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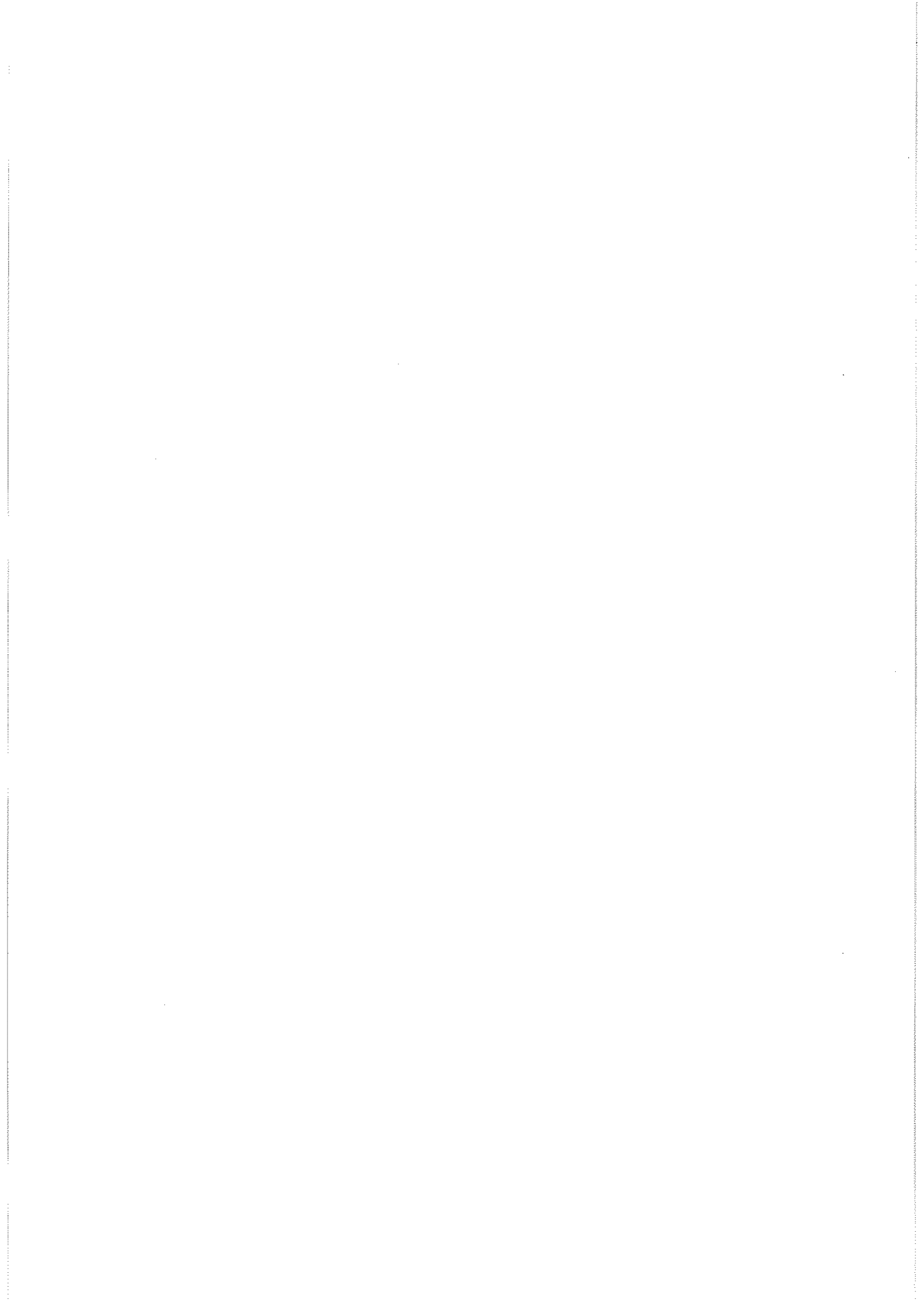
METHODOLOGICAL ISSUES
IN EVALUATION OF IRISH
INDUSTRIAL POLICY

