Project Analysis and Industrial Employment in Ireland

Frances Ruane

Special Article

in

QUARTERLY
ECONOMIC
COMMENTARY

June 1979

J. DURKAN
B. O'LOUGHLIN

PROJECT ANALYSIS AND INDUSTRIAL EMPLOYMENT IN IRELAND

by

FRANCES RUANE*
Trinity College, Dublin

1 Introduction

Over the past two decades the governments of many developing countries have become increasingly involved in directly promoting industrialisation. The degree of government intervention has varied greatly, in terms of both the overall level of assistance to the industrial sector (ranging from licence-giving to widespread protection) and the nature of assistance given to the individual firm within the sector (automatic or discretionary, once-for-all or on-going, general or specific). The prevalence of such government intervention combined with the failure of these and other policies to achieve the desired targets (higher growth rates, more equitable income distribution and in particular full employment) has generated a torrent of literature since the late 1960s under the general heading of *Social Cost Benefit Analysis*. The objective of this literature has been to develop a practical technique whereby a government agency in a developing country can evaluate individual industrial projects (both private and public) in terms of their *total* effects on society, by taking into account the objectives of, and constraints on the economy.

The purpose of this paper is to show the relevance of such methods of project appraisal to the industrial development programme currently in operation in Ireland. In Section 2 of the paper, we outline the basic methodology of project appraisal as evolved for less developed countries and consider in what respects this methodology would require modification for a semi-developed country such as Ireland. In Section 3 we examine the appropriateness of the methodology to the Irish context, and compare it with the methods used presently by the Industrial Development Authority (IDA) to evaluate projects. Finally, Section 4 reviews the value and limitations of using this methodology to evaluate industrial projects in Ireland.

2 Project Appraisal: The Social Viewpoint

2.1 Project Appraisal: Private and Social

The concept of project appraisal, by which we mean calculating the costs and benefits of a project, is by no means a new one in economics. For example,

*I am very grateful to the Editorial Committee of the *Quarterly Economic Commentary* and Maurice FG. Scott for comments on earlier drafts of this paper. The usual disclaimer applies.

we are familiar with how the business man chooses between alternative projects on the basis of their discounted cash flows, that is, the stream of net income arising from each alternative. In general, the project which yields the highest private return over the investment period will be chosen, as long as its net present value is greater than or equal to zero. Thus the assumption that business men, among whom we include portfolio investors, maximize discounted profits implies that in a market economy, there will be a strong tendency for the most privately profitable investments to be undertaken.

The novel aspect in the recent literature on project appraisal, as found in the OECD (1968) manual by Little and Mirrlees[1] or in the UNIDO (1972) manual, lies in the *method* suggested to measure the costs and benefits of industrial projects from a *social* rather than a *private* point of view. While it is appropriate for the business man to use *market* prices to measure the costs and benefits of alternative investment strategies in terms of the flow of income they generate for him or the owners of the project, this measure will in general be inappropriate for estimating the costs and benefits of such a project to society. Both manuals argue that the appropriate measure for evaluating projects from a social perspective is *social profitability,* and provide feasible methods for measuring this concept. Social profitability is conceptually analogous to private profitability — it measures the flow of net *social* benefits from a particular project. However, instead of using market prices to value the project's inputs and outputs, as appropriate for estimating private profits, *shadow* prices are used to value these same inputs and outputs, and in addition to take account of any indirect effects of the project, such as externalities, which do not enter the private profitability calculations, e.g., pollution, market development, etc. Both manuals concentrate on the problems of deriving and estimating shadow prices, which reflect the true social costs and benefits of particular factors and goods.

The main emphasis in both manuals is placed on those divergences between social and private profitability which are due firstly to distortions[2] in factor and goods markets (arising from government policies, monopoly power, etc.) and secondly to income distribution effects. (While the business man is not concerned with the effects of different projects on income distribution *per se,* these effects can have a serious impact on welfare, especially in developing countries, where there may be few policy instruments available to government to manipulate the distribution of income. In extreme cases, project selection itself may be the only policy instrument for redistributing income.)[3] Relatively

1. This manual has been revised and extended in Little & Mirrlees (1974). We will refer to this later version as the LM manual.

2. We follow the literature here in using 'distortions' to refer to any disturbances in goods or factor markets which result in prices not being Pareto optimal. The term distortion does not imply any value judgement.

3. There are basically two reasons why project selection may be required to redistribute income in developing countries: firstly, neither taxation, nor redistribution at the level of the individual family unit

little attention is paid by either manual to what have traditionally been seen as the important social aspects of industrial projects in the development process, namely, externalities, linkages, etc. The authors of both manuals argue that the divergences between market and shadow prices created by such market distortions as tariffs, excise taxes, interest subsidies, and wage rigidities are quantitatively far more important than those created by externalities, linkages, etc. and hence, concentrate their energies on dealing with the former rather than the latter.[4]

The estimation of a complete set of shadow prices is seen as the key step in evaluating projects from a social perspective. These prices take account of both the *resource* and *fiscal* constraints on a country's achieving a higher level of welfare. The notion of prices which take account of resource constraints is very familiar in economics: such prices measure the opportunity costs of particular goods and factors. On the other hand the notion of prices which take account of fiscal constraints is quite novel and very important, as it means that the values in the government's social welfare function can be incorporated consistently into the evaluation of each project. This point will become clear when we discuss the derivation and estimation of shadow prices in Section 2.2. However, before turning to discuss how such shadow prices might be calculated, it is important to recognise the difficulty of calculating the costs and benefits of a project, even at market prices. The main problem is the uncertainty about future prices: these must be estimated in order to calculate the stream of future costs and benefits. To do this it is inevitable that one has to make some heroic assumptions, but it may be some consolation to those attempting a social evaluation, that many of these assumptions must also be made in calculating the private profitability of the project.

