INTRODUCTION

defence against modern monetarism, which interprets historical correlations as evidence of causation and is in a chronic state of confusion between flows of income and stocks of wealth.

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1. Introduction

Keynes’ General Theory of Employment is an application to output as a whole of the analysis developed by Marshall of the short-period equilibrium of a particular industry. In a typical Marshallian short period, demand for a commodity (for example, fish¹) has recently risen and is expected to remain at its new level. Output is limited for the time being by the existing capital equipment of the industry (trawlers). Competition prevails and the price of the commodity is equal to marginal costs to the firms concerned. Marginal costs are rising sharply as demand strains against the limits of capacity. Marginal cost, and therefore price, exceeds average cost, and profits (quasi-rents) stand at a level which causes the firms already in the industry to place orders for more capital equipment, and induces new firms to enter the market. This corresponds, when extended to output as a whole, to a situation where prospective profits are inducing a level of investment which keeps effective demand at a satisfactorily high level. The reverse case, where demand has fallen relatively to capacity, is rather lightly sketched by Marshall. Price is held precariously above average prime cost by “fear of spoiling the market”. ² Profits are so low that not only is no new investment going on, but even existing equipment may not be renewed as it wears out. The analysis of this situation, extended to output

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as a whole, occupies the main part of Keynes' General Theory.
To extend Marshall's long-period theory to output as a whole is by no means such a simple matter. In long-period equilibrium the representative firm in an industry is enjoying normal profits, which means that, while some firms may be expanding and others contracting, the industry, on balance, is making no change in its capital equipment. When all industries simultaneously are in this state, there is zero net investment and zero saving for the economy as a whole. This is clearly contrary to the spirit of Marshall's system, which is obviously intended to apply to an expanding economy. But if we take it the other way, and regard long-period equilibrium as some kind of steady expansion, what becomes of normal profits in the representative firm?

There are all sorts of secondary difficulties. The output of an individual firm is no longer limited by a fixed amount of equipment, and firms enjoy "internal economies" as they expand—that is, average costs fall as output grows. What then limits the size of any one firm? Marshall falls back on the argument that, though "there are many fine natures among domestic servants",¹ the sons of successful entrepreneurs are corrupted by life in pampered nurseries, so that before a firm has had time to grow very large, its efficiency decays. But if only one in a thousand picks an able nephew or son-in-law to manage the business in place of his own disappointing offspring, for a generation or two, that firm will end up with a monopoly of the industry.

There are any number of such incidental puzzles. The main difficulty is that, as soon as we envisage an economy in equilibrium with zero net investment, we are plunged into an imaginary world, for the institutions of capitalism,

¹ Principles [25], p. 207 note.

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in actual experience, are closely bound up with the process of accumulation.
Instead of wallowing any longer amongst these contradictions, let us boldly throw away the notion of long-period equilibrium and see how we get on without it.

2. DEFINITIONS AND ASSUMPTIONS

In what follows we shall be concerned with the rate of output of commodities (goods and services) in an expanding economy. The conception of output involves the conception of utility in some shape or form, for without it we could not distinguish between a commodity and a heap of dirt. However, we shall not enter into this question but be content to assume that whatever is marketable has utility. We shall be concerned mainly with a movement forward through time, with the stock of capital and the stock of technical knowledge growing as time goes by, so that when we compare two outputs the later one is larger than the earlier, in the sense that there is potentially, if not actually, a larger rate of output of each item of which the earlier output was composed.¹ True, technical progress destroys many commodities, but they are mainly of the non-marketable variety, such as peace and quiet, which do not enter into the calculation of either the smaller or of the larger output.

The "quantity" of output is conceived in the manner made familiar by the conception of the "volume" of exports—that is, outputs are reckoned in their natural units, tons, yards, entertainment-hours, all summed in terms of the prices ruling at some arbitrarily selected

date (new commodities which have come into existence since the base date being added in at their value in terms of existing commodities).

Capital is conceived in terms of the physical outfit of capital goods required to produce a given rate of production, when working at its designed capacity, with the technique in use.¹ (If we followed Wicksteed in treating consumption as the finishing stage of an industry producing utility², we could measure consumption goods in the same way.) We measure all values in terms of the average price of a man-hour of labour, and we ignore the index-number problem which presents itself when wage rates for different types of labour vary relatively to each other. Thus the stock of capital is measured in terms of its cost of production in wage units. Given the relation between money prices and money wages, it can also be reckoned at its value in terms of commodities.