Patrick Honohan

January 1996

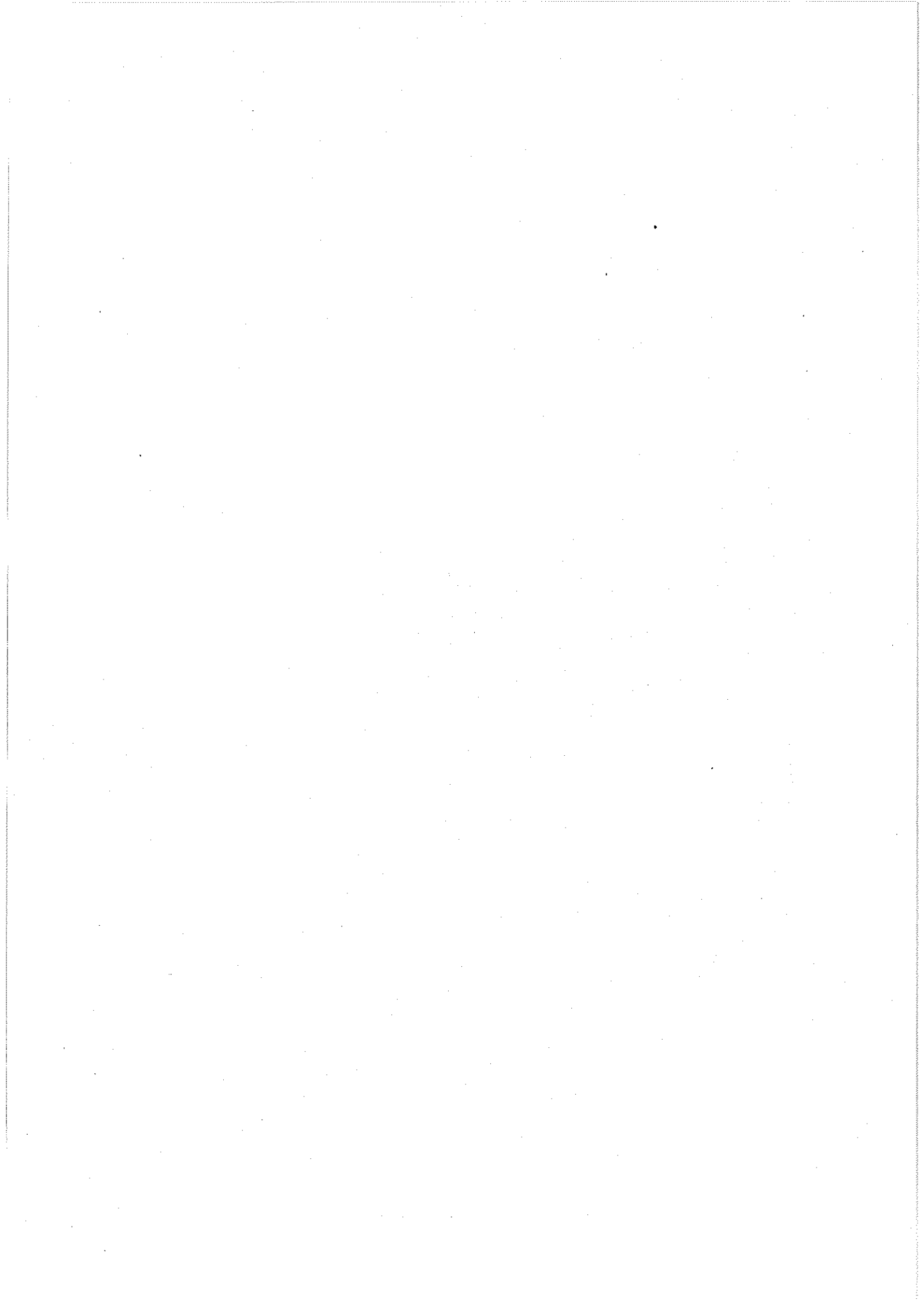
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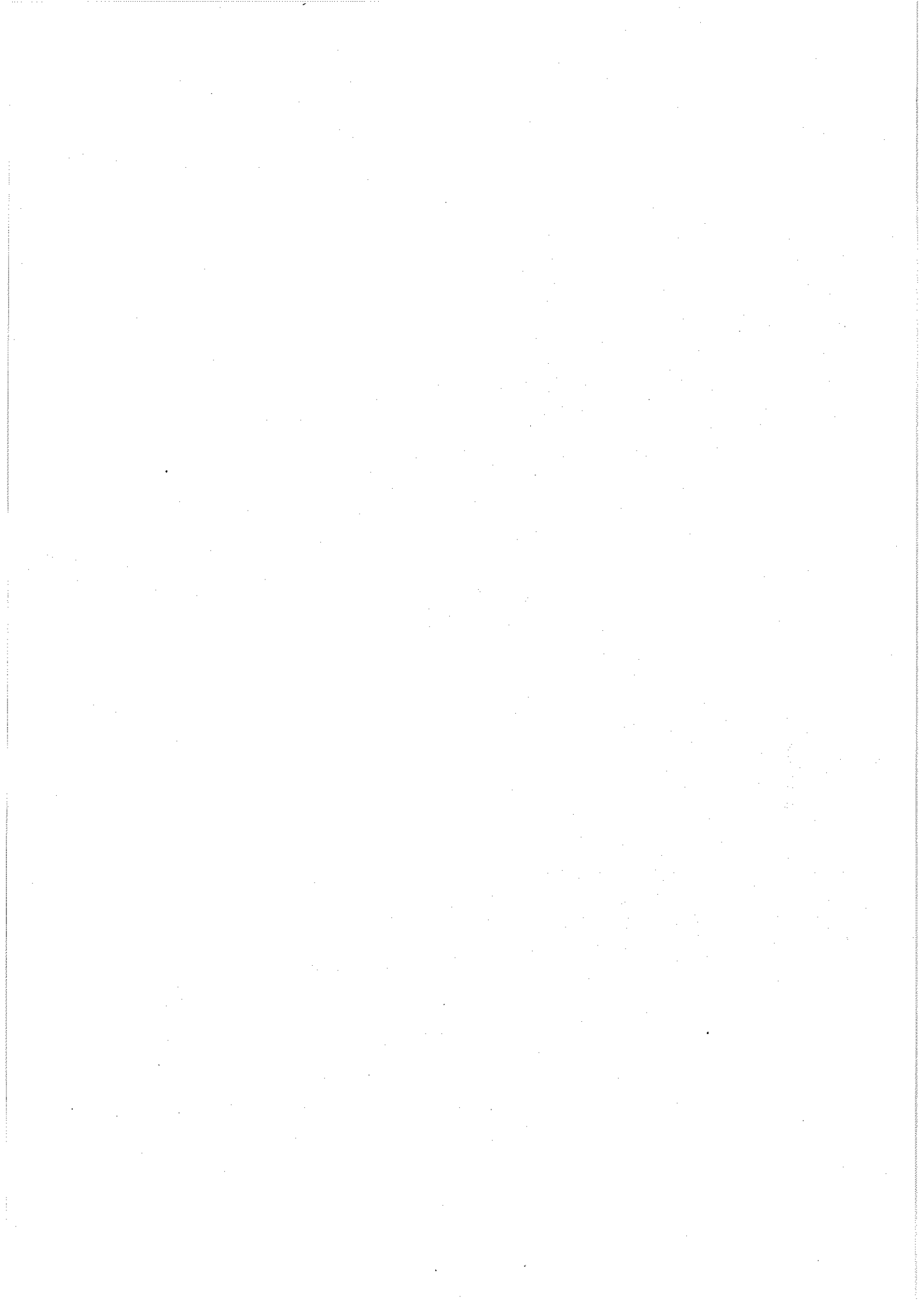
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METHODOLOGICAL ISSUES IN EVALUATION OF IRISH INDUSTRIAL POLICY

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1 Introduction and Summary

Industrial policy incentives in Ireland

Industrial development policy in Ireland has long been characterized by its reliance on both discretionary and non-discretionary incentives. The former includes a range of grants for new investment or expansion projects in manufacturing and certain internationally traded service sectors. The latter features a low (10 per cent) corporation profits tax rate applicable to essentially the same sectors. Although the regime does not discriminate between foreign-owned and indigenous firms, the large inward flows of foreign direct investment encouraged by the regime (notably, but not exclusively by the possibilities for tax-sheltering afforded by the 10 per cent tax rate) has resulted in a remarkably high share of foreign-owned companies in manufacturing whether measured by employment (45 per cent) or output (70 per cent).

