

Payroll Taxes: Capital Grants and Irish Unemployment

FRANK BARRY*

University College, Dublin

I INTRODUCTION

A recent OECD study concluded that no other member country had a tax/subsidy system as biased against the use of labour as the Irish. This view of the flawed nature of the Irish system has, however, been disputed by many commentators.

The question to be pursued here is whether these disagreements stem from conflicting views of the causes of the prevailing unemployment problem. In an earlier paper, Barry (1987b), I attempted to identify the various macro-economic perspectives on unemployment that distinguish the competing schools of thought in Irish economic debate from one another; three views in particular emerged: firstly, the Classical small-open-economy view that production is cost-constrained; secondly, the neo-Keynesian view that aggregate-demand deficiency is also important, and thirdly, the Structuralist view that barriers to world-market entry represent the major growth-inhibiting constraint facing a late-industrialising economy such as Ireland's.

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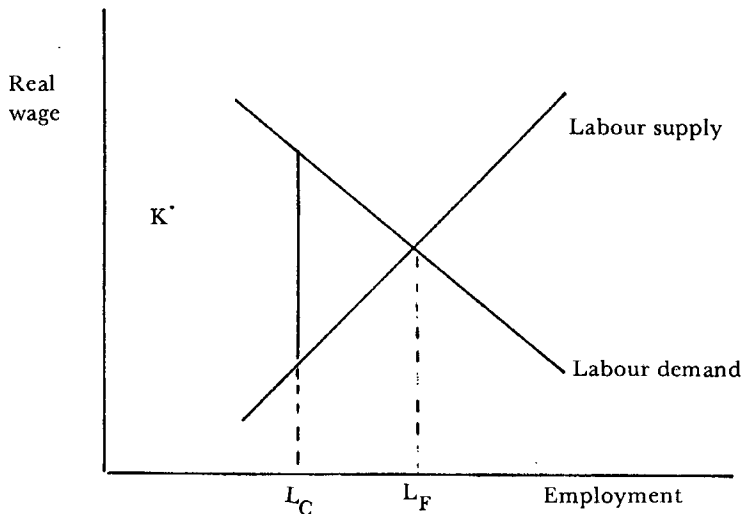
In the present paper I consider the role of capital and labour subsidies within the context of each of these perspectives, and conclude that a strong argument can be made in each case for at least partial replacement of the current programme of investment grants (which function as *marginal* capital subsidies) by an alternative policy of marginal payroll-tax reductions.

II FACTOR SUBSIDIES UNDER CLASSICAL UNEMPLOYMENT

The pure small-open-economy (SOE) model postulates, as a first approximation, that the Irish economy can be considered to consist of perfectly competitive firms producing internationally-traded goods at prices determined exogenously on world markets; as a small actor on these markets the economy is assumed to be able to sell as much as it desires to produce. There can be no demand-deficiency under these conditions, and the level of employment and production will be determined solely by the structure of costs that firms face.

Within this model any unemployment above the frictional level must be of the Classical (excessive-wage) variety. This is illustrated in Figure 1 below, where the level of activity denoted L_F is taken as our measure of full employment; it occurs at the intersection of the initial labour-supply and neo-Classical labour-demand functions. Much attention has been focused in recent years on the "tax wedge" as a factor capable of driving the economy below L_F (see e.g., Walsh (1987a, 1987b), Murphy (1987), Bean, Layard and Nickell (1986)). By widening the gap between employers' real labour costs and the real after-tax wage received by employees, taxation reduces employment to the level L_C .

Figure 1: *The Labour Market, Indicating Employment Effects of the Tax Wedge and of Keynesian Recession*



Other factors which may operate to reduce employment in this Classical fashion include trade union activity or changes in the replacement ratio.

If factor subsidisation is to be used to combat Classical unemployment, can it be shown that labour subsidies are preferable to capital grants? The standard message emerging from the literature on optimal intervention – that intervention should be directed as closely as possible to the source of the distortion – is applicable in a straightforward fashion in this case: the essential distortion under Classical unemployment is that labour costs are excessive, and a policy of reducing the cost of labour attacks this distortion directly.

