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A THEORY OF THE RATE OF GROWTH OF THE DEMAND FOR LABOUR IN THE LONG RUN

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Introduction

Employment has grown at very different rates in different countries and at different periods of time. Both Ireland and the United Kingdom are unusual in having experienced declines in employment during many years since the Second World War. In Ireland, employment fell on average at about one third of 1 per cent per annum in the 39 years from 1947 to 1986.[1]

What is it that determines the rate at which employment grows over a long period such as that? Economists have been described as parrots who have learned to croak "supply and demand" in response to any question, and you can think of me, if you wish, as an old grey parrot. I shall croak almost entirely "demand", my aim being to sketch out a theory which will help us to understand which factors are important in determining the rate at which the demand for labour grows — or declines. However, although I am going to discuss the demand for *labour* I shall not be discussing the behaviour of aggregate demand for *goods and services*. Swings in *that* demand have been very important in explaining how the demand for labour changes over the trade cycle, and much attention has rightly been given to them. But it is the determinants of the demand for labour *in the long run* with which I am concerned, and theories about that have been, in my opinion, less successful. They have often relied on the concept of an aggregate production function, to which some very fundamental objections can be made, and have ended up by explaining observed changes in employment and capital input, together with the

1 For 1947-1967, these figures come from Kennedy and Dowling (1975). For later years they are from *OECD Economic Outlook*, December 1987.

associated changes in the shares of labour and capital income in total income, in terms of labour-using or labour-saving technical progress. Such concepts, I suspect, are examples of Clapham's "empty economic boxes" (Clapham, 1922). They are no more than labels. One does not help a man who knows he has hay fever by telling him that he is suffering from allergic rhinitis.

I confine myself to theory with a certain trepidation. In a lecture in honour of R.C. Geary one cannot ignore his criticisms of some economics and economists. What he held

> . . . in particular abhorrence is that dialectical immaterialism, that survival of scholastic philosophy in a field where it should never have had a place, taking the form of article, comments, rejoinders *et al ad inf.*, all participants playing the game according to the rules in which the hypothesis and therefore the conclusions (if any) bear no necessary relation to the facts of life (Geary, 1962, p. 317).

He was a great believer in quantification, and held "that the future of economics must lie with econometrics, including therein descriptive economics and interpreting 'econometrics' in its widest, in fact literal, sense" (ibid., p. 319). I plead in my defence that theory is a necessary stage in the analysis of facts, and that a single lecture is too short to enable one both to explain and to test a new theory. A proper understanding of the factors determining the demand for labour in the long run requires not just theory but a thorough historical investigation. Geary's views on these matters are right, in my opinion, and I trust that my forthcoming book on economic growth will show that this is not mere lip service I am paying.

My lecture contains a little algebra, which would have been child's play to Geary. He was contemptuous of purely literary economics, but I am not sure whether he would have approved of the introduction of eleven equations, and a diagram, in a lecture of this kind. His injunction was: "Always use the simplest methods to a given end: a philosophy which has the great advantage that one's argument is comprehensible throughout to the decision makers, non-mathematicians to a man" (ibid., p. 325). I don't know how many decision makers are present in the audience. Perhaps some of them are even mathematicians! I will do my best to convey the essential points of the argument to any who are not, since I entirely agree with Geary that "no matter how subtle the mathematics and the reasoning, the final arbiter is good sense" (ibid., p. 325-6).

Investment

The theory I shall outline stands, like the rest of us, on two legs. The first of these is a concept of investment which I believe can profoundly affect one's view of economic growth and development, although I do not expect to convince you of that in this lecture. Conventionally, investment is regarded as the accumulation of capital, which implicitly (and sometimes quite explicitly as well) is imagined as a physical substance such as corn, steel, meccano sets, tractors or, more fancifully, jelly. I want, instead, to return to the old idea of investment as a sacrifice of consumption, the cost of changing economic arrangements. In a static economy, there would be no change, and so no investment, and the whole of national output (net of maintenance expenditures) would be consumed. If the economy is to grow, it must change, and in order to bring that about consumption must be reduced, and the resources freed in this way must be devoted instead to altering economic arrangements. The commonest form of change is probably moving earth and stone from one place to another, but the cost of constructing machinery and vehicles is equally a cost of change, as are research and development expenditures, expenditures on developing new markets, arranging finance, and, of course, a great deal of human investment: education, training, and the movement of workers from one place to another. I will emphasise only one way in which this concept of investment differs from the conventional one. It leaves no room for a separate cause of growth called "technical progress". Since all change is due to investment, or to purely demographic factors which for convenience I treat separately, there is nothing left to be explained by technical progress. Hence my theory of employment cannot explain differences in the rate of growth of the demand for labour between periods or countries as being due to more or less labour-using or labour-saving technical progress. This inability, however, is not something for which I need to apologise.