While the benefits of the non-discretionary (tax) regime are thus evident, there are also costs to having a two-tier corporation tax system, whether one thinks in terms of lost revenue, or in terms of the higher tax burden borne by the remainder of the economy. In particular, the high rate of tax on labour has probably contributed to Ireland having a higher rate of unemployment than the EU average for the past two decades. The existence of the discretionary (grant) element also has benefits and costs. On the one hand, it allows the Irish authorities to compete with other possible destinations for internationally mobile investment projects, on the other hand, it encourages rent-seeking that may distract local entrepreneurs from productive activity.

Evaluation of applications for grant-aid

Taking as given both the discretionary policy and the existence of grants, the Irish industrial development agencies still need a system of *ex ante* evaluation of specific applications for grant assistance. The Economic and Social Research Institute recently carried out a review of the evaluation model which had been in use by the agencies since the late 1970s and which was based on economic cost-benefit methodology.¹ Some aspects of our findings may be of more general methodological interest.

We started from the position that the evaluation model is essentially a management information system designed to improve decision-making in regard to grant approvals. As such, the model should be based on the policy-maker's understanding of the economic distortions to which policy is addressed, and employ a credible quantification of these distortions. It should, when employed, result in satisfactory policy decisions which are not themselves distorting.

¹The review was carried out by the author and Eoin O'Malley, with a contribution by Philip O'Connell and the assistance of Jane Kelly, Siobhan Kenny and Alan Wall.

The old approach

Essentially, the old cost-benefit model took the cost to be the grant outlay, and the benefit to be 85 per cent of the wages generated through jobs created.² This is equivalent to using a shadow wage rate of just 15 per cent, well below rates commonly reported in the literature. On the other hand, in order to be approved, projects had to satisfy a threshold benefit to cost ratio set arbitrarily at 4 to 1.

This old approach seems deficient both in the ranking of projects and in its approach to the cut-off or threshold. It failed to take account of system effects in arriving at a shadow wage and it neglected the problem of deadweight. Furthermore, there is no basis for ignoring (as the old method did) tax revenue generated by the project as an offset to the grant cost incurred.

Shadow wage

Despite high unemployment in Ireland, a shadow wage as low as 15 per cent of market wage cannot be defended. The well-documented rapid and substantial migration responses to changes in the difference between Irish and UK unemployment levels imply that job creation in Ireland has a relatively weak impact on unemployment (Honohan, 1992). This is the major factor in our suggestion that the shadow wage for this kind of employment creation is about 80 per cent.

Tax revenue and the shadow-price of public funds

While the treatment of tax revenues in appraisal can be controversial, the position here is clear. Inasmuch as the cost being considered (the grant) is a transfer, and not a resource cost, the whole situation is really more analogous to tax policy than to traditional project appraisal. Not only must tax revenue be included in the calculation, but, using public funds as the numeraire, the other (employment-related) benefits must be discounted by a factor reflecting the shadow-price of public funds, estimated in Ireland to be about 1.5 at present, down from over 2 in the mid-1980s (Honohan and Irvine, 1990). Because projects differ in their labour and tax intensity, including tax revenue in the calculation alters the ranking of projects.

Deadweight in grant assistance

Considered in isolation, the projected cash-flows for most proposals envisage positive net revenue flow to the Exchequer in present value terms. But, as is clear when considering the matter from the tax policy point of view, account must be taken of leakage or deadweight in assessing the appropriate cut-off for grant assistance. After all, some of the projects might have proceeded with lower grant-aid or none at all. The maximum deadweight would occur if all projects were awarded the same rate of grant, and the size of this maximum deadweight can be approximated using empirical estimates of the aggregate elasticity of manufacturing activity with respect to the rate of grant.³ On the other hand, grants are not uniform, but are the subject of bargaining between agency and entrepreneur. The agencies are required by

²Both directly in the project being grant-aided and indirectly from the project's sub-supply needs, cf. O'Malley, 1995.

³In practice we have inferred this from estimates of elasticity of demand for labour in manufacturing (cf. Bradley, FitzGerald and Kearney, 1993).

their statutes to negotiate the lowest possible grant rate. In order to infer the degree to which the agencies manage to reduce deadweight below the maximum, we have relied on bargaining theory (cf. Osborne and Rubinstein, 1992). Quantification here is somewhat tentative (we suggest 80 per cent deadweight), but the logic of the approach is clear and has a wider applicability.

Organization of the paper

The paper is organized as follows. We begin in Section 2 with a brief account of recent trends in Cost-Benefit analysis. Section 3 describes the basic criterion function for evaluating applications for industrial grant-aid. Section 4 explores the impact of migration flows on the shadow price of labour (Annex 1 assesses the empirical evidence for quantification in the Irish context). Section 5 looks at the interaction of tax policy and industrial policy in the Irish context, and suggests a possible framework (formalized in Annex 2) within which the rationale for existing policy can be assessed. Turning to the issue of how to evaluate individual applications for grants, Section 6 illustrates how the important issue of deadweight can be addressed. Section 7 contains concluding remarks.

2. The Fall and Rise of Cost-Benefit

Following something of a lull in the early to mid-1980s, there has been a very substantial recovery in academic interest in issues of cost-benefit analysis. The reasons for this evolution are informative and help pinpoint what was less useful about previous work and what is likely to be fruitful in the future.

The late 1970s and early 1980s trend towards the substitution of structural reform policies in preference to selective intervention by governments lies at the root of the decline in cost-benefit analysis around that time.

2.1 *Role of Cost-benefit Analysis*

Fundamentally, cost-benefit is designed to take account of market failures, i.e. of situations where market prices do not correspond to social value.⁴ If there were no market failure, then optimising behaviour by profit-seeking enterprises and by individuals in households should result in a socially optimal outcome - no involuntary unemployment, no missed opportunities to get the most out of national economic resources, no unwarranted environmental degradation. But in the presence of market failure the prices prevailing in the market-place do not provide the signals and incentives that will lead to a good outcome. All of the major classical sources of market failure are relevant to the industrial policy problem:

Externalities: for example where my behaviour affects your opportunities, resulting in spillover costs or benefits not borne by me. If some of the costs or benefits of my actions are not internalized by me, I will tend to consume or produce too much, or too little (in the sense that others would be willing to subsidize me to produce more or consume less). The relevance to industrial or r&d linkages will be evident.

Absence of relevant property rights: for example if nobody owns the watercourses or the seafront, then I can degrade the water quality by discharging waste without cost; whereas if the watercourse had an owner, she would likely impose a fee that would induce me to curtail my discharges. This kind of situation is increasingly relevant in terms of the location decisions for heavy and other industry.