2.2 Derivation and Estimation of Shadow Prices

The methods for calculating shadow prices are complex, and it is impossible to set them out in any detail here. The interested reader is referred to the

---

may be feasible because of large administrative costs, so that transferring income to poorer groups which are concentrated in the same area may be undertaken more efficiently through project selection. Secondly, even if there are no such administrative problems, the incentive effects of taxes and subsidies may make it more efficient to use project choice to redistribute income. Sen (1975), Little and Mirrlees (1974) and Little Scitovsky and Scott (1970) argue that, in the absence of lump-sum taxation, job creation through project selection is one of the most effective methods of redistributing income.

4. In so far as one is dealing with a marginal industrial project, this may indeed be true, and in such a case, ignoring externalities may be a practical shortcut. However, one would have to be wary of ignoring externalities in the case of a large project, such as the proposal to build a zinc-ore smelter in Ireland. Lal (1975) argues further that what are often considered to be important externalities are in fact misconceived externalities in the project appraisal context. In particular he cites Hirschman's backward and forward linkages, which he says are only relevant in project appraisal if they affect non-traded goods which have indivisibilities in production (when in fact the externality is due to the indivisibility, not the linkage) or if there is an unlimited supply of investment funds (which is most unlikely to be the case in either less-developed or semi-developed economies). See Lal (1975), pp. 74-6.

LM and UNIDO manuals, to Squire and van der Tak (1975),[5] Little and Scott (1976), Scott, MacArthur and Newbery (1976), and Schwartz and Berney (1977). Both manuals see the problem of estimating shadow prices as one of finding the easiest method of adjusting market prices, so that they measure social costs and benefits correctly, and provide the basis for *consistent* social evaluation of marginal projects, i.e., they work from market prices, which are known, to shadow prices. Shadow prices are required for all goods (including services), both traded and non-traded, and for all factors (in practice this means labour, and finding the correct discount rate for investment projects); these prices are interdependent, as distortions in factor markets will affect prices in goods markets and vice versa.[6] We now consider each of these shadow prices and introduce a simple model to demonstrate how profits estimated using market prices provide little guidance to the relative social benefits of different projects.

The assumption that, as far as most trade is concerned, developing countries can be treated as small open economies, is made in both manuals. This assumption implies that the particular economy in question has no influence on world prices — it can buy or sell as much as it wishes on world markets, without affecting prices. In other words the prices of all *traded* goods are parametrically given for this economy.[7] Thus while market prices for traded goods may be highly distorted (because of tariffs, quotas, export taxes, etc.) the shadow prices for traded goods are given by border prices, which measure the rate at which the *country* can trade its exports for imports, i.e., border prices represent the opportunity cost to the country or producing a particular good. The contrast between market and border prices is illustrated in Table 1 which demonstrates the relationship between the output produced by, and the traded inputs used by, the marginal worker at market and shadow prices.

Our example considers two projects, A and B, which produce traded goods using imported inputs, non-traded inputs and labour. All projects last for a single period only. The market prices of both inputs and outputs of each project are identical, and if we assume that other production costs (non-traded inputs and labour) are the same for both projects, then the private profits of both projects are identical. However, the output of Project B is protected by a higher tariff than that of Project A, such that the value of output of Project A is twice that of Project B at border prices, though identical at market prices. Thus while market prices indicate that the projects are equally profitable, Pro-

5. The book by Squire and van der Tak probably provides the best introduction to social cost benefit analysis.

6. For a simple description of how precisely trade distortions can affect factor prices, see Findlay & Wellisz (1976).

7. Except in the very short run where contracts are fixed, this assumption is valid for many developing countries, as it is for Ireland.

ject A, assuming that other production costs are identical, is far more socially profitable than Project B.[8]

TABLE 1

Prices (£)	Project A		Project B	
	Market	Shadow	Market	Shadow
Output Value	200	100	200	50
Imported Inputs	30	20	30	20
Profits (including other production costs)	170	80	170	30

