

**The Value of Cost Benefit
Analysis of Road Projects**

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Introduction

The Government announced in the National Plan, and is now implementing, a major increase in road expenditure. One reason why this has happened is because cost benefit studies have suggested that such an increase could be justified in economic terms. The argument that cost benefit studies in some sense "justify" additional road investment has been accepted rather uncritically in recent years, and in view of its practical consequences requires closer examination. In discussing this argument I shall refer to Sean D. Barrett and David Mooney's recent cost benefit analysis of the Naas bypass, as a good recent example of such studies.

There are two basic grounds for concern at the use of cost benefit analysis to support increases in road expenditure now. First, the type of justification for road investment which cost benefit analysis is able to provide is a rather specialised one. The fact that a project shows a high rate of return on a cost benefit study does not mean that our debt problems are unlikely to be made more acute by carrying out the project, or that the effect on permanent employment will necessarily be favourable, or that many other forms of public expenditure might not perform as well or better on both counts. It is doubtful whether an expansion of road investment represents an appropriate use of the very limited funds which can be assembled for expanding publicly funded activities, and we are only going to find out whether it is or not if we can develop techniques which will indicate what the likely effects of particular types of public expenditure on employment and the public finances are going to be.

Secondly, there are obvious dangers in major increases of expenditure in areas where the main policy issues are unresolved. Ireland has no coherent transport policy, and even if one considers roads policy in isolation from other transport questions, there are still important unresolved issues. In particular, no clear choice has been made between developing a high cost, high quality road system which will generate substantial additional traffic, and increase dependence on private transport, and a more limited and balanced policy of using road investment as one of a number of instruments to reduce acute traffic and environmental problems. While actual application of cost benefit analysis to alternative means of resolving existing traffic problems would tend to favour the latter, more modest approach, merely using the fact that some road projects have been found to have favourable rates of return when analysed to support a higher general level of road spending is likely to cause a shift in the opposite direction, towards a more ambitious policy.

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The remainder of my paper is divided into two sections, dealing with the two main issues outlined above. The first section thus seeks to define more closely the relation between the benefits identified in a cost benefit study and employment and the government finances, while the second deals with the effects of an increase in road expenditure, justified by reference to cost benefit methods, on roads and transport policy.

I. THE BROADER ECONOMIC STATUS OF ROAD USER BENEFITS

One surprising effect of Ireland's continued debt and unemployment problem has been increased interest in cost benefit analysis. It is surprising because the benefits measured in cost benefit analysis are basically increases in consumer welfare, and the relationship between such increases and the consequences of the projects analysed for employment and public indebtedness is very tenuous.

The point is of some practical significance. The Government's economic plan *Building on Reality*, which provides for a 52 per cent increase in road investment over the plan period, quotes as a reason for this the view of the National Planning Board that "a much higher level of investment in road improvements than is at present being undertaken could be justified using public sector investment appraisal techniques" (*Building on Reality*, p.58). The National Planning Board see foreign borrowing as an appropriate way of funding this increase (*Proposals for Plan*, p.101).

It is not easy to reconcile this view with the Board's statements that "public sector foreign borrowing should be undertaken only to finance investment which generates a return which covers the cost of this debt service" by a substantial margin, (p.44) because if this is not done, "cumulative debt servicing problems will occur and the public debt will grow exponentially" (p.35). There is no evidence that the return on road investment to the Government generates anything like a sufficient return to cover the cost of debt service. Presumably their real view is that benefits to the community, not the Government, should exceed interest on the capital cost of the project, but this leaves us with a logical gap: unless benefits to the community can be converted into income for the Government, we have no assurance that such projects will not contribute to the exponential growth in public debt which the Board deplures.

The gap could theoretically be closed by charging tolls and the Board favours this (p.101). However, it seems unlikely that toll roads will finance more than a small proportion of road spending, because:

- (1) Most road schemes are not suitable for toll collection.
- (2) The yield on roads which are suitable for toll collection may be low, and require supplementing. For instance it was estimated that annual income from a toll on the Naas Bypass would be c. £750,000¹, or around 4 per cent of capital cost (*The Irish Times*, 20.9.83).

