

ECONOMIC PLANNING FOR TRANSPORT - SOME PRACTICAL
CONSIDERATIONS

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ABSTRACT: This paper is based on the work conducted by the Bureau of Transport Economics for the forthcoming combined road and urban transport Capital Grant Legislation. It is directed towards the difficulties inherent in making inter-modal and inter-task trade-offs and offers some practical suggestions for handling these difficulties.

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INTRODUCTION

The term 'planning' has several connotations. It has been referred to as information processing, strategy formulation, the application of intelligence to the future, preparation for action and a number of other similar interpretations. One particular definition provided by De Salvo captures the essence of most other definitions. De Salvo interprets planning as an ordered process in which decision makers seek by forethought to affect action to bring about more desirable states than would otherwise occur.⁽¹⁾ Under this very broad definition planning appears to be any ordered long term decision making process.

A more restricted definition is put forward by Marjolin "Planning is a technique in the service of policy. What matters ultimately is not the technique but the policy. The planning makes it possible to see whether the State is really pursuing the policy that it intends to follow and that it claims to be following.... Doubtless it is possible to make good policy without planning if the needs are so evident that there could be no doubt as to what action to take. Where they are not so evident, a great deal of information and thought may be needed. In the present circumstances of very considerable uncertainty, of rapidly changing conditions, planning can be held to make a rational economic policy possible."⁽²⁾

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1. J.S. De Salvo (Edit, 1971) "Proceedings of a Conference on Regional Transportation Planning": The Rand Corporation, January 25-27, 1971. A Report Prepared for U.S. Department of Transportation Office of the Assistant Secretary for Policy and International Affairs.
 2. Robert Marjolin, "Action Programme" European Economic Commission, Brussels, 1962.

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Thus the need for planning inputs into policy decisions can be seen as largely the result of the complexity of modern developed economies and the very long term effects of many policy decisions.

The term 'Economic Planning' is most often used in a macro sense relating to the economic management or detailed development planning of an entire economy. The degree of intensity of such macro-economic planning varies from the highly aggregative fiscal and monetary management techniques as applied in Australia through the French concept of consultative or indicative planning to the centrally planned economies such as the Soviet Union. It is interesting to note that even in these latter economies planning is not regarded as a rigid deterministic process.

"In a real economy as opposed to a model, an 'optimal plan' may in fact be far from optimal.... Consequently, it is important to realise that optimal planning does not replace the economic decision maker, it simply provides him with information which may be helpful in reaching sensible decisions. An 'optimal plan' is a guide to making sensible decisions, not a substitute for them."⁽³⁾

There is, however, another planning concept which may be labelled micro-economic planning. In the transport context this means the extension of engineering, operational and land use plans, which are essentially technical in nature, to encompass a broad spectrum of economic variables.

3. M. Ellman, "Optimal Planning - a Review Article", Soviet Studies Vol. 20 July 1968.

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This form of economic planning is a good deal broader and more complex than the economic evaluation of specific individual projects. It is essentially directed towards an efficient allocation of resources between competing demands in a relatively small sub-sector of the total economy and may encompass a transport system, a geographical region or corridor or even the whole transport sector.

The broadest application of micro-economic planning is in the context of the development of a desirable level of resource allocation from the economy as a whole to a specific subsector.

Whether governments should engage in economic planning is a question often asked. Whilst it is not the purpose in this paper to enter the debate, it is perhaps pertinent to note in brief the broad philosophies behind the controversy. The non-economic arguments generally revolve around the question of freedom under planning, whilst the economic arguments centre on the efficiency of planning in the attainment of desired objectives. The case against intervention rests on a view of the private market as an efficient allocator of resources, in which the inter-action of supply and demand will ensure an allocation of goods and services according to the needs and desires of the community and that this process is too complex for any planning authority to handle. The case for planning by government rests on a completely opposite viewpoint, namely, that economic efficiency cannot be achieved under a free market system without at least some degree of government involvement.

