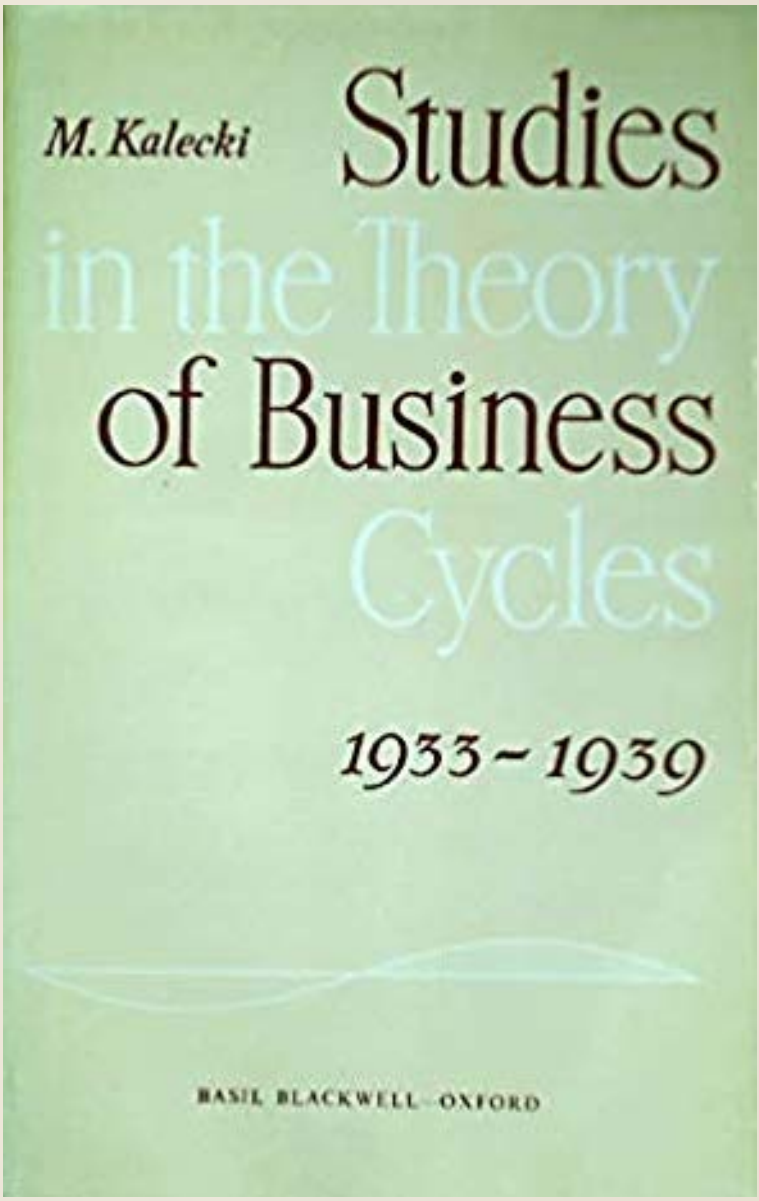
M. Kalecki
Studies
in the Theory
of Business
Cycles
1933 - 1939
BASIL BLACKWELL · OXFORD

STUDIES IN THE THEORY OF BUSINESS CYCLES

1933–1939

by

MICHAL KALECKI

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CONTENTS

INTRODUCTION

It is difficult now to recapture the state of orthodox opinion in the early years of the great depression.

There was heavy unemployment in Britain even before the world slump set in. In 1929 Lloyd George was campaigning for a programme of public works. In reply, British officials propounded the "Treasury View" that if the Government borrowed, say, a hundred million pounds to set men to work on road building and so forth, foreign investment would be reduced by an equal sum and no overall increase in employment would occur.

In 1931 the Labour Government was led to destruction through the belief that it was necessary to balance the budget in order to save the exchange value of sterling.

Academic opinion was serenely oblivious to the problems of reality. Professor Robbins, surrounded by unemployed labour and idle plant, defined economics as "the science which studies human behaviour as a relation between ends and scarce means which have alternative uses".[1]

According to accepted theory the price level was determined by the quantity of money. But the suggestion that the depression might therefore be relieved by increasing the quantity of money was confined to cranks. In the orthodox view it would create a dangerous inflation.

The Marxists abused the academics, but they shared their belief in the principles of sound finance.

In this fog Keynes was groping for a theory of employment. He had backed up Lloyd George with a rather vague and half-baked argument that an increase in investment would generate an increase in saving (so that borrowing in one form need not be subtracted from borrowing in another)[2] and he set a young pupil, R. F. Kahn, to work it out properly. During the sessions of the Macmillan Committee on currency and banking he was coming to the view that there was a fallacy in the accepted argument that a cut in money wage rates would restore profitability to enterprise, by lowering costs relatively to prices, because prices would come

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[1] *Essay on the Nature and Significance of Economic Science,* 1932.

[2] J. M. Keynes and H. D. Henderson, *Can Lloyd George Do It?*

down more or less in proportion. But in his great theoretical *Treatise* his mind was working on a different plane and it failed to produce a theory of employment, though it contained the highly significant conception that an increase of investment without (as we should now put it) a corresponding increase in the propensity to save raises profits, while an increase in propensity to save without a corresponding increase in investment reduces them.

Over the continent, no doubt including Poland, the fog of orthodoxy was even thicker than in England. Only in Sweden Wicksell's pupils were puzzling out a new line. In *Monetary Equilibrium* published in Swedish in 1931, Gunnar Myrdal twitted Keynes upon his "attractive Anglo-Saxon kind of unnecessary originality" but he was not altogether clear of the fog himself.

The *Treatise on Money* was passed for the last time to the printers in September 1930 and Kahn's article appeared in the *Economic Journal* of June 1931, setting out the analysis of the multiplier—the relation of an increase in employment in investment to the total increase in employment that it generates—and showing how the rise in incomes that accompanies an increase in investment brings about a rise in savings of an equal amount.

There followed a great bout of argument that churned over these ideas for three years.

In 1933 I published a kind of interim report, which clears the ground for the new theory but does not supply it.[3] It was not till the summer of 1934 that Keynes succeeded in getting his theory of money, his theory of wages and Kahn's multiplier into a coherent system.

In January 1935 he wrote to Bernard Shaw: "I believe myself to be writing a book on economic theory which will largely revolutionize—not, I suppose at once but in the course of the next ten years—the way the world thinks about economic problems".[4]

The main lines of that theory nowadays seem so obvious that it is hard to remember that they did indeed require a revolution in thought. They may be summarized in the propositions that the rate of saving is governed by the rate of investment, that the level

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[3] "The Theory of Money and the Analysis of Output", in the first number of the *Review of Economic Studies;* reprinted in *Collected Economic Papers,* Vol. 1.

[4] R. F. Harrod, *Life of Keynes,* p. 462.

of prices is governed by the level of money wage rates, and that the level of interest rates is governed by the supply and demand of money.

The General Theory of Employment, Interest and Money was published in January 1936. Meanwhile, without contact either way, Michal Kalecki had found the same solutions. The first essay in this volume was published in 1933. Like a prelude it enunciates themes later to be elaborated.

The last few pages bring out sharply the first Keynesian proposition that an increase in investment does not require a prior decision to increase saving. Firms and governments are free to raise their rate of outlay on investment at any time, and, when they do, savings, one way or another, increase to the corresponding extent.

In the English version of the theory there was a lot of unnecessary confusion between the equality of savings and investment as an accounting identity (which requires appropriate definitions of the two quantities and the time period) and the substantive proposition that a decision to increase investment will generate a corresponding net increase in saving, while a decision to increase saving will not. The trouble arose because the careless language of Keynes and his popularisers (amongst whom I must plead guilty) gave an opening to opponents who delighted to interpret a mistaken formulation as a substantive error at the heart of the new theory.

Kalecki avoided all this pother because he started from the assumption that wage incomes are fully spent (with a negligible time-lag) on consumption, so that the gross overall surplus on the sale of consumer goods is equal to the wage bill of the investment sector *plus* the expenditure of capitalists for consumption. "The workers spend what they get; the capitalists get what they spend." An increase in investment increases profits to whatever extent is required to raise saving out of profits to the corresponding extent.

The reason for this more direct attack upon the problem arose from the different background of the two discoverers. Keynes had been brought up in the Liberal tradition of social harmony, which slurs over class differences. The preface to the *General Theory* ends thus: "The ideas which are here expressed so laboriously are extremely simple and should be obvious. The difficulty lies, not in the new ideas, but in escaping from the old ones, which

ramify for those brought up as most of us have been, into every corner of our minds."

Kalecki was not brought up so. The only economics he had studied was in Marx. Keynes could never make head or tail of Marx. In the letter to Shaw, quoted above, he maintains that his new theory is going to cut the ground from under the feet of the Marxists. But starting from Marx would have saved him a lot of trouble. Kahn, at the "circus" where we discussed the *Treatise* in 1931, explained the problem of saving and investment by imaging a cordon round the capital-good industries and then studying the trade between them and the consumption-good industries; he was struggling to rediscover Marx's schema. Kalecki began at that point.

In another sense, however, Kalecki's aproach was more conventional than Keynes'. He arrived at a general theory through a model of the trade cycle. It was probably for this reason that the significance of his ideas was not recognized by readers of his French publication in 1935. The problem of the trade cycle had always been regarded in the orthodox tradition as a special kind of conundrum, apart from the main body of doctrine. Keynes, on the other hand, attacked the main body directly and never really succeeded in getting out a coherent theory of the cycle.

It is interesting to notice that the first version of Kalecki's model had the same missing link as Keynes'. In Keynes' 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. Later, 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.*

In his later works Kalecki supplied an answer (as he tells us

in the Preface, with some trouble) 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' 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.

Whether this solution is accepted or not, it draws attention to the fact that some kind of solution is required. The re-publication of his first attempt should certainly convince Kalecki's readers that his later labours were not unnecessary.

The third theme of the Keynesian revolution—that the rate of interest is a monetary phenomenon—which raised so much controversy for us, seems to have come quite naturally to Kalecki. This also was probably due to his immunity from orthodox teaching, in which (even today) there is a strong tendency to confuse the rate of interest with the rate of profit.

The second theme of the *General Theory*, the interrelation between prices, money wages and employment, was no less important than the first. This theme is clearly sounded in the third essay in this volume and elaborated in the fifth.

Keynes' *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.