Stylised Facts of Growth

The other leg of the theory is the simplification procured by the concept of steady growth, or the stylised facts of growth, as Kaldor first called them. He drew attention to certain constants in the historical growth experience of countries. Slightly modifying his list, I define steady growth as the constancy of the following five variables: g, the proportionate (strictly exponential) rate of growth of output, g_L, that of employment, λ, the share of labour income in total income, s, the corresponding share of investment, and r, the real rate of return to investment. Of course, all of these will vary over the trade cycle; but over long periods, say 10 to 40 years, I believe it is a reasonable first approximation to describe the behaviour of g, g_L, λ, s and r as if they were constant. Evidence in favour of this assertion is provided elsewhere.

Constancy of these variables over long periods does not mean that they are constant for ever. For example, g greatly increased in many countries after the Second World War, and it fell back again in many after 1973. There have been great variations also in g_L, s, λ and r between periods and countries. Any theory of growth, and of employment growth, must somehow allow for this variation. It is manifestly unsatisfactory to proceed, as did Harrod and Domar, as if the marginal capital/output ratio, or the rate of productivity growth, are technological data. For then the shifts which have occurred cannot be explained in terms of one's theory, but are attributed to that black box, technology, which, as I have already suggested, may be empty after all.

Further Preliminary Points

There are three further preliminary points I have to make. First, my theory refers only to the enterprise sector of the economy, and does not seek to explain employment in public administration and defence, health or education. Public enterprises are covered so long as their behaviour approximates to that of private enterprises, but if they are used to an important extent (as they undoubtedly are in some countries) as devices to mop up unemployment, then they must be left out.

Secondly, it is essentially a two-factor theory. Output is measured by value-added in terms of consumption units, whether for a whole economy or a single enterprise, and labour and capital are the only two factors which contribute to it. Purchases of materials or services from elsewhere are neglected – implicitly I am assuming that they maintain a fixed ratio to output. This is unsatisfactory, but it is a common enough device and I employ it so as to keep matters as simple as possible.

Thirdly, the theory deals with human investment in the following way. In principle, each worker is weighted by his relative marginal product before combining workers together into total labour input. Hence total labour input and its rate of growth, g_L, are *quality-adjusted* in this way. Most would accept that part-time workers should count for less than full-time workers. I count any worker who adds twice as much to output as another worker as twice as much labour input, whether this is because he works twice as many hours or because he works the same number of hours but twice as efficiently. This implies that more highly trained and educated workers count as more labour input than their less well-trained colleagues. The effects of human investment therefore show up, in my theory, as increases in labour input, and expenditure on human investment is consequently ignored, since its effects have already been taken into account. In all this I am following Denison's lead (see, e.g., Denison, 1967). Again, it is a simplification which is not altogether satisfactory, perhaps especially in a theory of employment. It begs the question of the effects of training and education on employment, whereas that ought to be a matter for investigation. This is perhaps the greatest weakness in the theory as it stands. It focuses on non-human investment, which I call *material* investment, as well as other variables affecting employment, and assumes that human investment can be dealt with by measuring g_L in the quality-adjusted way just described.

Investment, Output and Employment

Let me now proceed without further ado to outline my theory. Investment is the cost of changing economic arrangements. The changes are of many kinds, but I will select only two for analysis: the change in output and the change in employment. These will be referred to as the *characteristics* of a particular investment or of a whole set of investments. They can be measured by the change in output per unit of investment expenditure, q, and the change in employment per unit of investment expenditure ℓ. However, the units in which q and ℓ are expressed needs further explanation. These units are chosen so that, in steady growth, q and ℓ will be constant. The simplest way to achieve this is to define q and ℓ so that:

$$q \equiv g/s \tag{1}$$

and
$$\ell \equiv g_L/s \tag{2}$$

Thus, for example, if g = 0.04, g_L = 0.01 and s = 0.2, then q = 0.2 and ℓ = 0.5. Another way to put it is that q and ℓ are what the rates of growth of output and employment would be if the whole of output were invested with these average characteristics.