PLANNING AND EFFICIENCY

A central objective of government is the improvement of the efficiency of resource allocation within the economy. For the economy as a whole an efficient allocation of resources is said to exist if there is no other allocation possible which would make at least one person better off without making anyone else worse off.⁽⁴⁾ When this is the case, resources are allocated in a manner consistent with the broader national objective for maximising the welfare of individuals throughout the economy.⁽⁵⁾ The desirability of such alternatives depends on value judgements concerning the respective distributions of satisfaction amongst all individuals and groups in the relevant economy. Thus the most desirable situation is one in which the allocation of resources within the economy is efficient and the associated distribution of satisfaction and hence all costs and benefits is acceptable to society. The choice between the alternative efficient allocations of resources in order to achieve one which is socially acceptable is, of course, the responsibility of government.

It can be shown theoretically that perfectly competitive conditions throughout an economy will produce an efficient allocation of resources.⁽⁶⁾ However, actual economies

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4. Under this criterion, attributable to Vilfred Pareto in *Cours D'Economic Politique*, 1896-1897 the term 'better off' must be seen in terms of people's individual preferences and not as perceived or judged by others.
 5. An optimal allocation of resources is a necessary but not sufficient condition for the maximisation of individual welfare.
 6. For a proof of this assertion see for example G. Debreu, Theory of Value: An Axiomatic Analysis of Economic Equilibrium, New York: John Wiley and Sons, 1959.

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may fail to be economically efficient because of the existence of market imperfections such as natural monopolies,⁽⁷⁾ externalities, public goods, uncertainty and incomplete information flows to buyers and sellers. These factors are always present in all types of economies and hence an overall efficient market allocation process does not prevail. The improvement of resource allocation in such circumstances can often only be achieved by some degree of public intervention in the market.

Transport exhibits many if not all of the conditions that make it difficult or impossible for markets to work in an economic and efficient manner; externalities abound, marginal costs are frequently lower than average costs, use related pricing and exclusion are often difficult, and a degree of local monopoly commonplace.

PLANNING INSTRUMENTS

There are many possible means by which a national government can affect resource allocation in the economy. These include pricing policies, undertaking the complete supply of a service or good, subsidisation, taxation and regulation. There is however, no single means of determining which of these methods is superior in any particular instance. Situations should be judged on their individual characteristics and speci-

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7. This refers to situations in which firms have increasing returns to scale. In these cases, firms are induced to expand their production until they are one of a few or the only firm in the relevant market. When this situation occurs, the firm(s) would have some control over price, and the main requirement for competition which is that all firms and individuals are price takers and not price makers, is violated.

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fic policies selected on distributional as well as on economic efficiency grounds. It may be that some combination of several intervention measures ensures a 'better' allocation of resources than any one method. The best policy mix will depend on differences between benefits and costs of alternative combinations of measures, the extent of interaction with other parts of the economy and the direct costs of implementation of the policy.

For the Commonwealth Government, the range of intervention measures that can be applied is restricted by the powers granted to it under the Constitution. For example, in the transport sector, intervention through regulation and pricing has been mainly limited to the sea and air modes where the Commonwealth Government has a greater share of overall responsibility. In other areas such as the provision of roads, rail standardisation and assistance to urban public transport, intervention is only possible through agreement with the States or through specific purpose capital grants under Section 96 of the Constitution.

The level of resources allocated to transport should be determined on the same basis as those allocated to other sectors of the economy. Therefore, the criteria for determining such a level should lead to the selection of projects assessed to yield benefit-cost ratios at least equal to those for projects undertaken in other areas of the economy.

The allocation of investment funds within and between sectors must be determined by decisions which take account of non-pecuniary and intangible objectives and effects as well as those which can be more readily quantified and subjected to economic analysis. Nevertheless, investment in activities which are shown to have a high economic return and are optimally

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timed will generally improve the efficiency of resource allocation within the economy as a whole, particularly if non-pecuniary costs are relatively unimportant. However, even in these cases care must be taken to ensure that such projects will not have adverse repercussions elsewhere in the economy, so generating significant social costs.

Despite some shortcomings, benefit-cost analysis remains the best generalised technique for assessing the desirable allocation of resources to specific projects. The results of such analyses provide a guide to the selection of preferred projects from among a range of alternatives. It is for this reason that benefit-cost analysis is an established part of the procedure for allocating investment funds between alternative road programs and has, more recently, been used for allocating investment funds between specific urban public transport projects.

