

A Cost/Benefit Evaluation of Irish Airlines

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I INTRODUCTION

This paper deals with an attempt to measure the economic contribution which the Irish airlines (Aer Lingus and Aer Linte) make to the economy, and is based on a report prepared for the company in 1968 *

A conventional answer to this question would be to calculate the net output (or value added) of the firm since this would be its contribution to the measured GNP. Employee remuneration and profits are the major constituents of net output, and it is profits which, in turn, are the normal basis for deciding whether the particular output obtained represents the best, or an adequate, use of the resources employed by the firm. The reason for this is because all the firm's earnings, other than profits, are matched by payments for items which have (potential) alternative uses, leaving profits as the element of surplus. The prices which are paid for the firm's purchases of labour, materials, or other resource would be taken as an adequate measure of the alternative output which these resources could produce elsewhere, since the same prices would apply to other firms. In the case of profits, on the other hand, there is no reason for expecting the same profit level to prevail in all firms, and the highest profit rate is deemed to constitute the best economic use of resources. This commercial assessment of the size and relative worth of any one project's economic contribution is in practice sometimes supplemented by more wide-ranging estimates. Such estimates are usually referred to as cost/benefit calculations, and seek to take account of the unpriced or inadequately priced activities arising from the firm's operations. Where relevant, the results of such cost/benefit estimates can be presented in the form of a "social" rate of return, in contrast to the "private" returns denoted by commercial profits.

The information needed for a cost/benefit calculation is analogous to that required for a commercial evaluation, in that it is necessary to identify the gross contribution, and then deduct from this, the opportunity cost (value in alternative uses) of the resources involved, in order to arrive at the *net* social returns from the project. The first step, calculating the gross return, calls for the identification, and financial valuation of any "outputs" or "services" supplied by the "projects" (or firm) which are not adequately (if at all) reflected in the revenues from its sales. The second step, estimating the opportunity cost of the project's activities is much more complex, since it calls for some specification of the situation which might exist in the absence of the project. Since this alternative is a purely hypothetical situation, it follows that (a) there can be a larger number of alternatives,

*The Report was prepared by the Economists' Advisory Group, London, and by the author. Professors Peacock and Wiseman acted as joint directors of the project. Professor Morgan was the other E A G member actively involved in the study.

and (b) no direct empirical measurement of the chosen alternative(s) is possible. To some, this necessity to specify a hypothetical alternative to the actual situation is an overwhelming objection to the cost/benefit approach, but the same problem confronts any investor, who must always compare whatever is expected to happen if a project is undertaken with the position that would exist if he rejects it. Once a decision is taken, the rejected option enters the realm of "what might have been" and is not susceptible to empirical measurement. But if the problem of formulating hypothetical alternative(s) is no different in kind with cost/benefit than with other investment decisions, it is at the same time one which is different in degree, and one which gives rise to difficulties of both specification and quantification. The solutions adopted for these problems in the case of the airlines will emerge later. Here it may be noted that frequently, the practice is not to attempt to go through the full sequence of first measuring the gross contribution of a project, and then as a second step subtracting its estimated opportunity costs as inferred from some alternative hypothetical position, but rather to specify and measure the *changes* which take place between the two positions. This practice has been followed in the present paper.

Having warned about the need for judgments and estimates, it is also relevant to refer briefly to the statistical material and to the numerical estimates presented in the paper. Since the study was prepared in a limited time-period it was necessary to rely on readily available statistical material. This, allied to the necessity for estimates, frequently of a rather crude nature, means that no great degree of accuracy can be expected of any one figure, and no particular emphasis should be attached to them. The primary intention throughout has been to identify, and indicate the possible magnitude of the various elements in the calculation. Numerical values are used both for this latter purpose, and to facilitate the exposition rather than to suggest precise results. The calculations presented refer to the financial year 1966/67, which was the most recent year for which data were available at the time of the study.

The sequence in which the estimates are developed is first in section II, the commercial accounts and some subsidiary data are summarised. These commercial results serve as the point of departure for sections III and IV. The first of these sets out the nature of the "corrections" to be made to the commercial accounts, while the second presents the relevant estimates. Section V offers some brief general conclusions, together with some related comments on the exercise.

II. COMMERCIAL AND RELATED DATA

The revenue and expenditure of Aer Lingus for 1966/67 is summarised in Table 1. It is of some importance to the later discussion to distinguish domestic from foreign transactions, Table 1 therefore summarises this information for the major areas.

TABLE 1

REVENUE AND EXPENDITURE OF AER LINGUS BY
GEOGRAPHICAL AREAS 1966/67 (£000)

Revenue	Total	Ireland	Great Britain	North America	Other
Passenger	16,657	4,687	4,351	6,771	848
Cargo	2,191	900	603	595	93
Mail	307	235	38	27	7
Other	2,434	942	483	966	43
Total	21,589	6,764	5,475	8,359	991
<i>Expenditure</i>					
Payroll	6,772	5,234	544	870	124
Fuel and Oil	1,555	752	224	428	151
Landing Fees	1,283	636	439	130	78
Training Expenses	253	178	22	22	31
Maintenance (materials)	683	20	209	454	—
Engine Overhaul etc	821	—	410	97	314
Handling charges at outstations	1,025	323	340	252	110
Passenger food	546	297	16	206	27
Agents Commission	1,184	256	225	521	72
Advertising etc	792	104	203	410	75
Aircraft hire	500	420	80	—	—
Other	3,212	2,023	277	828	84
Total allocated	18,626	10,243	3,099	4,218	1,066
Depreciation	1,858				
Total expenditure	20,484				

The difference between revenue and expenditure of £1.1 million constituted the operating profit, the figure for net profit was shown as £0.9 million, representing a rate of return of approximately 4 per cent on the net assets employed of £24 millions.

It will be seen that 69 per cent of total revenue came from export sales, the major source of such earnings being North America which contributed almost 40 per cent of total revenue. On the expenditure side, 45 per cent of allocated spending went on external items so that there was a significant net surplus on foreign transactions which served to finance the larger volume of domestic payments. The actual size of the external payments depends on how the residual items between total revenue and allocated expenditure are apportioned geographically. For later convenience it may be useful to spell out the actual apportionment used here, and this is done in Table 2.

TABLE 2

ESTIMATION OF AER LINGUS NET PAYMENTS BY AREA (1966/67)
(£m)

	Total	Ireland	Foreign
	£21 6m	£6 8m	£14 8m
Total Revenue			
<i>Expenditure</i>			
Allocated in Table 1	18 6	10 2	8 4
<i>Depreciation</i>			
Flight	1 5	—	1 5
Other	0 3	0 2	0 1
Operating Profit	1 2	1 2	—
Total Expenditure	21 6	11 6	10 0

There was thus on balance an estimated net inflow of £4 8 millions in foreign exchange from airline operations in that year

An indication of the value added by Aer Lingus, which as indicated in the opening section is the measure of contribution to the economy for national accounts purpose, can also be derived from the expenditure data. This can be done by approximating to the national accounts measure of "net product". This net product is taken as the total wages and salaries payments, plus the trading profits of a firm. It is thus the remainder after all payments for materials and services, including depreciation (which is taken as the cost of the capital equipment employed). The sum of these net products for all enterprises and employing units represents the national income. The net product of Aer Lingus is taken as being its total payroll within Ireland plus its operating profits. Table 3 shows this calculation together with data for selected sectors. To facilitate comparison the net product per employee is also shown.