Labour Intensity of Investment

At any given time, businessmen are confronted by a set of investment opportunities from which they select some. There are numerous factors which determine their rate of investment, s, but I cannot discuss these here. There is far too much else to discuss. Another set of factors determines the labour intensity, or the labour characteristic, of investment. That *is* what I shall discuss, and I shall try to show that these factors can be divided into three. First, there is the rate of investment itself, s. Secondly, there is the share of labour incomes in total income, λ. Finally, there is a group of other factors which I shall label f and hold constant for the moment. These must refer to the nature of the investment opportunities available. Is it reasonable to begin by holding these constant?

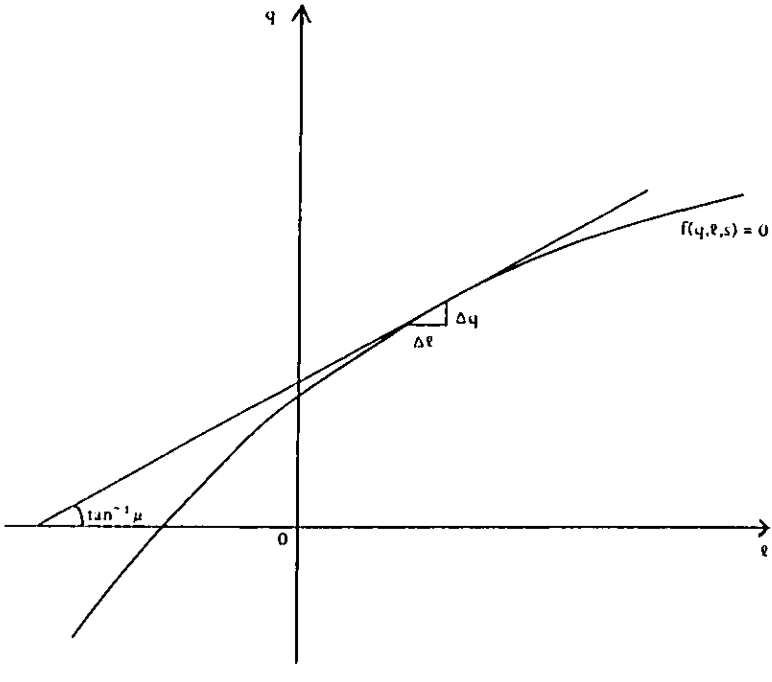
I think it is, and for the following reason. If, as I have argued, steady growth is a reasonable approximation to the experience of many countries over quite long periods, then it can be explained very simply in terms of the above variables with f constant. Thus let us assume that the investment opportunities are constant in the sense that f is constant. Assume also that s is constant – I have to take this here as an exogenous factor through lack of time. Then, as long as λ is constant, my theory will conclude that both q and ℓ will be constant. That conclusion will be explained presently. Now if s, q and ℓ are all constant, then we can see from (1) and (2) that g and g_L are also constant. This shows that four out of the five variables which are constant in steady growth will be constant so long as f and λ are constant. The fifth variable is r, and that, in fact, will also be constant in these circumstances, since it can be shown (but cannot be here, through lack of time) that:

$$r = q - \lambda\ell \qquad (3)$$

Let me comment a little further on the constancy of f and λ. My explanation as to why investment opportunities should always be there, so to speak, and *not* be exhausted by undertaking them, is that the very fact of undertaking them creates further opportunities. We see only a little way into the future, as in a glass, darkly. Each step forward reveals a little more of what is in front. There is no need to posit some *external* agency, and call it "technical progress", as in conventional theory. Changing economic arrangements, i.e., investment, itself is enough to change the opportunities which we can see. The hypothesis that they are *constant*, in the sense assumed, is simply a working hypothesis consistent with the empirical record of reasonably steady growth, and that is its justification.

The constancy of λ is a different matter. It is a necessary condition of steady growth, and it requires that real wage rates on average rise at the same rate as output per worker. This need not happen, and indeed has not happened in some countries and periods. However, if it does not happen, there will be consequences for the rate of growth of the demand for labour, and it is precisely these which my theory is designed to analyse.