Monopoly power: for example I have so much influence over the price I can charge that I will restrict output though marginal cost is below price. This can be potentially relevant in the labour market, where centralized pricing decisions may contribute to unemployment.

⁴ There is only a relatively small published literature on Irish cost-benefit, despite many unpublished studies. Gray's (1995) review of standard methodology contains some Irish case studies and references. Boyle (1993) describes the wider process of policy evaluation in an Irish context. There are many textbooks on cost-benefit analysis: a good recent one is Zerbe and Dively (1994). Dreze and Stern (1987) and Squire (1989) are fairly recent surveys at a more technical level. Layard and Glaister's (1994) updated book of readings surveys some of the unresolved or disputed issues. Finally, Department of Finance (1994) and HM Treasury (1991) are official appraisal manuals.

Taxation: it is not possible for the Government to raise enough revenue to meet various essential functions that it performs without introducing distortions to economic behaviour. Its high tax burden is a feature which Ireland shares with most modern industrial economies; and the distorting effects of taxation are so often perceived as a major source of economic inefficiency that they cannot be neglected in any list of market failures.

Since market-driven choices may lead to socially inferior outcomes, the cost-benefit analyst attempts to construct a set of "as if" or *shadow* prices, which represent the prices which, if they prevailed in the market, would lead enterprises and individuals to make economic choices that correspond to the optimal welfare of all.⁵ The use of these shadow prices to guide public investment policy, the policy of state enterprises, and other public interventions is the goal of cost-benefit. By arranging that the public sector, in its direct economic interventions, behaves as if the shadow prices were in effect, the hope is that the economy as a whole will move closer to the optimum.⁶

2.2 *Reasons for the Decline in the Use of Cost-benefit*

Decline in the use of cost-benefit analysis in the 1970s may be traced to a wider disillusionment with piecemeal state intervention.⁷ Why limit oneself to making allowance for market failure in deciding the behaviour of state enterprises and state agencies if the sources of market failure could themselves be eliminated? This was the theme of the structural reform and structural adjustment movements, which were popularly manifested in Thatcherism and Reaganomics, but have actually guided economic policy initiatives since the late 1970s in most countries in the world, to a greater or lesser extent.

These movements were also informed by the abandonment of the assumption that publicly-owned agencies or enterprises would always pursue social goals in a single-minded fashion. Once the relevance of this classic problem of principle and agent was recognized, the

⁵A large branch of cost-benefit analysis also considers the distribution of resources between individuals as a potential source of deviation from the social optimum. This branch recognizes that, even if the economy were producing at maximum efficiency, the optimum might not have been achieved if welfare is unevenly distributed among members of society. Our approach will, for the most part, assume that the problem of distribution is addressed somewhere else in the policy structure, and must be taken as given by those involved in industrial policy.

⁶One important issue here is that if certain segments of the economy are using shadow prices, while other parts of the economy are still responding to market prices, the outcome could be worse than if all were responding to market prices. More sophisticated applications make sure that these general equilibrium considerations are taken into account in computing shadow prices for guiding public sector decisions.

⁷In addition some self-serving applications of cost-benefit analysis helped discredit the technique in some quarters. The fact that choosing shadow-prices is by no means an exact science provided scope for the manipulation of cost-benefit techniques to become a potential source of distortion itself.

technocratic approach of cost-benefit lost some of its attraction.

This is not the place to adjudicate on the success of the attempt to eliminate monopolies, increase competition and lower tax distortions. It is certainly the case that freer trade, the progressive completion of the single market in Europe, and the weakening of trade union power, have lowered the importance of many of the distortions to which cost-benefit solutions had been addressed.

For example, with free trade and elimination of foreign exchange controls, the notion of a shadow price of foreign exchange has lost all relevance.

The development of the international capital market as the residual source of borrowed funds has meant that the world interest rate has largely displaced shadow discount rates based on national rates of time preference or intertemporal substitution.

Despite the higher levels of unemployment which have prevailed since the mid-1970s, and as will be examined in greater detail, even the shadow price of labour has been set close to or at the market wage in the cost-benefit practice of several industrial countries.

2.3 *The Come-back*

But cost-benefit has made a come-back. Why? Part of the reason is nothing more than a reaction to its comparative neglect in the mid 1980s. Not everything can be solved by structural adjustment, and Government inevitably remains heavily involved in influencing economic activity. The continuing role for Government and its agencies in project development and large-scale physical planning means a continuing need for consistent methods of evaluation which are not merely based on financial profitability. Thus issues of transport congestion and the value of time, safety regulation and the value of a life, and such like, continue to require a cost-benefit type approach. The more obvious reason for the return to cost-benefit is the increasing public awareness of environmental issues which have not found satisfactory market solutions, and which inherently call for public policy intervention.⁸

If the shadow price can be worked out analytically, would it not be best for public policy to attempt to push market prices in the direction of the shadow prices, for example, through taxation? This is the approach advocated in many environmental contexts, and it has much to recommend it. This solution does require a decision to be taken at the highest levels of government. In the context of a free-trade area such as the European Union, it may require supra-national authority, or at least a cooperative international arrangement. Indeed, a world

⁸The cutting-edge of applied cost-benefit analysis at present is in the evaluation of unmarketable environmental goods, such as clean air and water, biological diversity (e.g. preservation of wetlands) and future climate risk. Attempting to determine the social value of this kind of thing by survey techniques, asking a representative sample of people what value they place on it ("contingent valuation"), raises conceptual and practical problems which are very hotly debated at present (cf. the debate between Diamond and Hausman, 1994, Hanemann, 1994 and Portney, 1994). This area is likely to become increasingly important in industrial policy in Ireland in the future.

solution may be required for some large policies such as that relating to CO₂ emissions. It is the consideration that a higher layer of government may be required to achieve the best solution (equalizing the shadow and market prices) that ensures a continued role for traditional cost-benefit interventions, i.e. public bodies acting on the basis of shadow prices which differ from market prices.

2.4 Layers of Government and System-wide Impact

Theoreticians have made significant progress in advancing our understanding of how to analyze the economy-wide impact of a cost-benefit procedure.⁹ This so-called "general equilibrium" approach will prove to be an essential component of our approach.

An important element of recent theoretical work has been designed to clarify the appropriate behaviour of different layers of government which have different instruments at their disposal. Although the full optimum may not be attainable, it is important, in determining the optimal behaviour of a particular layer of government, to decide in advance what externalities it should take into account in deciding its actions, and what externalities it should leave uncorrected as being the appropriate responsibility of another layer.