One point he raises that we had somehow overlooked. The analysis of imperfect competition was being developed side by side with the *General Theory* but they were not brought to bear on each other. Already in 1935 Kalecki had seen the connection when he showed that, if prices are sticky, a cut in money-wage rates actually reduces employment. This theme is further elaborated in the last essay in this volume, which points the way to an important element in the extension of the analysis into long-run problems that is going on today.

The publication of this volume in English provides the evidence for one of the most striking of the great coincidences of scientific discovery. But it is valuable not only in the context of the history of thought. Its sharp and concentrated statement provides a better introduction to the general theory of employment, interest and money than any that has yet been produced.

Cambridge JOAN ROBINSON

FOREWORD

This book contains my early studies in the theory of the business cycle published in Poland in the years 1933–1939 which were almost inaccessible after the war. As the reader will find, I had dealt in these essays with a number of basic issues which were in the centre of economic discussion during the subsequent twenty years[1]. The studies also reflect the most essential features of my theory of the business cycle. I modified in my later work only the factors determining investment decisions and I allowed for changes in inventories in the course of the business cycle, from which I abstracted in the first version.

Incidentally, this development of my theory (as presented in the *Theory of Economic Dynamics*[2]) which was quite laborious, hardly earned me any applause. It was frequently maintained that the first version was more lucid and elegant.[3] I myself consider that the modifications introduced meant some progress since the later version of the theory seems to me better founded and more realistic. Nevertheless this attitude of my readers is an additional inducement to re-publish my earlier studies.

The essays in this volume are put in chronological order. Some details concerning the dates of the publication of the originals and the way in which they are re-published here are given below.

The Outline of a Theory of the Business Cycle is the first (and most essential) part of my booklet *An Essay on the Theory of Business Cycle* which was published in 1933. I supplemented this study by a short passage concerning the problem of the money market taken from my *Essai d'une théorie du mouvement cyclique des affaires* published in the French quarterly *Revue d'Economie Politique,* March–April 1935. Apart from this nothing of importance has been added either to this or to other items.

The paper *On Foreign Trade and Domestic Exports* was published in *Ekonomista* in 1933 (No. 3).

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[1] It is worth noticing that there is a certain affinity between these theories of mine and those of Rosa Luxemburg.

[2] George Allen and Unwin, London 1954.

[3] See, for instance, R. G. D. Allen, *Mathematical Economics,* London 1956, p. 261, and Oskar Lange, *Pisma ekonomiczne i społeczne 1930–1960* (Papers in Economics and Sociology 1930–1960), Warszawa 1961, p. 285.

The Mechanism of the Business Upswing and *The Business Upswing and the Balance of Payments* were published in the weekly *Polska Gospodarcza* in 1935. They are in a sense a popular version of the preceding two items. It may, therefore, be advisable to start reading the book from these two chapters.

Finally *Money and Real Wages* (consisting of a theoretical and a statistical part) is a complete reprint of a booklet under the same title published in Warsaw in 1939.

M. KALECKI

1. OUTLINE OF A THEORY OF THE BUSINESS CYCLE

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.

1. *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

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

Thus C denotes all goods which are consumed by capitalists and A includes—since we abstract from workers' savings 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.[1]

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.

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 proportionate 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

[1] 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 $C+A$.

the sum of the production of investment goods and the increase in inventories.[2] *For the sake of simplicity we assume that aggregate inventories remain constant throughout the trade cycle.*

It follows from the above assumptions that the real profits P are proportionate to B_0+A, where B_0 denotes the constant part of the capitalists' consumption, and A the gross accumulation which is equal to the production of investment goods.

2. *Investment.* We assume that the period of construction ϑ is the same for any investment project. This of course is not in fact the case. ϑ 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: 1) investment orders, i.e. all types of orders 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; 2) production of investment goods A which, according to the above, is equal to the gross accumulation; 3) deliveries of finished equipment per unit of time D.[3]

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 $t-\vartheta$; thus the curve D is the curve I shifted by the time-lag ϑ (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 ϑ 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 the time ϑ all orders which come within the shaded

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[2] 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 steel or cement). Changes in this type of inventory must be thus included in "the increase in inventories".

[3] 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.

area have not yet been completed, while all 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:

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

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

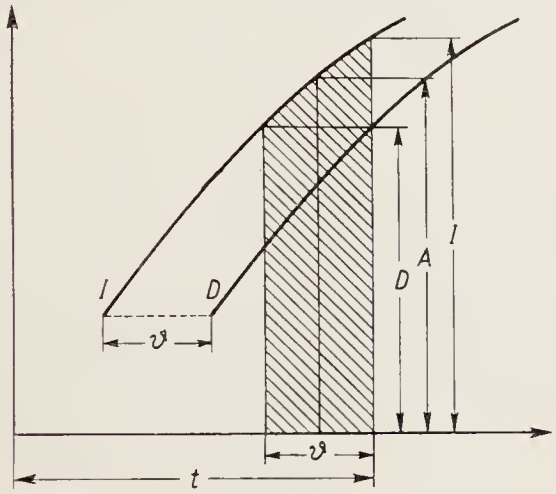

FIG. 1

It follows that A is equal to the shaded area of the trapezium divided by ϑ. 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 $t-\frac{\vartheta}{2}$. 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* $t-\frac{\vartheta}{2}$. Thus the curve A is approximately identical with the curve I shifted by $\frac{\vartheta}{2}$ (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 was already pointed out in the footnote 3 to page 4).

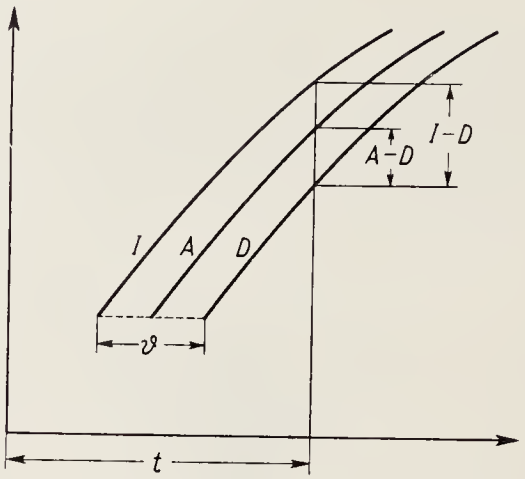

FIG. 2

3. *Changes in the volume of capital equipment.* Let the volume of capital equipment at a given time be denoted by K. 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 $\frac{\Delta K}{\Delta t}$, 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:

$$\frac{\Delta K}{\Delta t} = D - U \tag{5}$$

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 seem therefore that in the 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.

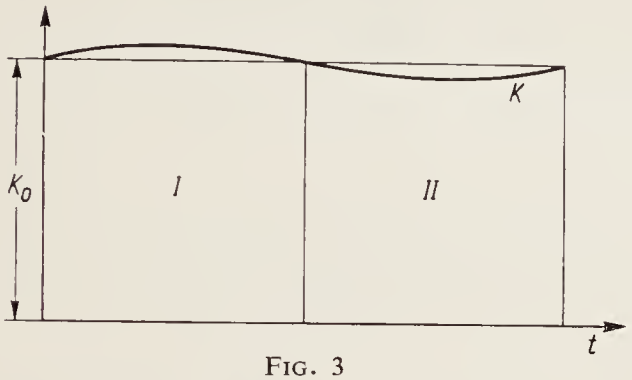

FIG. 3

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:

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

4. *Investment orders as a function of gross profitability and of the rate of interest.* 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: 1) the depreciation βk (β being the depreciation rate); 2) the interest on capital k amounting to ik (i being the rate of interest); 3) 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 $\frac{P}{K}$ may be estimated from the actual gross profitability of existing plant. 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 $\frac{P}{K}$. Thus we may conclude that $\frac{p}{k}$ is estimated on the basis of $\frac{P}{K}$, and that the investment orders at a given time depend on the gross profitability $\frac{P}{K}$ 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 $\frac{P}{K}$ and i, but rather the ratio of I to the volume of capital equipment K, i.e. $\frac{I}{K}$; indeed, if P and K increase in the same proportion, $\frac{P}{K}$ 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 $\frac{P}{K}$ and a diminishing function of i.

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* $\frac{P}{K}$.

From this assumption and the equation (7) it follows that $\frac{I}{K}$ is a function of $\frac{P}{K}$:

$$\frac{I}{K} = F\left(\frac{P}{K}\right) \tag{8}$$

Let us also assume that *the rate of interest increases sufficiently slowly in relation to the gross profitability* $\frac{P}{K}$ *for* F *to be an increasing function.*

Since, as was shown above, the gross profit P is proportionate to B_0+A where B is the constant part of capitalists' consumption and the gross accumulation A is equal to the production of investment goods, $\frac{P}{K}$ is proportionate to $\frac{B_0+A}{K}$ and the equation (8) may be written as follows:

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

where φ is an increasing function.

Moreover, we assume that φ *is a linear function i.e.*

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

The constant m must be positive since φ 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 the equation (10a) it follows that

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

I representing the orders for goods used for the reproduction and expansion of capital equipment remains always positive; it may, however, possibly approach the zero level. Let us imagine that I falls below the positive value mB_0. For values of I less than mB_0 the expression $\frac{m(B_0+A)-I}{K}$ is greater than $\frac{mA}{K}$ i.e. $\frac{mA}{K}$

will be then 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.

According to equation (10a), in which the coefficient 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.

The Mechanism of the Trade Cycle

1. The main conclusions of the argument in the preceding chapter may be stated as follows:

a) The time-lag between the placing of investment orders and deliveries of new equipment is ϑ; the curve of deliveries D is shifted from the curve of investment orders I by the time ϑ. The curve of the production of investment goods A is shifted from the curve of investment orders approximately by $\frac{\vartheta}{2}$.

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

c) 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.

d) 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 capitalists' consumption.

2. These points already enable us to say something about the mechanism of the trade 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 ϑ 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 the 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.

3. We shall now make a detailed examination of the way in which the mechanism of the trade 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 (a) at the beginning of this section shows that the curve A is shifted approximately by $\frac{\vartheta}{2}$ and the curve D by ϑ from the curve I.

The ordinate of the curve D is equal to $D - D_0$ which, as shown by conclusion (c), 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 ϑ during which investment orders exceed the level of replacement requirements; capital equipment, however, has not yet begun to expand because deliveries of new equipment are as yet lower than the replacement requirements.