TABLE 3

NET PRODUCT, AGGREGATE AND PER EMPLOYEE SELECTED
SECTORS, 1966

	Total (£m)	per worker (£)
	Aer Lingus	6 5
All Distribution and Transport	143	690
Industry	265	910
Net National Product	836	785

It will be seen that the net product per employee in Aer Lingus is significantly above the average in the other sectors shown. This means for

example, that in 1966, Aer Lingus although it employed less than 0.4 per cent of the total labour force, contributed 0.8 per cent of the national income.

Finally, the total and skill composition of the Aer Lingus labour force which is of some relevance to the later discussion may be noted. The latest available data on a comparable basis are those given in the 1961 Census of Population. Some of this data is presented in Table 4 (a) and (b).

The occupational categories are too broad to give more than a general picture, but nonetheless they show some important differences between the skill structure of the Aer Lingus work and that for the economy as a whole. In particular, there is a greater proportion of male employees in the categories of "salaried employees" (which includes airline pilots along with senior managerial staff) and "intermediate non-manual" (which contains the main body of administrative and clerical workers). Such differences are relevant to the question of alternative employment opportunities which will arise in Section IV.

III MODIFICATION OF THE FINANCIAL DATA THE NATURE OF THE PROBLEM

Our concern is with the contribution of Aer Lingus to the Irish economy. That contribution is partly direct: this we have already dealt with. It may also be indirect in that Aer Lingus's activities confer benefits or impose costs upon the community other than those which show up in the "commercial" accounts. We must try to identify these costs, in order subsequently to quantify them. Also, it is necessary to assess the extent to which these "indirect" effects are due to the existence of Aer Lingus, in the sense that they would disappear, or change in magnitude, were Aer Lingus to be withdrawn. In this section, are set out what are believed to be the relevant body of indirect influences, together with an explanation of the alternative situation in which it is proposed to evaluate them. The latter task has already been outlined, but the explanation may be repeated at risk of tedium, if the reader is to understand what has and what has not been done. Attention is also drawn to the special conditions of the Irish economy that are relevant to this problem.

We need to consider indirect effects of Aer Lingus's operations because the measurements derived from financial data only provide a fully accurate measurement of the economic costs and benefits associated with the enterprise in question when various conditions are fulfilled. When these are not met in full, economic effects may either appear in the financial accounts at values which diverge from their economic worth, or they may be excluded from the accounts altogether.

The first step, then, is to identify possible causes of divergence of the kind described. The procedure adopted was to examine the pattern of Aer Lingus's activities, and to list those which may produce significant items. This list was then checked against the various discussions of airlines problems in the professional literature. Finally, comments were obtained

TABLE 4a

MALES AT WORK CLASSIFIED BY SOCIAL GROUPS 1961
(% DISTRIBUTION)

	Total	Higher Professional	Lower Professional	Employers and Managers	Salaried Employees	Intermediate non-manual Workers	Other non-manual Workers	Skilled Manual Workers	Semi-skilled Manual Workers	Unskilled Manual Workers	Unknown
Air Transport Number	1,781	36	10	65	208	568	336	227	62	269	—
%	100	2.0	6	3.6	11.7	31.9	18.9	12.7	3.5	15.1	—
Transport Communication and Storage Number	47,278	281	62	667	1,834	5,935	21,894	7,025	6,181	3,367	32
%	100	6	1	1.4	3.9	12.6	46.3	14.9	13.1	7.1	—
All non-Agricultural Employees Number	428,250	21,437	14,790	22,283	14,080	86,633	60,717	110,174	47,775	50,034	327
%	100	5.0	3.5	5.2	3.3	20.2	14.2	25.7	11.1	11.7	1

TABLE 4b
FEMALES AT WORK CLASSIFIED BY SOCIAL GROUPS, 1961

	Total	Higher Professional	Lower Professional	Employers and Managers	Salaried Employees	Intermediate non-manual Workers	Other non-manual Workers	Skilled Manual Workers	Semi-skilled Manual Workers	Unskilled Manual Workers	Unknown
Air Transport Number %	773 100	— —	3 4	— —	1 1	497 64.3	220 28.5	2 5	50 6.5	— —	— —
Transport Communication and Storage Number %	6,880 100	3 —	9 1	137 2.0	22 3	4,599 66.9	1,732 25.2	5 1	348 5.1	24 3	1 —
All non-Agricultural Employees Number %	235,744 100	14,306 6.1	26,164 11.1	4,463 1.9	294 1	82,568 35.0	51,302 21.7	17,618 7.5	38,355 16.3	537 2	137 1

Source Census of Population, 1961

from people familiar with airline activities. On this basis the following list of items emerged:

- (a) *Tourism/trade* Any effects which the presence of Aer Lingus has on the level of activity in these sectors, that are not reflected in transactions with the company itself
- (b) *Training* The extent to which Aer Lingus benefits from training courses provided elsewhere, the extent to which training provided by it benefits other sectors
- (c) *Defence* The extent to which the presence of skilled personnel and equipment constitute a second-line group of value in an emergency
- (d) *Noise* The adverse effects which aircraft noise may have on communities in the neighbourhood of airlines/airports
- (e) *Safety* The degree of safety of travel by Aer Lingus in relation to all other forms of travel for the journeys concerned
- (f) *Regional pattern* If Aer Lingus has a different regional distribution of its domestic spending to alternative enterprises, the extent to which regional shifts constitute gain or loss
- (g) *Foreign earnings* Whether and to what extent foreign exchange earnings should be valued differently from the official exchange rates
- (h) *Secondary effects* If the alternative uses of Aer Lingus's resources entailed some fall in net product, the extent to which this fall would generate induced (or multiplier) reductions in net product elsewhere in the economy

Having identified the possibilities (and the list is not necessarily exhaustive), it is necessary to quantify the benefits and costs associated with them. This raises three questions to which answers must be given: what kind of alternative situation is to be considered, what kind of valuations are needed, and what characteristics of the Irish economy are of importance? We shall consider these in turn.