The relevance of this difficult question for the industrial promotion agencies is immediate. The national Government has established a regime of taxation: should the industrial policy agencies take this regime as a corrective one which moves market-prices close to the shadow price, or should the agencies attempt, through the policy of grants, to offset the effects of national taxation? This will prove to be the crucial question which our study will resolve. (To anticipate, our answer will be closer to the latter than the former).

2.5 The Need for Simplicity

Although the pendulum of political economy, and the emergence of environmental awareness, have been the main driving forces in the cycle of interest in cost-benefit in recent decades, there is another, more practical factor, which has proved to be important, namely the need for simplicity. Project appraisal techniques which had heavy data requirements, and required elaborate and opaque calculations to produce answers - many of which lacked intuitive appeal - were never likely to catch-on in practice. Reappraisal by some of the authors of the most widely used cost-benefit manuals has pointed towards the need for a drastic simplification of cost-benefit procedures if they are to be applied in routine situations (such as arise with the industrial development agencies).¹⁰ This message must be taken seriously in the overhaul of our industrial policy appraisal procedures. In particular, and in response to guidance received from the agencies, we attach importance to ensuring that our proposals for the model impose as few operational innovations as possible.

3 Evaluation of Applications for Grant-aid: The Basic Formula

The formal cost-benefit appraisal system operated up to now by the industrial development agencies has been based on a simple criterion function which expresses the discounted present value of the project benefits as a multiple of the grant paid. Retaining this approach, we need

⁹Notably in Drèze and Stern (1987, 1990), Hoehn and Randall (1985).

¹⁰Cf. Little and Mirrlees (1991).

to modify the formula in at least three major respects.¹¹ First, the shadow wage rate needs to be modified to take account of general equilibrium effects. This also has a knock-on effect on the shadow prices of other inputs, since they are linked to the shadow wage through the estimated labour content of the inputs. Second, there has to be a fuller treatment of taxation, including tax revenue as a benefit offsetting grant costs and also applying a weighting (the shadow prices of public funds) before adding revenue benefits to private benefits. Third, projected benefits must be reduced by a deadweight factor, designed to take account both of the response elasticity of projects and jobs to grant levels and the degree to which an increase in grants can be confined to those projects that are actually dependent on it. These three aspects are considered in the following three sections.

Although most of the discussion can be followed without recourse to mathematical notation, it is worth explicitly setting out the criterion function which underlies the discussion. Thus, for any given grant-aid application, the following function is calculated on the basis of projected flows:

$$(1-\theta)\{\sum_i x_i p_i [(1-v_i)/\phi + \tau_i] + \tau_0 \pi\} / g \quad (1)$$

where the p_i are market prices, v_i are the ratios of shadow to market prices, and x_i the volume of each input i , τ_i the tax rates (inclusive of a standard allowance for savings on social welfare payments resulting from a fall in unemployment) with τ_0 the tax rate on profits π . θ is the deadweight and ϕ is the shadow price of public funds. The grant cost is denoted by g . All of these elements are calculated in present value terms.

The elements of the formula can be seen more clearly by beginning with the term immediately after the summation sign:

$$x_i p_i [(1-v_i)/\phi + \tau_i] \quad (2)$$

Recalling that the social benefit of the use of an input is equal to the value of input use multiplied by one minus the ratio of the shadow price to market price of that input, this expression represents, for each input i , the sum of the social benefit of that input use plus the tax revenue.¹² In order to make it commensurate with the Exchequer revenue terms (as discussed in Section 4 below), the social benefit is reduced by the factor ϕ representing the shadow price of public funds.

This term is summed over all the inputs, and the tax revenue from profits is added to obtain the part between parentheses:

¹¹Several additional modifications are not discussed in the present paper.

¹²As will be described below, in the case of labour, the tax element includes savings on social welfare. Thus we can think of these two elements as being essentially (i) the private benefit obtained by those individuals who are no longer involuntarily unemployed and (ii) the net additional cash flow to the Exchequer resulting from the additional employment and reduction in unemployment.

$$\sum_i x_i p_i [(1-v_i)/\phi + \tau_i] + \tau_0 \pi \quad (3)$$

which represents the total "benefits". Finally, this is all premultiplied by the adjustment for deadweight $(1-\theta)$, before being divided by the grant "cost" g

The parameters v , ϕ , and θ are successively discussed in the next three sections of the paper.

4 Migration and the Shadow Price of Labour

One of the central parameters cost-benefit analysis of Irish industrial policy has been the shadow wage rate. In this section we review existing practice and explain why major changes are necessary.

4.1 Current practice

In practice, the low shadow price of labour has been the key variable in the agencies' cost-benefit methodology. McKeon (1979-80) stated that the figure used was computed on the basis of assumed opportunity costs applied to the actual profile of employees recruited. For those not previously employed a zero opportunity cost was assumed, while for those coming from employment in the agricultural, service and manufacturing sectors, the opportunity cost was set equal to the estimated market wage. McKeon also provides a table showing a sample distribution in 1980, from which one could infer that the shadow wage would be at least two-fifths of the market wage, since 47 per cent of the sample came from other employment.

At a subsequent stage the shadow price was fixed at a much lower figure, namely 15 per cent of the market wage. Both theoretical considerations applied to Ireland, and the example of other countries suggest that the 15 per cent figure is much too low.

On theoretical grounds, the partial equilibrium methodology of using a sample profile of recruits must be rejected in favour of a general equilibrium analysis which takes account of the overall system response. In our view, the major theoretical argument here relates to migration.¹³ The rapid and substantial response of net migration to employment availability at home and abroad implies that job creation does not reduce unemployment one-for-one. As we will explain, the theoretical literature on the impact of migration on shadow wage rates shows that, even in the presence of involuntary unemployment, migration could fully eliminate any gap between shadow wage and market wage except to the extent that job creation does have an impact on unemployment.

International practice also argues against a major gap between market and shadow wage. In Canada, the shadow wage used is 95 per cent of the market wage; in the UK the shadow wage is set equal to the market wage. Even for developing countries, practice points in the same direction. According to Little and Mirrlees (1991) "there is a consensus that the shadow wage is probably not very different from the wage paid" for modern-sector urban wages in

¹³The migration aspect was also mentioned by Ruane (1979), though her (1980) paper focuses instead on distributional issues.

developing countries.^{14,15} It is no longer credible to use as low a shadow wage as has been the practice to date in Ireland.