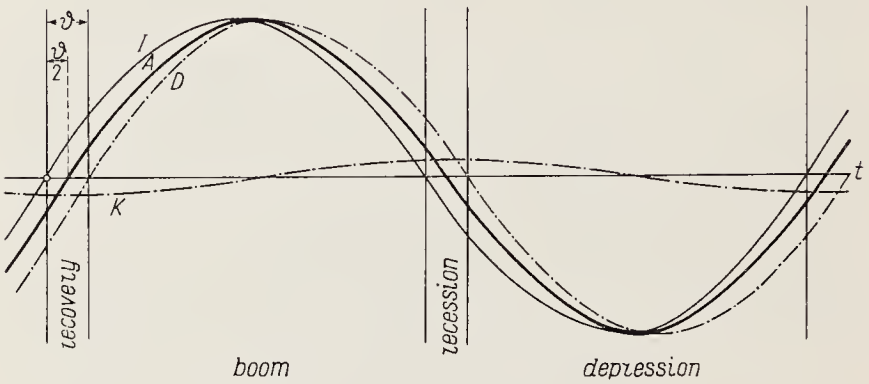

FIG. 4

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 the *boom* deliveries of new equipment already exceed the 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 the *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 the *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.

4. We 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 the aggregate production. The gross real profits P are, on the one hand, an increasing function of the gross accumulation A (P is proportionate to $B_0 + A$, where B_0 is the constant part of capitalists' consumption), and on the other hand, they can be expressed as the product of the volume of the aggregate production and of the profit per unit of output.[4]

The relation between changes in the gross accumulation which is equal to the production of investment goods, and those of the aggregate production materialises in the following way. When production of investment goods rises the 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 good industries. The consequent increase in employment in the consumer-good industries leads to a further rise in the demand for consumer goods. The levels of aggregate production and of the profit per unit of output will ultimately rise to such an extent that the increment in real profits is equated to the increment of the production of investment goods.

The account of the process is not yet complete because changes in capitalists' consumption have not been taken into consideration. This consumption C is dependent to a certain degree on the aggregate profits P and will increase together with the gross accumulation A since from equation (2) and (3) it follows that $C = \frac{B_0 + \lambda A}{1 - \lambda}$. The increase in capitalists' 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

[4] We assume here that aggregate production and profit per unit of output rise or fall together, which is actually the case. This results at least to some extent from the fact that a part of wages are overheads.

goods for the workers which causes a further rise in production. *The aggregate production and the profit per unit of output will ultimately rise to such an extent as to assure an increment in real profits equal to that of production of investment goods and capitalists' consumption.*

5. Some doubts may be raised by the final part of the preceding paragraph. The conclusion that the increase in capitalists' consumption increases in turn 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 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. Capitalists' 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, where the 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 the 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 realised profits, so that the sum of deposits remains unchanged. In actual fact, however, credit inflation is inevitable owing to the "technical" elements of the money market mentioned above. This is connected with the fact discussed above that the increase in production of investment goods or in the capitalists' 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 follows suit. This is the basis of our assumption that the rate of interest i is an increasing function of the gross profitability $\frac{P}{K}$ (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 $\frac{P}{K}$ 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 rises sufficiently slowly in relation to the gross profitability $\frac{P}{K}$ 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.

2. ON FOREIGN TRADE AND "DOMESTIC EXPORTS"

1. Capturing of new foreign markets 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 capitalists' 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, were 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 8 factories are built each year instead of 5. 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 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

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[1] We abstract from workers' savings here.

[2] In addition to the increase of foreign claims or the payments of foreign debts the influx 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 capitalists' consumption.

to investment activity; the 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.

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

[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.

increase in exports contributes to the increase in the balance of trade and consequently in 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 $\frac{s}{\alpha}$. Moreover let the ratio of imports to the value of aggregate production be β[6]; then the increase in imports will be $i = \beta\frac{s}{\alpha}$; 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 70 mil. zl, 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 $\frac{0.5}{0.5+0.2}70 = 50$ mil. zl.

Exports rise additionally by 20 mil. zl. but imports increase by the same amount, or exports increase by 70 mil. zl., imports by 20 mil. zl., and the balance rises by 50 mil. zl., 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 doles, or public works, the result is very similar to that of securing a surplus in foreign trade. To the surplus of exports over

[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.

imports there corresponds here the sale of commodities, used for the 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 capitalists' 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 abstract from 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 influx 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). 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 $\frac{e_1 - i}{\alpha}$. If, moreover, we denote the ratio of imports to the value of aggregate production by β, the corresponding rise in imports will amount to $i = \frac{e_1 - i}{\alpha}\beta$. It follows that

$$\frac{e_1 - i}{i} = \frac{\alpha}{\beta} \tag{4}$$

This equation is identical with the equation (2) except that instead of the increase in exports e, we have here the "domestic exports" e_1. Like the equation (2) the 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 70 mil. zl. 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 20 mil. zl. This rise in imports will have two results: 1) profits will increase not by 70, but only by 50 mil. zl.; 2) there will be a deterioration of 20 mil. zl. 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: 1) the influx of foreign capital; 2) the suspension of the servicing of foreign debts; 3) outflow of gold and foreign currency. Since "domestic exports" raise the average profitability, there will be a tendency for the influx 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 nevertheless 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 depreciation.

As a result of depreciation 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 for 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 the time it lasts, by a tendency of these prices to rise in terms of the domestic currency. But even if we abstract from this tendency—which can be prevented, e.g. in such a way that no formal de-

preciation 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 depreciation, 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 $\frac{m}{n}$. It is obvious that for sufficiently large values of n the ratio $\frac{m}{n}$ will become less than one, i.e. for a larger quantity of domestic products a smaller quantity of foreign goods than before the currency depreciation will be obtained. Thus, there is a certain maximum level of imports which can be secured through depreciation. The depreciation 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 depreciation. 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 depreciation (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 depreciation 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, how-

ever, 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 section 2 and 4 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 section 2 and 4, let 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 $\frac{k-s}{\alpha}$, and the corresponding rise in imports to $\frac{k-s}{\alpha}\beta$. Since imports increased by the same amount as the decline in the balance of trade, i.e. by s, we obtain:

$$\frac{k-s}{\alpha}\beta = s$$

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 influx 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 influx of foreign capital, it will be confronted with the same balance of payments difficulties as the upswing based on "domestic exports".

3. THE MECHANISM OF THE BUSINESS UPSWING

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 to capacity and in consequence unemployment vanishes. Has depression been thus 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. Capitalists' consumption changes in general

but little in the course of the business cycle. It is true that increased profitability stimulates investment but this stimulus will not work right away since the entrepreneurs will temporise 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 occured, 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 consumption 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 in the period 1931–32, 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.

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) nor have they 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 drawing on their reserves. The means used by the entrepreneurs for construction of new establishments reach the industries of investment goods. This additional demand makes for setting to work idle equipment and unemployed labour. The increased employment is a source of additional demand for consumer goods and thus results in turn in higher employment 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, 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 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 have come into being. Profits 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 will result in an increased demand for money in circulation, and thus will call for a rise in credits of 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 meantime 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 will have 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 get out of use, but 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. 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 was 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 consumption goods will cause fuller employment in the consumer-good 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 p.a., the capital equipment is expanding by 40 establishments p.a. Now the demand will be met by an increasing number of establishments and as a result the degree of utilization of each of them will diminish. 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 pro-

duction and of a decline in unemployment—a fall in production and an increase in unemployment 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 the capital equipment, i.e. the increase in the 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 which draw on their cash reserves to buy the issue. The government spends the money, e.g. on construction of railways. As in the cases described above, employment in investment-good industries increases and subsequently, as a result

of the higher purchasing power of the workers, in consumption-good 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. 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. 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 gets 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 will gradually reduce its investment activity. Thus an upswing started by a new invention continues after its impact 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 doles. In this case the direct effect of government intervention will be felt in consumer-good industries. Only after some time, when their increased profitability will induce them to invest, will prosperity be shared by investment-good industries as well. This increased investment activity financed by creation of purchasing power will enhanee 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, sooner or later—as was proved

in the preceding chapter—will come to a stop as a result of expansion of capital equipment.

It must be added that the pre-condition 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, but only a shift in its structure would take place.

4. THE BUSINESS UPSWING AND THE BALANCE OF PAYMENTS

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, iron ore etc.; 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, abstract from 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 one instance only is it very likely that the deterioration of the balance of trade in the course of an upswing will be automatically offset by the influx 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 of 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 exchange 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 influx 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 one at a time 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 in consequence of currency depreciation the export prices of a given country measured in 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 $\frac{1}{0.8} = 1.25$ 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 be increased but 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 structure 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 the tariffs. In order to illustrate the rigidity of demand for goods of a given country it is useful to consider some data concerning Japan. In the period 1932–1934 the Japanese terms of trade fell by 18%. Although at that time the volume of world trade already tended 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 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 does not make sure that the means for an expansion of imports

can thus 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 influx of foreign capital is forthcoming—are sometimes met by 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 influx 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 it will be forced to resort to restrictions of imports of raw materials etc. Let us analyse the consequences of such a state of affairs.

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 lopsided boom the consumption of the broad masses 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 byproducts, 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.

5. MONEY AND REAL WAGES

PART I (THEORY)

The "Classical" Theory of Wages

1. The assumptions of the "classical" theory of wages may be subdivided into two categories:

(a) The assumption of perfect competition and of the so called "law of increasing marginal costs". The consequence of this assumption is the association of the rise in employment with a decline in real wages.

(b) The assumption of a given general price level or a given value of the aggregate demand, from which it follows that real wages change in the same direction as money wages.

Now, the cut in money wages being followed by a decline in real wages, and the latter being associated with a rise in employment, the reduction in money wages leads, according to the "classical" theory, to an increase in employment.

Before a critical appreciation of these assumptions we shall describe them in some detail.

2. Let us start from the law of increasing marginal costs and perfect competition. Imagine an establishment with a given capital equipment which produces 100 units of a certain commodity. By increasing employment slightly it may produce 101 units. Now the additional cost of producing the 101st unit, consisting mainly of the cost of raw materials and wages, is called the marginal cost at the level of production equal to 101.

According to the "law of increasing marginal costs", the marginal cost, i.e. the cost of producing the last unit, rises with the level of output obtained from a given capital equipment. This law will appear to many readers not too plausible and rightly so: whereas in agriculture a disproportionately higher input of fertilizers and labour is required in order to increase the yield, in an industrial establishment the marginal cost starts to rise spectacularly only when maximum utilization of equipment is approached, —which happens to be rather an exception.

We shall examine critically the "law of increasing marginal costs" in the subsequent sections, while at present we shall concentrate on its consequences.

Let us consider a system of perfect competition where a single entrepreneur disregards the fact of "spoiling the market" through his increasing the supply, but considers the price as given. It will be easily seen that the output of an establishment will be pushed up to the point where the marginal cost is equal to the price (on Fig. 5 this level of output is OA).