To simplify the argument we will divide the community into three classes, workers, entrepreneurs, and owners of wealth. An entrepreneur normally doubles the role of owner of wealth to some extent, and uses his wealth in his business. Apart from this, he operates with borrowed funds; there is no share capital.

Money and bonds make up the whole supply of paper assets, and there is only one rate of interest—the rate on bonds.

These assumptions are not essential to the argument, but they promote clarity by giving us a definite and simple picture of the economy.

The total of profits is national income, net of depreciation of existing capital, minus wages. From the profits they receive entrepreneurs pay over to the owners of wealth sums governed by the rate of interest which was ruling at the time when they contracted debts to them. The excess of profit over interest is net profit.

The “General Theory” is used in a loose sense, to include Keynes’ book and the subsequent development of the ideas contained in it.

3. The Rate of Interest as a Regulator

Before proceeding with the main argument it is necessary to guard against following a false scent: the conception of an economy which is automatically held on a path of steady development by the mechanism of the rate of interest.

Keynes threw out a suggestion¹, which has been elaborated in various ways², that full employment might be maintained by sufficient variations in money-wage rates. When unemployment appears, the argument runs, money wages and prices fall. If the quantity of money is not reduced correspondingly, the existence of cash now redundant to the needs of active circulation causes the rate of interest to fall, and this process continues until the fall in the interest rate has stimulated investment (or reduced thriftiness) sufficiently to restore full employment.

It has been advanced, in support of this point of view, that while unemployment has been notoriously more prevalent in the twentieth century than in the nineteenth, wages have been notoriously more sticky, and that unemployment can therefore be accounted for by the breakdown of the above mechanism.³

¹ General Theory [21], p. 180.
² Pigou, "Real and Money Wage Rates in Relation to Unemployment" [31], Economic Journal, September 1937; Hicks, "Mr Keynes and the Classics" [10], Econometrica, April 1937; Modigliani, " Liquidity Preference and the Theory of Interest and Money" [28], Econometrica, January 1944.
³ Pigou, Lapses from Full Employment [30], p. 72.
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But the analysis raises more problems than it solves and is by no means in a state to bear historical applications.

First of all there is a purely formal difficulty in the way in which the argument is usually stated. It jumps from the total stock of capital appropriate to a certain rate of interest to the rate (say, per annum) at which investment is carried out, so that the rate of investment is represented (given the prospect of profit) as a function of the rate of interest. But clearly we cannot say what rate of investment is appropriate to a given rate of interest without knowing for how long that rate of interest has been ruling and the investment going on.

However, the main point of the argument can be rescued if we say that, at any moment, if the rate of interest falls, the total of investment plans will increase, and the rate of investment is likely to be higher for some time than it would have been if the rate of interest had remained at the former level. On this basis it is, perhaps legitimate (with due reservations) to speak of a full-employment value of the rate of interest, in a given short-period situation.

But it is by no means easy to see how the monetary mechanism is supposed to ensure that the rate of interest actually assumes its full-employment value. If the economy is conceived to have experienced the operation of this mechanism within living memory it must be supposed that people expect a fall in wages and prices when unemployment threatens to appear. Under the influence of such expectations investment plans are postponed. Thus the appearance of unemployment must be imagined to reduce the full-employment value of the rate of interest by more than it makes the actual rate fall.

On the other hand, if the economy has had no such experience but has lived through prosperous times when

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the rate of interest had no occasion to fall, the tendency of the rate of interest to respond to changes in the demand for money must have atrophied. Owners of wealth in such a case must be supposed to have been endowed by past experience with a confident belief in a normal value of the rate of interest (that is, a normal price of bonds), and then, if a short-period situation should arise which (according to the theory) required a fall in the rate of interest, the rate of interest would refuse to fall. For as soon as the price of bonds began to be bid up by those who found themselves holding redundant money, plenty of owners of wealth would be willing to sell bonds at the raised price, intending to hold money for a time, and repurchase bonds when their price relapses to normal, thus making a profit on the round trip.1 Thus the rate of interest could not fall appreciably below its expected value. It could, however, rise above it when the supply of money, relatively to national income, was suddenly reduced, for it is worth while sacrificing interest for the convenience of having money as a medium of exchange. The demand for money, against the rate of interest, at any moment, must then be visualised as somewhat of this form (given national income and the expected long-term rate of interest).

