

INVESTMENT THAT RAISES THE DEMAND FOR CAPITAL

THE purpose of this article is to state a proposition which underlies the modern "monetary over-investment theories" of the trade cycle in a form in which, as far as I know, it has never before been expressed but which seems to make this particular proposition so obvious as to put its logical correctness beyond dispute. This, of course, does not necessarily mean that the theories which rely largely on this proposition provide an adequate account of all or any trade cycles. But it should do something to show the inadequacies of those current theories which completely disregard the effect in question. It should, moreover, clear up some of the confusion and misunderstandings which have made it so difficult to come to an agreement on the purely analytical points involved.

It will surprise nobody to find the source of this confusion in the ambiguity of the term capital. In static analysis, the term capital refers equally to the aggregate value of all capital goods and to their 'quantity,' measured in terms of cost (or in some other way). But this is of little significance because in equilibrium these two magnitudes must necessarily coincide. In the analysis of dynamic phenomena, however, this ambiguity becomes exceedingly dangerous. In particular, the static proposition that an increase in the quantity of capital will bring about a fall in its marginal productivity (which for the purposes of this article I shall call the rate of interest), when taken over into economic dynamics and applied to the quantity of capital goods, may become quite definitely erroneous.

THE RELATIVE SIGNIFICANCE OF THE AMOUNT OF INVESTMENT AND OF THE FORM THAT IT TAKES

The assumption that an increase in the quantity of capital goods will necessarily decrease the return to be expected on further investment is generally treated as obvious. It is, therefore, desirable to state the actual relations between the two magnitudes in a form which may, perhaps, sound somewhat paradoxical. The main thesis of this article will be that the effect which the current production of capital goods will have on the future demand for investible funds will depend not so much on the quantity of capital

goods produced, as on the kind of capital goods which are produced or on the particular forms which current investment takes, and that an increase in the current output of capital goods will frequently have the effect not of lowering but of raising the future demand for investible funds, and thereby the rate of interest.

Each separate step of the argument which leads to this conclusion is a familiar and obvious proposition. The first main point is that most investment is undertaken in the expectation that further investment, for which the equipment that formed the object of the first investment will be needed, will take place at a later date. This may be expressed by saying that current investment will be guided by the expectation that investment will continue at a certain rate for some time to come, or that the rate of interest will stay at a certain figure. The success of current investment will depend upon this expectation being fulfilled. Most individual acts of investment must be regarded, therefore, as mere links in a chain which has to be completed if its parts are to serve the function for which they were intended, even though the chain consists of separate and successive acts of different entrepreneurs. The manufacturer of any kind of machines who increases his plant can do so only in the expectation that the users of these machines will at some later time be willing to install additional machines, and that these machines may be wanted only if somebody else will later be willing to invest in their products, *etc. etc.*

The first investment of such a chain, therefore, will be undertaken only if it is expected that in each link of this chain a certain rate of interest can be earned. But this does not mean that, *once this investment has been made*, the process of further investments will not be continued if conditions change in an unfavorable direction, —if, for example, the rate of interest at which money can be borrowed rises. If the investments already made are irrevocably committed to the particular purpose, this provides a margin within which the total profits to be expected on the whole chain of successive investments may fall without affecting the profitability of the further investments still needed to complete the

process. For if the fixed capital already created is specific to the particular purpose, it will, of course, be used even if the return covers little more than the cost of using it (but not interest and amortization); and since the owners of this fixed capital will find it in their interest to use it so long as they get only a little more than mere operating cost, nearly the whole amount which it was originally expected would be earned as interest and amortization becomes available, as it were, as a premium on investment in the later stages of the process. The amount by which entrepreneurs in these later stages need to pay less for the products of the earlier stages, because the equipment there is already in existence, thus becomes available for expenditure on the completion of the process. And the greater the amount of investment which has already been made compared with that which is still required to utilize the equipment already in existence, the greater will be the rate of interest which can advantageously be borne in raising capital for these investments completing the chain.

“COMPLETING INVESTMENTS” AND THE RATE OF INTEREST

Obviously then, the demand for capital at any particular moment depends not so much on the productivity that the existing structure of real capital would have if completed—the long term schedule of the productivity of investment—as on the proportion between that part of it which has already been completed and that part which has yet to be added to complete it. Only for a very small fraction of the total investments—the marginal investments which represent the beginning of new chains of investment—will the demand for funds promptly react to a change in the rate at which capital can be borrowed. For the rest, the demand for capital will be highly inelastic with respect to changes in the rate of interest.

The consequences of this can readily be shown by a schematic example. Assume that past investments have been guided by the expectation that a rate of interest of four per cent would continue to rule for some time, but that in order to complete the investments which have been undertaken in this expectation a greater supply of loanable funds would be required than is actually forthcoming. Assume

further that, if investments in the recent past had been guided by the expectation of a five per cent rate of interest, the amount of further loans required to continue these investment processes would just exhaust the current supply. This does not mean that once investments have been undertaken in the expectation of a rate of four per cent, a rise of the interest rate to five per cent—that is, to the figure which, if correctly foreseen, would have represented an equilibrium rate—will now be sufficient to reduce demand for loans to the level of the supply. If a considerable part of the equipment to be used has already been produced, many investments, which it would never have been profitable to start if a rate of interest of five per cent had been foreseen, will be well worth while continuing, even at a rate much higher than five per cent. The loss will fall entirely on those entrepreneurs who in the past, in the expectation of the lower rate of interest, have already erected new plant, *etc.* But the concessions in price, below their actual cost of production, which they will be compelled to make, will enable the other entrepreneurs, whom they supply with equipment, to go on with the installation of new machinery, which would not have been possible if developments had been foreseen correctly from the outset. The construction of a large hydro-electric plant that would have been profitable if the rate of interest had remained at four per cent will prove unprofitable if the rate of interest rises. But, once it has been constructed and charges for electric power adjusted to get maximum profit over current expenditure, it will give rise to a further demand for capital for the installation of electric motors, *etc.*, which will not be sensibly reduced even by a rate of interest much higher than five per cent.