The effects of factor subsidies under Classical unemployment can be demonstrated in the following stripped-down version of the SOE model employed in Barry (1989) for this purpose. Since output prices are exogenous, let us hold them constant and set the price level at unity. Hold the real wage, w , constant at a level sufficiently high to generate unemployment and let the interest rate, r , be determined exogenously by international capital mobility.

Now consider the effects of a labour subsidy, m , and an investment subsidy, g , on the decisions of SOE firms. Profits, p , are:

$$p = F(K_0 + I, L) - r[K_0 + I(1 - g) + bI^2] - (w - m)L \quad (1)$$

where $F(K, L)$ is a constant returns to scale production function in capital and labour, K_0 is the initial capital stock, I is investment (whether net or gross investment is subsidised is irrelevant to the issue at hand, so depreciation is ignored), and bI^2 represents the capital-adjustment cost (resulting from factory-floor disruption, for example).

The first-order conditions for the solution of this optimisation problem are:

$$F_L(K/L) = w - m \quad (2)$$

$$I = (F_K/r + g - 1)/2b \quad (3)$$

The first condition represents the familiar equality between the marginal product of labour and employers' real wage costs. The latter therefore determines the capital-labour ratio. This in turn feeds into the investment equation via the marginal product of capital, and combines with the interest cost of capital and the investment subsidy to determine the capital stock, and hence also the level of employment. Investment is therefore seen to depend, reasonably, both on interest rates and on factors influencing profitability.

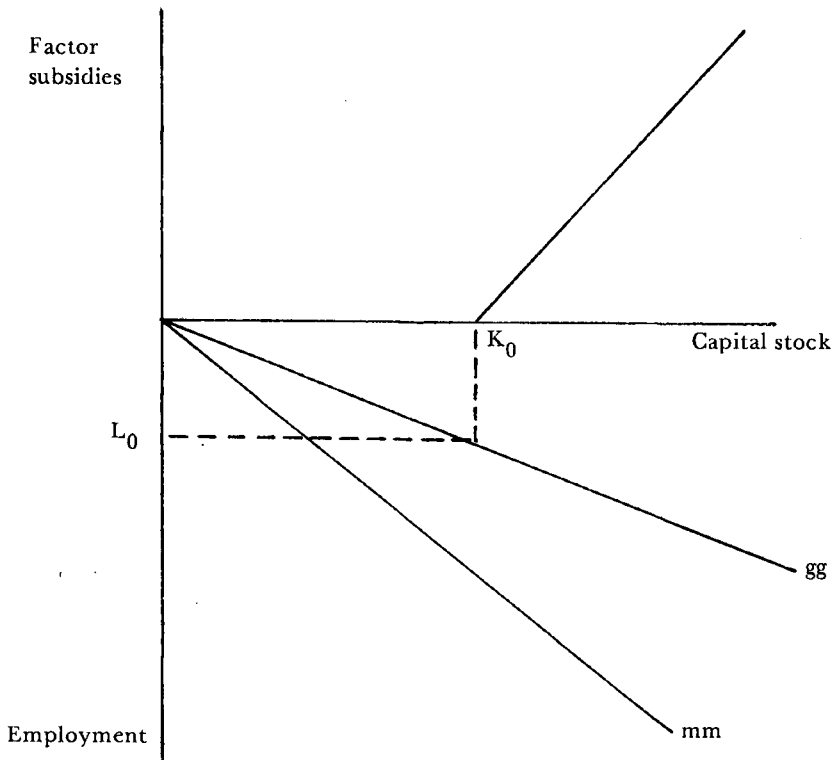
The end-period value of the capital stock, denoted by an asterisk, is therefore:

$$K^* = K_0 + (F_K/r + g - 1)/2b \quad (4)$$

An increase in either subsidy under these Classical conditions raises both K^* and L^* , although the labour subsidy, by reducing the capital-labour ratio, generates more employment per unit of capital as long as substitution possibilities exist either in production techniques or in the choice of goods to be produced.¹