INVESTMENT DECISIONS

In the particular case of the assessment of capital investment projects, benefit-cost analysis is specifically directed to the comparison of the capital costs with the resulting stream of net benefits. It takes as its starting point the principle of market based measures of benefits and costs. Benefits are measured by the price that consumers of the output would be willing to pay even if they are not actually to be charged. From these benefits operating costs are deducted. Capital costs are measured by the investment outlay necessary to undertake the project. Since most projects generate effects which are not valued in the market such as social and environmental impacts, it is not always possible to fully quantify all benefits and costs. In these cases, however, benefit-cost analysis provides a framework for com-

paring the quantifiable costs and benefits of a project against which any unquantifiable or non-pecuniary effects can be assessed. Attempts have been made to formalise such a comparison by using techniques such as the planning balance sheet.⁽⁸⁾ These techniques provide a framework in which to describe the intangible effects and distributive impact of particular projects.

Benefit-cost analyses are most effective in comparing projects that are roughly similar in purpose, generate the same sorts of benefits, and have similar types of externalities. In situations where there are significant differences between projects, with respect to externalities or in the types of benefits produced, the results of benefit-cost analysis are less reliable. This is particularly so when there is more uncertainty attached to the assessment of benefits from one project than with those from another. For example, two projects may have identical benefit-cost ratios yet the benefit from one may be almost entirely in the form of reduced operating costs while benefits from the other may be almost entirely in the form of one or two minute time savings per passenger. Although such time savings have value, considerable uncertainty exists as to the true worth of the resource savings which they represent. This situation is analogous to the commercial valuation of financial assets associated with different risk levels. The greater the risk in the expected future income flows, the higher the discount rate which may be applied.

8. See for example N. Lichfield and H. Chapman, "Cost Benefit Analysis and Road Proposals for a Shopping Centre", Journal of Transport Economics and Policy, Vol. II, No. 3 (Sept. 1968), pp. 280-320.

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Another difficulty associated with proper evaluation of the costs and benefits of a transport project is the high degree of interaction between transport modes and between transport and other economic activity. There is considerable complementation and substitution possible between transport and other forms of communication and energy transmission and between transport, land use patterns and the organisation of industry and associated resource inventories. In practice, interactive effects, particularly those external to the transport sector, tend to be ignored due to data limitations and the sheer complexity of the analysis required to encompass them.

Pricing and cost recovery policies are an important aspect of interaction between transport projects and between transport and the rest of the economy. Assumptions made regarding such policies can have decisive effects on the results of benefit-cost analyses. The effects of such assumptions through demand relationships on assessed conversion and generation benefits are well known. However, they can also have an important influence on the levels of assessed direct benefits when these accrue to overseas users of Australian transport facilities.

In deciding between a number of projects, it is important to take account of distributional effects. Although benefit-cost analysis provides a basis for judging investment alternatives in terms of assessed economic efficiency, the benefits being measured "to whomever they accrue", every investment decision will favour some groups of people more than others. For example, the choice of a rural rather than an urban road project will result in the direct benefits being distributed between two completely different groups of people. Allocation decisions will always have distributional consequences.

While there is no practical way of combining both efficiency and distributional considerations in project evaluation, economists can point out the distributional effects of particular projects.

The distributional effects of specific projects will also be affected by the pricing policies adopted after the projects are implemented. Where public policy is for the recovery of all of the costs of a particular project from its beneficiaries these effects will be reduced. In other cases an element of indirect subsidisation or taxation must result. Provided that the project is economically warranted however, net benefits to the beneficiaries will always exceed the total costs of the project.

If the distributive and other non-quantified effects are proportionally the same for all projects under consideration, the benefit-cost ratios and the relative project rankings that they indicate will not be changed by their exclusion. This is unlikely to be the case in practice and subjective judgements would normally be necessary in order to determine which projects should be undertaken.

The distribution of investible resources between the public and private sectors is normally accommodated by the choice of discount rate. I do not propose to embark on a discussion of discount rates here. However, it is worth noting that the implicit public sector discount rate, judged by the internal rate of return of projects actually implemented, may on occasion be considerably higher than is normally assumed in evaluations. This presumably results from the operation of an overall constraint on the availability of public sector funds and may point to the desirability of funding projects direct from beneficiaries where this is feasible.