In order to get to grips with this I must first discuss how the two characteristics of investment, q and ℓ, are each related to the other. It seems clear that, if businesses select investments which increase employment more per unit of investment, they must expect them also to increase output more per unit of investment. Unless this were so, the more labour-intensive investments would not be as profitable. The extra output is needed to pay the extra wages. Consequently, as ℓ increases q must also increase. It seems reasonable, however, to assume that the good old law of diminishing returns applies here. In other words, equal successive increments in ℓ will result in successive increments in q which diminish. If we now draw a curve relating q to ℓ on a diagram in which q is measured vertically and ℓ horizontally, then this curve will slope upward to the right and will also be concave when viewed from the origin (see the diagram). This curve refers to q and ℓ for a given rate of investment, s. It shows the maximum value of q



available for any given value of ℓ, since businesses will always want to increase output as much as possible for given increments of employment and given rates of investment. We could write the equation to this curve as $f(q,\ell,s) = 0$, and my assumption that f is constant is an assumption that this curve remains fixed. The question we must next answer is, what point on this curve will a business (or businesses in general, where the curve refers to a whole economy) select?

A Static Firm in a Static Economy

I shall answer this question first for a static firm in a static economy, since that helps one to see the answer for a growing firm in a growing economy. The static firm is going to undertake a small, once-for-all, amount of investment. Let it invest at a rate s for a short interval of time δt. We can imagine it comparing successively more and more labour-intensive investments. Moving along the curve from left to right, successive increments in ℓ, $\Delta\ell$, result in successive increments in q, Δq. The ratio $\Delta q/\Delta\ell$, which I shall call μ, will diminish as one moves along the curve. Somewhere along the curve the optimum value of μ will be reached.

Consider a marginal move along the curve to the right, that is, compare the alternative investments, one slightly more labour intensive than the other. Let the existing level of output be Q, and the difference in level resulting from the choice of the more labour-intensive investment be δQ. Then, if we express this difference in proportionate terms, $\delta Q/Q$, it will, by our earlier definition of q, and if δt is infinitesimally short, have a limiting value equal to the rate of investment, s, multiplied by the addition to q, that is Δq, and by the time interval δt. Hence:

$$\frac{\delta Q}{Q} = s \,.\, \Delta q \,.\, \delta t \qquad (4)$$

By similar reasoning, the proportionate gain in employment is:

$$\frac{\delta L}{L} = s \,.\, \Delta\ell \,.\, \delta t \qquad (5)$$

Now when we have reached the most profitable point on the curve there will be no further gain to be made by moving still further to the right along it. At this point, therefore, the value of the extra output will just equal the cost of the extra labour. If the wage-rate is w, measured in terms of output, then at this point:

$$\delta Q = w \, . \, \delta L. \tag{6}$$

From (4), (5) and (6) it follows that:

$$\mu \equiv \frac{\Delta q}{\Delta \ell} = \frac{w.L}{Q} \equiv \lambda \tag{7}$$

In words, that point will be selected by the profit-maximising businessman where the slope of the curve equals the share of labour income in output. More labour-intensive investments will thus be chosen the lower is this share, since μ, the slope of the curve, becomes lower the further to the right we move along it. For given initial output and employment levels, the share of labour income depends on the real wage. The lower is that wage, the bigger will be the increments in both employment and output which firms will choose to secure from a given, once-for-all investment.

A Growing Firm in a Growing Economy

So much for a static firm in a static economy. Let us now consider a steadily growing firm in a steadily growing economy. Fortunately, a great deal of the preceding argument carries through to this case, but there is one crucial difference. The thought-experiment now is no longer about a once-for-all change in levels of output and employment which will persist for evermore. Instead, I ask you to imagine the firm altering its investment programme for a short period of time so as to give it a slightly more labour-intensive form. It then relapses back into steady growth. As a result of choosing more labour-intensive investment for a short while, both output and employment will be higher than they would otherwise have been, and these new larger amounts of output and employment will then continue to grow at the previous rates, which we may call g and g_L. To secure this, the same *share* of investment is required as before, s, and this means that the absolute *level* of investment must be higher, because output is higher. It is this requirement for more investment which, as we shall see, makes the crucial difference between the static and the steadily-growing firm.

As before, we consider marginal moves along the curve relating q and ℓ and seek to identify the optimum point and the slope of the curve at that point, μ. Equations (4) and (5) for incremental output and employment levels are unchanged. Equation (6), however, now has to be modified.