This outcome is illustrated in Figure 2, in which K_0 and L_0 represent the initial equilibrium of the economy in the absence of any subsidies. The top panel of Figure 2 shows the positive impact that either subsidy exerts on the capital stock, while the bottom panel depicts the relationship between the

Figure 2: *The Impact of Factor Subsidies under Classical Unemployment*



1. Under alternative assumptions concerning the production process a capital grant could induce substitution against labour. This would strengthen the case being made here.

resulting stock of capital and the employment level. An investment grant causes the economy to move out along the ray marked gg , while an employment subsidy induces movement along mm , which is more steeply sloped because of the lower capital-labour ratio generated by this policy.

In terms of employment creation, therefore, it is clear that in the Classical case labour subsidies are at least as good as capital subsidies, and are better if factors are substitutable in any way.²

Two further issues must be mentioned at this stage. The first concerns the response of wages to policy intervention. Wage demands, realistically, are influenced by the degree of tightness or slackness in the labour market. Policies which increase the demand for labour will therefore exert upward pressure on wage costs, and the subsidies will be "shifted" to some extent onto employees. It is shown in an appendix to Barry (1989) that allowing for this possibility does not affect the relative positions of capital and labour subsidies in the policy hierarchy. The employment effects already discussed serve as a crude measure of employees' ability to reap wage increases in this fuller model in which smaller employment effects would occur alongside wage gains.

The other issue to be taken into account is the tax cost of these public-sector programmes. In his classic discussion of the theory of optimal intervention, Corden (1974, p. 48) argued that "policies at the top of the hierarchy are those which are directed precisely to the point of the divergence; relevant subsidies required will then cost rather little, less than when the subsidies are less discriminating." For the case under discussion the validity of Corden's speculation has been demonstrated, again in Barry (1989), when *marginal* labour subsidies are compared with investment grants, since the latter, to achieve any given increase in employment, require more capital than a programme of labour subsidisation would, because of the differential impact of the policies on the capital-labour ratio.

The proof is as follows. The first-order conditions, (2) and (3) above, imply:

$$dK/dg = 1/2b \quad (5)$$

$$dL/dg = (L/K)dK/dg \quad (6)$$

$$dK/dm = (L/K)(1/r)(1/2b) \quad (7)$$

2. Defenders of current IDA practices, in response to an earlier version of this paper, have suggested the following scenario within which the above conclusion would be invalid: all goods are produced with a given technique of production; within the conceivable domain of Irish factor prices there is a severely limited choice of goods which could be produced; and foreign industrialists would misread any subsidisation of labour as an indicator of inferior quality. Readers must decide for themselves how realistic a view of the world this is.

and

$$dL/dm = (L/K) (dK/dm + L/F_L') \quad (8)$$

where F_L' is the derivative of the marginal product of labour with respect to the capital-labour ratio. Consider levels of g and m that generate equal increases in employment. The cost per period of the investment subsidy is rg times the amount of investment it stimulates, which is rgK/L times the amount of employment stimulated. The tax cost of the labour subsidy, on the other hand, is m times this amount of employment. Is $rgK/L > m$? By the assumption that the subsidies are set such that equal increases in employment are generated, we have $g = m(dL/dm)(dL/dg)$, so the proof requires that $r(K/L)(dL/dm) > (dL/dg)$. Substituting in the values derived in the equations above quickly reveals that this is so.

III FACTOR SUBSIDIES UNDER KEYNESIAN UNEMPLOYMENT

So far we have been considering only Classical unemployment. As far back as 1981, however, Patrick Honohan showed that foreign demand exerts a significant effect on Irish export quantities independent of its impact on prices, a finding inconsistent with the complete supply-side nature of the SOE model.