¹This illustrates the wide gap between the financial return of road projects, based on toll revenues, as compared with the estimated cost benefit return (21 per cent in this case). The difference arises because it is never possible for a producer to charge each consumer the maximum he or she, individually, is prepared to pay and consumers are therefore always left in possession of substantial "consumers surplus". For this reason, cost benefit calculations typically show much higher rates of return than commercial assessments of the same project (Glassborow, 1960).

- (3) If there was going to be a major shift in roads policy towards toll roads, the proposed increase in public expenditure on roads appears unnecessary, as the Government envisages that the toll roads will be built by private enterprise.

It is also possible to argue that road investment increases welfare more than it increases debt payments, and that it is theoretically possible to increase taxation (preferably of the upper income groups who put the highest value on time savings and will therefore presumably enjoy much of the benefits) while still leaving the community, as a whole, better off. However, most Government activities increase welfare, and whether the cost of the activities exceeds the benefits, or vice versa, recovering the benefits through taxation remains difficult. For practical purposes, both the tax authorities and the public will equate the tax base with cash income, and exclude benefits in kind from Government activities.

There is thus an important practical distinction between benefits to road users and income for the Government. In the language of cost benefit analysis, there may be considerable difficulty in converting the potential Pareto improvement identified by a cost benefit study into an actual Pareto improvement, so that the gainers — the users of the roads — actually compensate the main loser, the Government. In the absence of a straightforward increase in taxation to pay for additional road expenditure the recovery of the funds invested (other than through tolls and taxes arising from the construction work itself) depends on the benefits enjoyed by the community leading indirectly to increased employment, a widening of the tax base, and increased income for the Government. Unfortunately, the links between increased community benefits and increased employment and tax revenue are very unreliable. To illustrate this point, a discussion of the development and function of cost benefit analysis is necessary.

The Development of Cost Benefit Analysis

Cost benefit analysis of road investments has developed because the conventional method of assessing an investment — by seeing whether the prices one is able to charge after the investment has been made provide an adequate return on the capital invested or not — is not applicable, as road users are not charged specifically for the use of new or improved sections of road. In the absence of tolls, one is left with the problem of assessing the value of benefits in kind — time savings, fuel savings, reductions in accidents and so on — for which no cash price has been paid. This difficulty was of practical as well as theoretical significance for those seeking to justify road investment, and in Britain after the Second World War, the first attempts were made (by the British Roads Federation) to put a monetary value on the benefits of road construction (Brunner, 1948; Brunner and Drake, 1952). These were followed in 1960 by the much more sophisticated M1 Study (Beesley and Reynolds, 1960) which effectively established the technique in its modern form.

Benefits in Kind

However, the ability to value benefits in kind irrespective of whether a price has actually been paid for them or not is a source of weakness as well as

strength. Some of the benefits are going to be in the form of non-working time; a large number of people will have a few minutes more (non-motoring) leisure time at their disposal. The benefit to these people may be real, but because it is a direct benefit in kind it does not result in the further purchases and in the further creation of employment and tax revenues which would have arisen in the case of a cash payment. In other words, this particular type of benefit is irrelevant to employment and government income.

In the Naas Bypass Study, as in most such studies, benefits in the form of non-working time are a minority of total benefits (around one-quarter in the Naas Study). Almost two-thirds of the benefits identified in the Naas Study are in the form of working time. However, even in relation to working time, the gap between the benefit in kind conferred and any further economic effect remains, though in a reduced form. Theoretically, working time savings will benefit the business concerned. The authors of the Naas Study cite two American studies carried out in the early 1960s showing that hauliers were able to "attain the full benefits from highway improvements by economising on fleet and labour costs", and note that in those parts of the labour force most likely to travel by road on business "monopolistic power is limited".

A British study in the late 1970s suggested that small time savings are difficult to use, because peoples' days are usually organised into a number of activities, and substantial time savings may be necessary if an additional activity is to be fitted in (Heggie, 1979). As a result, cost benefit studies may grossly overstate the economic value of time savings to businesses. Small time savings may be particularly relevant in a country of short distances such as Ireland. It is difficult to accept that there is not significant "leakage", with a substantial proportion of working time savings making life easier for the driver but having no further economic significance.

