propensity' for decent dwellings, and will building construction stop? Will the nation shift to the austere consumption habits of the eighteenth century? Will people move from cities to rural areas, strongholds of thriftiness and saving? Will technical progress be brought to a standstill?
>
> None of these assumptions seems very probable. Observations point rather to very different trends. New, higher consumption habits were acquired by workers during the War boom. New habits were brought back to the country by the returning veterans. The tide of marriages and births resulted in an unprecedented demand for new homes, a demand which cannot be satisfied in three or five years. The deferred demand for durable goods and accumulation of war savings open new markets for production. The new technology of light metals and plastics and the progress of electronics generate new outlets for investment. The progress of aviation makes urgent the task of adjusting our urban areas to the new means of transportation. The huge financial reserves of business concerns, farmers and public agencies make private construction and public works possible on a scale never dreamed of before. The United States has emerged from the war as the first economic power in the world. The state of international security demands considerable outlays for defense. The nation is facing a tremendous expansion of individual and collective consumption and spending.

I quote these two passages in full because they are fairly typical of the optimistic approach to the long-run employment problem in the USA. I therefore consider it useful to examine the argument in some detail.

1. With regard to the ratio of saving to aggregate income, it is not correct to compare this ratio at full employment with the pre-war average saving ratio, even if deep depressions *are* excluded. For even then the corresponding average pre-war employment is far from the full-employment level. The comparison is improved if a period of high level of employment is considered, for instance, 1923–9. Now in this period the average ratio of savings (including undistributed profits) to

aggregate private income (including undistributed profits, after taxation, and including so-called transfer incomes) was about 11.5%. In relation to national income (which represents private incomes exclusive of transfers but before direct taxation), this ratio would be about the same as against 10%, which is Mr Woytinsky's figure. It should be added that in 1940 the ratio of savings to aggregate private income was 12% and in 1941, which was the first year of nearly full employment after the great depression, about 20%. It is true that in the latter, rearmament was already on a large scale, but no limitations on consumption of any sort had yet been imposed. In the light of these figures, the saving ratio 16.5% which I obtain in my article from Mr Smithies' forecasts does not appear to be fantastic. (I shall deal with this subject below.) But even assuming the saving ratio at the 1923–9 levels (11.5%) and $152 billion of aggregate private income, I should have arrived at $17.5 billion for savings (as compared with the figure of $25 billion given in my article). With private investment assumed at $10 billion, this would still leave an 'over-saving gap' of $7.5 billion.

2. The statement that savings, except during wars and deep depressions, were roughly in balance with demand for new capital is irrelevant to our problem. It probably implies that, except during wars and deep depressions, budget deficits and export surpluses were, on average, of no great significance and that the average level of employment was nevertheless at a fairly high level. As stated above, this level was definitely short of full employment; of course it was not low either, but how could it be if Mr Woytinsky cuts out deep depressions?

3. If it is assumed that after the transition the savings ratio at full employment will be higher than at prosperous periods before the war, say, 16.5% as compared with 11.5%, it does not mean in the circumstances an increase in thriftiness. For Mr Smithies' forecast implies a considerable rise in consumption per head as compared with the pre-war period, and the increase in the savings ratio is due, not to reduction in consumption out of a given income, but to the fact that consumption increases in slightly lesser proportion than income. (If the savings ratio increases from 11.5% to 16.5%, the rise in consumption falls 5% short of the rise in income.) In this context Mr Woytinsky's reference to the return to eighteenth-century austerity may be considered nothing but a sign of his deeply emotional attitude to the problems in question.