The significance of aggregate demand in production and employment-determination in Ireland is also apparent from the results reported in Walsh (1987a), who concludes that:

an increase in the Irish (structural) budget surplus increases the level of unemployment and lowers the rate of real GNP growth *for a given rate of EEC growth* . . . For a given fiscal stance, Irish GNP growth reflects that in the EEC very closely, while Irish unemployment seems to vary slightly more than proportionately with EEC unemployment.

These results clearly point to the inadequacy of macroeconomic models which ignore the impact of demand, and particularly foreign demand, on SOE employment and production. There is a good deal of consistency in the messages emerging from empirical studies of current European unemployment that aggregate demand deficiency has played a major role over the course of the 1980s, even in the small open economies. The results of Bruno and Sachs (1985), updated in Bruno (1986), broadly concur with those of Bean, Layard and Nickell (1986) who conclude that while supply-side factors have played a significant role, nevertheless "the decline in demand, relative to potential, seems to have been an important proximate cause of the rise in unemployment, especially in the European Community".

The next step in the analysis of factor subsidies, then, is to study their

impact under conditions of Keynesian (demand-deficient) unemployment. A Keynesian recession arises when a reduction in aggregate demand is met by wage and price stickiness, so that the displacement of resources from declining sectors does not create an incentive for other sectors of the economy to expand and take up the slack. What is the status of the neo-Classical labour demand function depicted in Figure 1 under these conditions? Recall that this curve was drawn under the assumption that all firms could sell as much as they desired to produce at going world prices. This assumption is now clearly violated; even with real wages remaining at their full-employment levels, firms reduce employment because of the demand constraint they face in output markets, and the employment level for the economy lies to the left of the neo-Classical function, at a point such as K.

This case can be modelled by assuming that the economy faces a constraint whereby exports cannot exceed the fixed level X_0 which represents the deficient level of foreign demand:³

$$X_0 \geq F(K_0 + I, L) - I - bI^2 - C(Y) + M(Y) \quad (9)$$

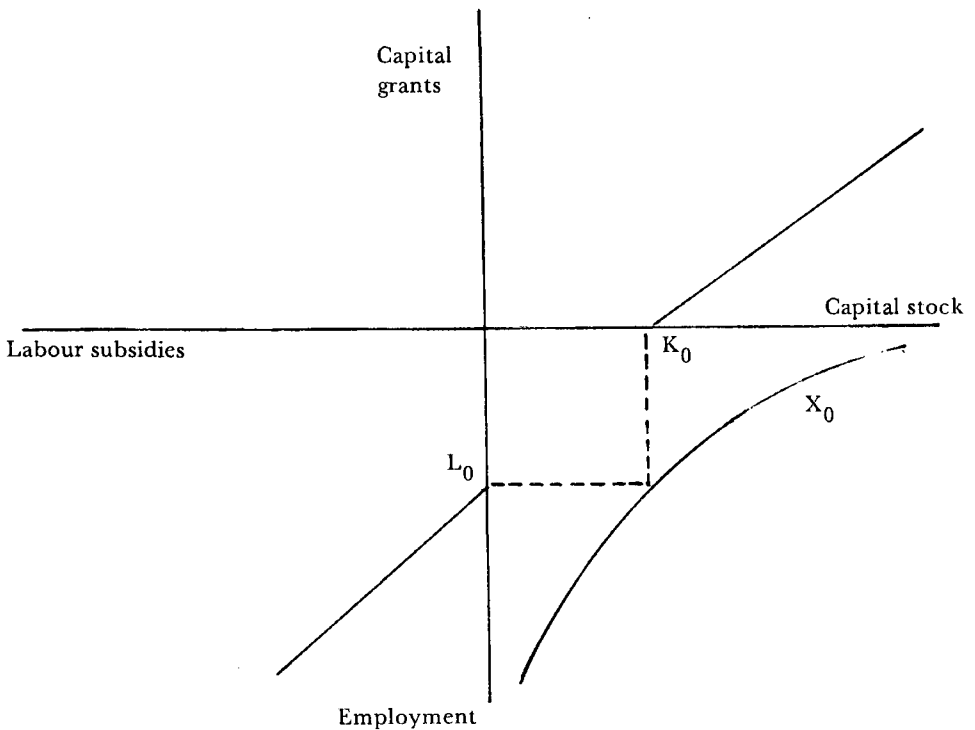
$C(Y)$ in this equation is a simple Keynesian consumption function, $M(Y)$ is domestic demand for the composite import good, and direct government expenditures are ignored. Firms must now take this constraint into account when maximising profits, and, as Barro and Grossman (1971) pointed out, the marginal product of labour and the real wage (assumed constant) will no longer be equated. This changes dramatically the nature of the impact of factor subsidies, as analysed in detail in Barry (1987a). A diagrammatic treatment will suffice for present purposes.