1 See below p. 148. See also Kaldor [15], p. 15. 2 Cf. Modigliani [28], p. 55.
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Thus, if the system happens to get into a position where the full employment value of the rate of interest lies below its actual value, no automatic corrective is at work. The rate of interest may be assumed to fall after sufficient time has gone by for expectations of its future recovery to be undermined. But meanwhile the rate of investment is low, unemployment is rife, and a slump has set in. By the time the rate of interest comes down, profit expectations have come down still more. The automatic corrective action of the rate of interest is condemned by its very nature to be always too little and too late.

(The above argument is derived from the "liquidity preference" theory of the rate of interest, but it does not depend on uncertainty, indeed it is the very confidence with which the owners of wealth believe in the normal price of bonds that makes the rate of interest so reluctant to fall.)

It might still be argued that the automatic reaction of the monetary system can be supplemented by conscious policy, and that sufficiently far-sighted and drastic action could always force the rate of interest to its full-employment value. On this line of thought it might be held that, if anything resembling steady progress has ever been known in reality, it must have been because wise and powerful monetary authorities were controlling the rate of interest in this way. But such a conclusion is untenable for two reasons. Our argument applies to the whole capitalist world, not to one country, but monetary systems are managed nationally, and, until recent times, the overriding objective of monetary policy has been the stability of the foreign exchanges. In some circumstances it may happen that a fall in investment in one country is accompanied by a strengthening of its exchange rate, making a fall in the interest rate possible, but it would only be by a happy accident which could not be relied upon regularly to occur. A country whose share in world investment mainly takes the form of a surplus of exports, matched by foreign lending, will sometimes find that a spontaneous fall in lending runs ahead of a fall in exports, so that the exchange is strengthened as investment falls, but more often a fall in exports requires a rise in the rate of interest to redress the balance of payments, so that the rate of interest has to be raised just when employment is falling.

The second objection applies equally in an open or a closed system. Monetary control is essentially asymmetrical. It has the power to check an expansion in employment, but it is too feeble to promote one; for while the authorities can always force the rate of interest up at short notice by reducing the quantity of money, the extent to which they can lower it quickly is very limited, even if they are prepared to increase the quantity of money ad infinitum.

Therefore mere monetary management cannot preserve full employment. If in reality long periods of expansion have occurred, it must have been because there was some force continually driving the economic system into its bridle. The difference between one period and another lies far less in the behaviour of the monetary mechanism than in the circumstances with which the mechanism has to deal.

4. WHAT IS THE BOTTLENECK?

1. FULL EMPLOYMENT AND FULL CAPACITY

Before setting out upon our quest for a long-period theory we must investigate the question of the factors limiting output at any moment.

1 Cf. Harrod, Towards a Dynamic Economics [8], p. 62. It was Mr. Harrod, I believe, who first pointed out the need to introduce liquidity preference into the "classical" scheme.
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In the foregoing (as in much current discussion) it was taken for granted that full employment sets the upper limit to the possible rate of output, but this slurs over an important question: the relation between full employment of labour and full-capacity operation of capital equipment.

In the situation depicted in the General Theory, output has fallen below the level attained in the recent past; equipment, as well as labour, is waiting for a revival, and the question of whether full capacity or full employment would be reached first, if a revival occurred, is still remote. In that setting it was natural enough to neglect the distinction between them, but for long-period problems the question cannot be left in such a vague state.