Indeed, once the entrepreneur increases his output, the marginal cost is higher (according to the "law of increasing marginal costs") and therefore the cost of production of the last unit exceeds the price (point M is above the straight line CB) and as a result a cut in production will ensue. If, however, the production is below the level at which the price is equal to the marginal cost, the last unit produced yields more than the additional cost involved (point N is situated under the horizontal line CB) and therefore the output will be expanded. The equilibrium is reached when the marginal cost is equal to the price.

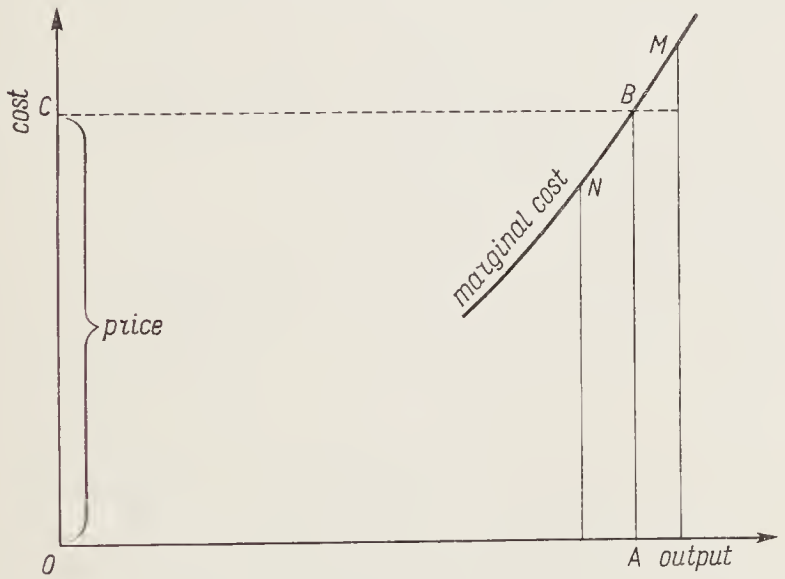

FIG. 5

3. Let us now consider a closed economic system. It may be easily shown that if we assume the "law of increasing marginal costs" the aggregate output can expand given the level of wages, only provided that the prices of the commodities produced rise. Indeed, on this assumption the increase in output is associated—

given the level of wages and prices of raw materials—with an increase in marginal costs which must be "covered" by the rise in prices. But higher prices of finished goods with given wage rates are tantamount to the fall in real wages which will thus accompany the expansion of output.

We have not taken into consideration so far a factor which will exert an additional pressure on real wages. We assumed the prices of raw materials to be given while in fact with the increase in production, and thus in the demand for raw materials, the prices of the latter will rise in accordance with the "law of increasing marginal costs". This will affect the prices of finished goods additionally and as a result the reduction in real wages associated with the increase in production will be *pro tanto* greater.[1]

On the assumption of the "law of increasing marginal costs" production can increase with a given level of money wages only on the condition that prices rise and thus real wages decline. An increase in production may also ensue if the decline in real wages is the result of a cut in money wages while prices of manufactured goods are unaltered. The marginal costs of these goods at the initial level of output will fall (the curve of marginal costs will shift downwards), and this will encourage the entrepreneurs to expand production up to the point where the marginal cost is equal to the price.

Thus from the "law of increasing marginal costs" follows the inverse relation between production and real wages.

4. From this, however, it cannot be concluded that a reduction in money wages leads to an increase in production, since no relation between the changes in money and real wages has been established yet. The "classical" theory, in order to deal with this problem, makes additional assumptions of a different type. It is sometimes assumed that the general level of prices depends on the credit policy of the banks (in particular on that of the Central Bank). Assuming, moreover, that this policy, and thus the general level of prices, is given, the conclusion is arrived at that the reduction in money wages is identical with that of real wages.

Frequently, however, a more sophisticated assumption is made

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[1] As a result the curve of the marginal costs of finished goods shifts upwards, and to a given level of production then corresponds a higher marginal cost, and thus a higher price.

that it is the value of the aggregate demand or—what amounts to the same—the value of the aggregate production that is determined by the credit policy. Once we assume this value as given, the process of the reduction of money wages will be as follows. The cut in money wages results at the initial level of output in a reduction of marginal costs (the curve of which shifts downwards). However, the general price level does not change initially because the aggregate demand is assumed to be stable. Thus prices exceed the marginal costs, which leads to an increase in production. As a result the marginal costs increase and at the same time prices decline, since the same money demand is met by a larger volume of goods. The equilibrium is reached when the marginal costs are equal to the respective prices. This equilibrium is obviously reached at a higher level of production, and at a lower level of real wages than was the case in the initial position. Thus on the assumption of a given aggregate demand, a cut in money wages results in an increase in production accompanied, as follows from the above, by a reduction in real wages.

The assumption of a given general price level or a given aggregate demand is totally unfounded. We know only too well that in the course of the business cycle both magnitudes are subject to violent swings. Why then should we assume that they remain unaltered in the aftermath of a wage reduction? If, however, we reject these assumptions a quite new theoretical construction is required in order to enable us to appreciate the consequences of changes in money wages. We shall deal with this problem in the next section.

The Wage Reduction on the Assumption of Perfect Competition

1. In this section we assume for the time being rising marginal costs and perfect competition in accordance with the "classical" theory. We drop, however, the assumption of the stable general level of prices, or the stable money value of the aggregate demand. We shall assume in addition that the system is closed (we shall introduce foreign trade at a later stage), that it consists only of capitalists (entrepreneurs and rentiers) and workers, and that the workers do not save, but spend their total income on consumption. Before considering the consequences of

a wage reduction within such a framework we have to advance some argument of a more general character.

2. The national income in our system may be presented in two ways, namely from the side of incomes and expenditure:

Income	Expenditure
Income of capitalists	Investment
Wages	Consumption

or

Income of capitalists	Investment
	Capitalists' consumption
Wages	Workers' consumption

By investment is meant here the purchase of fixed capital (machinery, buildings etc.) and the increase in inventories. Since the workers are assumed to spend all their earnings on consumption, wages and salaries are equal to workers' consumption. We thus obtain:

$$\text{Capitalists' income} = \text{Investment} + \text{Capitalists' consumption}$$

This equation is of fundamental importance for our subsequent argument. It enables us to explain the fluctuations of production. Let us consider investment, capitalists' consumption and workers' consumption in a certain period. In which of these three items of national income may spontaneous changes occur? It is first obvious that workers' consumption cannot be subject to such a change. Indeed, it can neither exceed nor fall short of their earnings. But the position is quite different as far as capitalists' expenditure is concerned. In the next period they may increase their consumption or their outlay on investment above their present income, drawing on bank credits or on reserves of their own. The capitalists also may reduce their expenditure on consumption and investment below their present income, paying off credits or increasing their reserves. Once they have done it, however, the above equation shows clearly that the income of the capitalists as a body will increase or diminish precisely by as much as their expenditure was increased or diminished. The aggregate production is bound to reach the level at which the profits derived from it by the capitalists are equal to their consumption and investment. Since the workers spend on consumption goods as much as they receive in wages, the remainder of the national income, being the share of ca-

pitalists, is just equal to their expenditure on consumption and investment goods. Therefore the capitalists as a class determine by their expenditure their profits and in consequence the aggregate production.

This result is likely to appear paradoxical to many readers. Therefore it will not be out of place to shed some light on it from a somewhat different angle.

We shall represent our system schematically as composed of three departments: production of investment goods, production of capitalists' consumer goods, and workers' consumer goods or wage goods. The latter are partly consumed by workers who produce them, while the surplus is bought by the workers employed in the other two departments. This surplus is the profit derived from the production of wage goods. (Indeed, the value of the remainder is equal to the wages earned in this department). If for instance the value of the production of wage goods is 10 mld. zlotys and the workers employed in their production received 6 mld. zl. in wages, then the respective profits are 4 mld. zl. But as 6 mld. zl. earned in wages in the department of wage goods are spent on these goods, the surplus equal to $10 - 6 = 4$ mld. zl. is bought by workers of the two other departments: the department of capitalists' consumer goods and the department of investment goods. Thus the wages in the two departments as well as the profits in the third department are equal to 4 mld. zlotys. If employment and aggregate wages in the capitalists' consumer goods and investment goods industries increase, the demand for wage goods increases as well and their production is bound to be stepped up to the point where the profits, i.e. the surplus of the value of production over wages in this department, would be equal to the increase of aggregate wages in the other two departments.

Next, the value of production of capitalists' consumer goods and investment goods is, of course, equal to the sum of profits and wages in the corresponding departments. However, the wages in these two departments are equal to the profits in the third one; thus the total profits are equal to the value of capitalists' consumption and investment. Let us suppose, for instance, that the value of production of these two categories is 7 mld. zl., out of which 3 mld. are profits and 4 mld. wages. As profits in the department of wage goods are equal to the wages in the other two departments, the former amount to 4 mld. Aggregate profits

$3 + 4 = 7$ mld. zl. are equal to the capitalists' consumption and investment.

3. As will be seen, the fluctuations in production and profits depend on the fluctuations in capitalists' consumption and investment. If at some moment, for instance, the entrepreneurs are in a more optimistic frame of mind, their investment activity will expand and employment in construction, machine industry etc. will increase. The resulting rise in the consumption of workers will in turn be followed by an increase in production of wage good industries. As was shown above, the aggregate production will expand to the point where profits will be higher by an amount equal to the value of additional investment—if it is assumed that capitalists' consumption remains unchanged.

If, however, the latter increases as well, owing to higher capitalists' incomes, the increase in profits will be correspondingly enhanced. In any case production will be finally pushed up to the point where the increase in profits will be equal to the increase in expenditure on investment and capitalists' consumption.

The question is frequently asked about the "wherewithal" for financing the increase in investment if capitalists' consumption does not decrease simultaneously and does not "release" some purchasing power for investment. It may sound paradoxical, but according to the above, investment is "financed by itself".