The constrained export level can be represented as the isoquant in the south-east quadrant of Figure 3. An investment subsidy, as illustrated in the north-east quadrant, raises the stock of capital, but this simply displaces labour because it has no effect on the demand constraint in the long run.⁴

The substitution effect of factor subsidisation therefore manifests itself in the Keynesian case while the output effect has been seen to dominate under Classical conditions. A labour subsidy under present circumstances would exert a substitution effect in the opposite direction, as seen in the southwest panel, leading to an increase in the level of employment.

3. On the export sales constraint see Moore (1989) and the references cited therein.

4. It might be argued that attracting multinational companies to locate in the domestic economy could relax the export demand constraint because of their highly developed marketing and distribution systems. This would simply mean that Keynesian and Classical unemployment were less dissimilar.

Figure 3: *The Impact of Factor Subsidies under Keynesian Unemployment*

The conclusion to be drawn from the analysis of the present section, therefore is that the dominance of labour subsidies over capital grants is even stronger under Keynesian conditions.

IV FACTOR SUBSIDIES UNDER IMPERFECT COMPETITION

The discussion of Keynesian and Classical unemployment in the preceding two sections of the paper has been based on the assumption of perfectly competitive firms. Not only is this empirically unlikely, and unduly restrictive in that firms in this scenario may be either cost-constrained or demand-constrained but not both, it is also basically incompatible with the arguably-realistic assumption that prices may remain at disequilibrium levels for substantial periods of time. The trend amongst many macroeconomists in recent years has therefore been to model the goods market in terms of imperfectly-competitive firms.

Hickman (1987) and Coen and Hickman (1987) have studied OECD unemployment in a model in which firms set prices as a markup over normal

costs, and choose inputs of capital and labour to minimise the cost of producing the output they expect to sell at the price they have set. The demand for labour is therefore dependent simultaneously on the level of effective demand and on the wage-rental ratio. Keynesian unemployment in this scenario occurs when output is below its potential level, while Classical unemployment exists if the current real wage exceeds the real wage that would generate full employment if output were at potential. The results reported paint a surprisingly similar picture to the one emerging from Bruno and Sachs' analysis, in terms both of the differences between the structure of European and North American unemployment, and in the breakdown of the overall period into subperiods in which Classical or Keynesian factors dominated.

The Coen-Hickman model cannot, of course, be taken as a realistic representation of the Irish economy, no more than the pure SOE model can be accepted as a valid depiction of the multinational sector of Irish manufacturing industry. The assumption of constant-markup pricing is particularly inappropriate given the number of empirical studies, including Browne (1982) and most recently Callan and Fitz Gerald (1989), which show that domestic costs do not exert a significant influence on Irish export prices.

As I suggested earlier in Barry (1987b), the "kinked oligopoly demand curve" model, depicted in Figure 4, provides us with a framework within which these results on the exogeneity of export prices are compatible with Honohan's finding that exporters may be demand-constrained on world markets. Sweezy's (1939) formulation of the demand curve was based on the conjecture of the firm that its rivals would match any price decreases that it were to make, so that the impact on demand for its products would be minimal, while competitors would not be expected to follow suit were it to raise its prices. Negishi (1979) provides an alternative interpretation, as follows: "Lower prices asked by a supplier may not be fully advertised to customers buying from other suppliers who are maintaining their current price, while a higher price charged by the same supplier necessarily induces present customers to leave in search of lower price suppliers".