There are a number of possible relations between capacity and available labour:

(1) Capacity may have been abruptly reduced (say, by bombing) relatively to available labour. Men are idle for lack of equipment to work with, although effective demand is high. There is then a strong inducement to invest. But the output of consumption goods has been reduced (by the destruction of equipment and stock) below what people are accustomed to, and at this low level is highly inelastic. Any increase in the rate of investment therefore leads to a sharp rise in prices, which reduces real wages rates below the level regarded as tolerable even by employers and causes money wage rates to rise, so that we have the spectacle (undreamed of in the General Theory) of the vicious spiral of wages and prices setting in while there is still heavy unemployment.¹

(2) Capacity may increase abruptly, relatively to available labour. This happens, particularly in "new"


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countries, when a small amount of investment (say, in building a railway, or in prospecting for minerals) brings a large amount of hitherto untouched natural resources into play. Prospects of profit are then high in utilising the new capacity, but hands are lacking, and for a time effective demand strains at the limits of full employment. But available labour meanwhile is rapidly increasing, for immigrants are attracted (not to mention slaves or convicts) so that the supply of labour responds to the demand for it. (Regions as diverse as Malaya and North America were peopled by this process.) At the same time, investment takes the most labour-saving form that existing knowledge permits, and technique is constantly being improved so as to increase output per man-hour. (This seems to be the most likely explanation of the high productivity of labour in American industry.)

There is no reason to expect demand and supply of labour to keep exactly in step, and the new countries may experience an alternation of periods when immigration has overshot the mark, and available labour exceeds capacity, with periods when capacity exceeds available labour.

(3) Capacity may be increasing, not by violent leaps but by a gradual process of accumulation, while population, or rather available labour, is stationary, or increasing at a slower rate. This state of affairs may continue so long as technical progress is raising output per man and so reducing the amount of labour required to operate a given capacity.

(4) Available labour may be increasing faster than capacity. When the size of families is such that available labour, from year to year, increases faster than demand, there is a continuous increase, from year to year, in numbers unemployed. The increasing tendency of population may be kept in check by Malthusian misery, so that every increase in demand for labour increases the supply of
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human beings (this was Ricardo's hypothesis). The unemployment may be "disguised" as rural over-population, or it may be continually drained off by emigration to the "new" countries. But, in normal times, in the "old" countries, there is labour available for employment which is not being used.

Thus occasions when available labour falls short of capacity are likely to be rare and an analysis in which capacity is treated as the short-period bottleneck, restricting the possible rate of output at any moment, has more general application than one in which full employment sets the upper limit.

II. FINANCE

There is another kind of check upon the possible rate of accumulation besides capacity and available labour: that is, the supply of finance. A world in which entrepreneurs could borrow without limit at the ruling rate of interest, would be much unlike the world we live in. Unlimited borrowing would be possible only where there was no uncertainty about future profits, not only in the broad, but in respect to the fortunes of individual enterprises. Where there is uncertainty, borrowers must provide lenders with more security than their own hopes, and investment plans are limited by the supply of finance.

Owing to the ambiguous nature of the word capital there is a tendency to confuse the supply of finance with the supply of saving. But they must be sharply distinguished, for they operate on totally different planes. A "shortage of capital", in the sense that saving is inadequate, limits the rate of investment which it is physically possible to carry out; it shows itself in an excess of demand for labour over supply, and it is caused by a high proportion

1 See Robertson, Essays in Monetary Theory [32], p. 3.

of consumption to income. A "shortage of capital", in the sense of an inadequate supply of finance, limits the investment plans which entrepreneurs are able to organise. It shows itself in a high risk premium on industrial securities and in difficulty in arranging new loans, and it may be caused by general lack of confidence on the part of owners of wealth, or by the fact that too small a part of total wealth is owned by actual or potential entrepreneurs.

It is true that the amount of finance (including investment of a firm's own funds) actually used during a period is equal to the savings made during the period, because both are equal to the investment made during the period, but there is no direct connection between them. In respect to a particular scheme of investment, the finance which it requires has to be arranged before outlay on investment begins, while the purchase of securities out of the savings which correspond to it are made only after the income which it generates has worked its way through the economy. Nor is the amount of finance available in a particular situation in any way governed by the rate of saving which is going on at that moment. It is perfectly possible for schemes of finance to be arranged on a single day which would keep investment (and saving) running at the maximum possible level for years. On the other hand the existence of idle resources, which indicates that potential saving is running to waste, does nothing to facilitate the supply of finance.

1 The entrepreneur, to save interest payments, as far as possible avoids borrowing in advance of actual outlay. He prefers to arrange for a "line of credit" (in the simplest case, overdraft facilities at a bank). As the actual outlay on investment is made the credit is used up, the lender providing the borrower with funds by selling out other assets, and accepting his obligations in their place. Thus finance is not normally taken until actual outlay is made, but it must be provided for in advance when the scheme of investment is planned.