If, for instance, an entrepreneur is gradually drawing on his bank deposit for construction of plat, he is increasing by the same amount (on the assumption of stable capitalists' consumption) profits of other entrepreneurs (through an increase in the production), and as a result, along with the dwindling of his bank deposit the deposits of other entrepreneurs are rising *pro tanto* and therefore the banks are not forced to reduce credits. Here, however, an important reservation should be made: in line with the increased turnover the demand for cash in circulation rises. Consequently the bank deposits would diminish and thus the banks would lose a part of their cash reserves. This in its turn would cause an increase in the rate of interest which would adversely affect investment activity. For it is, indeed, the difference between the expected rate of profit and rate of interest that stimulates investment. However, the situation is relieved by the expansion of credits of the Central Bank which increases the quantity of money in circulation and in this way either prevents

any rise in the rate of interest or at least limits its scope. One could, of course, envisage a banking policy which is designed to keep the aggregate demand at a constant level and, therefore, prevents production from either expanding or shrinking. (This is the assumption of the "classical" theory mentioned in the preceding chapter). In fact, however, the changes in the rate of interest are in general much too weak to halt an incipient upswing resulting from an increase in investment or to prevent a depression brought about by its collapse.

An important part is undoubtedly played here by a certain factor of a special nature. As we have just seen, an increase in the rate of interest hampers the expansion of production by discouraging investment activity. It is, however, the long-term rate of interest that is relevant to investment in fixed capital. Now, the long-term rate of interest—for reasons we cannot analyse in detail here—reacts only slightly to the changes in the short-term rate determined by banking policy. This results in the following set-up: the increase in investment activity causes a rise in the aggregate output and thus in the demand for cash; this tends to push up the short-term rate of interest which, however, is only slightly reflected in the level of the long-term rate of interest. Thus the expansion of investment is not much hampered by the reaction of the money and capital market.

4. Let us return to the problem of reduction in wages. Let us assume that money wages have been reduced in a certain proportion. How will this affect production and employment?

In the light of the preceding argument this query is reduced to the following problem: how does capitalists' consumption and investment react to a cut in money wages? For, as was shown above, it is the change in the volume of capitalists' consumption and investment that is the cause of expansion or shrinkage of production.

At the first glance it may seem that as a result of the wage reduction the capitalists increase their consumption and investment in anticipation of higher profits of their establishments. Should the capitalists act thus in fact, the reduction of wages would, indeed, be followed by an increase in production and the "classical" theory would be vindicated.

A closer analysis, however, shows that this is most unlikely to happen. It is, indeed, improbable that the investment and

consumption of capitalists should increase *immediately*. First of all it is almost certain that the entrepreneurs will not step up their investment immediately after wages have been reduced, but will rather wait for an *actual* increase in profits. In addition even should they increase their orders for capital equipment, the expansion of production in the respective industries would for technical reasons materialize only with some delay.

The same is true of capitalists' consumption. Also in this case the capitalists are more likely to postpone any increase in their spending until the expected increase in incomes would materialize and even then some time-lag would probably still be involved. To sum up: *it is most likely that in the period following immediately the reduction of wages, the volume of capitalists' investment and consumption will be unchanged.*

It will be, however, easily seen that as a result both these magnitudes and in consequence the aggregate production as well will not change at a later date either. Indeed, in the period immediately following the wage-cut, capitalists' consumption and investment remain stable, as assumed, and thus aggregate production does not change either. However, as a eonsequence of the general reduction of wages the marginal costs and along with them the prices (equal to the respective marginal costs in the system of perfect competition) will decrease in the same proportion as wages. But in this case the only change in the economic situation is a proportionate decline in the general level of prices and wages. It is therefore obvious that the capitalists will increase neither their consumption nor investment in a later period, if they did not do so immediately.

This process may be presented by means of our scheme of three departments. According to our assumption the capitalists' consumption and investment do not change initially. Therefore there is no change either in the production of the department of capitalists' consumer goods or in the department of investment goods. The same applies to the employment in both these departments as a result of which the effective demand for wage goods produced by the third department decreases in the proportion of the wage reduction. But as the marginal costs in this department decline in the same proportion as well, there will be no change in the production of the third department either. As a result production and employment in all three departments will remain

for some time unchanged, while the prices equal to the marginal costs decrease in the same proportion as wages. In this situation, however, there is no reason for the capitalists to increase their consumption and investment, as the expected increase in profitability did not materialize.

If the capitalists do not raise their consumption and investment immediately after the reduction of wages (which seems most unlikely), they are caught in a vicious circle. The profitability of enterprises does not rise, because neither investment nor capitalists' consumption has increased. But neither of these items can increase since profitability has not. Consequently the only factual result of the reduction of wages in a system of perfect competition is a decrease in the general level of prices.

5. It should, however, be noticed that a change in the general level of wages and prices may have some indirect influence upon employment. Indeed, in consequence of the decrease of the general price level with an unchanged level of production, the demand for cash diminishes and this in turn causes, as was mentioned above, a decrease in the short-term rate of interest which may favourably affect investment activity and thus cause a rise in production. However, as pointed out above, changes in the short-term rate of interest influence but slightly the long-term rate which is relevant to investment. Therefore the reduction of wages which only slightly influences the long-term rate of interest cannot stimulate investment essentially. It may even be argued that often the opposite is the case. A general reduction of prices increases the burden of indebtedness, since money incomes diminish while the "old" debts do not. This causes difficulties in servicing the debts, ending frequently in failures. As a result confidence in the solvency of firms is undermined which may lead to an increase in the long-term rate of interest even though the short-term rate declines.

This discussion points to the improbability of the effect of the reduction of wages on the level of production and employment through the medium of the rate of interest. The most likely effect of wage reduction in a system of perfect competition is a decline in the general level of prices with no change of production and employment[2].

[2] In the above consideration we omitted the effect of one more factor which may have a certain influence on the consequences of

Dropping of the Assumption of Increasing Marginal Costs and Perfect Competition

1. In the preceding section we assumed in accordance with the "classical" theory increasing marginal costs and perfect competition, while concentrating our attention on the problem of changes in effective demand and, in particular, on how it is affected by a reduction of wages. By dropping the unrealistic assumption of the stable level of prices or of the stable value of the general demand we have made the first step towards a realistic approach. Next we shall subject to a critical examination the assumption of increasing marginal costs (we have already expressed some misgivings on this account) as well as that of perfect competition.

As was stated in the preceding section, the sphere where increasing marginal costs prevail is agriculture, where an increment in yield requires a disproportionate outlay of fertilizers and labour. The position is altogether different in industry. If, for instance, in a given establishment two shifts rather than one are worked, the cost of raw materials and labour will increase more or less proportionately. Only the third shift may involve some technical problems. It is therefore reasonable to assume that in an industrial enterprise the curve of the marginal costs is horizontal over a rather long range of output and starts rising only when full capacity is approached. As experience shows, such full utiliza-

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wage reduction. We have in mind here the shift in the distribution of profits from the entrepreneurs to the rentiers. Indeed, when prices decline in the same proportion as wages, this will be also true of profits. But the money income of rentiers consisting of the interest on "old" debts does not change and, therefore, their relative share in profits increases. If the entrepreneurs are "poorer" than the rentiers, this kind of shift will result rather in a decrease of total capitalists' consumption. Should the reverse be the case the result would be an increase in capitalists' consumption. The first pattern applies usually to societies where the concentration in industry is not too far advanced; the second—to developed capitalist economies. In the latter case, as follows from the above, capitalists' consumption is likely to increase, and this in turn will have a favourable effect on production and employment. But the final outcome is by no means certain even in this case, because quite a number of firms are in a precarious financial position, as a result of the decline in income while their "old" debts remain unchanged, and this discourages any investment activity on their part. In any case should an increase in employment at all take place, it would be on a small scale.

tion is rather exceptional and therefore the assumption of increasing marginal costs must be dropped.

Then, however, a difficult problem arises. On the assumption of increasing marginal costs the production of an establishment was pushed up to a point where the price was equal to the marginal cost (Fig. 5). Now, the price is higher than the marginal costs (Fig. 6) when the degree of utilization of the establishment is not very high. If, however, at the level of production OA the price AB_1 is higher than the marginal cost AB why does not the entrepreneur expand production even though he would in this case make additional profits? (For on each additional unit of production he would gain the difference BB_1 between the price and the marginal cost).

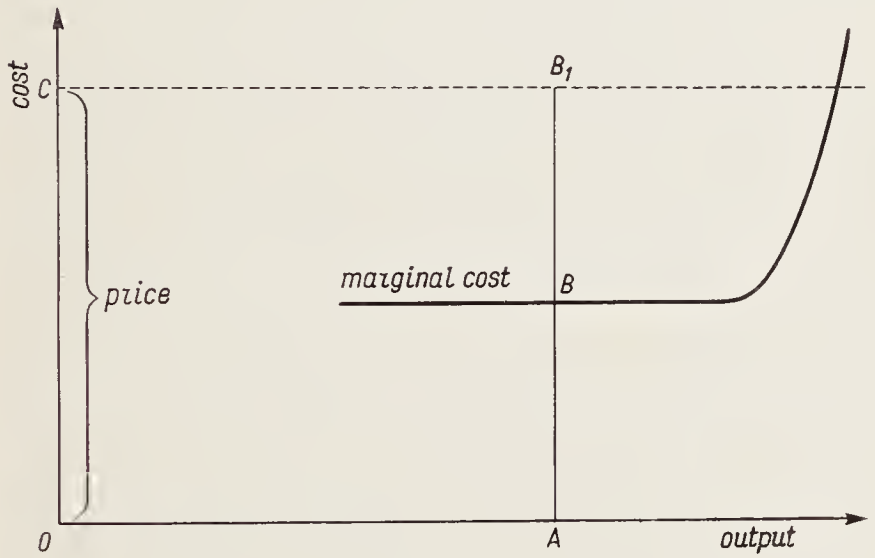

FIG. 6

The question is not difficult to explain in the case of cartels. A cartel does not expand production beyond a certain point A because the price of the commodity produced would decrease so much that in effect this would cause a loss rather than a gain. The production of a cartel does not reach the level at which the price is equal to the marginal cost but is fixed at the point at which the cartel, owing to its monopolistic position, attains the maximum profit. The price then exceeds the marginal cost.

This, however, does not solve our problem fully. It is true that the cartelized sector in a modern capitalist economy is considerable, however, in a significant part of the economy competition of one type or another is still in existence. Is it possible that in this sort of establishment the position presented in Fig. 6 may prevail?

An ingenious but simple answer to this question has been given only recently.[3]

It appears that even non-cartelized firms compete with each other in a rather *imperfect* way. Let us recall first what is actually meant by perfect competition. This is a situation in which a single entrepreneur is able to increase his sales without "spoiling the market", i.e. without affecting the market price. This is not in fact usually the case: a single entrepreneur has his "private" market, i.e. he has permanent customers, he specializes in the production of certain goods which are somewhat different from those produced by his competitors etc. Thus in order to increase his sales he must reduce his prices in order to gain new customers, to increase the demand for the specific commodities he produces etc. As a result the situation presented in Fig. 6 prevails in general in the non-cartelized industries as well. The entrepreneur expanding his sales beyond the point A would increase his profit if the price were fixed. As, however, he has to reduce it, he may make a relative loss rather than a gain. An entrepreneur when asked why he does not expand his production, hardly ever replies that the cost of additional production would be too high but rather that "he would be unable to sell more". In the light of the "classical" theory this would not make sense, but the theory of imperfect competition is in a position to interpret it quite precisely: the entrepreneur considers in fact that the extension of "his" market would require such a reduction in prices that this would not be offset by increased sales.