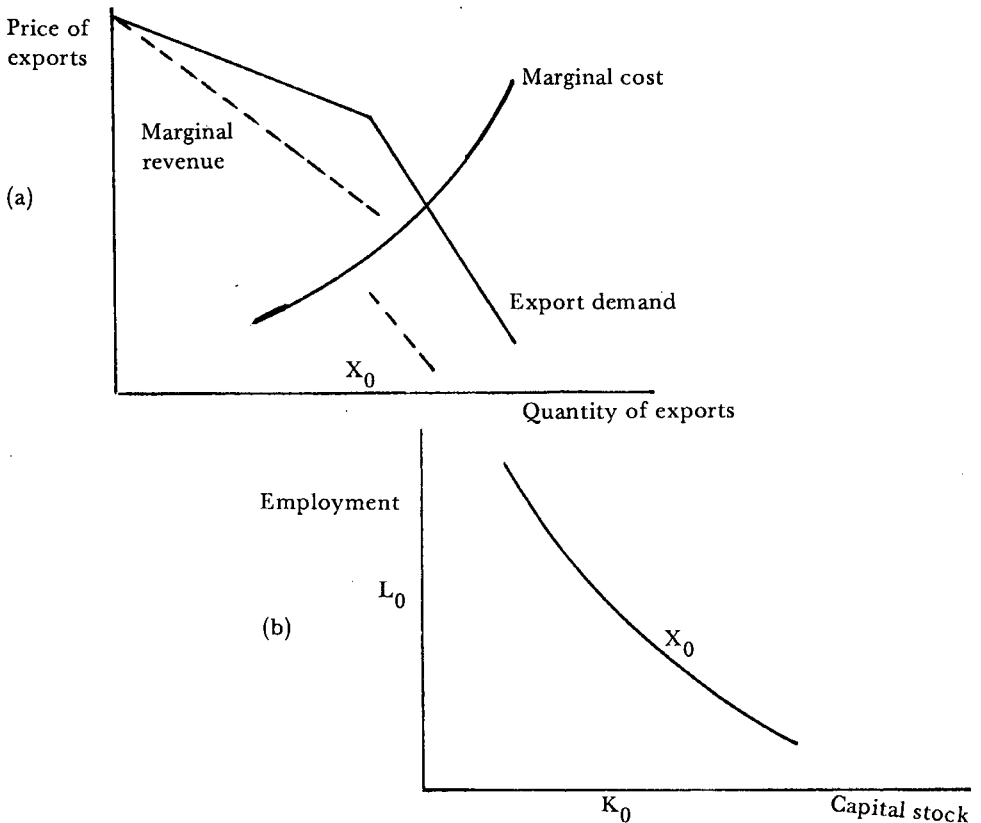
Interestingly, Kennedy and Foley as far back as 1978 suggested that the Irish export sector might fruitfully be viewed in this light, and the thrust of my argument in Barry (1987b, section 4) was that such a model seemed to capture some of the important aspects of the macroeconomic perspective of the Structuralist school, associated in Ireland with the work of Eoin O'Malley (1989), which emphasises the constraint on economic growth posed by the barriers to entry that indigenous firms in a late-developing economy such as Ireland's will face when attempting to break into world markets already dominated by well-established firms.

Optimal policies within the Structuralist framework will be those designed

to aid indigenous export-oriented firms overcome the specific barriers to entry that they face. To the extent that lack of access to capital represents such a constraint, capital subsidies can clearly be beneficial.

Assume for the moment however that the barriers to entry are generally of a different nature, as outlined in the Telesis Report (NESC, 1982). Will labour subsidies or capital subsidies contribute more to employment creation? Note that output, for a broad range of costs, is determined exogenously by the level of foreign demand, as in panel (a) of Figure 4. (The comments contained in footnote 4 are again applicable here.) This output level can be depicted as the isoquant in panel (b), and the position chosen on the isoquant will, as in the Keynesian case, be influenced both by investment grants and by employment subsidies. As in the analysis of Coen and Hickman, therefore, the demand for labour will be a function of aggregate demand (for commodities) and of the relative prices of capital and labour. Does this model threaten the conclusions on factor subsidisation arrived at so far? Not in the least. Labour subsidies have been seen to dominate capital subsidies under both Keynesian and Classical conditions; the fact that these conditions may co-exist clearly cannot affect this conclusion.