For a growing firm it is insufficient to say that its objective is to maximise profits. Instead, let me at this stage assume that its objective is to maximise the value of the firm to its owners, that is, the discounted present value of the firm, which should equal the market value of its share capital. I assume that its owners value the firm by estimating the future amounts of money which they will *take out* from it, whether by way of dividends or capital distributions. For a firm in the simple case I am considering here, where there is neither taxation nor lending nor borrowing, so that all investment is financed out of profits, take-out is equal to profits minus investment, and so to output minus both wages and investment. For a steadily-growing firm with output growing at g, and with the shares of both wages and investment in output constant, take-out must also be growing at g. The value of the firm is then the discounted present value of this steadily growing stream of take-out.

The value of the firm will be unaffected by any change which leaves both the amount of take-out and its rate of growth unaffected, as well as the rate of discount. Now for the firm we are presently considering, both the rate of growth and the rate of discount are unchanged after the small deviation in its investment programme has been completed, since the firm by assumption relapses back into its previous state of steady growth. The only question is, then, what has happened to the rate of take-out. In the static case we selected the point on the q, ℓ curve where further movement to the right no longer increased profits. To find the optimum point now we must select the point where further movement to the right leaves take-out unchanged. Hence, instead of Equation (6) we put:

$$\delta Q = w.\delta L + \delta S \qquad (8)$$

The extra output now has to pay for both the extra labour *and* the extra investment. How much is that extra investment? It is the amount needed to maintain the previous share of investment in output, s, given that the level of output is now δQ higher. It must therefore equal $s.\delta Q$. Hence (8) becomes:

$$\delta Q = w.\delta L + s.\delta Q \qquad (9)$$

From (4), (5) and (9) it follows that:

$$\mu \equiv \frac{\Delta q}{\Delta \ell} = \frac{wL}{Q(1-s)} \equiv \frac{\lambda}{1-s} \qquad (10)$$

In a growing economy, therefore, the labour-intensity of investment will be higher not only the lower is the share of labour income, λ (as in a static economy), but also the lower is the rate of investment, s. In the completely static case, with $s = o$, we get back to our earlier formula (7) in which $\mu = \lambda$.

One must not jump to the conclusion that a low rate of investment is necessarily good for labour demand. Indeed, the opposite could well be the case. We are now concerned with g_L, the growth of employment desired by the firm, and that equals the *product* of ℓ and s. Lower s thus has two opposite effects on g_L. For given λ, it tends to raise ℓ,[2] which is beneficial, but it also directly reduces the amount by which ℓ is multiplied to give g_L, and that could be harmful. The net effect of these opposing influences could go either way. Furthermore, λ may not remain constant when s changes, and much may depend on what it is that has caused s to change in the first place.

The theory so far has focused on only two strategic variables, λ and s, as determining the rate of growth of demand for labour, g_L. I want now to mention four others which I believe to be important, and to indicate how they can be

2 It does this, first, because it increases the denominator on the right-hand side of Equation (10), thus reducing μ and moving the optimum point rightwards along the f-curve in the diagram. Secondly, if there are diminishing returns to the *rate* of investment, s, the f-curve is shifted out from the origin, and this also tends to increase ℓ as well as q on plausible assumptions. In the sequel, I neglect this species of diminishing returns, and proceed as if the position of the f-curve were independent of s.

fitted into the framework of the theory. These four additional variables are the degree of monopoly, animal spirits, taxation of savings or investment, and cheapness and ease of borrowing.

Degree of Monopoly

My imaginary firm so far has been assumed to sell and buy in perfect markets. If there is extra output to be sold, or labour to be employed, I have assumed that the extra receipts in the first case, and the extra costs in the second, are correctly measured by the relevant prices (i.e., price of output and wage-rate for labour). In the simplest case of monopolistic competition (which is all I shall consider here) it is marginal revenue rather than the price of output which is relevant. In order to sell additional output, either prices must be cut or else extra selling costs (for advertising, packaging, more salesmen, etc.), must be incurred. Hence each additional unit of output adds to sales revenue, let us say, only η times as much as it would if markets were perfect, with η perhaps appreciably less than 1.[3] Without reworking the previous argument, I will merely assert (what may be intuitively obvious to some) that Equation (10) needssto be modified by substituting η for 1. Hence, for given λ and s, this makes μ bigger, and the firm then selects less labour-intensive investments as a result. It thus appears that the less competitive the product markets (i.e., the lower is η) the slower will the demand for labour grow, unless there are offsetting effects on λ or s.