The difficulties of specifying an alternative situation have been referred to already. Given that the concern here is not with the profitability of individual routes, the simplest case has been taken: namely, that in the absence of Aer Lingus the traffic now operated by them would be available for operation by overseas airlines. It is not suggested that this is the most realistic alternative: it is simply a means of providing a "benchmark". Further, this assumption of "100 per cent operation" does not imply that, even if we start from the proposition that all Aer Lingus's present services are justifiable by commercial criteria, overseas airlines would choose to operate the same routes in the same fashion. Indeed, it will be contended that even on the basis of "100 per cent operation", foreign-based airlines would select a different pattern of operations (A simple practical possibility, e.g. would be reduced usage of Cork and Shannon). It will be appreciated that, while the method adopted avoids consideration of "unprofitable" routes (and perhaps loses realism in doing so), this type of consideration could have been introduced in a general way, for example by assuming that overseas carriers operated at 95 per cent of Aer Lingus's present scale. But this would be to render the exercise more complex, and risk diverting attention from its prime objective and in any case it would be

more satisfactory were the exercise required, to undertake a direct study of the likely scale of alternative operations by identifying and studying the "non-commercial" traffic concerned

Having specified an alternative situation, the next step is to consider what it is that is to be measured. Since our purpose is to identify the contribution of Aer Lingus to the economy, we need to see what difference is created in the benefits and costs occurring under each of our specified heads if Aer Lingus is replaced by the hypothetical new arrangement. It follows that we need not attempt to define or measure "total" indirect benefit or cost under the various heads. If we can specify and quantify the *difference* between the two situations, the figures so obtained can be used to modify the "commercial" data already provided, in order to provide a more realistic evaluation of the community return on Aer Lingus capital.

But there is another qualification to be made. If, directly or indirectly, the withdrawal of Aer Lingus causes a reduction in the use of resources in particular sectors of the economy (e.g. if there is a reduction in the demand for some types of airline labour), it cannot be assumed that these resources will not find other productive uses. That is, we need to distinguish between the "gross" change which results (effectively, the reduction in output because resources are displaced), and the "net" change, (which sets off against the gross change an evaluation of the contribution of the displaced resources in alternative employments). It is clearly the latter that is of interest as a measure of Aer Lingus's contribution.

This brings us to our third question, which concerns the character of the Irish economy. In a fully-employed and competitive economy in which resources (capital and labour) are reasonably free to move between uses, the displacement of such resources in one sector should lead to their employment elsewhere at rates only marginally below their present earnings. In such circumstances, there may be short-term costs of movement imposed on the community, but the continuing "loss of output" can only be small, because the contribution of the resources in their new uses largely offsets their contribution in the earlier one. But these happy conditions are not met with in the present case. First, some of the resources are specific to their present uses (in the sense e.g. of possessing labour skills relevant only to the airline industry) such resources, at best, would be employed elsewhere in less productive uses. Second, the postulated conditions of competition do not prevail. Leaving aside the general policies of intervention by government, it is clear (e.g.) that the government does not see market forces as the only relevant determinant of foreign exchange earnings. Perhaps most important, the necessary condition of full employment is not fulfilled. The available evidence, which it would be pointless to enunciate at length, shows the Irish economy to be affected by a chronic under-employment of labour, which government policies are concerned to correct. Further, the unemployment is not of a simple "cyclical" type, capable of correction by simple injections of purchasing power. It is rather a problem of excess labour supply of a type not uncommon e.g. in the less developed countries of the world. This is a larger matter, and one which will not be pursued. Its relevance here is that any resources displaced

by the withdrawal of Aer Lingus cannot be expected to find high-output alternative employments: they are also likely to remain unemployed, to accept market reductions in earnings (i.e. output), or to emigrate.

Finally, attention must be drawn to the practical problems of valuation. The estimates themselves are necessarily indirect and need to be treated with caution. The procedures used for individual calculations are set out in Part IV, and we would hope are sufficiently clear in each case. Some illustrative comment on the general nature of the problems may be useful here. *Tourism* serves to illustrate the dangers of double-counting. Suppose we could discover the "loss" in tourists that would result from Aer Lingus being withdrawn. It is tempting to value the total contribution of these tourists to hotel, shop, etc. trade as parts of the "benefit" conferred by Aer Lingus and now lost. But this would be double-counting. We might get the same result by withdrawing the shops, hotels, etc. instead of Aer Lingus! We must find ways to limit ourselves to Aer Lingus's own contribution.

Another problem is illustrated by the displacement of manpower. Suppose, as a result of Aer Lingus being withdrawn, some educated manpower would emigrate. If we ignore the emigrant, our task is to assess whether the rest of the community will be better or worse off (i.e. have a higher or lower output per head) in consequence. The problem (which has appeared in other contexts as the "brain drain") needs only to be stated for its complexity to be apparent. Educated manpower consumes as well as produces, pays taxes and receives unrequited government benefits, might make remittances from abroad, and so on. Much could be written on this and similar problems. But given the nature of the task, and the magnitude of the effects in question, we have felt justified in using arbitrary methods and giving summary explanations. Moreover, given the costs of acquiring information, the question of where to cut off research of this kind must always be faced.

IV AN ESTIMATE OF AER LINGUS'S CONTRIBUTION TO THE ECONOMY

In this section the hypothetical alternative outlined in the preceding paragraphs is first considered, and the pattern of costs and benefits associated with it is estimated. The changes which these would represent from the present pattern can then be taken as an estimate of Aer Lingus's contribution to the economy. The estimates are made in two stages, first the calculation of the financial accounts for the alternative position, and secondly, the estimation of the changes in the indirect costs and benefits set out in Section III.

The alternative financial accounts can be crudely estimated by using a number of simple assumptions. First the revenue side. Of the total revenue of £21.6 m. in 1966/67, some £6.8 m. came from domestic sources, the other £14.8 m. from external sales (Table 1). Under our alternative hypothesis, external revenue would accrue to operators outside Ireland, and so does not concern us here. Revenue from domestic sales would depend upon services provided. It is assumed that these would be substantially, even if

not precisely, the same as those actually provided by Aer Lingus, and therefore the domestic revenue earned by alternative carriers is put at the figure of £6.8 m actually earned by Aer Lingus.

Next the expenditure side. Following the same format as in the published accounts each of the main items may be examined in turn using the 1966/67 data given in Section II above.

The question is how the allocation of expenditure as between Ireland and elsewhere would alter with external carriers. Aircraft hire can be ignored as an occasional item. Fuel and oil, landing fees, maintenance (materials), engine overhaul, and agents' commissions are all assumed to be divided between home and overseas in the same way as shown in Table 1 that is they are taken to be independent of the location of the airline company.

The figures for passenger food suggest some scope for using more supplies from the home base. If this held for other carriers too the proportions shown in Table 1 may be assumed to be reversed (i.e. domestic expenditure would become 46 per cent, and external 54 per cent).

Advertising is a more problematic item. The existing A.L.T. budget contains efforts at selling Irish holidays to foreign tourists. Foreign carriers would undoubtedly make some efforts to sell space on flights to Ireland, the question is whether they would make the same relative efforts. For the present purpose, advertising outside Ireland can be ignored, since it would be paid to foreign firms. Advertising within Ireland is assumed to be unchanged, at approximately £100,000 a year.