1 Except in so far as the authorities deliberately make credit easy in an attempt to help recovery.
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All the same there is an important round-about connection between saving and finance. This is seen most clearly if we go to the opposite extreme from the assumption of unlimited credit and, instead of assuming that every entrepreneur can borrow ad libitum, assume that there is no borrowing at all, and that each entrepreneur is confined to investing his own past accumulated savings, so that the only source of funds for investment is "internal finance". Even then, each does not make new investment crumb by crumb as profits accrue. In any one year some are investing and some accumulating reserves by saving out of profits. Each scheme of investment, paid for from reserves, so to speak uses up finance equal to its value. By the time the investment has been completed and expenditure out of incomes earned in making the investment has run its course, savings equal to the value of the investment have been added to wealth somewhere in the economy.

Now, from the point of view of any individual concern, the investment which it will plan to undertake, in any situation, depends upon two things—prospective profits and the amount of reserves at its disposal. Its reserves in turn depend upon the savings which it has made in the more or less recent past. If other members of the community besides entrepreneurs are saving, the addition to reserves of firms made in any period is less than the investment carried out in that period, and the system must soon run down.

But even if all saving were done by entrepreneurs, the system is not guaranteed against trouble, for the distribu-

1 We must suppose that the entrepreneurs are sufficiently versatile to make investments wherever the prospect of profit is greatest, for, if each invests only in the line of business where he happened to start, production would rapidly get out of step with demand (unless demand in each line happened to expand in just the right proportions) and the prospect of profit in some lines would fall so low that investment in them would cease.

1 Marx assumes that reserves amassed in one period will always be invested in the next (except in times of crisis). In this case the rate of accumulation is governed by saving, though the mechanism is totally different from that postulated by the monetary theory discussed above.

2 In the case where each piece of investment is financed by the past savings of the firm which makes it we can speak of the supply of finance in existence at any moment—that is, the sum of uncommitted reserves of firms. When borrowing is possible the supply of potential finance cannot be so definitely conceived. It depends very much upon the credit of would-be borrowers. Moreover, the amount that any one can arrange to borrow, at a particular moment, increases up to a certain point with the interest that he offers, though it does not increase indefinitely, since it is of no use to try to attract finance by offering a rate of interest that no one believes the borrower will be able to honour. (See Kalecki, "The Principle of Increasing Risk", Essays in Economic Fluctuations [16].)
an element of the pawnshop in even the most sophisticated kind of borrowing—existing wealth is pledged as a guarantee for new loans. Thus (given the prospects of profit and the general state of confidence and the reputation of the particular concern) the amount of new borrowing that an entrepreneur can arrange at any moment largely depends upon the ratio of the total debt of the concern to its total assets, that is, on the proportion of its assets that it owns outright. (If the debt of a concern is, say, half the value of its assets, net earnings, reckoned as a percentage on the value of the assets, can fall to half the rate of interest on the debt before the concern defaults or begins to pay interest out of capital.)

Suppose that we start from a position with a given number of entrepreneurs, each of whom owns half the capital which he operates. If each continually makes net saving (in excess of amortisation) at a rate equal to half the investment which he carries out, the ratio of debt to assets remains unchanged (apart from accidental gains and losses) and the supply of finance (so long as prospects and confidence remain constant) will be continually renewed as it is used up.

If more than half of all saving is done outside the concern, say by rentiers, then the ratio of debt to assets in the concerns is rising, and the power of the original set of entrepreneurs to borrow is gradually exhausted. All the same, investment can continue indefinitely if the class of entrepreneurs is recruited, at an adequate rate, by rentiers using their accumulated wealth to start businesses. (Rentiers may prefer land to industrial securities, so that

1 See Kalecki [16], p. 99. Mr. Kalecki works out his argument as though new borrowing was governed by the absolute difference between the capital owned by the firm and its "commitments", but he states in a footnote (p. 106) that it is the ratio, not the difference, which is relevant.
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Thus we find once more that the distribution of saving (though not its amount) has in the long run a cumulative influence upon the supply of finance, and so, indirectly, upon the rate of investment.