There are, I think, some plausible reasons for the full-employment savings ratio after the transition period being higher than before the war (in 1923–9 or 1940). A large part of savings is made up, in prosperous periods, of corporate savings (undistributed profits) and savings out of higher- and middle-income brackets. Now, in a state of permanent full employment, the utilization of equipment is likely to be higher than in 1923–9 or in 1940. This will be reflected in the relation of profit to capital, and will result in a considerably higher percentage of profits going to corporate savings and a correspondingly lower percentage going to dividends. Further, real incomes will increase considerably as a result both of fuller employment and of a rise in productivity. This applies to high incomes as well, and here such a rise may well lead to a higher proportional increase in savings than in consumption. However, as shown above, substantial 'over-saving' will be left in Mr Smithies' 'model', even if the savings ratio is assumed at the level of 1923–9 or 1940. (Mr Woytinsky mentions as a factor tending to depress the future savings ratio the fact that workers became accustomed to higher consumption during the war. Even if it were granted that this would have any repercussions in the future, the influence of this factor upon the savings ratio is bound to be small because the workers' contribution to total saving is of no great importance.)

4. I agree with Mr Woytinsky that the extra demand for houses will continue into the 1950s. This factor has been taken care of in the forecasts quoted in my article [see p. 399 n. 11; also p. 8 of Mr Smithies' paper in *Econometrica*]. I disagree, however, that the same is true of deferred demand for durable goods, which, I think, is likely to be exhausted by 1950.[6] The same is probably true of the demand of industry for plant and machinery,[7] even if, in addition to arrears during the war, we take into consideration the influence of new technological developments (innovations will partly overlap with the satisfaction of deferred demand for investment).

5. Mr Woytinsky's reference to *public* investment as a factor in sustaining a high level of employment in the 1950s is rather puzzling. If

[6] See J. Steindl, 'Post-War Employment in the USA', *Bulletin of the Oxford Institute of Statistics*, Sept. 1944. The *National Survey of Liquid Assets* of the Board of Governors of the Federal Reserve System points to the same.

[7] See Steindl, 'Post-War Employment in the USA'.

he assumes that public investment is financed by borrowing, it contradicts all his argument, which is directed against the necessity of public borrowing for the maintenance of full employment. If, however, public investment is financed by taxation, its stimulating effect upon employment is very much reduced, and it has to be on an enormous scale to constitute an important factor.

Mr Woytinsky starts next his final attack on 'models'. (Incidentally, this term has not been used in my article, but to Mr Woytinsky, I seem somehow to stand for 'models and the like'. He stresses that 'the controversy in interpreting historical trends cannot be solved by tricky "models" which postulate in advance a definite pattern of development', and he maintains that his own 'projection', showing that the situation in 1950 will be 'inflationary' rather than 'deflationary', is based on an 'appraisal of the prevailing trends in our economy'. To me his 'projection' is as 'tricky' a 'model' as any other forecast. He differs from other model-builders only by his set of assumptions, which does not impress me as particularly well-founded. He assumes for his 1950 model a low current savings ratio, which is based on a crude and, as I tried to show above, erroneous extrapolation of pre-war trends. Also, other model-builders arrive at their savings ratios by extrapolation of pre-war trends and, although I have certain objections against their methods, they seem to me still much more reasonable than that of Mr Woytinsky. Mr Woytinsky assumes further that in 1950 '4 billions of war savings will flow back into consumption'. Other 'model-builders' are by no means oblivious of this possible effect, but they assume that by 1950 the effects of 'deferred demand' will be exhausted, which again seems to me quite reasonable. It is thus really not clear why Mr Woytinsky claims a monopoly for basing his 'projection' on an 'appraisal of the prevailing trends in our economy'.

A Comment on 'Monetary Policy'

[1]

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The main contributor to the symposium was Prof. L. W. Mints, of the University of Chicago, who delivered a paper on 'Monetary Policy'; the other participants were A. H. Hansen, H. S. Ellis, A. P. Lerner, and Kalecki.

The main contention of Mints's paper was that general economic equilibrium and a high level of employment could be achieved by means of a monetary and fiscal policy, without counter-cyclical and thereby highly volatile government expenditure. His favoured policy measures were price elasticity and monetary stability. Therefore 'we shall have to give more heed than heretofore to protecting the freedom of the market from encroachments by both business men and laborers' ('A Symposium', p. 60).