Handling charges at outstations refer to items not supplied from within the firm. The lower domestic per cent is assumed to be due in part to some services being available within Ireland from the company. With external carriers it is assumed the domestic element would rise, to say 50 per cent.

This disposes of items purchased from other firms. The remaining items (training, payroll and other costs) are largely internal to the airline.

The payroll total of £6.8 million required more detailed treatment. The overseas component can be assumed to remain so, leaving the domestic payroll of £5.2 million as the area for examination. A breakdown of staff numbers and costs into each of the major functional areas, namely, operating, sales/marketing, maintenance/overhaul, training and administration, was obtained. It was assumed that all training and maintenance activities would be located at overseas centres, so that domestic employment would become zero. A sales and marketing force would continue to be needed, but it was arbitrarily assumed that this would be only two-thirds of the existing numbers, because of the fact that many external airlines already have some sales forces in Ireland. For the remaining categories of operations and administration the expectation would be that these would also become predominantly externally located. It was assumed that the proportion of domestic to overseas spending on these items shown for Aer Lingus, would be reversed from 85 per cent domestic/15 per cent external, to 15 per cent domestic/85 per cent external. The effects of these assumptions would be to produce a total domestic payroll of just over £1 million and a work force of 680 people.

The remaining current item is "other costs" of £3.2 million approximately. In the absence of data this was assumed to be divided equally between home and overseas expenditure.

Depreciation is not subdivided in Table 1. Of the total of £1.8 million in 1966/67, £1.5 million was aircraft etc. and this is taken as all external. The remainder, ground equipment, premises, etc. is assumed to be divided equally between domestic and external.

Summing these estimates, the total domestic expenditure which would have accrued (on our alternative hypothesis) from externally-based airlines having the same over-all expenditure (£20.48 million) as Aer Lingus had in 1966/67 can be derived. This is shown in Table 5.

TABLE 5

ESTIMATES OF DOMESTIC SPENDING
WITH EXTERNAL CARRIERS £'000

Fuel	750
Fees	640
Outstations (handling)	510
Food	250
Commission	260
Advertising	100
Payroll	1,040
Other	1,600
Total	5,150

The net result of these estimates is to suggest that with external carriers for the same traffic patterns, direct spending in Ireland would fall from £10.2 million to £5.2 million. In addition it is assumed, as seems reasonable, that profits are also transferred abroad. One consequence of this expenditure switch, is that instead of a net intake of foreign exchange of about £4.8 million (Table 2 above) there would be a net payment abroad of £1.6 million (Domestic revenue £6.8, spending £5.2). Associated with this expenditure change would be a direct fall in employment of approximately 3,200 (3,868—680). The reduction in the net product (i.e. the contribution to Irish national income) of the air transport industry would be £5.4 million, the difference between the £6.5 million shown in Table 3 and the £1.04 million of payroll which is the only component of net product in Table 5.

These reductions in foreign exchange earnings, employment and net product are all gross reductions. That is, they are the immediate or impact effects of the assumption of a change to external carriers. The net reductions would depend on the alternative uses to which the resources released from Aer Lingus would be put. This aspect will be discussed later in the section.

The next stage is to estimate the changes in the various indirect items which would result from this assumption of changing to external carriers.

Tourism and trade In the case of tourism the suggestion is that Aer Lingus not only sells airline seats in the normal manner but also sells holidays in Ireland. All sectors engaged in tourist transactions therefore experience some economic benefit which is not reflected in Aer Lingus's accounts. As already indicated the object here is not to attempt any measurement of the total size of such benefits, but to estimate whether there would be any change in their size resulting from changes in the pattern of airline operation. In this case the basic question is whether the same number of tourists would visit Ireland, that is whether the assumption made earlier that all existing traffic would be available to alternative carriers, is valid.

First then it is necessary to establish whether there is *prima facie* evidence that Aer Lingus does positively influence the tourist inflow to Ireland. The rising numbers of tourists in recent years are not in themselves any evidence of this. What may, however, be taken as a possible indicator is that there has been a faster rate of growth in the number of U.S. visitors to Ireland than in their numbers to other European countries. This above average growth could be the result of many possible influences – one might be that, since Ireland is nearer than other European areas, the costs of travel to Ireland are slightly lower. However, it seems reasonable, in the absence of any detailed analyses of the tourist pattern, to accept that Aer Lingus may have been a contributory factor. A supporting piece of circumstantial evidence for this claim would be that the faster growth rates have been associated with regions in the U.S. to which Aer Lingus operates services. People in these areas could have travelled by alternative routes and carriers prior to the introduction of Aer Lingus services, the provision of an Aer Lingus service was apparently associated with above average increases in traffic. These data must of course be treated with care, since it is not certain that it is the provision of services by specific carriers as distinct from provision of specific services which stimulates traffic.

For our present purposes here, it may be assumed that there is some substance in the claim that Aer Lingus services plus publicity boost the tourist flow. The question is then to decide what proportion of this traffic would be lost if alternative carriers were operating. In 1955/6, Ireland received 3.59 per cent of all U.S. visitors to Europe, by 1966, this proportion had risen to 4.83 per cent. We make the arbitrary assumption that half of this increase is directly attributable to the activities of Aer Lingus, and would be lost if similar services were operated by external carriers. This would have amounted to about 13,500 visitors in 1966.

On the basis of the estimated expenditure by tourists in 1966 given by the Central Statistics Office, average spending, other than travel, was £73 per overseas visitor. Applying these to the numbers of U.S. tourists in the preceding paragraph gives a total of £985,000 as their spending in Ireland.

This estimate does not in itself provide a measure of their economic value to the economy, since among other things, there would probably be some import content in their spending to be offset against this total. The conventional measure of the economic contribution of these tourists is the addition to net product which they create. For the three sectors listed in the 1960 Input/Output table which would be most affected by tourist spend-

ing (Hotels, Trade and Transport and Recreation and Entertainment) the net product was of the order of 66 per cent of sales (total output) This percentage applied to the total spending figures of £985,000 for the marginal tourist would imply a loss of £650,000 in net product

The question would then arise of whether it was worth spending some funds on offsetting publicity in order to avert this loss of net product To answer this some estimate of the required scale of spending would be needed A crude measure of such spending might be the differential level of Aer Lingus spending abroad as compared with the domestic market Thus 32 per cent of Aer Lingus revenue comes from domestic sources, but advertising etc spending as listed in table 1 was only 13 per cent of the total (104,000 out of £792,000) If the ratio of advertising to sales had been the same in overseas markets as at home, overseas advertising by Aer Lingus in 1966/67 would have been £210,000 The difference between this and the actual overseas spending of £688,000, amounting to £478,000, may be taken as a crude measure of the publicity campaign which might need to be mounted by the Irish economy if air transport was in the hands of external carriers who would not themselves spend on this scale