Figure 4: *A Structuralist Model*



V POINTS RAISED IN THE LITERATURE

I now want to broaden the discussion to consider point by point some other arguments which have been made in defence of capital subsidies as opposed to labour subsidies.

(i) Conniffe and Kennedy (1984, pp. 178-81) note that it is not necessarily true to say that the combination of capital grants and labour taxes is inconsistent with the goal of employment creation. In particular, "if the mix of factors is close to constant and there is no choice of industry, the output effect will dominate and a subsidy to capital will increase employment". What is clear from the present paper, however, is that labour subsidies would have the same effects as capital subsidies under these strong assumptions, and would have more beneficial effects if these conditions were not met.

(ii) The Industrial Development Authority argues that its capital grants are in effect capitalised labour subsidies. There are two problems associated with this view. Firstly, a substantial proportion of the jobs projected and created at the time of the grant disbursement prove unsustainable within a relatively short period of time;⁵ labour subsidies, on the other hand, are only disbursed for as long as employment lasts. Secondly, any discretionary programme diverts resources away from production and into wasteful lobbying activity; this is known in the literature as "rent-seeking behaviour" (see e.g., Krueger (1974)). The labour-subsidy programme under discussion here is non-discretionary.

(iii) Clearly if the capital market is distorted, then a case can be made for capital grants. The notion of imperfections in the market for financial capital seems particularly implausible in the case of the overseas firms which receive a significant proportion of IDA aid however. It must nevertheless be admitted that the apparent adequacy of sources of finance for fixed-asset investment for newer indigenous firms today may be due in large part to the IDA's role in the market. It is also clear though that Irish private capital markets are developing rapidly over time, and policies directed towards aiding or steering this development would seem superior to the current capital grants programme.

(iv) Conniffe and Kennedy go on to argue that while there may be imperfections in the labour market which keep the cost of labour above its social opportunity cost, labour subsidies or payroll tax reductions could weaken employer resistance to further wage demands and thereby counteract to some extent the employment effect. This implies an entirely reasonable model in which wage demands are positively affected by profitability and employment buoyancy, but as argued in Section II above, this does not overturn the policy

5. NES (1982, No. 66, p. 26) reports that "in the case of indigenous grant aided industry 31,200 jobs were created over the period 1973-79 but only 10,300 still existed at the end of the period, i.e., 67% of the jobs which were created were subsequently lost. The corresponding figure for foreign grant aided industry was 43%."

hierarchy: it implies that either type of subsidy would raise wage demands, and lesser employment gains would result than would occur in the absence of this response.

(v) Kennedy, Giblin and McHugh (1988, p. 176), in accepting that capital grants may have substitution as well as output effects, supplement these points by arguing that "a high capital-labour ratio is not itself a barrier to absorbing surplus labour unless there is a shortage of capital". Is this correct? For the Keynesian and Structuralist cases discussed in Sections II and IV above, the cases that actually capture most closely the macroeconomic perspective of their work, we see that it is not. If the shortage is of demand (whether foreign or domestic) for the economy's products, then the output effect is weakened and the substitution effect of factor subsidies dominates.

(vi) Several commentators have raised the point that if factor prices are perceived to be out of line with each other, should not the removal of capital grants be capable of alleviating the problem as effectively as reductions in labour costs? The answer is that this would apply in the Keynesian and Structuralist cases, as presented in the text, since either approach would simply induce a movement of the economy along the isoquant. The proposition is not valid for the Classical case, however, where the output effect is all-important, because the output effects of these policies are quite different. The same conclusion clearly emerges when one takes into account the potential of the various policies to attract multinational investment.