At this stage it may be desirable to recall that, as with most applications of cost-benefit analysis, we maintain the Utilitarian premise that what is to be optimized is an aggregate of the economic welfare of the individuals in society. The familiarity of this assumption to economists should not allow one to neglect the fact that it reflects a very focused philosophical and political position. Thus, the social decisions in relation to the level of unemployment which our method proposes are based on the impact of unemployment on individual welfare, and not on an independently determined employment goal for society.¹⁶

4.2 *The Basic Theoretical Insight*

It has long been recognized in the literature that migration could affect the shadow price of labour. A quarter of a century ago, Harris and Todaro (1970) proposed a simple model of migration which displays the basic argument. They considered two regions between which labour is free to migrate. The first region relies on subsistence agriculture, the other is a modern urban economy whose wage rate w_m is pitched above market clearing levels and results in a rate of unemployment u . The agricultural region has full employment, but at a low and constant labour productivity w_a .

If potential migrants equate their expected earnings in the two regions,

$$w_a = (1-u)w_m, \quad (4)$$

the equilibrium unemployment rate will be:

$$u = 1 - \frac{w_a}{w_m}. \quad (5)$$

Since the creation of an extra job in the urban sector will induce $1/(1-u)$ migrants (in order to restore the equilibrium unemployment rate, the shadow price of labour v , its opportunity cost, is

¹⁴A survey by MacArthur (1994) of shadow wage rates used in semi-input-output analyses of shadow prices reveals that the lowest of 33 shadow wages used was 0.26 times the market wage - and that was for unskilled labour in Ecuador. The unweighted mean of the shadow wages used was 0.67 and the maximum value was 1.13.

¹⁵Some apparent contradictions to this consensus turn out to have little relevance to the problem at issue. For example, a study for Northern Ireland by Kirkpatrick and MacArthur (1990) arrived at a very low shadow price for a worker leaving unemployment for a job. But the approach used in that study wholly neglected migration and other systemic responses and is mainly relevant to ring-fenced employment schemes targeted at the long-term unemployed.

¹⁶Sen (1975) discusses some alternatives.

$$v = \frac{w_a}{1-u} = w_m \quad (6)$$

The implication of this very simple model is that, despite the persistence of unemployment in the urban region (indeed, *because* of the persistence of unemployment) the shadow wage rate is not lower than the wage actually paid in the urban region.

Though quickly endorsed by Harberger, Stiglitz and other distinguished economists, this result did not immediately attract general acceptance because of the very strong assumptions on which it was based and also because observed unemployment rates in the urban areas of developing countries seemed much lower than would be implied by the relation (2) above.

As Sen (1975) put it, "the invisible hand strikes again" in a way that seems unduly reductionist, and a number of objections can be raised to the analysis.

But subsequent analysis has shown that some of these objections have less force against the high shadow wage conclusion than might have been expected. Much more elaborate and realistic models still lead the conclusion that the shadow wage rate should be close to the marginal product of labour in the urban sector.¹⁷

4.3 *Qualifying the Basic Theory*

Although devised to account for rural-urban migration in developing countries, this literature has an obvious application to Ireland. In lieu of the agricultural region we have emigrant population working in the UK and elsewhere. In lieu of the fixed agricultural income, these emigrants receive a "utility package" which is insensitive to Irish labour market conditions. Irish wage rates are largely set by negotiation and are higher than would be necessary to clear the market.¹⁸ The hypotheses that Irish unemployment adjusts fully to changes in the UK rate of unemployment and that fluctuations in domestic employment levels have only a transitory effect on domestic unemployment obtain some empirical support from econometric studies (Honohan, 1984, 1992, Bradley et al., 1995, Wright, 1993).¹⁹ Ignoring, for a moment, the duration of this transition, we thus have the necessary components for an application in Ireland of the theories leading to a shadow-price of labour equal to the going wage rate. (Annex 1 elaborates on the question of quantification in the Irish context).

¹⁷These models assume that the objective of the social planner is to maximize a weighted average of individual *expected* utilities, i.e. the standard approach and one which is also adopted here. It is worth noting, however, that if the social planner were instead to take account of the *ex post* inequality in utilities resulting from the persistence of unemployment, this would tend to raise the shadow price of labour rather than lowering it, because the higher the shadow wage, the higher the urban population and so the higher the number of unemployed.

¹⁸Note that higher-than-market-clearing wage rates can be rationalized in a number of ways, including the efficiency wage theory, insider-outsider models, etc.

¹⁹This does not preclude a role for relative wage rates and relative unemployment benefit rates.

In order to escape the tyranny of the invisible hand, we must therefore closely scrutinise the key assumptions of these models to see what deviation may be justified. It seems that the result hinges on whether job creation in the city alters (i) living conditions in the rural area or (ii) the unemployment rate in the city. In the simple model above neither occurs.

At first sight it might seem that a different specification of the utility function whose optimization drives the behaviour of potential migrants might matter. But, as shown by Heady (1981), much more realistic utility functions still predict result that the rate of urban unemployment is insensitive to job creation in the city, and hence would not alter the condition $v = w_m$. Heady's model allows the migrant to consider the possibility of a number of different possible outcomes - perhaps a long wait before a job materialized, perhaps an immediate job, but then a layoff followed by return to the rural sector, and so on. In particular this allows for preferences such that potential migrants would require an earnings premium to induce them to travel. So long as the expected utility of these options can be expressed as a function of the wages and the numbers employed in both regions, the same type of reasoning can be applied. Expected utility will be equalized as between those who migrate and those who do not, and maintenance of this equilibrium will ensure that the urban unemployment rate will remain insensitive to job creation there.²⁰

In a developing country context, it is quite likely that, by reducing population pressure on the land, urban job creation would impact rural incomes favourably, thereby upsetting the simple shadow price rule (6). But it is hard to see how emigration from the UK to Ireland could have much impact on the UK labour market, so the relevance of this generalization to the Irish case is doubtful.

Several other generalizations²¹ seem to do little to convincingly reduce the shadow wage below the market wage. For example, Bell (1991) notes that the prices of goods might be different because of barriers to trade, and spending preferences may change for those who migrate. Likewise, the unearned income of migrants may differ from that of the host population. These factors can certainly cause the shadow price of labour to deviate from the wage rate, but there is no presumption as to which way the effect will go. Furthermore, several of these effects seem unlikely to be of quantitative significance in the Irish context. For example, price distortions due to barriers to trade seem negligible in the Irish context.