The price at which finance can be obtained is related to the yield at ruling market prices on securities comparable with those to be issued by way of the new loans; this depends on the total supply of such securities outstanding, in relation to the demand for them, the demand being influenced by the tastes and views of owners of wealth and the supply of other assets, and by the supply of money relatively to the needs of active circulation, in the manner discussed below.¹ A fall in the general level of interest rates tends to lower the price required for new finance (because it reduces the return which the lender can get on his money in other ways) and to increase the amount of finance available on given terms.

Further influences upon the supply of finance may be summed up under two broad headings; first, the state of expectations, and, second legal and institutional arrangements and the habits of lenders. There is a general tendency for the supply of finance to move with the demand for it. It is true, of course, that at any moment there are many excellent ideas which cannot be implemented because those who have conceived them are unable to back them with finance. But, by and large, it seems to be the case that where enterprise leads finance follows. The same impulses within an economy which set enterprise on foot make owners of wealth venturesome, and when a strong impulse to invest is fettered by lack of finance devices are invented to release it (the invention of the joint-stock company with limited liability was a technical revolution comparable to the invention of the steam-engine), and habits and institutions are developed accordingly (it was possible for the prejudice against banks participating in industry to take root in England, where other sources of finance were forthcoming, but not in Germany, where they were not). On the other hand, in a stagnant economy it is impossible to say whether it is lack of enterprise or lack of finance which prevents development from getting under way.

What is true of the broad sweep of development is also true from year to year in a given economy. A high level of prospective profits and a high degree of confidence in these prospects promote enterprise and at the same time ease the supply of finance.¹ A fall in confidence restricts the supply of finance at the same time as it checks the desire to invest. Thus the supply of finance cannot be regarded as a rigid bottleneck limiting the rate of investment, but must be treated rather as an element in the general atmosphere encouraging or retarding accumulation.

III. LAND

Capital equipment forms a bottleneck only from a short-period point of view. The essence of development is that capital accumulation is going on, so that the bottleneck is constantly growing wider as time goes by. But natural resources are not indefinitely expandable, and land may set a permanent limit to economic growth. Some aspects of this question will be discussed later, but at the first stage of our analysis we will rule it out by postulating an economy which is surrounded by undeveloped territory (with all its endowment of ores, waterways and so forth) of the same economic quality as that already in use, so that, provided that an appropriate part of investment is devoted to transport and the opening up of new

¹ See below, p. 25 et seq.

¹ Cf. below, p. 156.
land, there are no long-run bottlenecks caused by limited supplies of vegetables or minerals to impede expansion.

IV. CAPITAL EQUIPMENT

We are left, then, with the capacity of capital equipment as the normal upper limit upon the possible level of output at any moment.

Capacity is a somewhat vague notion. In some productive processes it may have an almost literal meaning—say, the capacity of blast furnaces—but in many the possible rate of output per day or per week from given equipment has no very sharp upper limit. Moreover, the capacity of plant depends upon the length of the working shift, the number of shifts that can be worked per week, and the possibility of overtime.

However, the notion of the limit to the rate of output set by capacity does correspond to practical experience. The entrepreneur in charge of production, at any moment, finds himself either in a "buyer's market" or a "seller's market". In a buyer's market the producer is anxious to get orders "to keep the wheels turning". In a seller's market, buyers are begging him to produce at a faster rate than he can. He responds by raising his prices so as to get the most profit possible in the immediate situation, by filling up his order book and lengthening the delay in delivery, or simply by picking and choosing, meeting the demands of valued customers and refusing the rest (the mixture of these methods chosen varies with the nature of the market and the policy of the individual producer). Meanwhile, if he expects the situation to last, he will set about enlarging his capacity.

The limit to the rate of output in a seller's market may be set by physical capacity in the literal sense, by conventions governing the length of the working day, by

marginal costs (including wear and tear of machinery) rising sharply as the rate of output from given plant is pushed above a certain speed, or it may be set by full employment of the existing number of workers with particular skills which require long training.