The estimation of shadow prices for *non-traded* goods is considerably more complex. The approach taken in the LM manual is to distinguish in the first instance between whether or not the use or production of a marginal unit of a non-traded good leads to adjustments in the production of that good (in which case we look at its marginal social cost), in its consumption (in which case we must look at its marginal social benefit) or both (in which case the shadow price of the good is a combination of the values of marginal social cost and benefit). If output expands as the demand for a non-traded commodity expands, then the marginal social cost of increased production is estimated by valuing the inputs necessary to increase production at shadow prices. In this case, the non-traded good is decomposed into traded and non-traded components, using input-output tables. As above, the traded components are valued at border prices, while the non-traded components are further decomposed into traded and non-traded sub-components, until eventually the good can be measured in terms of traded elements and primary factors only, and valued at their shadow prices. If consumption of the non-traded good elsewhere in the economy falls as the project generates additional demand, then the marginal social benefit of this reduced consumption is measured by 'assessing the net social cost of the changes in producer and consumer surplus and related changes in expenditure patterns induced by the increase in price required to divert the non-traded input to the project'. (Squire and van der Tak (1975, p. 34). The LM manual provides a short-cut for this procedure:[9] the shadow price for a range of non-traded goods is calculated and the ratio of these prices to market prices is used to estimate a standard conversion factor, i.e., if the market price of any given non-traded good is multiplied by this factor, an approximate estimate of its shadow price will be obtained. Obviously,

8. This assumes that the recipients of the profits of private projects are identical in both cases.

9. They argue that it will not be practical to attempt to estimate the shadow price for each and every non-traded good in this rigorous manner although for any very important non-traded input used in production, it would be advisable to do so.

in principle, for each good there is a true conversion factor, and to the extent that the true conversion factor differs from the standard conversion factor, the estimate of social profitability which is produced will be incorrect. It is now time to introduce non-traded goods into our example.

TABLE 2

	Project A		Project B		Project C	
Prices (£)	Market	Shadow	Market	Shadow	Market	Shadow
Output Value	200	100	200	50	200	100
Imported Inputs	30	20	30	20	30	20
Non-Traded Inputs	30	20	30	20	30	15
Profits (including labour costs)	140	60	140	10	140	65

In Table 2 we see that the shadow prices of both traded and non-traded inputs used in Projects A and B are identical, while the shadow prices of the non-traded inputs used in Project C are lower. Thus, if we assume identical private and social labour costs for each project, we find that the private profits of Projects A, B and C are identical, while the social profitability of C is highest and that of B lowest. We now turn to consider what is probably the most important element in estimating social profitability in developing countries, namely, the social cost of labour.

The two crucial elements in the calculation of the social cost of labour for a project, namely the shadow wage, are the output foregone in the rest of the economy through employing an additional man[10] on that project and the social value of the resulting additional consumption which depends crucially on the income levels of those benefiting from the project and the values implicit in the government's social welfare function. If the income distribution effects of the project are ignored, the shadow wage is simply identified as the value marginal product of labour employed in the best alternative to the project in question, i.e., employment on the project should expand, until the value marginal product of labour equals that of the best alternative. In most developing countries, however, the wage paid to labour employed on industrial projects greatly exceeds its *alternative* value marginal product,[11] and it is important to consider the income distribution effects of the marginal

10. While it is customary in most of the theoretical literature on project appraisal to refer to *the* shadow wage, implying that labour is homogenous, this assumption can be relaxed very easily. In practice, a single shadow wage is probably not inappropriate to most industrial projects in many developing countries.

11. LM consider the case where the wage in the industrial sector is set institutionally above the prevailing wages in other sectors of the economy.

individual's being paid this higher wage. The income distribution effects depend on (a) the individual's (and his family's) income under both alternative types of employment; (b) how the additional income (consumption) of this individual is funded; and (c) the relative weights of the different objectives (e.g. increase efficiency, greater equality in the distribution of income, etc.) in the government's social welfare function. As long as the opportunity cost, in terms of government revenue, of funding this additional consumption is positive, but less than infinite, the shadow wage will be greater than the output foregone elsewhere in the economy as a result of employing an additional man on the project, but will be less than the market wage he is paid. Table 3 illustrates how the labour costs affect private and social profits, and demonstrates clearly the extent to which private profitability can be a poor indicator of the relative social profitability of different projects. The market wages facing all projects are identical and greater than the shadow wages, which are identical for Projects A, B and C and lower for Project D.[12] In private profit terms all four projects perform identically, while the social profits which arise from employing the marginal worker range from -£40, to £30.

TABLE 3

Prices	Project A		Project B		Project C		Project D	
(£)	Market	Shadow	Market	Shadow	Market	Shadow	Market	Shadow
Output Value	200	100	200	50	200	100	200	100
Imported Inputs	30	20	30	20	30	20	30	20
Non-Traded Inputs	30	20	30	20	30	15	30	20
Labour	120	50	120	50	120	50	120	30
Profits	20	10	20	−40	20	15	20	30

Finally, we consider briefly the appropriate rate of interest at which the returns from projects in an intertemporal model should be discounted. Both manuals claim that savings in developing economies are sub-optimal because of externalities and/or monopolistic and fiscal distortions.[13] They argue strongly that the rate of interest used to discount investment projects (the accounting rate of interest) must reflect the weights attached to present and

12. The shadow wage for Project D might be lower because the labour it employs has a lower opportunity cost than that labour employed on Projects A, B or C, or because the income distribution effects arising from employment on Project D are more favourable than those associated with the other projects.