(vii) On the tax cost of employment creation, it may be the case that a marginal employment subsidy programme would cost more (in terms of deadweight) than the capital grant cost of around £9,000 per job created as reported by Telesis. The Telesis numbers are fatally flawed however, as Fagan and Murphy (1986) and Ruane (1987) have pointed out: Telesis arrive at their figure by dividing total grant payments by the number of jobs sustained on grant aided projects (which includes almost all manufacturing projects), thereby assuming that none of these jobs, or alternatives, would have existed otherwise. The equivalent assumption of zero deadweight would yield the highly-desirable costing of £0 per job created under a zero marginal payroll tax proposal. The logic contained in the tax cost calculations in Barry (1989) seems sturdier.

VII IN CONCLUSION: A POLICY PROPOSAL

It has been argued here that the subsidisation of labour is preferable to the subsidisation of capital under all the theories of unemployment considered. Marginal labour subsidies, i.e., those applied only to new jobs, avoid *most* of the deadweight losses to government associated with subsidies distributed across the board.

Abolishing payroll taxes for new jobs, which is the form of marginal labour subsidy I am advocating, would clearly lead to a deadweight loss in tax revenues from the jobs that would have been created in any case. An obvious means of financing this would be to reduce the IDA budget for fixed capital grants by the annual amount lost to the exchequer through the introduction of the present proposal, though removing subsidies to housing, for example, would seem to make more economic sense.⁶

A crucial point yet to be considered is the question of time consistency. In order to stimulate the investment required to support new long-term employment there would have to be a credible commitment that the scheme would remain in effect for a minimum of at least five years. This would represent a major difference between the present proposal and the much less ambitious PRSI-Exemption and Employment Incentive Schemes (EIS) currently in place.⁷

These various considerations therefore lead to the proposal that employers' PRSI contributions be abolished,⁸ for a period of five years at least, for jobs created after a particular date (falling sometime before the policy is announced). As the scheme is based on numbers employed rather than on the identities of those employed, it would allow no scope for firms to make extra profits simply by increasing labour turnover, for example.

The proposal is obviously very modest in comparison with the scale of Irish unemployment. It must therefore be viewed as only one amongst many changes that would need to be made in order to have an appreciable impact on the problem. Any scheme that raises productive employment, however, may be judged likely to offer the additional benefit of increasing the level of GNP to be shared by society.

6. Some "back of the envelope" calculations reported in the Working Paper version of this study suggest, however, that the *net* loss to the exchequer resulting from the introduction of the present proposal is in any case likely to be small, and indeed may even be negative.

7. The operation of the latter has recently been reviewed by the ESRI. In their report Breen with Halpin (1989) emphasise that EIS is quite different from the type of programme discussed here. In particular, subsidies under the EIS are offered only for particular categories of employees ("the social goal") and only in respect of the first 24 weeks of employment; it may function therefore merely to offset the initial costs associated with taking on extra employees, or by playing an educational role "in demonstrating, to a small number of employers, that they can profitably increase their number of employees." Furthermore, the EIS is restricted to a maximum of 4 employees per firm.

8. A surprisingly resilient result that emerges whether labour markets are characterised by "monopoly union", "Nash bargaining" or perfectly competitive behaviour is the proposition that it is irrelevant, from the viewpoint of either efficiency or equity, whether employers' or employees' taxes are reduced. I am reluctant to incorporate this conclusion, since it accords so poorly with the perspectives of those actually engaged in labour market negotiations. The resolution of the paradox would seem to lie in the fact that while the conclusion is appropriate to long-run equilibrium, it fails to hold in the presence of short-run wage stickiness, and the policies therefore have different effects on the discounted sum of returns over time, much as the Stolper-Samuelson results on income distribution appear less powerful when short-run capital specificity is taken into account (see e.g., Neary (1978)).

A final point to note is that though the policy is consistent with theories of unemployment that allow a role for the authorities in "picking winners", this particular policy leaves that task to the market.

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