If this type of campaign were to be financed from the public sector either wholly or in part, the above estimate would be of some relevance If however it were to be left to the private sectors concerned they might not undertake such a programme From the viewpoint of firms, advertising would reduce their profits as compared with the present, hence their maximum additional spending on advertising would be the incremental profits which they would hope to obtain from these marginal tourists Again using the same Input/Output table, the average profit element in total output for the three sectors used was about 25 per cent, so that the profit element in the tourist spending outlined above was £250,000 approximately This may be taken as one other possible measure of the economic loss to the rest of the tourist sector which would result from the abolition of Aer Lingus It is possible to envisage intermediate positions also, where some advertising was used which retained some of the tourists "at risk", this need not be pursued here If there were a fall in tourist numbers, this would also affect airline revenue and operations, but since the fall is external, these complications are ignored here

A similar type of analysis would apply to trade – whether in goods or services, and to travel associated with it The suggestion is that the presence of Aer Lingus offices in various centres abroad provides an increased awareness of, and eases the process of contact with, Irish products It is more difficult to estimate the extent to which such a positive effect on trade arises, because there are a larger number of factors at work in the development of business contracts, and also because the assumptions made for business behaviour may be somewhat different to those adopted for the analysis of consumer spending It is more probable that in the trade area, the provision of air services to Ireland is a necessary factor to be associated with others, and that it is the total package of attractions which influences the decision to trade One possible approach to the problem would be to explore the time savings associated with Aer Lingus services to various

overseas centres in relation to the services of alternative carriers. If, for example, a direct service from Dublin to Dusseldorf results in a time saving compared with alternatives, this has the effect of lowering the total costs associated with business transactions involving the movement of people by air, and would be analogous to a fare reduction for such services.

As an illustration of such calculations, the following crude estimate may be used. Assume that in the absence of Aer Lingus the alternative services to European centres would entail changing planes en route (e.g. at London). This would raise total journey time. The time saved by the present services may thus be measured. It is then necessary to identify the number of business travellers. Since detailed statistics by nature of journey were not available we will assume that the proportion of business journeys is the same as that shown for air travellers between U.K. and Ireland in 1966, namely 20 per cent. For the major routes in question the estimates are shown in Table 6.

TABLE 6
ESTIMATED SAVING OF BUSINESS TIME

Route	1 Total Passengers (‘000)	2 Business Travellers (=20% of 1)	3 Estimated time saved Hours per trip	4 Total business time saved (hours) (‘000)
Dublin—Paris	23.6	4.7	2	9.4
Dublin—Brussels	3.0	6	2	1.2
Dublin—Dusseldorf	4.6	9	1	0.9
Dublin—Frankfurt	3.3	7	1½	1.0
Dublin—Zurich	3.9	8	1½	1.2
Dublin—Rome	4.1	8	1	0.8
Dublin—Amsterdam	6.5	1.3	1	1.3
Cork—Paris	2.0	5	2	1.0
Total				16.8

Allowing for other routes it is not unreasonable to assume that total savings of business time were in the region of 20,000 hours. If these time savings are valued at £1 per hour the sum involved would be £20,000. It should be added that this is in general a conservative valuation since it takes no account of journeys which would not be undertaken in the absence of direct services.

No attempt has been made to estimate the value of Aer Lingus offices etc. abroad, as a stimulus to trade. This might more appropriately be conducted in the context of studies of export promotion, by bodies such as Coras Trachtala.

Training There is a possibility that Aer Lingus receives some training courses etc., at less than their cost, and conversely, that it provides training

to some of its staff who may then leave to work elsewhere in the economy, in which case Aer Lingus would provide training to other sectors at less than cost. Examples of the first type would be any aeronautical engineering courses provided by the Vocational Educational authorities, or pilots and other personnel trained by the defence forces, and on the reverse side, Aer Lingus training courses for flight personnel, instrument technicians etc. Data did not permit a direct calculation of whether or not Aer Lingus both receives and makes available benefits of this type.

Defence The operations of Aer Lingus provide a nucleus of skilled personnel and also perhaps equipment which are available for any defence emergencies. In their absence, therefore, defence spending might need to be at a higher level in order to achieve the same degree of security. The idea is not so much that a larger air force group would be kept in permanent being, but rather that a larger amount of training for reserves would be needed, and possibly also that options to use civil aircraft in emergencies might have to be bought. The suggestion is not that the Aer Lingus group provide material for frontline forces, but that they are the potential transport and supplies element in air defence. Any valuation of this type of benefit centres on policy decisions regarding defence. We have naturally not attempted to explore these.

Noise Significant differences in the volume of noise would be likely only if external carriers (contrary to the assumptions so far made) adopted a significantly different volume of services or pattern of routes. Should such changes in services occur, they would probably take the form of a reduction in the number of flights to and from Cork and Shannon. The resulting decline in noise would be a benefit to residents in those areas, but neither is densely populated. We have not, therefore, attempted to value this benefit here, though possible methods of valuation, which might be used in a more comprehensive study, are available.

An illustration of the problems of valuation may be taken from London Airport. The Treasury makes grants of up to 50 per cent of the insulation costs, or £100 whichever is the less, for houses in districts affected by aircraft noise. The £100 figure is the effective rate of grant since total costs now exceed £200 per house.

A second measure – the change in the capital value of a house – would on theoretical grounds be expected to exceed insulation costs (for non-insulated houses of course!) because insulation would not mitigate other adverse effects, such as the reduced welfare of relaxation in the garden. In the London case, however, appeals to have the rateable valuation of affected houses reduced, have all been unsuccessful, because it was shown that the capital value of these houses had not *apparently* fallen. The reason for prices not falling was that there was a strong demand for adjacent housing from people who worked at the airport! To move further away would impose travel costs on these workers, so that the actual price paid for these houses reflected some comparison between travel and noise costs.

Safety Switching to alternative carriers could entail different safety levels. There are no data however which suggest significant differences in safety levels as between Aer Lingus and other major carriers. Accordingly

for this component of traffic the change is assumed to be zero. If there were a different pattern of services, e.g. fewer internal flights, leading to a diversion of domestic traffic to other forms of transport, calculation would also be needed for these other forms. No attempt has been made here to value this change in risk of accidents.

Regional Effects The discussion of changes in net product and employment arising from our assumed switch to external carriers did not make any separate distinction of regional changes from overall changes. However, public policies, most notably the higher level of grants paid to new firms establishing themselves in specified areas, indicate that the government attach a specially high value to employment and output in these parts of the country. It is important, therefore, that the specific regional pattern of changes should be described, and if necessary valued.

The overall reduction in employment associated with a switch to alternative carriers has already been shown. The bulk of the fall would presumably be in Dublin-based workers. Some fall would also occur in provincial employment. For illustrative purposes, the arbitrary assumption is made that the staff numbers needed for alternative carriers at Cork and Shannon airports would be half of the existing levels (which were Cork 33, Shannon 217 for 1966/67). The higher value to be placed on employment in these locations, may be illustrated by supposing that these would qualify for the higher rates of industrial grants (this would not be correct in the case of Cork city, but the numbers are not very large).