13. The externalities tend to arise from the interdependency of actions: for example, while a person may be willing to save in order that future generations may be better off, he will not undertake additional saving if he thinks that this will lead others of his generation to reduce their savings. Furthermore, as the consumer is mortal his attitude to saving could be expected to differ from that of the collective society. Monopolistic and fiscal distortions tend to discourage savings by individuals on low incomes. See Little, Scitovsky and Scott (1970).

future consumption in the government's social welfare function. Estimation of the accounting rate of interest is, they admit, the most difficult component of project evaluation. For a further discussion see LM, chapter 14.

2.3 Project Evaluation with Shadow Prices

We now turn to consider how the shadow prices discussed in the last section can be used in the evaluation of industrial projects. In fact the LM manual develops its methodology primarily for government-owned projects; this means that all of the 'private' profits generated by a project go directly into the hands of the government, which will distribute them in such a way as to maximize welfare. When the project is privately-owned, part of the profits go to the government in the form of taxes (in which case that portion is identical to a government-owned project, for the government is a part-owner in every project up to the amount of the tax rate);[14] the remaining profits go to the capitalists and must be valued in like manner to the increase in wage income: as capitalists are assumed to be wealthy, the component of their profits consumed will receive a low weight relative to that of low-wage workers, whereas the component saved will receive a larger weight if savings are suboptimal.[15]

Despite the fact that the LM manual concentrates on publicly-owned industrial projects, it does not assume that the body responsible for socially evaluating these projects has any widespread control over fiscal instruments. In particular, the manual is concerned with the case where the project-evaluation agency, referred to as the COPE (the Central Office of Project Evaluation), must appraise projects in whose output and/or input markets, there are government-created distortions. Thus the method of project appraisal described does not presume the use of first best policies by the government, and although a particular COPE may have some influence on the introduction or reform of certain fiscal policies (tariffs, factor subsidies, etc.), such influence is not assumed.[16]

Using the set of shadow prices estimated for an economy, the project evaluation agency calculates the social profit of alternative projects. If a project is socially unprofitable then it should be rejected, no matter how privately profitable it is, as undertaking this project would be welfare reducing. In practice it may not be possible for the project evaluators to stop such a project

---

14. For example, if there is a profits tax of 50%, then effectively the government has a half share in the firm.

15. If the capitalists are foreigners, then their consumption would receive a zero weighting; in this way the LM manual deals with foreign investment as a very special case of private investment. For a fuller treatment of the problems involved in appraising foreign projects, see Lal (1975) and Newbery in Little and Scott (1976).

16. See Dasgupta (1972) for a discussion of the effects of having a more or less powerful COPE.

being undertaken (especially if the private profits generated are large), but the agency can make certain that it receives no government aid.

The main task for the project evaluation agency occurs when after the initial evaluation it emerges that the project is socially profitable but not privately profitable. The agency then has to calculate whether, if given sufficient government assistance to ensure private profitability, the project would still be socially profitable.[17] If it would still be socially profitable, then such assistance should be given. While this rule for when to accept or reject a project, and how much assistance to give it is very straightforward, it is not made clear how the assistance should be given. Assuming that it is not possible to eliminate the distortions or overcome the fiscal constraints which cause private and social profits to deviate, the project evaluation agency can ensure private profitability by giving either an output or factor subsidy to the firm. The preferred method of assistance will be that which brings shadow and market prices for the firm closest together, thereby minimizing by-product distortions. For example, *if* the only distortion in the economy occurs in the labour market, where market wages exceed shadow wages, *and* lump-sum taxation is possible, then the first best policy will be to subsidize the wage faced by the firm, to eliminate the difference between shadow and market wages.[18] However, the agency may not find it possible to follow first best policies, because of administrative and political pressures, pressures from existing firms arguing that they cannot compete with subsidized firms,[19] or pressure from trade unions in the assisted firms.[20] Such pressures have undoubtedly led many countries to assist firms individually, on a once-for-all basis, by giving concessions such as capital grants, rather than on-going wage or value-added subsidies.

Finally, we consider the case of projects which are both privately and socially profitable. Such projects are those which would be undertaken without government assistance, but in the presence of schemes to assist industrial investment, they are likely to seek financial assistance. As long as the project will definitely go ahead without assistance, the agency should try to withstand any pressure to give assistance, as each £ paid out reduces social profitability. If the project may not be undertaken without assistance, despite its private

17. Clearly the assistance given by the government is an additional cost, which must be subtracted from the initially calculated social profits.

18. If it is not possible to intervene at the source of the distortion, then additional resource costs are incurred; this point has been widely discussed in the trade and welfare literature (see Bhagwati (1971), Corden (1974) and Neary (1978) for a discussion of the problems of using second best policies to eliminate the effects of immovable distortions), but has been ignored in the literature on project appraisal. Findlay & Wellisz (1976) draw attention to this omission, and illustrate its importance.

19. This argument will generally be weaker for exporting or new import substituting projects, which are those aided under the IDA programme in Ireland.

20. If trade unions, in the light of the wage subsidy, put upward pressure on wages in that firm, then the effects of the subsidy will be negated, and the project may fail.

profitability, which is often the case for foreign-owned projects which are mobile between countries in response to differential assistance, then the agency should consider giving such a firm assistance. However, as in the case of privately unprofitable projects, it should pay the minimum amount necessary to guarantee the project's being undertaken.