Employment and Financial Implications

The working time savings which do result in labour savings to an employer will enable him to increase his profit margins and/or his sales. Increased employment arising from either of these causes may or may not be sufficient to offset the effects of reducing the labour content of each unit of production. The effect on the public finances is similarly unpredictable, as transfers of income from the highly taxed household sector to the lightly taxed corporate sector would reduce tax revenues. Some of the potential for employment creation would only become actual after further public funding had been provided in the form of IDA grants. There is no reason to suppose that the net effect in terms of employment or for the Exchequer is necessarily going to be related to the value of the original benefits estimated in the cost benefit analysis, or that they are going to be positive at all.

The Naas Bypass Study is a particularly good example of the drawbacks of cost benefit analysis because the proportion of benefits which are not in the form of time savings is unusually low (9% of total). In effect, the bypass is presented as a publicly funded labour saving project, which must be questionable in a period when there is every prospect of high unemployment continuing for an extended period. As there is no necessary relationship between the benefits identified by the Study, and the increase in employment

and Exchequer income arising from the project (if any), we are no wiser as to the effect of such projects on the main economic variables as a result of the analysis. However, given the likelihood of extensive "leakage" of benefits, only a limited proportion of the benefits identified in the analysis are going to have further economic effects. We do not know whether these effects are positive or negative, and if they are positive, what leverage the "effective" benefits exert on employment and income. In so far as there is an increase in income, the Government should be able to recover a limited proportion of it through taxation. For the Government to derive enough income in this way to offset interest payments on the capital invested, the "effective" benefits would have to exert a fairly remarkable degree of leverage on household income.

This is not to say that road investment does not improve the prospects for foreign investment, but merely that it is not known whether the improvement is sufficient to offset any negative effects road investment may have on employment by a worthwhile margin. The cost effectiveness of road investment also needs to be questioned: by 1987, the capital allocation for roads will be over 40 per cent of that for industry, and it is particularly difficult to believe that employment gains will be anything like in proportion. Nor is it clear what sort of road improvement is required to achieve such benefits, assuming they are available. Are we to aim for a road system as good as those foreign executives use at home, or at a system which provides them with a more modest, but more predictable service (NESC, 1981) or should we be satisfied if the road system does not become more of a constraint to industrial expansion than it is at present (ESRI, 1984)? Many of the road schemes actually being planned or built would make most sense in the context of the first objective, which is also the most ambitious and expensive, and for which the largest effect on employment would be needed by way of justification.

Tendency to Overstate User Benefits

Allowance should also be made for the tendency for cost benefit analysis to overstate user benefits in the first place, and the effect this may have on the recoverability of capital invested. For purely methodological reasons it is easier to value the direct effects of a project than indirect ones. The direct effects on users are normally exclusively beneficial, the indirect effects frequently adverse, and the consequence of being able to value the former but not the latter is to introduce a bias which will normally be in favour of the project considered. Like most similar studies, the Naas Bypass Study values construction and maintenance costs and user benefits only. It considers, but does not value, some environmental effects of the project, this being the issue with which British critics of cost benefit analysis are most concerned. Other indirect effects which are likely to have more direct relevance to the public finances are:

- (1) the effects on unit costs (Thompson, 1974) of the parallel Dublin Cork rail line, and indirectly on the CIE deficit,
- (2) the effect of additional traffic generated by provision of the motorway on traffic conditions in Dublin, offsetting user benefits on the road itself,
- (3) the likely stimulus to "one off" commuter housing around and to the west of Naas and its impact on servicing costs for local authorities and other statutory undertakers (Suffren, 1977).

To be fair, the generation of additional traffic is also likely to produce additional government revenue by increasing the consumption of motor products, though at the cost of raising imports, particularly imports of oil.

Implications for Economic Policy

Road investment is not a particularly suitable means of providing additional employment in present circumstances because the extent to which funds can be recovered by the Exchequer has not been established, and the effects on public debt are unknown and uncontrolled.

The current willingness to invest in roads may owe something to a reluctance to reduce capital expenditure too drastically because of the effects this might have on unemployment. If this is a major motive, it would be better if it were evaluated more explicitly. The difficulty with infrastructural investment as a means of combating unemployment is that if the bulk of the funds spent cannot be recovered, then they will have to be provided afresh each year merely to maintain the same level of employment. The same objection applies to the special employment schemes which have also developed rapidly in the last few years.