This is the solution of the problem in question. The establishments are in general not fully utilized since they maintain a monopolistic (cartels) or a quasi-monopolistic (imperfect competition) position in the market. This is the reason why we usually en-

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[3] See for instance: P. Sraffa, "The Law of Returns under Competitive Conditions", *Economic Journal,* 1926; Ed. Chamberlain, *The Theory of Monopolistic Competition,* 1933; Joan Robinson, *The Economics of Imperfect Competition,* 1933.

counter the situation presented in Fig. 2, i.e. a horizontal curve of marginal costs much below the price level.

The ratio of the price to the marginal costs (higher than one) indicates how the position deviates from perfect competition and it may serve therefore to measure the "degree of monopoly".

2. The above considerations are pertinent to the problem of the changes in prices associated with those in employment. The conception of the association of a decline in real wages with the increase in production is based on the assumption of the "law of increasing marginal costs". Once we reject this assumption we have also to revise the views of the "classical" theory on the problem of real wages.

If the employment of an establishment rises but is kept within the range of stability of marginal costs (Fig. 6) then with a given "degree of monopoly" the ratio of the price of the product to the cost of wages and raw materials remains unchanged. As a result the real wages have no tendency to fall, which would be the case with increasing marginal costs. Only the increase in the prices of raw materials in relation to wages may result in a decrease in real wages since it will cause the rise in the prices of the goods produced and thus a fall in the ratio of wages to prices. From this angle the increase in employment will in fact have an adverse effect upon real wages, because in branches producing basic raw materials (in agriculture as well as mining) marginal costs are increasing, and therefore the prices of raw materials increase in relation to wages in response to a higher demand. The reduction in real wages is, however, incomparably smaller than it would be, were the marginal costs increasing in all stages of production. The price of finished commodities will increase in this case only as a result of the rise in the prices of basic raw materials which often play only a small part in costs and therefore a corresponding reduction of real wages with the increase in employment will be kept within narrow limits.

3. There is still another factor influencing the real wages in the opposite direction. In the preceding section "the degree of monopoly" measured by the ratio of prices to marginal costs was assumed to be a constant parameter. In fact, however, this ratio increases in the depression and diminishes in the boom. While the cost of raw materials and wages are reduced in the depression some prices do not fall at all or fall but little. The cartels are not

endangered by outsiders cropping up; in non-cartelized industries the cntrepreneurs are rather reluctant to reduce prices, fearing to unchain cut-throat competition etc. If, however, in the course of the business cycle the prices of finished goods change less than the marginal costs, the divergence between them will increase in the depression and will shrink in prosperity. Hence real wages will be lower in the slump and higher during the boom than would be the case with a constant "degree of monopoly".[4]

Thus there are two opposite tendencies in the shaping of real wages: when production rises the prices of raw materials increase relative to wages but at the same time "the degree of monopoly" declines; when production shrinks the prices of raw materials fall in a higher proportion than wages but "the degree of monopoly" rises.

Let us imagine for instance that the ratio of the cost of raw materials to that of wages for some product is 30:70. As a result of the upswing the prices of raw materials increase by 40% and wages by 10%. The marginal cost of the commodity considered thus increases by $0.3.40\% + 0.7.10\% = 19\%$. We assume that due to the "rigidity" of the price its ratio to marginal cost decreases by 5%; as a rcsult the price increases only in the proportion $1.19 \times 0.95 = 1.13$. Therefore the real wages decline in the proportion 1.10:1.13, i.e. approximately by 3%.

Thus the rise or decline in real wages depends on the relative weight of the two opposite tendencies. It is very likely that the resulting changes in real wages are generally rather small.[5]

4. There is still one more essential problem to consider concerning real wages. So far we have examined the question how cstablishments with a given equipment and a given technique respond to an increasing demand. However, when a longer period is considered it is necessary to take into account the fact that due to technical progress the cost of labour at a given level of wages is falling and hence there is a tendency for a slow but steady decline in prices in relation to wages, tantamount to a rise in real wages. Therefore the changes in real wages reflect the combined effect of cyclical fluctuations and technical progress. Our argument in the preceding section concerned rather the rela-

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[4] The statistical data for Poland are quoted on p. 66.

[5] See, for instance, pp. 68–70.

tion of the cost of labour to prices than real wages. In fact real wages change in the same way as the product of this ratio and the index of productivity.

In the example considered in the preceding section the cost of labour rose by 10% and its relation to prices declined by 3%. If at the same time productivity increases, say, by 2% this means that the money wages rose in fact by 12% and the real wages declined by 1%.

Reduction of Wages under Imperfect Competition

1. We shall now examine the problem of the reduction of wages after dropping the assumptions of the increasing marginal costs and perfect competition. In order to do that we shall only have to repeat our argument in the section *Reduction of Wages on the Assumption of Perfect Competition* (pages 43–49) modifying it in accordance with the change in assumptions introduced in the preceding section.

Our argument was based on the fact that the volume of investment and capitalists' consumption is the basic determinant of production and employment, which are pushed up to the point where the income of capitalists is equal to their expenditure on consumption and investment. Moreover, we assumed that immediately after the reduction of wages the capitalists do not increase the volume of their consumption or investment. As a result the employment in the industries producing capitalists' consumer goods or investment goods does not increase and the purchasing power of the workers shrinks in the proportion of the wage reduction. This line of argument applies *in toto* to the case considered. Modifications are introduced only in its next stage. Under the assumption of perfect competition prices were equal to marginal costs and thus they fell in the same proportion as wages. Now there is a divergence between the prices and the marginal costs due to the cartelization or imperfect competition. Moreover, the reduction of wages will tend to cause a rise in this divergence because most likely some prices will prove to be "rigid" and thus will fail to decline in the same proportion as wages. Consequently the real purchasing power of the workers will decline: initially it decreases in money terms proportionately to wages while the decline in prices is less. As a result the demand for

wage goods will fall and in consequence the employment in the corresponding department as well. Thus the decline in real wages (the prices are reduced to a lesser extent than wages) is associated here with the *fall* in employment.

Is this the end of the process? Will not investment and capitalists' consumption—which according to our assumption did not change immediately after the reduction of wages—increase after some delay as a result of the "improved" relation of prices to wages? It may easily be shown that this is not the case. The volume of capitalists' consumption and investment has, for the time being, not risen. Since capitalists' income is equal to the value of this volume, it declined in the same proportion as prices. Therefore the relation of the income of capitalists to the prices of investment goods has not changed. Consequently the profitability of new investment has not increased: this profitability is nothing else but the ratio of its yield to its value. Also the capitalists' consumption does not tend to increase, as their real income (money income corrected for price changes) has not changed. Thus we are faced here with the same position as in the case of the reduction of wages under conditions of perfect competition: if capitalists' consumption and investment do not increase immediately after the reduction of wages there arises such a situation that these items will not increase at a later date either.

We may summarize the above analysis as follows: *A reduction in money wages is usually accompanied as a result of price "rigidity" by an increase in "the degree of monopoly" and consequently leads to a reduction in real wages as well. However, this decline is accompanied by a fall rather than by a rise in employment. The slump in employment in question affects the wage good industries while employment in industries producing investment goods and capitalists' consumer goods remains unchanged. The real income of the capitalists does not rise but the real income of the workers declines.*

The Reduction of Wages in an Open System

1. The problem of wages was discussed above under the assumption of a closed system. We will inquire now into the influence of foreign trade on the processes considered. A reduction in wages and the consequent fall in prices will obviously improve

the competitive position of the goods produced by a given country in the world market and thus will contribute to an expansion in the volume of exports. This would affect production and employment favourably. However, the reduction of wages, as will be seen below, exerts an opposite influence as well so that the final outcome is by no means certain.

Indeed, the reduction of wages in a given country has obviously no influence on the prices of imported raw materials. Therefore the prices of goods manufactured from them decline *pro tanto* more slowly. As a result real wages decline (in addition to their decrease caused by the "rigidity" of prices discussed in the preceding section). Consequently the purchasing power of the workers is correspondingly lower and has an adverse effect on the industries producing wage goods.

The final outcome of the reduction of wages depends on the extent to which the reduction of wages and prices will increase the volume of exports. For instance, should the resulting increase in employment just balance the reduction in real wages, the purchasing power of the workers as a whole would not change and therefore the reduction of wages would not influence adversely the production of wage goods. The production will increase in this case by the volume of additional exports; the working class, however, even as a whole, will not benefit from it, while the real income of a single worker will obviously decline. The position would be better, of course, should exports increase more than is necessary to balance the decline in real wages. If, however, they increase to a lesser degree, the real purchasing power of the workers will decline and it will be followed by a decrease in production and employment in the wage-good industries. It may even happen then that the volume of exports will increase in consequence of the reduction of wages but the aggregate production and employment will decline.

As was said above, the effect of a reduction of wages in an open system depends—as far as the aggregate production is concerned—on the extent of the expansion of exports, in other words, on the response of the foreign demand to the decline in prices of a given country. If this demand is elastic, i.e. if a small reduction in prices and wages is followed by a relatively large expansion in exports, then production and employment increase (which, however, is not necessarily tantamount to an increase in the

real purchasing power of the workers). If the demand for exports of a given country is inelastic a decline in production may ensue.

It should be noticed that because of tariff barriers, import restrictions etc., the elasticity of demand for products of a given country is rather small. The tariff barriers, high though they are, grow higher still when prices of imported goods decline. Such being the position, it is rather improbable that the reduction of money wages would result in the expansion of production and employment, and in particular in the rise in aggregate purchasing power of the workers, even in an open system.

2. It is worth noticing that the effect of a reduction of wages in an open system is very much the same as that of a currency depreciation. The two cases differ only in that in the former the wages decline and the prices of imported raw materials remain unchanged, while in the latter—the wages remain unaltered (in terms of domestic currency), and the prices of imported raw materials increase in inverse proportion to the currency depreciation. The effect of depreciation as concerns production and employment depends, as in the case of the reduction of wages, on the elasticity of the foreign demand for products of a given country.