2.4 Project Appraisal in Semi-Developed Economies

The literature on project appraisal which we have been discussing has been developed primarily for developing countries. Before turning to compare these methods with the approach taken by the IDA to project appraisal, we consider briefly in what respects the methods would have to be refined to take account of the different characteristics of semi-developed economies. There would seem to be a number of obvious but not very substantive differences:

1) The simplifying assumptions made already about the labour market in developing countries, even allowing for the extensions referred to above, would be seriously inadequate for analysing the more complex economic structures of semi-developed economies. In such economies it is essential to disaggregate labour by different skill categories, to allow for different types of labour market distortions, to distinguish a number of sectors in the economy from which the labour for the marginal project might be drawn and to specify the equilibrating mechanisms in different labour markets. The source of labour is a vital component of the shadow wage; if the labour comes from the unemployment pool, then its opportunity cost may be zero,[21] whereas if it comes from some other sector, its opportunity cost will be measured by its marginal product in that sector.

2) There are likely to be more instruments available for income redistribution in semi-developed compared with less-developed countries.[22] This means that the relative importance of using project appraisal as a method of redistributing income either inter- or intra-generationally may be reduced. However, it cannot be ignored entirely, and is likely to be important for regional redistribution in particular.

---

21. The opportunity cost will not necessarily be zero; whether it is or not depends on how the labour market operates. In Harris-Todaro (1970) type models, where labour is assumed to migrate to urban areas in response to the probability of attaining employment (which is assumed to depend directly on the unemployment rate in the urban sector), the effect of drawing a worker from the unemployment pool is to induce further migration, from rural into urban areas. Since labour employed in agriculture has a positive marginal product, the opportunity cost is positive.

22. It should be noted, however, that while there may be a variety of instruments for redistribution in a particular semi-developed economy, redistribution may be seriously constrained in practice by strong sectional interests. Marglin (1976) chapter 2, provides a general discussion of the impact of such constraints on employment creation. In Ireland the strength of such sectional interests has become increasingly apparent in recent years.

3) Institutional factors are likely to play a more important role in more developed economies. For example the existence of unemployment benefits, organised labour and management, etc., will affect the calculation of shadow prices, and add to the complexity of the costs and benefits to be counted.

Despite these differences the methodology is at least in principle equally valid for semi-industrialised countries, as much as for less-developed economies. If there is a divergence between social and private profitability then, no matter what the category of country, there is an argument for government intervention. The greater complexity in the structure of more-developed economies is likely to add to the complications of measuring social profitability; these complications should not be insurmountable, and semi-developed economies should make the necessary resources available to ensure that the government intervention is justified, and if justified, efficiently undertaken.[23]

2.5 Social Profitability and Proximate Economic Targets

Finally, before turning to examine the potential for, and problems arising in, using project appraisal in Ireland we wish to consider why social profitability, rather than growth potential, employment or desirable income redistribution effects, is the sole valid criterion for ranking projects. Social profitability incorporates both the production constraints on the economy, and the economy's objectives, weighted in accordance with the country's social welfare function.[24] Defining targets in such terms as higher growth rate or more equitable income distribution is misleading: no country wants maximum growth, as this would be at the expense of present consumption, and it may not want a completely egalitarian income distribution, because of the incentive effects of such a policy. In some sense there will always be some optimal level of growth and income redistribution consistent with the government's priorities, given the constraints it faces; *if* there must be a trade-off between these two

---

23. The question of when government intervention is justified is a difficult one; there is a danger in assuming that, for example, unemployment always justifies the payment of wage subsidies, because it signals some distortion in the labour market, which forces the real wage to exceed the market-clearing wage. This unemployment may not be due to any distortion, but may be the result of cyclical or seasonal factors, or may be search unemployment which is necessary to produce the correct allocation of labour. To justify intervention, it is necessary to ascertain that there is a distortion in the first place, and then to measure the extent of the distortion to determine how much intervention is required. It is possible that what appears at first sight to be a distortion may indeed be optimal. For a further discussion of this question, see Stiglitz (1976).

24. We assume that the social welfare values implied are those of the elected government, which is assumed to be behaving in a benevolent manner. Although most countries do not have explicit welfare functions, for political reasons, project evaluators should attempt to approximate it from government statements, tax and benefit schedules, etc. This task may prove to be one of the greatest facing the project evaluation agency.

targets (e.g., to obtain more growth, there must be more savings, and in order to generate these savings a less equal distribution of income is required as the marginal propensity to save of the higher income groups is larger[25]) then this trade-off is determined by the relative importance of these two targets in the government's social welfare function.

The target most frequently discussed with relevance to developing countries in recent years is employment. Economists differ on the question of whether employment per se is a valid economic target: LM (1974) argue that it is not a valid target, as employment is not desirable in itself,[26] while Sen (1975) argues that although it may not be a valid economic target, it is a social target, because of its recognition aspects.[27] However, both agree that it is a very effective method of redistributing income, and warn against the widespread misapprehension in the development literature that in some sense the LDC faces a choice between increasing output and increasing employment.[28] What is the relationship between social profitability and employment? Employment as a target is in fact a component of social profitability: if employment is important, then the shadow wage will be low and social profitability will be high. Thus a project which is desirable when measured in terms of the employment target, will by definition be desirable in terms of the social profitability measure. Social profitability is a superior target as it allows a project to be evaluated simultaneously in terms of targets other than employment, such as growth potential. For a further discussion of the relationship between economic targets, see Ruane (1976), Section 2.1.