So far we have implicitly assumed that the urban wage has been set above the market clearing level by some autonomous process. A feed-back effect of job creation onto the urban wage could upset the relationship of equation (6) above. A tendency for increased employment to drive up the wage would increase the shadow wage rate. But such an effect is not

²⁰This formulation does not deal with the possibilities that the subjective probabilities do not equal the objective probabilities, or that expected utility theory does not apply (cf. Sen, 1975). If the migration response is not necessarily tied to equalization of expected utility, then, as shown by Sah and Stiglitz (1985), the shadow wage rate is higher the more workers migrate, and *vice versa*.

²¹Particularly relevant papers not otherwise mentioned are Bell and Devarajan (1983), Burgess (1989), Dinwiddie and Teal (1987) and Gemmel and Papps (1991).

guaranteed. For example, as noted by Sah and Stiglitz (1985), efficiency wage theories which assume that the wage is above market-clearing level because of a link between wage rate and productivity, and because private firms are minimizing the labour cost per efficiency unit, predict no sensitivity of the market wage to employment levels.

Of the various assumptions whose relaxation would have a systematic impact on the shadow price, one of the most striking is the implicit idea that the pool of potential migrants is homogeneous. If we relax this condition, allowing segments of the population to differ in their propensity to migrate, then an expansion in domestic employment could have an impact on domestic unemployment. After all, if all of the most mobile immigrants have already arrived, then it will take a lower unemployment rate to induce further immigration. The marginal migrant will still be indifferent between staying abroad or coming home, but the lower unemployment will confer an external benefit on those who are at home. If so the shadow price of labour would be lower than the wage. As noted, this would require the unemployment rate to be sensitive to the level of domestic employment. In this context it has to be stressed that, while not inconsistent with a zero long-term response, the empirical evidence for Ireland referred to earlier cannot conclusively refute the hypothesis that there is some sensitivity.

4.4 Some Possible Misconceptions

Recognizing that the proposed increase in the shadow-wage could be controversial, it is worth summarizing the policy message that is being drawn from the analysis, and clarifying a few points on which there may be misconceptions.

First, it should be clear that the goal of reduction in unemployment is not at all being neglected in our analysis. On the contrary, we are making sure that credit is taken only for a realistic estimate of the unemployment impact of job creation.

Second, we are not saying that emigrants are indifferent between being at home and being abroad. What our approach does imply is that the marginal²² emigrant is indifferent between the average package of benefits (employment and employment prospects, wages, etc.) at home and abroad. For example, the emigrant might be prepared to accept a big cut in wages to come home.

Third, we are not discriminating between emigrants and residents in counting benefits. The actual distinction that is being made is between the impact of a new job on the unemployment conditions at home and abroad. There is an impact on the domestic job market; but there is no impact on the foreign job market. So when an emigrant returns to take a job in Ireland, that does not improve the lot of the remaining emigrants.

External benefits of reduced migration

What our approach does omit is any account of the external benefits of reduced emigration, i.e. the benefits that accrue to persons other than the migrants. One could imagine, for example, that parents and relatives might wish that their relatives were living in Ireland.

²²As usual in economic analysis, it is the marginal that matters for optimal pricing: it is the marginal unit that establishes the equilibrium price.

Return migration would benefit these relatives even if it did not reduce unemployment.²³ Depopulation can generate external costs also - as is graphically illustrated by the alleged difficulties of some rural football clubs in fielding a team following an exceptionally heavy wave of emigration. Depopulation is the obverse of congestion costs. (Our method ignores the alleviation of congestion costs also).

While these kinds of consideration could lead to looking at reduction in emigration or job creation *per se* as distinct objectives, and could be advanced as a justification for reducing the shadow wage, there are serious difficulties in quantifying such external benefits. The use of a questionnaire approach ("contingent valuation") is subject to the sorts of objections that have been raised in the context of attempts to place a value on ecological diversity through questionnaire methods (see above).

Furthermore, the policy importance of such external benefits may not be as large as is sometimes supposed. Because of the Government's budget constraint, additional public expenditure on job creation beyond the point where conventional benefits fell below cost would result in higher tax rates. This potential trade-off between higher employment and lower after-tax wages (Kennedy, 1992) may in turn be limited by the migration response. Resolving these large issues seems beyond the scope of the present study.

The labour market is often thought to be segmented, with most of the long-term unemployed unable to compete with other participants. The general migration argument does not apply to job creation that is successfully targeted on the long-term unemployed. A much lower shadow wage would therefore be assigned to sheltered or ring-fenced employment schemes designed for this special group (cf. Snower, 1994).

5 Distorting Taxation and the Marginal Social Value of Public Funds

Just how does taxation enter the picture? This is one of the trickiest aspects of policy evaluation in a tax-distorted economy, yet it is an important one. Indeed, neglect of the impact of distorting taxation seems to be the most serious conceptual gap in the appraisal framework used to date. The main issues here is that the agencies are spending Exchequer funds in the form of grants: the activities generated also lead to a flow of Exchequer funds. How are these two flows to be integrated into the analysis? Should the agencies regard the flow of tax revenues as a benefit or not?²⁴

5.1 Interpreting Existing Policy

If we have a good system of economic cost-benefit analysis, we should be able to give a ready answer to two commonly asked questions about Irish industrial policy:

²³This could already be taken account of to the extent that migrants internalize the preferences of their relatives.

²⁴Hitherto, Exchequer flows are considered during project appraisal in a separate check, and are not integrated into the cost-benefit calculation.

(i) "The grant-cost per job approved rarely exceeds £30,000; the 1994 average was only £17,100. But the tax revenue - income tax, PRSI, VAT and excises - paid by an average industrial worker over seven years would alone approach £30,000 - and that does not count savings on social welfare payments. Why aren't the agencies prepared to pay more if there is no net Exchequer cost?"²⁵

(ii) "Why can't a job-creating initiative in the non-traded sector get grants on the same scale as manufacturing?"

These are not easy questions to answer and, in attempting to do so, one must beware of the temptation to rationalize elements of existing policy which may be the matter of legitimate debate. But it is a serious weakness of the existing methodology that it cannot provide a satisfactory answer to either question.

The key to answering such questions is to take account of the fact that Government has revenue requirements for purposes outside the scope of industrial policy. These include covering the cost of various public and social services, and servicing its debt. As a result, distorting taxation is imposed on various forms of economic activity.²⁶ The puzzles implied by the above questions may simply reflect the tax distortion.