In present circumstances there are clear advantages in forms of public expenditure which generate income directly through sales or charges as well as indirectly through taxation, and this applies particularly to the construction sector, where there is very high unemployment but where conventional public investment programmes on the scale required would be very difficult to finance (cf. ESRI, 1984).

It is possible to devise forms of public expenditure where the funds spent can be largely or wholly recovered, and can be seen to be recovered without necessarily being profitable in the conventional sense. In the commercial area, if a public sector organisation requires public support which is less than the net tax income generated through its expenditure and any savings in social welfare arising from its operation, then it is providing employment at no net cost to the Exchequer. It is merely not making a contribution to the Exchequer, which is acceptable providing the practice can be confined to specific areas of the economy where there is no serious prospect of profitability, such as public transport and rehabilitation of older housing. It should be possible to calculate the tax income generated by the expenditure of a commercial operation, using input-output techniques, and such calculations could be used as a means of controlling public funding of such projects.

It is unfortunate that unwise investments in public enterprises have had the effect of reducing interest in public commercial activity, as a more rational result might be a reduction in the national enthusiasm for investment. Concentration on labour intensive commercial activities not involving significant investment, possibly organised at a local level, would allow the effects of employment creating projects to be more closely controlled. I have suggested some possible activities elsewhere (Mansergh, 1984). Some of these activities like the rehabilitation of inner city buildings for resale would have some of the advantages of public investment programmes (tackling long-term problems, reducing a drain on resources), while at the same time opening up the possibility of funding over a number of years being used cumulatively in order to build up the numbers of employed.

II. COST BENEFIT ANALYSIS AND TRANSPORT POLICY

The Naas bypass is the Republic's first motorway and gives us access for the first time to the highest level of road quality and design speeds currently available. One effect of providing roads of this quality is that the volume of traffic will increase, relative to what it would have been if a more modest, lower speed road had been built, and also, of course, relative to the situation if no new road had been built. It has been estimated that the average motorway opens with one third more traffic than can be accounted for by diversion from other roads (Drake, 1969) and thereafter may gain traffic more than twice as fast as the conventional road system (Tanner, 1968)².

Approach to Generated Traffic

One unfortunate feature of discussion of roads investment in Ireland to date is that it has tended to blur the distinction between two different forms of support for road improvements, based on different attitudes to this issue of traffic "generated" by the road improvement itself. On the one hand it can be argued that one should seek the highest reasonable level of quality, because time benefits in particular increase as speeds increase, and that the generation of additional traffic should be regarded either as a further benefit (a convention exists by which benefits to such traffic are valued at one half the value of comparable non-generated traffic) or at any rate as a neutral side effect. On the other hand, one can argue that the primary function of road improvements is to eliminate existing congestion, accident and environmental problems, and that it is an error to do so through the provision of very high quality roads because this will create additional traffic which will spill over onto the road network adjoining the motorway and create new problems there, as well as make the process of eliminating existing problems unduly slow and expensive. I shall use the term "expansionist" to describe the first approach (because of the tendency toward mutually reinforcing expansion of traffic and the road system) and "equilibrium" to describe the second (because it seeks a better balance between road capacity and traffic volumes).

Up till the late 1960s, most advanced countries followed an expansionist policy. Resistance to urban motorway proposals then produced a rather schizophrenic approach, as transport ministries adopted a more equilibrium oriented or "balanced" policy in relation to urban roads, but not inter-urban ones. This included a more favourable attitude to public transport, but progress in this direction has fallen off in recent years, partly because of political changes and partly because the financial support given for public transport costs and capital projects was not a substitute for the necessary structural changes in the transport market. The shift in favour of a more balanced approach was usually accompanied by changes in organisation, so as to bring responsibility for road construction and for other forms of transport together in one organisation (Starkie, 1976). The rather gradual moves towards

²As road use is affected by other factors apart from traffic generation, the extent to which this process is apparent will vary. Generation effects are likely to be least obvious in situations where economic circumstances are depressing the underlying rate of growth of traffic. Traffic generation will nevertheless take place, relative to what would otherwise have occurred, unless demand is completely inelastic and there is thus no response to reductions in the generalised cost of road use.

a Transportation Authority in Dublin are a belated and localised Irish version of this process.