3 Project Appraisal in Ireland

In this section we consider two questions: firstly, is it feasible to calculate a set of shadow prices for Ireland? And secondly, in what way does the project appraisal discussed in the previous section differ from the approach taken by the IDA?

3.1 Shadow Prices for Ireland: Is Estimation Feasible?

The calculation of shadow prices for Ireland is a perfectly feasible, if a

---

25. Little, Scitovsky and Scott (1970) point out that the larger marginal propensity to save of some of the higher income groups does not necessarily justify the low level of income redistribution in LDCs on the grounds of the growth target as there is no guarantee that such savings will be invested in the LDC in question; they favour the use of government policies to increase household savings, which they regard as sub-optimal, because of capital market inadequacies. (See chapter 2). Furthermore, if there is any Keynesian-type excess capacity in the economy, the smaller marginal propensity to import out of lower incomes may result in increased growth being positively associated with a more equitable distribution of income.

26. See Little and Mirrlees (1974), Section 4.31.

27. See Sen (1975), chapters 1 and 8.

28. The argument here is the simple one that, at any instant in time, as long as the value marginal product of labour on a particular project is non-negative, an increase in employment cannot reduce output.

rather long and tedious task.[29] However, as long as economic policies and social values remain broadly similar, the task should be a once-for-all one, with only relatively minor changes required from year to year.[30] As far as the prices of traded goods are concerned, Ireland can readily be assumed to be a small country, which means that border prices are accurate and simple measures of shadow prices. Furthermore as Ireland has a very open economy, the method outlined in the LM manual would be most appropriate as it is designed for such an economy.[31] Irish membership of the EEC complicates the calculation of shadow prices in two respects. Firstly, Irish tariffs are in the process of being aligned with EEC levels: the shadow prices would have to take account of these adjustments and of the fact that, while trade with the EEC will eventually involve no tariff distortion, tariffs will remain with the non-EEC members, albeit at a lower level. Secondly, at present Irish agricultural goods are traded at a different exchange rate to all other tradeables; as long as the Green £ continues to differ in value from the Irish £, this will affect the relative value of agricultural to non-agricultural goods. Both of these complications again favour the use of the LM approach.

The main complication arises in the labour market, because Irish labour has the opportunity of migrating to the UK in response to differential wage and employment prospects. The project appraisal manuals allow for migration of labour between sectors, but not between countries. However it may be the case that the existence of the UK labour market actually simplifies the calculations, as it represents a given price for labour from outside the economy, and hence the cost to certain individuals of remaining in Ireland.[32] Likewise the existence of an elaborate social security system provides a method of measuring the opportunity cost of taking up any kind of employment. It is vital that account be taken of the complexity of the system (in terms of the criteria for entitlement, the transferability of such provisions between different areas, and

---

29. Shadow prices have already been estimated for several developing countries using the UNIDO and LM methodologies. For discussions of the problems involved in applying these methods, see Gutowski and Hammel (1972), Little and Scott (1976), Scott, MacArthur and Newbery (1976), and papers by Bacha and Fereidoun in Schwartz and Berney (1977).

30. More serious changes might be required in the event of increased competition between countries for foreign investment projects, which would affect the supply of such projects to the Irish economy.

31. This is because the LM method uses prices of goods in terms of foreign currency as numeraire, while the UNIDO method uses the prices in terms of domestic currency, multiplied by the estimated shadow exchange rate. The more open the economy, the greater the advantages, in terms of accuracy and simplicity of the LM method compared with the UNIDO method, and vice-versa. See Dasgupta (1972).

32. It is very important to model the migration process correctly: it may be the case that a Harris-Todaro (1970) type model would capture this aspect of the labour market adequately. For a discussion, see Walsh (1974). Furthermore the importance attached by the Irish government to the right of each individual to a job in Ireland should be taken account of in this calculation.

the availability of social security to the Irish worker who migrates to the UK) in using these data to capture the opportunity cost of remaining unemployed.[33]

On the benefit side we face the problem of deducing the government's social welfare function. The Irish government has not been particularly explicit in setting out its economic objectives; in different national plans it has outlined its objectives in terms of growth, income redistribution (particularly in the regional dimension) and employment, in qualitative rather than quantitative terms, and it has not specified the weights of, and hence the trade-off between these objectives.[34] However, from the publicly stated objectives and the value judgements inherent in the existing fiscal schemes, it may be possible for the project evaluation agency to derive an approximate social welfare function, which would be an acceptable measure of the government's values.[35]

3.2 Project Appraisal and the IDA

In order to compare the IDA programme with the methods described above, we give a brief outline of how this programme operates. Business-men, both Irish and non-Irish, are encouraged to establish manufacturing plants in Ireland by means of a set of financial incentives (e.g. grants) and fiscal aids (e.g. tax reliefs).[36] The financial incentives, which are controlled by the IDA, are available on a discretionary basis — no element of the financial scheme is automatic. To determine whether, and to what extent a firm should receive financial aid, the IDA evaluates each project using a *modified* form of discounted cash flow analysis. The method is modified in the sense that a qualitative allowance is made for certain non-private aspects[37] of the project such as its high employment content (taking into account implicitly the low opportunity cost of labour), its location (which affects the regional dimension of income distribution), its externalities ('the full impact of the project on the

---

33. Ruane (1979) uses these data to derive estimates of optimal labour subsidies for unskilled labour from the unemployment pool being employed on marginal industrial projects. This paper provides implicitly the only estimates of shadow wages available for any type of industrial labour in Ireland.