Alvin H. Hansen thought Mints underestimated the structural financial defects of developed capitalist economies, and did not share his trust in the efficiency of monetary policy, especially of tax reductions, for the maintenance of full employment. Hansen wanted 'both to vary public outlays counter-cyclically and also to vary taxes with the cycle' (ibid. 69), and he thought that the criteria for the best use of government expenditure should be social priorities and not market profitability of investments (ibid., p. 73).

Howard S. Ellis supported the conclusion of *The Economics of Full Employment* (op. cit.) and emphasized the importance of institutional changes envisaged there. And Abba P. Lerner discussed the differences between Mints's and Hansen's approach to full employment, showing that in practice the suggested policy measures were similar. Lerner was also in favour of an economic policy which would eliminate business fluctuations rather than merely mitigate them.

[2]

See also 'Professor Pigou on 'The Classical Stationary State': A Comment', in this volume.

Multilateralism and Full Employment

[1]

First published in *Canadian Journal of Economics and Political Science*, 12, Feb.–Nov. 1946, pp. 322–7; Spanish translation: 'Comercio multilateral y pleno empleo', in *Investigación económica—rivista de la Facultad de Económia de la Universidad Nacional Autónoma de México*, 166, 1983, pp. 53–61.

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Towards the end of the war, the problems of organization of post-war international trade and finance aroused considerable interest. In 1943, government plans for the reconstruction of international finances were announced in the USA and the UK (see *Proposals for an International Clearing Union*, London, HMSO, Cmd. 6437, Apr. 1943; *United States Proposal for a United and Associated Nations Stabilization Fund*, repr. London, HMSO, 1943. On 23 May 1943, Keynes made his famous speech in the British Parliament where he put forward his own plans concerning these matters. In Aug. 1943, the Oxford Institute of Statistics published a special

issue of its bulletin where these plans were thoroughly discussed ('New Plans for International Trade', *Bulletin of the Oxford University Institute of Statistics*, 5, 1943, supplement 5). E. F. Schumacher studied the problem of international liquidity, and advanced some additional schemes which he believed could turn the British project into a workable system. T. Balogh dealt with some consequences of full-employment policies for balancing the balance of payments. Also included in this issue was a short paper by Schumacher and Kalecki, 'International Clearing and Long-Term Lending' (see also Kalecki, *Collected Works*, vol. vii), which showed that establishing an international clearing union would not be enough to ensure a sufficient supply of the currencies of those countries which run persistent surpluses on their balance of payments current accounts. In order to meet this difficulty, Schumacher and Kalecki argued that an international investment office should be attached to the clearing union; the aim of the office would be to grant credits to countries with persistent export surpluses.

Kalecki's and Schumacher's ideas were then developed by Balogh in his essay on the international aspects of full employment (*The Economics of Full Employment*, esp. pp. 157–80). Kalecki's 'Multilateralism and Full Employment' is a continuation of this debate.

A Note on Long-Run Unemployment

[1]

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Immediately after the war, many governments declared their intention of pursuing consistently a policy of full employment. Towards the late 1940s, however, it appeared that in practice they were merely prepared to take measures that would mitigate the course of the business cycle, and that the policy of permanently maintaining full employment had encountered various difficulties and had thus slipped down the list of government priorities. Kalecki, who at the time was dealing with various aspects of full employment (in his capacity as a UN civil servant), thought government intervention which was limited to mitigating unemployment in the crisis phase of the business cycle a highly unsatisfactory solution to the problem of eliminating unemployment in the long run. This opinion is reflected in several UN reports and documents prepared at that time under his direction. In one such report, he studied the problem of long-term unemployment in relation to economic policies limited to counter-cyclical government intervention (see *Background Paper on National Measures Concerning Full Employment*, New York, UN, E/CN.1/Sub.2/2, Nov. 1947; see also information on Kalecki's work for the UN, in *Collected Works*, vol. vii). He went on to discuss some theoretical aspects of this problem in his 'Note on Long-Run Unemployment'.

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