5.2 *The Shadow Price of Public Funds*

The analogy of a hypothetical would-be mineral water entrepreneur may illustrate the situation. Suppose the entrepreneur's main cost is a fixed initial cost which she covers by borrowing. Once this fixed cost is incurred, the mineral water can be supplied at essentially zero cost. But the entrepreneur will have to charge for the water if she is to service the initial debt. She prices above marginal cost, and some potential customers go thirsty.

Likewise the Government has to impose taxes which drive a wedge between cost and benefit at the margin, which leads to puzzles of the type we are considering. Taxation of factors of production discourages economic activity and its distorting effects are clear, especially where unemployment prevails.

This provides a possible answer to the first question. Economic activity must yield tax revenue. If the Government and its agencies reduce taxes or increase grants to the point where the "net Exchequer cost" is zero, the needed revenue will not be forthcoming.

A standard way of taking account of this revenue need is to build in to cost-benefit calculations a "shadow price of public funds". This is a factor (in this context greater than

²⁵Note, however that cost-per-job approved has been increasing rather sharply in the last few years. For indigenous companies it averaged £10,400 in 1989-91, but has increased steadily since then through £13,300 in 1992 and £15,000 in 1993. The cost-per-job sustained over the period 1987-94 was £11,400.

²⁶Some sources of taxation - such as some energy taxes, tobacco and alcohol taxes - both raise revenue and correct pre-existing distortions. However, the revenue yield of such corrective taxation is insufficient.

unity) by which non-Exchequer net revenues are divided in order to make them commensurate with grant and tax funds in the calculation. The purpose of the factor is to take account of the distortions that would be created (at the margin) by the extra taxation that would have to be imposed elsewhere in the economy in order to make good any loss of revenue arising from the project being evaluated.²⁷

5.3 *The Government as a Discriminating Monopolist*

There is another twist to the story, and this is more specific to the case of Irish industrial policy. What we observe is a sharp differentiation between the tax-and-grant treatment of certain broad categories of productive activity. The precise structure of this differentiation is quite complex, but an important feature is that manufacturing and certain internationally traded services are eligible for a 10 per cent corporation profits tax and for grant-aid.

Let us return briefly to the mineral water producer. She may be able to charge a different price for the water in the city to that charged locally. Every microeconomics textbook provides the simple calculation that shows how such price discrimination will increase her profits if the elasticity of demand in the two segments of her market are different. As long as the two segments of the market can be segregated, she simply raises the price for the low-elasticity group, and lowers it for the high-elasticity group. The discriminating monopolist will then typically increase production, and thereby increase the total social benefit of the water source.

The interpretation which we would like to propose for this policy structure is that the Government (directly and through its agencies) is acting in just the same manner.

If every economic activity were to be eligible for a 10 per cent profits tax and a grant of £17,100 per job, the impact on the Exchequer would be catastrophic. Instead, such a regime is open only to a limited segment of the economy. Effectively, the preferred category is offered a more favourable tax (and grant) environment than the rest of the economy. Provided the elasticity of activity (with respect to the tax-and-grant rate) in the favoured sector is sufficiently greater than that in the other, the decline in the less favoured sector will be less than the expansion in the favoured sector. Sufficient Exchequer revenue will thereby be generated to pay for needed Government services, while at the same time a greater level of economic activity will be induced.²⁸

By discriminating between categories of enterprise then, the Government is acting in a manner analogous to that of the textbook discriminating monopolist. Substitute "mobile or footloose

²⁷Heady (1988). Honohan and Irvine (1987, 1990) provide estimates for this parameter appropriate to Ireland in the mid-1980s. They ranged from 1.75 to 2.44. Since 1984 top marginal tax rates have been falling, and bearing in mind the rule-of-thumb that deadweight costs of taxation are roughly proportional to the square of the tax rate, it would be necessary to revise the marginal cost of social funds estimate to, perhaps as low as 1.5.

²⁸The consequences of discriminating between categories have recently been assessed by O'Rourke (1994) and by Barry and Hannan (1995). Note that the dividing line is not the same as that between "foreign-owned" and "indigenous".

investors" for "high elasticity group" and picture the Government, including its industrial promotion agencies, as the monopolist and we have a plausible first approximation to the design of industrial incentives.

Even if all other shadow prices were equal to market prices, this new approach could provide a possible reason for discriminating between categories in terms of tax rates and grants. Provided a sector or category of enterprises can be identified that has a more elastic response of economic activity with respect to the tax regime, and provided it can be ring-fenced away from other categories for the purposes of tax (and grant), then the total tax revenue required can be raised with lower distortion and lower social costs by presenting the high elasticity category with a more favourable tax regime.²⁹

We thus also have a possible answer for the second question insofar as the non-traded sector may on average have a lower elasticity of response to tax-and-grant rates than does manufacturing. The discriminatory policy may be rationalized in this manner.³⁰

The dividing lines chosen between different categories could be debated. At present, manufacturing and certain internationally traded services have a lower corporation tax rate, and may be eligible for grants; within this group, small firms appear to be separated by administrative practice and receive a lower rate of grant.³¹ This ranking does seem to accord with *a priori* views as to the mobility or elasticity of these categories. As discussed in Section 6 below, in assessing whether the classifications could be improved, one would need to consider not only issues of elasticity, but also the inevitable leakages and other distortions caused at the margins of the identified categories.

5.4 *Is Irish Industrial Policy Optimal?*

In order to verify the logical consistency of the argument, we have worked out a very simple algebraic model of optimal tax instruments in a constrained environment having the unemployment features in which we are interested. This model illustrates the verbal argument and is presented in Annex 2.³² To have presented a possible rationalization of the existing

²⁹This can be seen as a simple application of optimal Ramsey taxation, where taxes are imposed at rates that are inversely proportional to the elasticity of demand.

³⁰It must be pointed out that, because it distorts the productive sector's input decisions, such a policy is not the optimal policy in the standard framework as proposed by Diamond and Mirrlees (1971). Only if the menu of taxes available to the government is restricted should taxes that distort production decisions be used. For present purposes we are taking it that some such restriction applies.

³¹New foreign industry typically used to receive the highest rates of grant, but in recent years the gap between the average grant-cost-per-job approved for foreign and indigenous industry has effectively been eliminated.

³²This model can be seen as evolving from the approach proposed by Ruane (1979), though the emphasis here is rather different. In designing the model, we have had particular