34. For a discussion of the validity of and trade-offs between Irish economic targets, see Ruane (1976), Section 2.1.

35. Indeed as the terms of reference given to the IDA are very general, it has been necessary for it to impute values to the government; the advantage of an explicit welfare function is that it makes targets explicit and it makes clear the necessary trade-offs which the project evaluator faces on behalf of the country.

36. We will not discuss the fiscal aids here; they are given on an automatic basis to all firms which meet certain general conditions.

37. These aspects are in the spirit of the additional costs and benefits referred to in Sections 2.1 and 2.2. As noted in those sections, the manuals, and the LM manual in particular, pay little attention to these adjustments, considering some, such as transfer payments, to be obvious, and others, such as externalities, to be relatively unimportant.

national income'), etc.[38] The IDA seems to attach particular importance to the firm's being privately profitable, *independently* of the financial aid it receives; the assistance given depends on the social aspects of the project, and is intended as an inducement to such profitable projects to locate in Ireland. In other words, the only projects which are considered are those which are *privately* profitable and the real question faced by the IDA is whether such projects are socially profitable, and how profitable they are.

The main differences between the approach taken by the IDA and that in the LM and UNIDO manuals are the following:

1) To rank projects, the IDA uses private profitability, with a qualitative allowance for the social (non-private) aspects of the projects, as a criterion, while the manuals use social profitability. To the extent that the IDA's quantitative allowances are rigorously and identically applied in the case of each project, and take into account the government's social values, then the two rankings will be close, but the IDA approach will always be inferior.

2) If the project is *privately* profitable, then the IDA will pay a grant (the size of which is determined by reference to the project's desirable social attributes), in order to persuade the business man to undertake the project in Ireland.[39] There are upper limits set on the value of the grant which may be given; if this constraint binds, then the level of grant may not be sufficient to win the project. According to the manuals, if on the first count, the project is socially profitable, but not sufficiently privately profitable to be undertaken by the private sector, then the evaluation agency may intervene to try to make it privately profitable. If the amount of subsidy required to make the project privately profitable does not reduce the level of social profitability below the required level (i.e., that it be socially profitable after receiving the subsidy), then the subsidy should be paid. If the level of subsidy required to make the project privately profitable makes it socially unprofitable, then the agency should reject the project.

What are the advantages and disadvantages of the two approaches? The approach in the manuals requires the calculation of a complete set of shadow prices, which as we pointed out above, is a feasible but time-consuming task. Once these calculations had been made, however, the evaluation of individual projects would be relatively easy (not much more difficult than discounted cash flow analysis), and one could be confident that, at the margin, all projects would be treated identically. The IDA approach avoids the explicit calculation of shadow prices, but it requires examination of the social aspects of each

38. For details, see Industrial Development Authority (1976) and Ruane (1976), Section 2.2.

39. This approach is more appropriate for foreign — rather than domestically — owned projects, as the former are in general more internationally mobile.

project individually; this approach makes it very difficult to ensure identical treatment for each project.

The great advantage of social profitability as a criterion is that it allows one to determine whether or not the welfare of the country is being raised by having a particular project, and how much the country can afford to pay in the form of subsidies to win the project.[40] In the case of the IDA approach, there is a certain arbitrariness about the limit to the amount of aid which can be given, and there is no way of being certain that each particular project bargained for is desirable in itself. The danger in the IDA approach would seem to be that a project could receive aid when it was socially undesirable, or could be lost to another country because of the limits to assistance which are established in very general terms, despite being socially profitable. Furthermore, at a time when countries and regions in all areas of the globe are bargaining for international projects, it is important not to be misled by their activities, into paying too much for a project. The fact that other countries are willing to pay a lot for such projects should not necessarily lead Ireland to follow suit: these projects may have higher social profits in such countries (because of comparative advantage, say) or those countries may be mistaken in encouraging projects which actually reduce welfare. (See Levy and Sarnat (1975)). The IDA programme is better than many in that it attempts to evaluate each project individually, rather than giving some global concession (as is done in many developing countries and in the UK development areas), but without the use of social profitability as a criterion, one cannot guarantee that this programme approves and aids socially desirable projects only.

4 Project Appraisal — its Usefulness and Limitations

The general argument in this paper is that the LM method of calculating shadow prices, as an ingredient in measuring social profitability of industrial projects, could be used very effectively in Ireland. The LM approach is in fact a refinement of what the IDA programme already does — this refinement would allow explicit account to be taken of the economic constraints and objectives in Ireland in a systematic way, which would ensure that only projects which are welfare-raising are grant-aided, whether they are or are not privately profitable.