Conclusions

We shall now sum up the results of our inquiry.

We attempted to show that the reduction of wages in a closed system does not lead to an increase in production; that in conditions of perfect competition the level of production remains unchanged while prices decline in the same proportion as wages; however, under existing conditions of monopoly or imperfect competition a reduction of money wages tends to cause a decline in real wages associated with a decrease in employment. Moreover, it appears that in such a system there is in general no reason—in spite of the widespread belief—for the decline in production to be accompanied by an increase in real wages or vice versa. The analysis of the problem in an open system shows that even in such a case the reduction of wages does not necessarily lead to an increase in employment, and the prospects of raising the aggregate real income of the working class are even dimmer. In particular, under the system of high and rising tariffs it is very likely that a

reduction of wages will have an adverse effect upon employment also in an open economy.

The slogan "Rigid wages as a source of unemployment"—under which title a book by Mr. Wątecki[6] has been recently published in Poland—proves in the light of the above analysis entirely unfounded. And equally hopeless is the case of the supporters of this slogan who preach that collective bargaining by making wages "rigid" causes unemployment and poverty of the working class.

[6] J. Wątecki, *Sztywne płace źródłem bezrobocia* (Rigid Wages as a Source of Unemployment), Kraków 1938.

6. MONEY AND REAL WAGES

Part II (Statistics)

Methodological Problems

1. Attempts were made time and again to check by means of a statistical inquiry the thesis of the "classical" theory that an increase in employment is associated with a decline in real wages. As an example the well known inquiries of the French economist Rueff may serve. He starts from the generally correct premise that when the problem of the relation between real wages and employment in industry is examined, by real wages should be meant the ratio of money wages of the industrial workers to the prices at which the respective products are sold, i.e. wholesale prices. In the realization of this approach, however, he committed gross statistical errors. Rueff simply divided the index of industrial money wages by the general index of the wholesale prices and considered the fact that the ratio increased during the slump and declined during the boom to be the proof of the "classical" theory. Now it should be recalled that the indices of wholesale prices are based mainly on raw materials and semi-manufactures. These indices thus reflect to a considerable degree the changes in the prices of domestic and imported raw materials rather than those in the prices of manufactured goods. No wonder, then, that the ratios received by Rueff increased in the slump and declined in the boom, as it is generally known that the prices of raw materials fluctuate more strongly than wages (and prices of manufactured goods). But it is also clear that the ratio of wages of the British worker to the prices of Brazilian coffee is rather irrelevant to the conditions of industrial production in Great Britain. Thus Rueff's method applied by Mr. J. Wątecki (referred to above) to Polish data is far from being a pattern worth following.

However, even apart from questions of statistical technique the posing of the problem by Rueff is not quite satisfactory. The decline in real wages associated with the increase in employment is according to the "classical" theory a conclusion from a more general principle of "increasing marginal costs". It follows from this principle that with the expansion of output the prices of

finished products increase in relation to the prime costs consisting of raw materials and wages. Since, at the same time, the prices of raw materials increase in relation to wages this enhances the rise in the prices of finished products relative to wages (compare pp. 41–42). Therefore in orders to check the theorems of the "classical" theory a somewhat different approach is required. It should first be ascertained whether the prices of finished products do really increase in relation to the costs of raw materials and wages when output expands. Indeed, according to our argument (see pp. 53–54) the position should be the reverse, because the marginal costs are constant rather than increasing over the relevant range of output, while "the degree of monopoly" increases during the slump and declines during the boom. Only after the answer to this basic question has been found may we turn to another problem: how are real wages affected by the changes in the ratio of the prices of finished goods to prime costs (costs of raw materials and labour) on the one hand and by the changes of the ratio of prices of raw materials to wages on the other. Indeed, should the "classical" theory be correct real wages would fall with the increase of production. But if, as we maintain, the ratio of the prices of finished goods to prime costs diminishes in the upswing and conversely, the direction of the changes in real wages cannot be foreseen. For while the changes in prices of finished goods in relation to prime costs tend to associate the increase in real wages with the expansion of employment, the changes in the relation of prices of raw materials to wages work in the opposite direction.[1] In addition it should be recalled that real wages, apart from the cyclical fluctuations, tend to increase steadily as a result of the long-run rise in productivity due to technical progress etc.[2] It is this method that we shall follow when analysing the processes in question in the Polish economy.

Prices, Prime Costs and Real Wages in Poland

1. In the following analysis we shall treat the Polish industry as an entity. Thus as "raw materials" we shall consider only those imported or produced by domestic agriculture. As "finished industrial products" will be considered goods which after having

[1] See pp. 53–54.
[2] See pp. 54–55.

been sold do not undergo any industrial processing as contrasted to goods sold as materials by one industrial establishment to another.

For the type of inquiry envisaged here the following data are necessary: 1) The price index of "finished industrial products", i.e. finished goods in the strict sense, as well as raw materials or semi-manufactures used in this condition in other sectors of the economy (for instance, coal for households) or exported; 2) The price index of imported raw materials and home agricultural products used by industry; 3) The index of labour cost per unit of output. These data come mainly from the statistical inquiry carried out by me jointly with Ludwik Landau.[3] The indices obtained in this inquiry covered the period 1928–1934; they are extrapolated in this paper up to 1937.

2. The price index of "finished industrial products" was calculated in the inquiry quoted above in the following way.

First of all the aggregate sales of these goods were split into domestic sales and exports. Next the domestic sales were subdivided into the following groups: 1) consumer goods except food and fuel (textiles, utensils, furniture etc.); 2) sugar, beer, kerosene; 3) coal for households; 4) finished investment goods (buildings, machinery); 5) goods used in agricultural production (fertilizers, tools and agricultural machinery etc.). In Table I are presented the price indices of these groups of goods together with their weights corresponding to their domestic sales in the basic year 1928 as well as the general weighted price index of "finished industrial products" sold in the domestic market.

Next the price index of industrial exports was calculated on the basis of L. Landau: "*Polish Exports during the Depression*".[4] This index, as well as the index of "finished industrial products" sold in the domestic market, is weighted according to the proportion exports bore to the sales in the domestic market (both items valued in prices of 1928) in the single years of the period con-

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[3] *Wahania cen i kosztów a wahania produkcji przemysłowej w Polsce (Changes in Price–Cost Relations and Fluctuations of Industrial Production in Poland), Papers of the Institute of Research on Business Fluctuations and Prices,* Vol. IV, No. 2. Ludwik Landau was murdered during the occupation by the Nazis.

[4] *Papers of the Institute of Research on Business Fluctuations and Prices,* Vol. III, Nos. 2–3.

TABLE I

The Price Index of "Finished Industrial Products" Sold in Domestic Market

Year	Finished consumer goods (except food and fuel)	Sugar, beer, kerosene (net of excise)	Coal for households	Finished investment goods	Goods for agricultural production	"Finished industrial products" sold in domestic market
Weights	34	12	8	36	10	100
1928	100.0	100.0	100.0	100.0	100.0	100.0
1929	98.6	105.8	113.8	103.5	101.3	102.7
1930	91.9	108.7	116.1	101.0	99.2	99.9
1931	78.9	107.3	116.1	95.5	91.5	90.7
1932	67.6	102.0	107.2	80.5	81.4	80.9
1933	61.4	90.3	96.5	70.5	75.8	72.4
1934	59.2	86.0	91.5	67.7	71.1	69.3
1935	56.8	72.7	83.9	67.0	65.6	65.4
1936	56.6	60.9	77.3	63.6	62.0	61.8
1937	58.3	60.6	77.3	66.1	64.0	63.5

sidered.[5] Thus a general index of the prices of "finished industrial products" is arrived in Table II.

TABLE II

The Price Index of "Finished Industrial Products" Sold in the Domestic Market and Exported

Year	"Finished industrial products" for the home market		Exported goods		"Finished industrial products"
	Weight	Index	Weight	Index	Index
1928	79	100.0	21	100.0	100.0
1929	78	102.7	22	99.1	101.9
1930	75	99.9	25	84.5	96.0
1931	72	90.7	28	70.3	85.0
1932	77	80.9	23	59.0	75.9
1933	79	72.4	21	54.4	68.5
1934	80	69.3	20	51.3	65.8
1935	82	65.4	18	47.6	62.2
1936	84	61.8	16	47.0	59.4
1937	84	63.5	16	53.4	62.9

[5] Variable weights are applied here because export prices deviate considerably from the home prices for the same goods.

3. Let us turn now to the price index of raw materials and semi-manufactures imported or produced by home agriculture. This index is obtained as weighted average of the indices of prices of imported raw materials and semi-manufactures, prices of wood and prices of sugar beets (weights correspond to the values of respective materials used by the industry in the basic year 1928) (Table III).

TABLE III

The Price Indices of Raw Materials for Industry (Imported or Produced by Home Agriculture)

Year	Imported raw materials and semi-manufactures	Wood	Sugar beets	Price index of raw materials imported and produced by home agriculture
Weights	66	17	17	100
1928	100.0	100.0	100.0	100.0
1929	93.3	93.3	93.1	93.1
1930	68.6	71.9	75.7	70.4
1931	51.0	49.5	58.4	52.0
1932	41.6	38.3	65.7	45.1
1933	43.8	38.7	63.1	46.2
1934	43.2	44.3	69.9	47.9
1935	41.6	44.0	62.7	45.6
1936	45.2	52.3	61.1	49.1
1937	50.9	68.3	60.8	55.7

4. The estimates of the cost of labour given in the paper quoted are corrected for changes in productivity which were not accounted for in that paper: the index of hourly wages in industry and mining is divided by the index of average productivity based on L. Landau: *Bezrobocie technologiczne w przemyśle polskim w latach 1929–1935* (Technological Unemployment in Polish Industry in the years 1929–1935)[6] (Table IV).

Now it is easy to calculate the general index of prime costs as the weighted average of the index of prices of raw materials and the index of the cost of labour. As weights we adopt: a) the value of imported raw materials and of home agricultural products used by the industry, and b) the wage bill of industry

[6] *Studies and Contributions*, published by the Institute of Social Problems, Vol. I.

TABLE IV

Indices of the Labour Cost

Year	Index of hourly wages	Index of productivity	Index of labour cost
1928	100.0	100	100.0
1929	108.4	103	105.2
1930	108.1	107	101.0
1931	100.9	110	91.8
1932	92.8	116	80.0
1933	85.5	124	68.0
1934	82.0	127	64.5
1935	80.5	130	61.9
1936	80.3	134[a]	59.9
1937	82.2	137[a]	60.0

a — Estimate

and mining in the basic year 1928. The former amounts to 1.70 mld zl.[7], the latter—to 1.67 mld zl.[8] Thus the weights bear roughly the proportion 1 : 1. The results are presented in Table V.