Where craftsmen are the bottleneck in a profitable market employers may give way to the temptation to poach upon each other's coverts, and attract individual craftsmen by offering them better than the standard wages or conditions of work, but (as Adam Smith observed) each employer is reluctant to start a process of bidding up wages, which can only end by raising costs for all of them without increasing the total supply. Thus it often happens that a limited supply of craftsmen has just the same effect as a limited physical capacity of plant, in raising prices relatively to costs or delaying delivery, when demand expands. Once more, if the situation is expected to last, producers will set about widening the bottleneck by training new men.

All this, though important in reality, is somewhat vague, and to make our analysis neat we may formalise it by assuming that at any moment there is a certain rate of output for each type of commodity (including capital goods) which represents normal capacity working, and that this rate of output can be exceeded, in the short period, only at sharply rising marginal cost. In what follows we shall speak of normal prices and normal profits as those which rule when plant is working at normal capacity.

Further, it is natural to assume that capacity can be divided into two categories, that which caters for the production of consumption goods and that which caters for capital goods. Stocks of consumption goods, of course, form part of capital, so that consumption-goods industries
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may play a part in investment, and the investment made in a period is not necessarily the same thing as the output of capital goods produced during the period. But there is an important group of specifically capital-goods industries (construction, engineering, the greater part of iron and steel) whose capacity cannot be switched to the production of consumption goods (beyond a very minor extent) though each may produce a fairly wide range of types of capital goods. The following argument is conducted on the assumption that the stock of capital in existence at any moment is divided into an investment and a consumption sector, between which there is only a small amount of overlap.

5. A DEVELOPING ECONOMY

I. A MODEL OF STEADY ACCUMULATION

We are now ready to embark upon the analysis of an economy in which accumulation of capital is going on continuously.

We will first examine an ideal case of steady growth, in order to see what conditions are required to make such a state of affairs possible.

At the moment when our story begins there is a certain stock of physical equipment, adapted to the demands which have been ruling for various commodities. This entails that the division of capacity between investment-goods and consumption-goods industries is in the same ratio as the division of gross income between gross saving and consumption. Effective demand is such as to secure full capacity working of the stock of equipment, in both sectors. These conditions give us the total real income of the whole economy. We shall call this by the familiar name of “national” income, though the argument would have to be modified if applied to one nation trading with others. The investment which is going on is in course of enlarging the stock of capital in the expectation of future profits.

How should expectations be treated? If we endow our entrepreneurs with correct foresight, we land ourselves in a hopeless philosophical puzzle about Free Will and Predestination. (I foresee that you will read this essay. But suppose you hear that I foresee it, and decide not to out of pique. Then I foresee that you will not. But if I had not been so officious as to foresee it in the first place, you would have read the essay after all.)

There is a simple way out of this difficulty. History has endowed the present not only with a physical stock of capital, but with experience of the past. After a long course of prosperity the entrepreneurs, in our ideal case, know that the present rate of profit has lasted for some time back. They assume that the future will be like the past, and, since in our golden age of steady progress each section of time is like the next, their expectations up till now have regularly been verified. It is these expectations which govern the investment that is being undertaken.

Now we have to consider whether the situation is such that this state of affairs will maintain itself as time goes by. This is, in essence, the problem that Marx treated by means of the famous “Schema” in volume II of Capital, which have recently been revived in modern dress. Marx showed that it is not logically impossible to conceive of steady accumulation taking place indefinitely, but he

2 Rosa Luxenburg denied this. The reason is that she took seriously Marx’s assumption that real wages tend to be constant, while he contradicted it by embodying a constant rate of exploitation in his model. See below, p. 120, and p. 128.
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held that “in the crude conditions” of capitalist production it would do so only by an accident. Indeed, as we shall see, the conditions which steady accumulation requires are such as never to be found in reality. All the same, it is useful to set them out, in order to see what their absence entails.

The position that we are looking for cannot correctly be described as “equilibrium” for it has not the property of restoring itself in the face of a chance shock. It is, rather, a position which is free from “internal contradictions” in the sense that it can perpetuate itself continuously provided that no shock ever occurs.

Let us imagine that in our ideal world land and labour are always available as required, that the supply of potential finance is continuously renewed as it is used up, and that the monetary system functions in such a way as to keep the rate of interest constant.