The difference in grant rates is 66½ per cent for underdeveloped regions and 50 per cent for the rest of the country. The normal ceiling to grants is £1,000 per worker employed. The capital difference is thus £166. The annual value of this difference depends on the interest rate employed – at 7 per cent it is in the region of £12. Applying this to the reduction in regional employment of 125, gives an estimate of £1,500 as the additional annual value of the loss in regional employment, associated with the switch.

Foreign Exchange No distinction was drawn between domestic and foreign receipts and payments in making the calculations based on commercial accounts. This assumes that the official exchange rate is a correct measure of the opportunity cost of these transactions (i.e. of the value of the foreign exchange earned by Aer Lingus to the Irish economy). Again in practice there are Government policies in existence which suggest that foreign exchange is valued more highly than the official exchange rate. Among such policies are the exemption of export profits from income-tax and profits-tax, subsidies on agricultural exports, marketing grants for industrial firms, and the maintenance of an export-promotion body (Coras Trachtála). These measures amount in effect to selective devaluations of the Irish currency for the particular types of transactions affected by them.

Similar selective devaluations might also apply to Aer Lingus foreign exchange earnings. Tax relief on export earnings may serve as an illustration of this effect. It would appear from the Input/Output table referred to earlier, that profits were about 10 per cent of turnover. With standard income tax at 7/- in the pound, and a profits tax of 10 per cent, the normal

tax liability on profits would be in the region of 40 per cent – or about 4 per cent of turnover. The rebate on export earnings is based on their share of turnover, not their actual contribution to profits, hence 4 per cent may be used as the size of the concession. For Aer Lingus, with foreign revenue of £14.8 million in 1966/67 this would be equal to £0.6 million. It should be noted that the concession to firms is based on gross export earnings, that is, there is no offset of import content.

For the case posited here of a switch to external carriers, it is the net change in foreign exchange earnings which would be the more appropriate aggregate to which to apply the correction from a national viewpoint. This change was shown above as £6.4 million (a surplus of £4.8 changing to a deficit of £1.6 million). Applying 4 per cent to this would give £0.25 million as the adjustment in respect of foreign earnings.

Secondary Income Changes Finally it may be important to refer to more general effects on the economy which may stem from any initial change in net product. The estimated fall in net product of £5.4 million would mean that general purchasing power in the community would be reduced by this amount. This would tend to have a depressing effect on other sectors, whose sales and hence output and employment, would be adversely affected. There would thus be associated secondary reductions in product and employment, generally known as “multiplier effects”. There are recognised procedures for estimating these multiple effects on incomes resulting from any initial change. In the Irish case, the data are not available in published form for these relationships. A crude estimation from the national income data suggests however that the secondary, or induced reduction in income would be about two-thirds of any initial reduction. Thus for the initial fall of £5.4 million in Aer Lingus there would be subsequent falls totalling £3.6 million approximately in other sectors.

It should be noted that this multiplier reduction does not include any indirect effects of the replacement of Aer Lingus by external carriers. If, for example, this replacement led to a reduction in tourist spending and to a loss of product in those sectors, such a loss should be added to the Aer Lingus loss as part of the initial total, to which the secondary, *income-related* reduction in activity would apply. Again however, it is not necessary to explore the actual size of the initial and secondary reductions in detail.

Having now concluded a number of adjustments to the commercial accounts, these can be brought together to summarise the total estimated change for the economy as a whole, which would result from the switch to external carriers. This summary is presented in Table 7.

What this table suggests is that the total loss of output and utility to the community would be substantially greater than the direct loss of product calculated from the Aer Lingus commercial data. This is not, however, the end of the calculation. The above table represents the gross losses, and estimates the reduced flow of output and satisfaction resulting from the withdrawal of the resources concerned from their present uses. These resources would, however, be available for alternative uses in the economy. To arrive at the net loss of output and satisfaction, it is necessary to make one further set of estimates, namely to estimate how much output can be

TABLE 7

ESTIMATE OF GROSS LOSS TO THE ECONOMY FROM ABOLITION OF AER LINGUS (£'000)

	Low	Middle	High
A <i>Direct</i>	£'000	£'000	£'000
Loss of Net Product	5,400	5,400	5,400
B <i>Adjustments</i>			
Tourism	250	478	540
Trade	20	20	20
Training	?	?	?
Noise	?	?	?
Safety	?	?	?
Regional	2	2	2
Foreign Exchange	252	252	598
C <i>Secondary</i>			
Induced Income Changes	3,600	3,600	4,000
Total Gross Loss	9,524	9,752	10,670

? = Not quantified

expected to be regained by employing the resources elsewhere. The difference between the gross loss and the alternative outputs obtained will then be the *net* change resulting from the withdrawal of Aer Lingus, and hence would be the measure of the net contribution which Aer Lingus was making to the economy.

The resources released by the withdrawal of Aer Lingus would be both labour and capital. In a full-employment economy these resources would be reemployed elsewhere after a relatively short time-span, and should supply *almost* the same level of net product in their alternative uses. In the case of labour for example, the same wage rates should be obtainable by the workers in alternative employments, and these rates should reflect their contribution to output. (Some reduction in wage rates might occur for workers who had skills which were highly specific to Aer Lingus, but this need not be pursued here.) Similarly, capital should have alternative uses and would be demanded at the prevailing rate of interest. A slight variation on this analysis would be to envisage the influx of resources released by Aer Lingus on to the market causing some marginal reduction in both wage rates and interest rates, which reductions would cause demand for these resources to expand, the process continuing until full employment was reached.

In this type of full employment situation then, the net product lost by withdrawing Aer Lingus would be largely, but presumably not quite completely, replaced by alternative uses. A similar argument could be applied to the balance of payments. The foreign exchange content in Aer Lingus revenue is above the national average, hence the alternative outputs would not be likely to have the same foreign earnings. The net fall in these

earnings would cause some marginal pressure on reserves, but in a freely working system of international trade and payments, this could be corrected by marginal adjustments in prices or exchange rates

For reasons stated earlier, this form of full-employment analysis does not appear appropriate in Irish circumstances. At no stage has the economy been able to generate full-employment of labour, with the result that not only are unemployment rates high, but net emigration has also been considerable. Nor is this situation expected to change in the foreseeable future. The N I E C report on Full Employment published in 1967, does not appear to envisage full employment materialising before the 1980s. If this is so then it is most improbable that all labour released by Aer Lingus would be quickly absorbed. A less implausible alternative would be to assume that no alternative employment exists, and that none of the net product associated with labour would be regamed.

Some form of intermediate position is, of course, the most realistic. To the extent that Aer Lingus's personnel possess skills which are scarce and are in demand in other sectors they could obtain alternative employment, and their addition to the total supply of labour in these categories would have the effect of easing wage rates and expanding demand for such services. In other words, it is possible in conditions of general under-employment, to have full employment conditions prevailing for some skill categories. The usual procedure for dealing with this type of situation is to attempt some type of "shadow prices" for the different categories, that is, prices which reflect the opportunity costs of each group, rather than the actual money wage rates.