Tendency for COBA to Support High Cost Strategies in Practice

In theory cost benefit analysis can be used to adjudicate between these two approaches, and would be expected to favour the equilibrium oriented approach in the majority of cases, because:

- (a) where the existing road system is acutely unsatisfactory and road improvements at modest cost are physically practicable, the savings in time and travel costs are likely to be large in relation to the cost of the improvement, giving a high rate of return. It is difficult to achieve an equivalent rate of return on the further expenditure necessary to provide a higher quality road improvement. Where the existing road system is only mildly unsatisfactory, this may not be so, but in these circumstances the returns from any levels of road improvement will be less;
- (b) raising the quality of a road improvement can easily have a disproportionate effect on cost, because the task of designing a road which avoids expensive property or natural obstacles becomes much more difficult as one increases the minimum radius of the curves and the width of the corridor required.³

However, adjudicating between high and low cost approaches is only one of the uses which can be made of cost benefit analysis in the transport area. The other main use, as we have seen, is to provide a more general justification for increase in road expenditure, on the argument that representative schemes have been justified by cost benefit studies. In practice, this second application of cost benefit studies appears to have much more influence on events.

In turn, an increase in road expenditure will create the conditions in which an expansionist strategy can be applied, the possible preferences of those who have carried out some of the studies for a more modest approach notwithstanding. The principal reason for this is that the point of the analysis is generally perceived as being to determine whether the project's rate of return exceeds some minimum test rate. Given the organisational and professional pressures to seek the most expensive scheme standing a reasonable chance of funding, the natural consequence of this would be for most schemes put forward to have rates of return only slightly above the test rate. The reason this does not happen at present is because most Irish road improvements are put forward without a supporting cost benefit study, but a more informal process, by which the most expensive scheme likely to be sanctioned is put forward, can readily be envisaged. The effect of asserting, with the National Planning Board and *Building on Reality*, that "a much higher level of investment in road improvement could be justified using public investment appraisal techniques" and increasing the allocation for roads as a result, will presumably be to extend this process.

³ This view is consistent with the finding that the rate of return falls as the level of service is increased (Barrett, 1975/76).

Transport policy should take account of the particular circumstances of particular countries, including the presence or absence of a domestic motor industry and other macroeconomic circumstances (cf. Rothschild, 1974). It is not helpful to compare our road investment rate with that of other countries without knowing how far those countries have benefitted from their investments, and if they have, how far the conditions which allowed them to do so exist in Ireland now. At the simplest level, an expansionist policy is more expensive, takes longer to eliminate current problems and is more likely to generate new ones. The countries which have pursued the expansionist course with most enthusiasm in the past have had large domestic automobile and related industries and have been very conscious of the effects transport policy decisions might have on them (Buchanan, 1958). They have also been influenced by macroeconomic considerations (Rose, 1979), which, as suggested earlier, are probably irrelevant to our own current problems.

In particular, the growth in transport spending in the United States and Britain in the 1950s which resulted in their respective freeway/motorway building programmes was largely motivated, at least as regards timing, by the need to increase civilian expenditure to offset the decline in military spending after the end of the Korean war. The most advanced countries have traditionally found it possible, and on some arguments, necessary, to embark on massive public expenditure projects, both civilian and military. Ambitious expenditures of this sort are normally an effect of the country's prosperity, and it is doubtful whether smaller and poorer countries are wise in seeking to imitate them. When the United States and Britain were beginning their motorway programmes they were not faced by acute debt problems and, as imports of motor products into those countries was low then, they could be confident that the boost to the transport related industries would be almost entirely domestic. The gradual development of a motorway programme in Ireland at present is reminiscent of what the British were doing in the late 1950s (the Preston bypass, followed by the first phase of the M1) but without the favourable surrounding circumstances.

We will not, however, know for some time whether the Naas bypass was, with hindsight, the first piece of an incremental motorway programme or not. As motorways are a potentially emotive issue, there are good reasons for not presenting it in that light. The motorway content of a roads programme is only a moderate guide to how expansionist it is.

Despite the more favourable surrounding circumstances, public dissatisfaction with the results of expansionist policies — primarily for environmental reasons — has been a striking feature of transport planning in wealthier countries, and this has not been confined to urban road proposals. The advantages of being a late developer are unnecessarily limited if one does not take advantage of the opportunity to learn from the experience of others. An expansionist roads policy is also likely to make it more difficult and expensive to maintain any given level of public transport, because it usually diminishes the quality advantage of public transport or increases its quality disadvantages, and thus reduces demand, service frequencies and support for overhead costs such as track maintenance. This process is going to make life

more difficult for the 61 per cent of the Irish population over 10 who do not currently hold any driving licence.⁴ (Hillman 1973).

