OPTIMUM SAVING, INDIVIDUAL DECISIONS, AND THE DIMINISHING MARGINAL PRODUCTIVITY OF CAPITAL

The purpose of this note is to refute a fallacious argument in the problem of optimum rate of saving. The essence of the argument is that, as capital accumulation enhances the productivity of labour (and other non-capital factors of production), the social benefit of investment is not adequately reflected in the rate of return to the private investors. Savings undertaken by the individual savers, therefore, fall short of the social optimum. To show that this argument is widely held and to see the precise way it is argued, the following quotations are not out of place:

"...even if a perfect (italics added) market interest rate could guide private investors to maximise their welfare over time, it would not produce socially optimal investment decisions... Investment enhances the productivity of labour and other factors of production, and, as a result, increases their income. This is a cost to the private investor, who calculates his rate of return net of payments to other factors. But to society as a whole, those increased factor incomes should be treated as a gain. The social rate of return on investment, i.e., the marginal output-capital ratio, may therefore be much greater than the private marginal efficiency of capital."\(^1\)

"As time goes by, the rate of return on further investment falls. The faster accumulation takes place, the faster the wage rate rises and the faster the rate of profit falls. It seems that the benefit to 'society' from saving is not properly reflected in the 'reward' to the savers. How then does 'society' secure that the optimum amount of saving takes place?."\(^2\)

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1 M. S. Feldstein, "The Social Time Preference Discount Rate in Cost-Benefit Analysis," \(EcoNoMic\) \(JourNaL\), June 1964, p. 364.

"... when we are looking at the matter from the social standpoint, why should profitability be the criterion, even if we ignore external effects? (Italics added.) Why should not the social return on investment be regarded as being the total resulting addition to national output, without any such deduction of the values of other factors? In other words, why should it not be identified with the inverse of the capital: output ratio (Domar’s 'investment productivity')?"  

"... it is impossible to achieve a consistent solution of the saving problem on the basis of the individual saver’s decisions. The following two properties of the economic machine make for this impossibility. First, the volume of saving is assumed to be determined by the rate of interest. The rate of interest is equal to the marginal net productivity of investment. But because of the diminishing marginal productivity of investment, interest does not exhaust the net benefit of saving (investment). Thus savers get only a part of the new product resulting from investment, which must affect their marginal valuations (italics added) in making saving decisions. Secondly, even allowing for the deduction of the 'investment surplus', savers still do not get the full award for their abstinence from consumption, because as production increases real wages rise as well and a part of the new product is distributed as additional wages."

By arguments of *non sequitur*, Horvat pulls two rabbits (which are two sides of a non-existent coin) out of an empty hat, though the other authors quoted above find themselves able to pull out only one. We turn now to examine the reason why the hat is actually empty.

Employing the same arguments as those of the above quotations, one could argue that the supply of every factor of production falls short of the optimum. For example, one may say, "As the increased supply of labour enhances the productivity of capital (and other non-labour factors of production), the social benefit of labour is not adequately reflected in the payment of wages to the private workers. Labour supplied by the individual workers, therefore, falls short of the social optimum." Thus, Dobb should ask as well, "Why should wages be the criterion, even if we ignore external effects? Why should not the social return on labour be regarded as being the total resulting addition to national output, without any such deduction of the values of other factors? In other words, why should it not be identified with the inverse of the labour: output ratio?"

The whole mess is, of course, caused by inadequate understanding of the "marginal analysis." In the figure the horizontal axis measures the amount of capital, and the curve *P* measures the marginal productivity of capital.

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OA is the amount of capital stock at the beginning of the period under consideration. For this relevant period, therefore, the horizontal axis after A measures the amount of capital accumulation. The curve S is the marginal cost of saving or the supply schedule of saving, taking A as the origin. The intersection of the two curves at E determines the optimum amount of capital accumulation AB; EB being the rate of return for capital. Thus the total "social return" of AB amount of investment, i.e., the area ABEG is greater than the total payment to the investors (or savers) ABEF by the amount FEG. The extent to which "the productivity of labour and other factors of production" is enhanced by capital accumulation AB is measured by CDEG, as the pre-existing capital OA also suffers decrease in return measured by CDFG. However, the relevant question for efficient allocation\(^1\) is the relation at the margin. It can clearly be seen from the figure that at the margin the "social return" equals the "private return," both being EB; the marginal output-capital ratio\(^2\) is equal to the private marginal efficiency of capital. Thus, the marginal valuation curve of the savers is still the curve P, though they are not paid the whole area under the curve.

Only if a saver is in a monopolistic position so that he can influence appreciably the market rate of interest,\(^3\) will savings fall short of the optimum due to the diminishing marginal returns of capital. In this case, the more he himself saves, the smaller rate of return he gets. Thus, he will be guided by a curve marginal to the demand curve facing him (i.e., rates of interest at

\(^1\) Even for the problem of income distribution, capital is not entitled to claim the whole area under P curve, as every factor of production could then claim all of the social product, if it is indispensable in production. See the literatures on the "adding-up problem."

\(^2\) If the net figure is taken, and market imperfection and externality assumed non-existent.

\(^3\) This type of monopolistic power virtually does not exist, except in the case of Government's savings, especially in a centrally planned economy. But the Government should, presumably, ignore its monopolistic power and still be guided by the P curve.
different levels of his savings). Deviation from the optimum caused by this reason is, of course, similar to the common case of the monopolistic restriction in the commodity market. The argument criticised in this note, however, does not refer to this type of deviation, as is clearly indicated in the first quotation above.

We conclude that savings undertaken by the individual savers do not fall short of the social optimum owing to the fact of diminishing marginal productivity of investment, unless there is monopolistic power involved. The widely held argument criticised in this note is therefore clearly erroneous. Our argument does not mean, however, that individual savings may not fall short of the optimum owing to some other reasons.

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CURRENT TOPICS

The Annual Meeting of the Royal Economic Society was held at the British Academy, Burlington House, on July 2, 1970. Professor E. H. Phelps Brown, M.B.E., F.B.A., was elected President. Sir Alec Cairncross, K.C.M.G., F.B.A., (the retiring President), Sir Donald MacDougall, C.B.E., F.B.A., Sir Arnold Plant and Professor E. A. G. Robinson, C.M.G., F.B.A., were elected Vice-Presidents. The following were elected to hold office as members of the Council until 1975: Professor A. Beacham; Mr. C. F. Carter; Professor Miles Fleming; Mr. C. W. McMahon; Professor W. B. Reddaway, F.B.A.; Professor I. G. Stewart.

The meeting was informed that Mr. A. D. Marris, C.M.G., had asked to be relieved of the office of Treasurer that he had held since 1954. The Council had nominated Mr. W. M. Allen, who had served on the Council for many years to succeed him in that office. The meeting was also informed of the new arrangements for the conduct of the Society by which Mr. C. F. Carter would succeed Professor E. A. G. Robinson in the office of Secretary General, and Professor W. B. Reddaway and Professor D. G. Champernowne would be responsible with Miss Phyllis Deane for the editing of the Economic Journal.