For illustrative purposes a number of rather crude estimates of the alternative uses of Aer Lingus's labour may be attempted. Using the skill breakdown given in Table 4 above, it seems reasonably plausible that skilled, managerial and some professional employees among the males, and secretarial staff among the females would obtain alternative employment. The groups least likely to have other job opportunities are unskilled, semi-skilled manual workers and lower grade clerical staffs. Some of the specialised professional and technical staff (pilots and engineers) might be more likely to emigrate rather than take less remunerative domestic employment. Broadly, this suggests about 20 per cent of employees with good alternative prospects, about 50 per cent with poor ones, and about 30 per cent in intermediate positions. Since the good prospect groups would be above average in terms of earnings, it might be reasonable to think of the payroll shares corresponding to these three groups as being 25 per cent, 40 per cent and 35 per cent respectively. Depending on how the intermediate group are treated, estimates of the employment regained elsewhere would range from a minimum of 25 per cent to a maximum of 60 per cent of the total payroll displaced from Aer Lingus. This in money terms would range from about £1 million to £2.34 million. The treatment of the capital released from Aer Lingus is more difficult in some respects. The capital employed was about £24 million in 1966/67. One way of treating this amount is to say that if it became available to the public sector, it would reduce the government's net borrowing requirement by

this amount, and would save it the interest payments on such borrowing. This saving would then be the measure of the annual value of the funds released in alternative uses. At a rate of 7 per cent it would amount to £1.68 million.

Again, however, the question of full employment arises. It appears that there has not been any shortage of capital for any commercially viable project over recent decades, with the exception of a short period in 1965/66. If relatively easy conditions were to continue then a reduction in net public sector borrowing would release potential funds for the private sector, but these would remain unused. The saving to the public sector would then be cancelled out by the loss to the private sector lenders. In other words the alternative to employment of funds in Aer Lingus may be their unemployment. Again, other intermediate positions could be envisaged which need not be pursued.

The valuations of alternative uses for capital and labour thus obtained would give an estimate of the net product to be regained and therefore offset against the gross losses outlined earlier. A complete calculation of these alternative uses, and their valuation, would in principle need to do more than assess the direct effects. Once again, it would be necessary to record changes in the employment of labour and capital resulting from the indirect effects discussed. To do this in full would be a task of immense complexity, which cannot be attempted here. To that extent the estimation of the net loss of output associated with the withdrawal of Aer Lingus must remain incomplete.

Rough estimates can, however, be made for two items, the foreign exchange and secondary income effects. If it is assumed that output gained by the re-employment of resources would have an export content equal to the national average of about one-third, the resulting foreign exchange can be revalued in the same way as before, yielding the following results:

Export sales	33 $\frac{1}{3}$ % of net product
Profit on exports at average rate of 10%	3 $\frac{1}{3}$ % of net product
Income tax and profits tax (40% of profits)	1 $\frac{1}{3}$ % of net product

We should, therefore, add 1 $\frac{1}{3}$ per cent to our estimate of net output regained for the foreign exchange adjustment.

Output gained from the re-employment of idle resources creates additional spending and generates secondary increases in income, just as output lost has the opposite effect. It was suggested that these secondary effects were likely to be about two-thirds of the initial change which gave rise to them. An addition of this amount was made to the initial loss of net product shown in Table 7, and a similar addition is, therefore, made to our estimates of output regained. These estimates would then read as follows:

TABLE 8

ESTIMATE OF GROSS GAIN TO ECONOMY FROM ALTERNATIVE USE OF AER LINGUS RESOURCES (£'000)

	Low	Middle	High
A Direct			
Labour	0	1,000	3,340
Capital	0	1,680	1,660
Net Product	0	2,680	4,000
B Adjustments			
Foreign Exchange	0	36	53
Other	?	?	?
C Secondary			
Induced Income	0	1,800	2,700
Total Gross Gain	0	4,516	6,753

?=Not Quantified

To derive the estimated contribution of Aer Lingus to the economy we subtract the net product regained (Table 8) from the net product lost (Table 7) Since each table gives three estimates, this process yields nine alternatives which are, in ascending order of magnitude, as follows

	Gross Loss (Table 7)	Gross Gain (Table 8)	Net contribution of Aer Lingus
	£'000	£'000	£'000
1	9,524	6,753	2,771
2	9,752	6,753	2,999
3	10,670	6,753	3,917
4	9,524	4,516	5,008
5	9,752	4,516	5,236
6	10,670	4,516	6,154
7	9,524	—	9,524
8	9,752	—	9,752
9	10,670	—	10,670

The figures in the final column may be regarded as estimates of the social, as distinct from the private, contribution of Aer Lingus within the limiting assumptions we have set out Expressed as a proportion of its capital of £24 million, they represent a rate of return ranging from 11 per cent to 44 per cent If we disregard the three highest figures, which assume no alternative employment opportunities, the range is still from 11 per cent to 26 per cent This is very different from the 4 per cent rate of return derived from ordinary commercial accounts

V SUMMARY AND CONCLUSIONS

The emphasis in this study has been on demonstrating the nature of the calculations necessary to arrive at the contribution which a firm such as Aer Lingus makes to the economy as a whole. The main objective was to illustrate the limitations of normal commercial accounts for this purpose, and to show the nature of the adjustments which must be made, to such accounts in order to arrive at the correct economic assessment of a firm's impact on the economy.

As a basis for any such calculations it is necessary to set up one or more hypothetical alternatives with which to compare an existing situation. Since the objective was to consider the contribution of Aer Lingus as a whole, and not of particular services, one appropriate alternative assumption was that Aer Lingus did not exist and that a substantially similar range of services was supplied by external airlines.

Numerical data were used wherever possible both to illustrate the nature of the problems and to indicate the probable orders of magnitude involved. It must be emphasised, however, that the figures are subject to all the many qualifications described in the text.

It is nevertheless clear that, given the present structure of the Irish economy, there are many respects in which the financial accounts of Aer Lingus understate its true contribution to the national economy. The major benefits which do not appear in the accounts are as follows:

- 1 Aer Lingus provides employment opportunities for people, some of whom would otherwise either be unemployed or would have to work in less productive, and therefore less well paid jobs.
- 2 The primary increase in incomes created by Aer Lingus provides additional spending and so generates further income through "multiplier" effects.
- 3 Aer Lingus operations earn foreign exchange which could otherwise be earned only at a significantly greater cost in real resources, than that indicated by official exchange rates.
- 4 The operations of Aer Lingus and the advertising which goes with them have significant effects in encouraging tourism and promoting trade.
- 5 The existence of good air services enhances the attractiveness of Ireland for industrial firms, especially those with headquarters overseas.