Because of the absence of a domestic motor industry, Ireland has a stronger interest in an equilibrium oriented roads policy than most of her neighbours, and it is unfortunate that she is pursuing this policy, and the corresponding transport policies, in a half hearted way even in urban areas, where the arguments for this approach are widely accepted. Ireland may also have an interest in applying a more equilibrium oriented approach to inter-urban roads, even though this approach is not generally followed internationally.

If any such shift is to occur, politicians, administrators and economists are going to have to concern themselves as much with the type of road being built as with the absolute amount of money being spent. The quality of roads must thus become a policy issue, and not simply an engineering one. In some cases this is going to require willingness to experiment. For instance, the standard design of motorways is a package with two main elements: segregation of motor traffic from opposing flows and from other road users, which results in fewer accidents and relatively constant speeds leading to fuel savings, and high design speeds, which save time but partly offset the accident and fuel savings achieved through segregation. An equilibrium oriented inter-urban road policy would be interested in developing a lower cost lower speed design which nevertheless retained a significant degree of traffic segregation. At present the necessary design work has not been done because the countries and the professional groups who have had most influence on road design have not been very interested in equilibrium oriented policies for inter-urban roads.

An equilibrium oriented roads policy would also set a much higher value on predictability in travel times, rather than on reducing average journey times as much as possible. In urban areas, the techniques to achieve this exist, and basically involve controlling the flow of traffic onto the sensitive parts of the road network: these techniques have not been applied much in Ireland.

Conclusion

The practical effect of cost benefit studies has been to give the impression that the economic and transport benefits of current road investments are greater and more certain than they really are. The excessive trust placed in this technique at present focuses attention on the relatively peripheral questions it is capable of answering, to the detriment of more vital issues. If we are to make judgements on the value of particular types of road investment at present, we will need to know more about its effects on specific issues of importance. To get specific answers, we will need to ask specific questions.

This is not to say that cost benefit analysis is not a useful way of exploring a number of issues of interest, providing these issues are clearly defined. It is reasonable to use cost benefit as a justification for road investment, providing that it is made clear that the justification is essentially in terms of consumer

⁴ Mayer Hillman argued that older children and adults without driving licences will wish to be able to make trips without necessarily being accompanied by a car driver, and that the correct measure of access to the use of a car was not the proportion of households owning a car, but the the proportion of individuals capable of independent travel who are able to drive a car and have one available. DOE returns show total licences (including provisional licences) in 1984 were 1.11 million, as compared with an estimated population over 10 of 2.86 million.

welfare, and that the broader economic effects of road investment are not fully understood. Policy makers, having been informed of the relationship between benefits to road users and the cost of providing these benefits, will be in a reasonable position to decide what priority they will give to the welfare of road users, relative to other calls on resources. They should, however, also have access to information on the other effects of road investment.

Cost benefit analysis can also be of value as a means of comparing different solutions to the same traffic or environmental problem. If used in this way, its value will depend principally on the quality and range of alternatives considered, and how realistically these are costed. The range of alternatives can be improved if one uses a team based approach with different members of the team having different approaches or design philosophies, and if they are asked to provide additional schemes specifically to meet gaps in the cost range.

The usefulness of estimates of benefits can be increased by carrying out sensitivity tests, and some of these were carried out in the Naas Study. Additional sensitivity tests which might cast light on the issue of traffic generation might include:

- (i) ignoring all time benefits arising from travel at speeds in excess of the official speed limit.
- (ii) ignoring all time benefits arising from travel in excess of, say, 45 mph on rural roads and 20 mph on urban roads.

One could derive from test (ii) a crude measure of how far roads could be regarded as "expansionist". The greater the reduction in benefits resulting from the application of such tests, the more the value of the road lies in permitting relatively high speeds rather than eliminating low ones, and the more it is reasonable to characterise it as "expansionist". Such tests will affect the rankings of the alternatives, and may help illustrate the point that an apparently fairly basic inter-urban road can be just as expansionist as a motorway.