Animal Spirits

Clearly, there could be some such effects. One might expect that a greater degree of monopoly would increase the share of profits and reduce that of labour. However, it is a second kind of effect, on "animal spirits", which I want to consider next. In the argument so far I have assumed that managers seek to maximise the value of their firms to their owners.

3 If ϵ is the price elasticity of demand for a monopolist's output, defined so as to be positive, then the ratio of marginal revenue to price is given by the well-known formula: $\eta = 1 - 1/\epsilon$.

There is, however, a considerable body of opinion (Baumol, 1959; Marris, 1964; Williamson, 1967) which casts doubt on this, and which suggests that managers may give more weight to sheer size or growth than is in the interest of the owners. It has been pointed out, for example, that managers' pay is often more closely geared to size than to profitability, and that motives of power and prestige drive them in the same direction. I am in sympathy with these ideas, and believe that there is evidence to support them. How can they be incorporated in my theory?

The simplest way to allow for them is perhaps as follows. Let there be a premium which managements attach to output such that each unit of output is valued at *an* (for "animal spirits") in excess of its contribution to revenue or profit. The existence of this premium will lower the rate of return to investment required by management so that it will lie below the rate of discount of the firm's owners. Management will thus give more weight to achieving growth than the owners would like, and the value of the firm (i.e., the share value, if its shares are quoted on the stock exchange) will not be maximised. The same premium will also affect managers' choice in regard to the labour intensity of investment. They will choose more labour-intensive investments than if they were trying to maximise the value of the firm. Animal spirits (*an*) therefore come into Equation (10) as an addition to the marginal revenue of extra output. They therefore offset monopoly, and in place of unity in Equation (10) we must put $\eta + an$.

There is, indeed, some reason to believe in the happy result that the smaller is η the bigger will be *an*, so that the bad influence of monopoly on employment and resource allocation is offset, at least to some extent, by a strengthening of animal spirits. One reason for this is that an increase in the degree of monopoly (i.e., a fall in η) relaxes the financial constraints on management. They can, in effect, take out the extra potential profits in the form of higher output and greater employment, without worsening the position of shareholders. Furthermore, it is extremely difficult for shareholders to monitor what is going on. Two firms could have identical profits, capital, average rate of return, and dividends, one in a much more competitive situation than the other, and yet be indistinguishable to shareholders. The firm in the less competitive situation, by restricting output, raising prices, and discharging labour, could increase its profits and the firm's value to its shareholders, but the latter have no easy way of identifying that possibility. Circumstances *could* arise, however, in which the differences between the firms would be revealed. If profits are squeezed powerfully, as they have been in many countries in recent years, then the struggle for survival may compel the firm in the less competitive situation to pay more attention to actual profits. "Animal spirits" will then weaken, and employment and output will fall. I believe this has indeed happened.

This may be the right place to mention demand expectations, which some may feel should have been referred to much earlier. There is little doubt that the demand for labour in the short run is powerfully influenced by businessmen's expectations about the demand for their products. In long-run growth theory, however, the focus is usually on supply, that is, on the factors determining capacity to produce. It is assumed that, one way or another, total demand for output will adjust to total supply, so that it is the growth of capacity which really matters. I do not propose to depart from this customary procedure, since the question of how capacity and demand expectations interact is much too big a subject for me to embark on here. You are welcome to assume either that the economic system, without government intervention, ensures that expectations adjust to whatever it is that determines capacity, which must include those expectations themselves, or, if you prefer it, that government intervention ensures that the ratio of output to capacity remains roughly constant. I should, however, point out that "animal spirits" are not the *same* as demand expectations, and that the latter really require a separate analysis.

Taxation

Next, let us consider how taxation could affect the situation. Taxation of employment, which is probably the most important source of revenue since it includes not merely income taxes and social security contributions but also all expenditure taxes that bear on the earnings of labour, could have important effects, especially in the short run when there may be successful real wage resistance. However, the analysis of these effects takes us into questions of labour supply (which I consider very briefly later), and I am concerned here with demand. I therefore pass on to a lesser source of revenue which is, all the same, important in this context, namely, the taxation of saving and/or investment.