TABLE V

Indices of Prime Costs in Industry

Year	Cost of imported raw materials and home agricultural products	Labour costs	Prime costs
Weights	50	50	100
1928	100.0	100.0	100.0
1929	93.1	105.2	99.1
1930	70.4	101.0	85.7
1931	52.0	91.8	71.9
1932	45.1	80.0	62.5
1933	46.2	68.0	57.1
1934	47.9	64.5	56.2
1935	45.6	61.9	53.7
1936	49.1	59.9	54.5
1937	55.7	60.0	57.8

5. Having at our disposal now the index of "finished industrial products" and the index of prime costs we may calculate their

[7] *Wahania cen i kosztów* (Changes in Price–Cost Relations), p. 55, *ed. cit.*

[8] *Mały Rocznik Statystyczny, 1938* (Concise Statistical Yearbook of Poland 1938), pp. 145 and 258.

ratio which was actually our purpose. The results are presented in Table VI.

TABLE VI

Ratio of the Prices of "Finished Industrial Products" to Prime Costs

Year	Index of prices of "finished industrial products"	Index of prime costs	Ratio of prices to costs
1928	100.0	100.0	100.0
1929	101.9	99.1	102.8
1930	96.0	85.7	112.0
1931	85.0	71.9	118.2
1932	75.9	62.5	121.4
1933	68.5	57.1	120.0
1934	65.8	56.2	117.2
1935	62.2	53.7	115.8
1936	59.4	54.5	109.0
1937	62.9	57.8	108.8

We shall now compare the changes in the ratio of prices of "finished industrial products" to the respective prime costs with the changes in the indices of production[9] and employment (aggregate working hours in mining and industry)[10] (Table VII).

TABLE VII

Ratio of Prices of "Finished Industrial Products" to Prime Costs, Industrial Production and Employment

Year	Ratio of prices of "finished industrial products" to costs	Index of industrial production	Index of industrial employment
1928	100.0	100.0	100.0
1929	102.8	101.9	100.9
1930	112.0	89.7	83.5
1931	118.2	78.2	70.4
1932	121.4	63.7	55.2
1933	120.0	70.0	54.8
1934	117.2	78.8	62.0
1935	115.8	84.9	65.8
1936	109.0	94.3	71.8
1937	108.8	110.7	82.6

[9] *Monthly Statistical Tables,* published by the Institute of Research on Business Fluctuations and Prices.

[10] *Mały Rocznik Statystyczny, 1938* (Concise Statistical Yearbook 1938), p. 248.

It is immediately clear that the "classical" theory is not supported by the results of our statistical inquiry. It will be seen that the decline in production and employment is accompanied by an increase in the prices of "finished industrial products" in relation to prime costs and conversely. But this phenomenon, which is in disagreement with the law of "increasing marginal costs", can be easily explained by our hypothesis: by the constancy of marginal costs over the relevant range of output and by "the degree of monopoly" increasing in slump due to the "rigidity" of prices and decreasing in the boom. Contrary to the accepted opinion the ratio of prices to prime costs "improves" in the depression! It does not follow, of course, that profitability is high: the effect of the drop in sales outweighs by far the advantage from the increased ratio of prices to prime costs.

6. We shall calculate now the index of real wages of industrial workers. By the real wage is usually meant the ratio of the money wage rate to the cost of living. As, however, in the latter the prices of the agricultural products and the rent are included—and even weight heavily upon them—it is difficult to expect a close connection between real wages thus defined and conditions of industrial production. The counterpart of what was meant by "real wages" in our theoretical discussion is the ratio of money wages to the wholesale prices of the consumer goods sold by the industry in the domestic market. This "real wage" measures the amount of industrial consumer goods a worker could buy for his money wage. We shall first examine this series. The real wages in the usual sense are only loosely related to it. Nevertheless we shall next have a look at this series as well.

Let us construct the index of prices of the industrial consumer products for the home market. We shall use for the purpose the group indices presented in Table I of prices of: 1) finished consumer goods except food and fuel; 2) sugar, beer, kerosene; 3) coal for households—adopting the weights proportionate to those shown in this table. Next the index of money wages (taken from Table IV) is divided by the index of industrial consumer products for the home market and thus is obtained the index of "real wages" in our sense (Table VIII).

This series shows in the period considered a long-run positive trend resulting from the increasing productivity of labour due to technical progress etc. (compare pages 54–55). In order to eliminate

TABLE VIII

Index of "Real Wages" Based on Prices of Industrial Consumer Products for the Home Market

Year	The index of money wages	The index of prices of industrial consumer products for home market	"Real wages" (ratio of the money wages to prices)
1928	100.0	100.0	100.0
1929	108.4	102.4	105.8
1930	108.1	99.2	109.0
1931	100.9	90.7	111.2
1932	92.8	81.2	114.2
1933	85.5	73.0	117.1
1934	82.0	69.8	117.3
1935	80.5	64.3	125.0
1936	80.3	60.6	132.3
1937	82.2	61.6	133.3

this factor and to obtain the cyclical fluctuations of "real wages" we shall divide the cost per unit of output rather than the hourly wages by the prices of industrial consumer goods (Table IX). (This series shows the changes in the amount of industrial consumer goods a worker could buy for the wages he receives per unit of output.)

TABLE IX

Index of the Ratio of Cost of Labour to the Prices of Industrial Consumer Goods

Year	Cost of labour	Index of prices of industrial consumer goods	The ratio of cost of labour to prices
1928	100.0	100.0	100.0
1929	105.2	102.4	102.8
1930	101.0	99.2	101.8
1931	91.9	90.7	101.3
1932	80.0	81.2	98.5
1933	68.0	73.0	93.2
1934	64.5	69.8	92.4
1935	61.9	64.3	96.3
1936	59.9	60.6	98.8
1937	60.0	61.6	97.3

This series is in complete agreement with the results of the theoretical analysis on pp. 51–54. We stated there that the changes

in real wages associated with business fluctuations are rather small because of two factors working in the opposite direction: in the depression the increase in the "degree of monopoly" affects real wages adversely but this is counterbalanced by the influence of the decline in the raw material prices in relation to money wages; in the boom the opposite is the case. As a result the fluctuations are slight and rather irregular. We do observe this phenomenon in the series shown in Table IX. (It is worth noticing that at the bottom of depression in 1932 "real wages"—after the elimination of the influence of the increase in productivity—remained more or less at the same level as at the top of the boom in 1928). The index of actual "real wages" shown in Table VIII is the resultant of the cyclical fluctuations and of the steady increase in productivity (compare pp. 54–55).

7. Let us have a look now at the changes in real wages in the normal sense, i.e. in the ratio of money wages to the cost of living (Table X).

TABLE X

Index of Real Wages Based on Cost of Living

Year	Money wages	Cost of living	Real wages
1928	100.0	100.0	100.0
1929	108.4	100.5	107.9
1930	108.1	92.1	117.4
1931	100.9	82.8	121.9
1932	92.8	74.8	124.2
1933	85.5	67.5	126.6
1934	82.0	62.6	131.0
1935	80.5	60.0	134.3
1936	80.3	58.0	138.5
1937	82.2	62.0	132.7

This series shows also an increasing trend. After the elimination of the rise in productivity by calculating the ratio of the cost of labour per unit of output to the cost of living we obtain in this case as well a series showing rather small and irregular fluctuations (Table XI).

Indeed these fluctuations, which, by the way, are greater than those in the ratio of the cost of labour to the prices of industrial consumer products, do not show either any clear cut positive or negative correlation with the level of production or employment.

TABLE XI

Index of Cost of Labour in Relation to Cost of Living

Year	Cost of labour	Cost of living	Ratio of cost of labour to cost of living
1928	100.0	100.0	100.0
1929	105.2	100.5	104.7
1930	101.0	92.1	109.7
1931	91.9	82.8	111.0
1932	80.0	94.8	106.9
1933	68.0	67.5	100.5
1934	64.5	62.6	103.0
1935	61.9	60.0	103.1
1936	59.9	58.0	103.3
1937	60.0	62.0	96.8

Money Wages and Employment

1. We tested above statistically the "classical" theory of the changes in the ratio of prices to prime costs and in real wages, as well as our hypothesis on the subject. It will be difficult to find as precise a method to settle the dispute between the point of view of the "classical" theory and ours on the subject of the effect of the reduction of money wages upon the level of production and employment. For the changes in production depend on many other factors of which the most important is the mechanism causing the automatic business fluctuations which bears no definite relation to the changes in money wages. We may only show that even considerable cuts of money wages could not counteract a fall in production due to the cyclical downswing.

2. In Table XII the index of money wage rates is compared with the indices of industrial production and employment.

As will be seen, a considerable reduction in wages (about 8% per year) occured in the period 1930–1933. This reduction, however, did not by any means contribute to the alleviation of the downswing which was very drastic indeed. It is true that wage cuts, although on a smaller scale, continued through the period 1933–1935 when production began to rise. Hardly anybody will, however, attribute to this factor an important part in the improvement of the business situation in the last years. It is rather generally accepted that the first stimulus was generated by the dollar

TABLE XII
Indices of Money Wage Rates and of Industrial Production and Employment

Year	Money wage rates	Industrial production	Industrial employment
1928	100.0	100.0	100.0
1929	108.4	101.9	100.9
1930	108.1	89.7	83.5
1931	100.9	78.2	70.4
1932	92.8	63.7	55.2
1933	85.5	70.0	54.8
1934	82.0	78.8	62.0
1935	80.5	84.9	65.8
1936	80.3	94.3	71.8
1937	82.2	110.7	82.6

depreciation in 1933 which caused the spending of hoarded dollars on goods (residential building especially for private use, accumulation of stocks, in particular of textiles etc.). This brought about an increase in production in 1934. The improvement in profitability of business stimulated in turn private investment in the subsequent years. In addition Government investment played an important part in the expansion of business activity.

Conclusions

The analysis of the Polish statistical data shows that the "classical" theory is wrong in maintaining that the prices of finished industrial products increase in relation to prime costs when production expands and conversely. In fact the reverse is true. This is in complete agreement with our theoretical analysis which rejects the law of the "increasing marginal costs" and assumes that the "degree of monopoly" increases in the depression and declines in the boom.

It appears also most unlikely that the considerable cuts in money wages which took place in Poland during the downswing had any mitigating effect upon it. This again is in accord with our approach to the problem of reduction of money wages.