The attempts to quantify these and other indirect benefits suggested that the social rate of return on the capital employed by Aer Lingus was probably between 11 per cent and 26 per cent in 1966/67 compared with the return actually accruing to the firm, and shown in the accounts, of 4 per cent. These estimates are conservative in that they do not take full account of the social benefits from commercially unprofitable routes.

Rates of return such as 26 per cent may appear implausibly high to many. It must be emphasised however, that they result from using opportunity costs, as distinct from money costs, to value the resources used by the firm. Similar upward adjustments in rates of return could be expected

to result for virtually all firms, if this cost basis were applied to them. To that extent, the calculations are in effect a way of showing the social value of any firm in Irish circumstances. It is also important to add that not all of the estimated social benefits of Aer Lingus are of a general type applicable to all firms. Of the five categories summarised above, two are of this general nature, but the other three are specific to Aer Lingus, so that they enhance the social value of the firm by comparison with other firms which do not produce specific benefits.

These results make clear the limitations of taking investment decisions relating to Aer Lingus as an entity solely on the basis of the type of costs and revenues which appear in commercial accounts. The present study is not, of course, directly relevant to decisions concerning the amount of investment in particular projects or the operation of particular routes, but are complementary, and indeed logically prior to, these specific questions, since the latter presupposes the existence of the firm. The techniques used here can, of course, be applied to the analysis of particular investment decisions or the operation of particular routes, but the assumptions made and the calculations performed would have to be related to each specific problem, and cannot be inferred from a general study of this type.

DISCUSSION

Dr N Whelan I think that Dr O'Donoghue's paper is of great significance to the Irish public sector at present. It is the first time in which, to my knowledge, a cost-benefit evaluation has been published in relation to the Irish public sector. The cost-benefit methodology which has been formulated will undoubtedly be of great help to those who may be contemplating cost-benefit studies of other areas. One of the most important features of the study lies in the fact that it shows quite categorically how misleading normal commercial accounts can be as an indicator of the social returns from public bodies.

In connection with the paper itself there is very little one can say because while Dr O'Donoghue had, of necessity, to make many assumptions throughout, they have, in my opinion, been reasonable and are the best available estimates. I would like to refer however to the treatment of certain aspects of the paper. The first has to do with the basic hypothesis made in the paper, i.e., that in the absence of Aer Lingus the traffic now operated by them would be available for operation by overseas airlines. I wonder whether this "with" and "without" approach is realistic in the case of the present study. Surely the realistic alternative might not be the provision by an overseas airline of all the work now undertaken by Aer Lingus. Perhaps the Irish Shipping Companies would take some of this. I would have liked to have seen a more rigorous analysis of the situation which might come about in the absence of Aer Lingus.

The second feature has to do with certain of the benefits. I feel that in some of these it may not have been correct to attribute them in total to Aer Lingus. Take, for example, tourism. Dr O'Donoghue says that "in 1955/56 Ireland received 3.59 per cent of all U.S. visitors to Europe, by 1966, this proportion had risen to 4.83 per cent. We make the arbitrary

assumption that half of this increase is directly attributable to the activities of Aer Lingus. I wonder whether this is not an overstatement since the actual tourists attributable directly to Aer Lingus probably would not have come if certain essential infrastructural features within the country were absent. For example, what would the tourists do if there was no inland public transport service within the country? I should imagine that at least a high proportion of them would not visit Ireland and that Aer Lingus itself would not be a sufficient force to entice them to come. In this case then should the tourist benefits (even the half of the tourist increase attributable to Aer Lingus) not be divided in some fashion over all the relevant existing public bodies which contribute to making Ireland acceptable to tourists.

The last point I wish to make concerns the social returns. I think that we must reserve our judgement on the value of these social returns until similar exercises have been done for all public bodies. Perhaps the social return in the region of 11 per cent to 26 per cent is the norm which is generally applicable throughout the public sector. Indeed perhaps it is much greater or less than the norm. One just doesn't know. Thus before we can draw conclusions in connection with the social worth of the investment in Aer Lingus we must look at the social returns from the activities of other public bodies. I cannot help noticing that a very large proportion of the social benefits are directly or indirectly attributable to the labour content involved. It seems to me that there may well be a strong correlation between the amount of people employed in a public body and the social benefits derived from that public body. This is something which is very heartening to those of us in C.I.E. which employes over 19,000 people.

Mr O'Neill, joined with the previous speakers in congratulating Dr O'Donoghue on his very clear exposition of the cost/benefit analysis. He suggested, however, that until a similar analysis had been done of the various other items in the Public Capital Programme, it would be impossible to know precisely value of the social rate of return calculated for the airlines. He said that the Department of Finance was at present carrying out an appraisal of the Public Capital Programme. Because of constraints of time and staff, they might not be able to do as sophisticated an exercise as the Economists Advisory Group had done for the airlines, but they hoped eventually to set up standard criteria which could be applied to all major proposals for capital expenditure by semi-State bodies and Government Departments.

He expressed surprise at learning that the net additional benefit to tourism from the activities of Aer Lingus was, at best, not more than 10 per cent of the net product of the company. This suggested that tourist benefit should not loom large in their calculations. He enquired whether, if the Irish Airlines are accepted as having generated additional tourist business in excess of that which would have been induced by external airlines, the social rate of return should not have taken into account the capital investment needed to provide additional facilities for these extra tourists.

Dr O'Donoghue I agree with Dr Whelan that the treatment of the three items to which he refers is open to objection, and indeed I attempted to point out the reasons for the particular course of action selected in the paper. In the case of the assumption concerning the alternative form of airline provision I agree that the 100 per cent is unrealistic. But it is much more difficult to decide what the realistic level would be, and to arrive at such realistic levels it would be necessary to analyse the Aer Lingus routes in detail, to make scientific assumptions and therefore to have some knowledge about, both other airlines and other forms of alternative transport. Such an extended analysis was not possible in the available time.

The second item, the treatment of tourist benefits raises similar problems. I can simply repeat that the allocation of half of the apparent benefits was an arbitrary assumption, since there was no way of estimating from the available data, the relative influence of each of the groups which could affect the volume of tourist activity. Since tourism was not a major item in the Aer Lingus case it was not worth while pursuing this item at the time. Given the importance of tourism to the economy as a whole it would be useful to have a separate analysis of this question.

The third item concerns the interpretation, if any, which can be given to social rates of return. I agree that social rates will exceed private rates in Irish circumstances because of the continuing unemployment which exists here, but I would add that the social value of different categories of employment will vary depending on whether or not there are alternative employment opportunities available for the particular occupational group. At present for example, there appears to be full employment for many skilled categories, hence there would be no excess social return for these groups, whereas firms providing employment for those who would otherwise remain unemployed are providing such a social return. Mr O'Neill's query concerning the investment in tourist facilities could be answered in a similar manner. In calculating the "value" of a tourist to the economy it is necessary to decide whether the resources used to provide tourist services had alternative uses. If they had then the value of this alternative use should be deducted from their value in the tourist sector, in order to obtain the net contribution involved. This applied to all resources not only to capital.