Then the initial position of full capacity working can perpetuate itself provided that the following conditions are fulfilled:

(1) Technical progress goes on at a steady pace, and the age composition of the stock of capital is such as to require renewals at a regular rate. Amortisation allowances are set at the level appropriate to the rate of obsolescence and wear and tear which is being experienced, and, taken as a whole, are being continuously reinvested as they accrue.

(2) The gestation period of capital goods, on the average, is constant, so that there is a regular relationship between investment and the rate at which new capital goods become available for use.

1 Capital [27], volume II, chapter 21, section 2.

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(3) Technical progress is neutral on balance, in the sense that the cost in terms of wage units of capital per unit of output falls at the rate at which output per man-hour rises.

(4) Competition between entrepreneurs keeps constant the normal rate of profit, that is, the rate of profit obtainable when effective demand is such as to keep capital working just at capacity.

This, combined with the condition that technical progress is neutral, requires that the real wage per man-hour rises with output per man-hour, and provides that the relative shares of labour and capital in total net income remain constant. In Marx’s language, the rate of exploitation and the organic composition of capital both remain constant as accumulation goes on.

(5) The proportion of net income saved remains constant.

The behaviour of the level of prices need not be specified, but the behaviour least likely to disturb the above conditions is found when the average money-wage rate per man-hour rises with average productivity, so that the prices of commodities in general remain constant.

In the initial position we assumed that (steady development having occurred in the past) the stock of productive equipment was divided between consumption and investment industries (including in investment both the construction of capital equipment and the building up of stocks and work-in-progress) in the proportion in which gross income is divided between consumption and gross saving. The investment which was going on was in course of increasing the stock of capital in each sector. The five conditions set out above ensure that this situation is free
THE GENERALISATION OF

from any “internal contradictions”, that is to say it has no inherent tendency to upset itself. For if the stock of capital continues to increase at the same proportionate rate (reckoned in terms of product) as in the initial position, capacity, output, investment and consumption all increase at that proportionate rate. The stock of capital, as it grows, is continuously worked at capacity; it finds demand for its product growing at the same rate as output and yielding the same rate of profit. The expectations of profit in the light of which investment was planned are continuously fulfilled, and therefore renewed, as time goes by. The initial position continuously reproduces itself upon a gradually expanding scale.

This can be illustrated by a simple numerical example.

Let us suppose that the normal long-run proportion of net national income saved is 10%, that the value of the stock of capital is equal to five years purchase of net income, and that 10% of the stock of capital requires to be reproduced every year. Then 60% of the stock of capital must be devoted to consumption-goods industries, and 40% to investment-goods industries.

The proportion of renewals (10% per annum) is the same in each sector.

Let us suppose that entrepreneurs are choosing to replace capital at the required rate and to increase the stock of capital, measured in terms of product, by 2% per annum cumulatively. The gestation period of capital goods is constant, and we take a “year” to represent a period such that capital created by investment in one year is ready for use in the next.

<table>
<thead>
<tr>
<th>Stock of capital</th>
<th>Annual output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumption</td>
<td>Renewals</td>
</tr>
<tr>
<td>industries</td>
<td>Total</td>
</tr>
<tr>
<td>1st year</td>
<td>300</td>
</tr>
<tr>
<td>2nd year</td>
<td>306</td>
</tr>
<tr>
<td>10th year (approx.)</td>
<td>360</td>
</tr>
</tbody>
</table>

Thus, if s is the proportion of net income saved (\(\frac{1}{5}\) in the example) and T is the period for which net income is equal to the stock of capital (5 years in the example) the steady rate of growth of the stock of capital, and of all other quantities in the calculation, is \(\frac{s}{a}\) per period T (\(\frac{1}{5}\) over 5 years, or 2% per annum); or, if we write c for the ratio of the stock of capital to a year's net income (5:1 in the example), the rate of increase per annum is \(s/c\) (\(\frac{1}{5}\) in the example).

These relations ensure that continuous accumulation is possible, but even when all the necessary conditions for steady progress are fulfilled, its realisation depends upon faith. So long as entrepreneurs expect to find a profitable market for increased output they will maintain investment and so, at one stroke, maintain (expanding) effective demand and provide the equipment to meet it. Once they are smitten with doubt and each waits to see what the others will do, investment becomes insufficient to absorb potential saving and effective demand not only fails to expand but fails to remain at the level which makes the existing stock of capital profitable to operate. Thus