To see how this comes into Equation (10), it is easiest to take a very simple form of tax, say a uniform expenditure tax on investment, although I do not know of any practical example that takes just that form. If the tax-inclusive cost of saving or investment is denoted by an asterisk, it is then clear that we must put s^* for s in Equation (10), since, in our earlier argument, take-out will be reduced by these taxes when investment is increased to maintain the rate of growth unchanged. The effect of imposing, or increasing, such taxes will depend on how λ and s react. If both were to remain unchanged, then, since μ would increase, a less labour-intensive form of investment would be chosen, and so the rate of growth of the demand for labour would slow down. If λ remained unchanged but s fell by the full amount of the tax, then the labour-intensity of investment would be unchanged but the fall in s would reduce the rate of growth of the demand for labour again.

Actual taxes on savings or investment take many forms, and, of course, there are subsidies as well. Income tax is a tax on savings as also is profits or corporation tax, but their impact is lessened by more or less generous provisions for depreciation, and by investment grants. There are also wealth taxes and property taxes which fall on savings or investment. Tax systems in many countries differentiate between different forms of investment, different industries, different tax payers, and different types of finance. The result is often a confused welter of different tax and subsidy rates which are very difficult to summarise.[4] They may significantly reduce the efficiency of investment as well as increasing uncertainty in the

4 For a valuable attempt, see King and Fullerton (1984) and McKee *et al.* (1986). For a criticism of some of their formulae, see Scott (1988).

minds of businessmen, since the systems and rates keep changing. As a broad generalisation, I suspect that this differentiation and uncertainty act like a further increase in the average tax rate on saving or investment, without the benefit of raising more revenue.

Borrowing

The last factor I shall attempt to deal with is borrowing. My neglect of it thus far is unconventional, since it is more usual to start from the assumption that all firms have access to a perfect capital market where they can borrow unlimited sums at the unique market rate of interest. My assumption of complete reliance on self-finance is the opposite of this, and is a good deal nearer to reality. If one subtracts investment in financial assets from borrowing, the net sums remaining on average finance only a small proportion of real gross investment in the USA and the UK and, I suspect, in most other developed countries. Hence, at least for the average firm, it seems that borrowing is not of the first importance in this context. Nevertheless, it is important for some firms, and one would like the theory to cover it. My suggestion as to how this can be done is as follows.

If the funds borrowed cost the same, net of tax, as the rate of discount used by the firm, which should also be the marginal return earned on its investments, then borrowing makes no difference to Equation (10). If, however, as is more likely, funds can be borrowed at an average cost which is below that rate of discount, then this reduces the effective cost of a given rate of investment to the firm, and so acts as an offset to taxes on saving or investment. Further analysis of this could be quite complicated, so I will not pursue the matter. Instead, let s^* now represent the cost of saving to the firm gross of taxes and net of gains resulting to the owners from being able to finance part of the investment through borrowing. This implies that in some circumstances s^* could be less than s, the true cost of investment in terms of consumption forgone. Since borrowing acts like negative taxes, i.e., like subsidies to investment, there is no need to repeat what was said earlier about their effects on the rate of growth of the demand for labour.

Synthesis

My theory of the determinants of the rate of growth of the demand for labour has covered a number of variables which I believe are important and which are brought together in Equation (11): the share of labour incomes in total output, the share of investment in output, the degree of monopoly, animal spirits, taxation of savings or investment, and the cost of borrowing.

$$\mu = \frac{\lambda}{\eta + an - s^*} \tag{11}$$

A brief discussion of the rate of growth of the supply of labour and of the process which brings it into equality with that of demand is now in order, by way of conclusion.

As I said at the beginning, the theory refers to labour demand by essentially private enterprises. In so far as public enterprises behave similarly, they can be covered as well. Nowadays, however, the rest of the public sector is a large and growing source of employment. The rate of growth of labour supply to the enterprise sector can be greatly influenced by what is happening to employment in the public sector, and in some countries the latter has been used as a means of mopping up incipient unemployment. In some countries too emigration and immigration are very important. A visitor to Ireland who omitted to mention that would soon be put right. A third reason why the supply of labour to the enterprise sector may be fairly elastic is the willingness of women to enter or leave the labour force.

In the end, however, the level of real wages, which determines the share of labour income in the enterprise sector for a given level of output, has to adjust so as to match the growth of labour demand to labour supply. I have treated λ as if it were exogenous in discussing the factors determining the growth of labour demand, but when supply is brought in it becomes endogenous. This conclusion is fiercely resisted by some. I do not deny that there are other factors which influence the rates of growth of both demand and supply. My lecture has, I hope, discussed some of the most important ones, including some which could be influenced by government policy. But that still leaves the share of labour income in output, and the average real wage (before deduction of taxes on labour), as matters of key importance.

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