A more modest, equilibrium based policy may mean that some schemes, which make sense primarily on expansionist assumptions, are not necessary, and that other schemes can be carried out more economically. This may permit more rapid resolution of outstanding problems. Alternatively some of the funds available could be used for non-transport purposes, or to fund low cost experimental transport works and services, such as community car pools, (Fishman and Wabe, 1969), local collective taxi services in areas not served by bus, cycleways and bus priorities. The first two could be developed as self funding employment projects in the sense described earlier. The real case for road building at present is that some solution to the more acute existing and prospective traffic and traffic related problems will have to be found at some time and that as the opportunity cost of labour is very low at present there is something to be said for doing it now. But this argument applies equally to measures which tend to diminish demand for road capacity as well as to road construction, and does not apply to road schemes which generate substantial additional traffic and approach the problems involved in an unnecessarily expensive manner.

References

- BARRETT, S.D., 1975/76. "The Economic Evaluation of Road Investment in the Republic of Ireland", *Journal of the Statistical and Social Inquiry Society of Ireland*, Vol. XXIII Pt. III p.1.
- BARRETT, S.D. and D. MOONEY, 1984. "The Naas Motorway Bypass — A Cost Benefit Analysis" *Quarterly Economic Commentary*, January, p.21.
- BESSELY, M.E. and D.J. REYNOLDS, 1960. "The London Birmingham Motorway" *Road Research Technical Report No. 46*, Road Research Laboratory.
- BRUNNER, C.T., 1948. *The Road Way to Recovery* British Road Federation.
- BRUNNER, C.T. and J. DRAKE, 1952. "The Place of a Modern Road System in the National Economy", *Journal of the Town Planning Institute*, Vol. XXXVIII No. 7 May.
- BUCHANAN, C.D., 1958. *Mixed Blessing*, London: Leonard Hill Ltd.
- DRAKE, J., 1969. *Motorways*, London: Faber and Faber, p.76.
- THE ECONOMIC AND SOCIAL RESEARCH INSTITUTE, 1984. *Employment and Unemployment Policy for Ireland*, D. Conniffe and K.A. Kennedy (eds.), Dublin: Chs. 8, 12, 18.
- GLASSBOROW D.W. 1960. "The Road Research Laboratory Investment Criteria Examined" *Bulletin of the Oxford Institute of Statistics*, Vol. 22 No. 4, Nov.
- HEGGIE, I.G. 1979. "Economics and the Road Programme", *Journal of Transport Economics and Policy*, Vol. XIII No. 1, January, p.52.
- FISHMAN, L. and J.S. WABE 1969. "Restructuring the Form of Car Ownership", *Transportation Research*, Vol. 3, No. 4 Dec. p.429.
- HILLMAN, M. with I. HENDERSON and A. WHALLEY 1973. "Personal Mobility and Transport Policy", *Political and Economic Planning Broadsheet* 542, June.
- MANSERGH, N.B.K. 1984. "Physical Planning and Employment" Proceedings of National Planning Conference, (Cork), Irish Planning Institute, May.
- NATIONAL ECONOMIC AND SOCIAL COUNCIL 1981. *The Importance of Infrastructure to Industrial Development in Ireland*, Dublin: July, Ch. 4.
- NATIONAL PLANNING BOARD 1984. *Proposals for Plan*, Pl. 2309 Dublin: Stationery Office
- ROSE, M.H. 1979. *Interstate: Express Highway Politics, 1941-56*, University Press of Kansas.
- ROTHSCHILD, E. 1974. *Paradise Lost: The Decline of the Auto Industrial Age*, New York: Vintage Books, Chapter 8.
- STARKIE, D.N.M. 1976. *Transportation Planning Policy and Analysis*, Oxford: Pergamon Press, p.94.
- STATIONERY OFFICE, 1984. *Building on Reality*, Pl.2648, Dublin: Stationery Office.
- SUFFREN, P. 1977. *Housing in Rural Ireland*, Dublin: An Foras Forbartha, Section 5.
- TANNER, J.C. 1968. *An Economic Comparison of Motorways with two and three lanes in Each Direction*, Road Research Laboratory, LR205 HMSO, p.24.
- THOMSON J.M. 1974. *Modern Transport Economics*, Middlesex: Penguin Hammondsworth, p.93.