Project appraisal does not of course guarantee industrial development in any sense. The IDA argues that its main problem lies not in choosing between projects but rather in finding appropriate projects from which to choose. While this may well be the case, it is not true to say that a bad (i.e., socially unprofitable) project is better than no project, as one might be led to believe. This brings us to an important practical question, namely, if a formal method

---

40. For a comparison of the actual subsidies paid per job created on new projects with the subsidies based on shadow wage estimates (what Ireland can afford to pay), see Ruane (1979).

of project appraisal is to be introduced in Ireland, who should undertake it, i.e., who should be Ireland's COPE? In particular, should it be the IDA, the Department of Economic Planning and Development or a new body created specifically to establish the objectives for, formulate and review, industrial policy? Given that the IDA's primary role is to search out and market Ireland to potential investors, it might be more satisfactory if an alternative body would appraise the projects from a social perspective. Clearly there would be a close interaction between such a body and the IDA — in particular, IDA personnel would take account of the social criteria used by the project appraisal agency in its search activities. The existence of an independent agency might also provide a basis of establishing social profitability criteria inter-sectorally, and not merely within the industrial sector. In any event, given the importance attached to industrial development in Ireland, which is not unfortunately represented in a comprehensive industrial policy, we feel that it would be worthwhile to find the necessary additional resources to calculate shadow prices, in order to ensure that all projects which receive government assistance raise economic welfare.

REFERENCES

Bhagwati, J. N. (1971): 'The Generalised Theory of Distortions and Welfare', in Bhagwati et al. (eds.), *Trade, Balance of Payments and Growth: Papers in Honour of Charles P. Kindleberger,* Amsterdam: North Holland.

Corden, W. M. (1974): *Trade Policy and Economic Welfare,* Oxford: Clarendon Press.

Dasgupta, P. (1972): 'A Comparative Study of the UNIDO Guidelines and the OECD Manual', *Bulletin of the Oxford University Institute of Economics and Statistics,* vol. 34.

Findlay, R. and Wellisz, S. (1976): 'Project Evaluation, Shadow Prices and Trade Policy', *Journal of Political Economy,* vol. 84.

Gutowski, A. and Hammel, W. (1972): 'An Aid Agency's Experience with the Little-Mirrlees Method', *Bulletin of the Oxford Institute of Economics and Statistics,* vol. 34.

Harris, J. R. and Todaro, M. P. (1970): 'Migration, Unemployment and Development: A Two-Sector Analysis', *American Economic Review,* vol. 60.

Industrial Development Authority (1976): *Industrial Incentives,* Dublin: The Industrial Development Authority.

Lal, D. (1975): *Appraising Foreign Investment in Developing Countries,* London: Heinemann Educational Books.

Levy, H. and Sarnat, M. (1975): 'Investment Incentives and the Allocation of Resources', *Economic Development and Cultural Change,* vol. 23.

Little, I. M. D. and Mirrlees, J. A. (1969): *Manual of Industrial Project Analysis in Developing Countries, Volume II, Social Cost Benefit Analysis,* Paris: OECD Development Centre.

———————, (1974): *Project Appraisal and Planning for Developing Countries,* London: Heinemann Educational Books.

Little, I. M. D., Scitovsky, T. and Scott, M. FG. (1970): *Industry and Trade in Some Developing Countries: A Comparative Study,* Oxford: Clarendon Press.

Little, I. M. D. and Scott, M. FG. (1976): *Using Shadow Prices,* London: Heinemann Educational Books.

Marglin, S. (1976): *Value and Price in the Labour-Surplus Economy,* Oxford: Clarendon Press.
Neary, J. P. (1978): 'Capital Subsidies and Employment in an Economy.' *Oxford Economic Papers,* vol. 30.
Ruane, F. P. (1976): *Trade, Fiscal and Industrialization Policy in the Small Open Economy: The Irish Experience,* unpublished B.Phil. thesis for Oxford University.
_____, (1979): 'Optimal Labour Subsidies and Industrial Development in Ireland', paper read to *Irish Association of University Teachers of Economics Conference,* April 1979.
Schwartz, H. and Berney, R. (1977): *Social and Economic Dimensions of Project Evaluation,* Washington D.C.: Inter-American Development Bank.
Scott, M. FG., MacArthur, J. D. and Newbery, D. M. G. (1976): *Project Appraisal in Practice — the Little Mirrlees Method Applied in Kenya,* London: Heinemann Educational Books.
Sen, A. K. (1975): *Employment, Technology and Development,* Oxford: Clarendon Press.
Squire, L., and van der Tak, H. G. (1975): *Economic Analysis of Projects,* Baltimore: The Johns Hopkins University Press (for the World Bank).
Stiglitz, J. (1976): 'The Structure of Labour Markets and Shadow Prices in LDCs', paper read at *IBRD Research Workshop on Rural-Urban Labour Market Interactions.*
UNIDO (1972): *Guidelines for Project Evaluation,* written by Dasgupta, P. S., Marglin, S. A. and Sen, A. K., New York: United Nations.
Walsh, B. M. (1974): 'Information, Expectations and Human Migration: Specifying an Econometric Model of Irish Migration to Britain', *Journal of Regional Science,* vol. 41.