How far the rate of interest will have to rise to bring the demand for loans down to the available supplies will depend, as we have seen, on the proportion between that part of the complete investment processes which had been carried out before the unexpected rise in the rate of interest occurred, and that part of this total expenditure which has yet to be incurred. If, in a particular instance, interest at four per cent on the capital already invested and amortization of that capital would have represented 30 per cent of the expected price of the final

commodity in the production of which it was to be used, then interest charges involved in utilizing the existing plant and its products would have to rise so as to absorb the whole of this 30 per cent of the final price, before the demand for capital for this purpose would be effectively curtailed. If, of the remaining 70 per cent of the expected total cost of the final product, 15 per cent was allowed for further interest at four per cent, interest rates would have to rise to approximately 12 per cent before the profitability of the investments completing the process already begun would be reduced to zero.

Against this whole argumentation it might be objected that it completely ignores the effect of the rise in interest rates on current replacement of the capital in the "earlier stages" which has partly or entirely lost its value. It is certainly true that these items of equipment will not be replaced. But the implication that this will in any way relieve the demand for funds for investment is certainly erroneous. In so far as those items in the normal course of affairs would already need replacement, these replacements would have been financed out of amortization currently earned. They would not have constituted a demand on the funds available for investments. But if—and this is more likely—they have not yet become ripe for replacement, the amortization earned would temporarily be available for investment elsewhere. The fact that no amortization or only a reduced quota will be earned will then mean a reduction of the supply of investible funds, that is, it will represent a factor which tends to raise rather than lower the rate of interest.

CAUSES OF AN URGENT DEMAND FOR FUNDS FOR COMPLETING INVESTMENTS

The causes which are likely to bring about such a situation remain to be considered. Under what conditions will the demand for the additional capital required to complete a given capital structure drive up the rate of interest to a figure very much higher than the rate which is compatible with the permanent maintenance of that structure?

In principle the answer is surely clear. Anything which will lead people to expect a lower rate of interest, or a larger supply of investible

funds, than will actually exist when the time comes for their utilization, will in the way we have suggested force interest rates to rise much higher than would have been the case if people had not expected such a low rate. But, while it is true that an unexpected decrease in the rate of saving, or an unforeseen appearance of a new demand for capital—a new invention for instance—may bring about such a situation, the most important cause practically of such false expectations probably is a temporary increase in the supply of such funds through credit expansion at a rate which cannot be maintained. In this case, the increased quantity of current investment will induce people to expect investment to continue at a similar rate for some time, and in consequence to invest now in a form which requires for its successful completion further investment at a similar rate.¹ It is not so much the quantity of current investment but the direction it takes—the *type* of capital goods being produced—which determines the amount of future investment required if the current investments are to be successfully incorporated in the structure of production. But it is the amount of investment made possible by the current supply of funds which determines expectations about the future rate of investment and thereby the form that the current investment will be given. We can now see the justification for the somewhat paradoxical form in which the main thesis of this article was originally stated. An increase in the rate of investment, or the quantity of capital goods, may have the effect of raising rather than lowering the rate of interest, if this increase has given rise to the expectation of a greater future supply of investible funds than is actually forthcoming.

If this proposition is correct, and if its assumptions are empirically justified, this means that much of the purely monetary analysis of the trade cycle now current is built on very insufficient foundations. If it is correct, the common assumption that the expected return on investment, or the "marginal efficiency of

¹ For a somewhat fuller statement of these connections see my articles "Preiserwartungen, monetäre Störungen und Fehlinvestitionen," *Nationalökonomisk Tidskrift*, Vol. 73/3 (1935) (also a French version in the *Revue des Sciences Economiques*, Liege, October, 1935), and "The Maintenance of Capital," *Economica*, II (New series, August, 1935), particularly pp. 268 *et seq.*

capital," can be treated as a simple decreasing function of the quantity of capital goods in existence, or of the current rate of investment, will have to be abandoned, and with it much of the argument based on the supposed tendency of the "marginal efficiency of capital" to fall more rapidly than the money rate of interest. If past investment is often found to make further investment more rather than less profitable, this would also mean that the rise of the rate of interest towards the end of a boom—which so many authors believe can be explained only by *monetary* factors affecting the *supply* of loanable funds—can be adequately explained

by *real* factors affecting the *demand*. It shows, moreover, that a purely monetary analysis, which runs in terms of mere rates of investment without analyzing the concrete structure of these investments and the influence which monetary factors can have on this real structure of production, is bound to neglect some of the most significant elements in the picture. And, perhaps, it also explains why a careful analysis of the time structure of production (*not* in terms of an "average" period of production) is a necessary basis for a satisfactory analysis of the trade cycle.

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