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It is important to note that a benefit-cost ratio greater than one, given an appropriate discount rate, is a necessary but not a sufficient condition for project selection. It is also important that the project be optimally timed. That is, the net present value should be maximised. In the case of a program comprising a number of projects, ranking by benefit-cost ratio may not achieve this object.⁽⁹⁾

IMPLICATIONS FOR TRANSPORT PLANNING

Despite the usefulness of cost-benefit analysis, the use of individual project evaluations as an aid to longer term resource planning is not always appropriate. The selection and the economic merit of individual projects is often predetermined by the existing system to which they represent a marginal extension. A broader and more integrated assessment may be required to identify longer term opportunities that may lead to greater community benefits and hence a better allocation of resources as well as possibly meeting other goals, non-pecuniary or distributional.

The organisational structure of transport in Australia tends to exacerbate the problems of transport planners, and may be regarded as deficient in two important ways. In the first place the investment planning process for public transport facilities has often not taken into account whether a more productive investment might be made in another mode of transport. Instead, emphasis is placed on ascertaining which of several alternative investment proposals in one mode should be given priority. In consequence the process often ignores

9. See, for example, A.C. Harberger, "Cost/Benefit Analysis of Transportation Projects", Mimeo 1967.

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the question of whether, for example, it might not be better to build a new highway rather than a new airport and inevitably leads to some investments in other modes being ruled out even though the benefit-cost ratios might be higher than for the projects actually chosen. Secondly the investment decisions for road, rail and airport programs are not always made under the same economic constraints. Different pricing policies lead to different ranking in terms of benefit-cost ratios which in turn change the priority of investment decisions.

The fact that the evaluation techniques available to transport planners are not, and probably never will be, entirely adequate does not mean that they should not be used. The characteristic nature of transport markets demonstrates the need for government intervention measures to remove or counterbalance the undesirable effects of the many market imperfections that exist. The problem for planners is that whilst the evaluation methods available can almost certainly provide a transport strategy that improves economic welfare, the methods in themselves do not guarantee they have come up with the best strategy. This places transport planning authorities on a technically weak footing and therefore open to criticisms and counter proposals.

Nevertheless, benefit-cost analysis can provide a basis for broad economic planning in the transport sector. The most important point to remember is that the broader the sub-sector being examined the less likely it is that economic analysis alone can provide an optimal solution to the planning problem.

In these circumstances the roles of the analyst and the decision maker should be clearly defined. The analyst should avoid as far as possible the temptation to usurp the

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role of the political process by attempting to place values on benefits or costs that are essentially unquantifiable or incommensurable. He should also attempt to separate benefits of uncertain value from those which are readily quantifiable.

Rather than aim for the computation of some unique criterion of economic merit, it is preferable and considerably more honest to summarise the effects of a proposed program using a range of criteria.

Thus, for example, a transport planning balance sheet might contain for several projects or sub-programs;

- . description of project or sub-program,
- . assessed benefit-cost ratio,
- . total cost and source of funds,
- . composition of benefits,
- . distribution of benefits and costs,
- . net readily quantifiable resource cost or saving,
- . effects of interaction with other projects or sub-programs,
- . and, for a continuing program, the
 - rate of growth of task and
 - proposed rate of growth in expenditure.

Such a list of criteria could, of course, be extended almost endlessly. The choice for any particular program will depend mainly on the variation between the types of effects resulting from various projects and sub-programs. The aim should be to summarise whenever this can reasonably be done, and to point up the qualitative differences wherever they are important.

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It may often be possible to formalise the procedure by maximising the net present value of the readily quantifiable benefits and costs while introducing other important factors as constraints or as secondary output from the analysis.

The message for the economist is clear - the boot-maker should stick to his last. True, the academic welfare economist can accommodate virtually every human activity within his philosophical framework. However the applied practitioner will increase the value of his contribution to the planning process considerably if he admits that he does not possess the philosopher's stone of the ability to produce optimal plans.

Rather he should summarise and present to decision makers the important information relating to the economic consequences of alternative courses of action. This presentation should allow decision makers as much flexibility as possible to vary programs in the light of their assessments of non-economic factors and competing demands for resources from other sectors of the economy.

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