MULTIPLE OBJECTIVES, PUBLIC POLICY, AND THE ECONOMIST*

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1. Introduction

Traditionally economists have placed an overwhelming emphasis on the single objective of economic efficiency, with, in limited cases, some acknowledgement that equity questions should be weighed. Real world policy makers have multiple and conflicting goals, many of which are politically motivated, 'non-economic', and exhibit elements of incommensurability. For this reason much of what economic policy advisers have had to offer has been rejected, or compromised in application. The aim of this paper is to illustrate how the economist may assist the now almost unaided decision maker in exploring policy outcomes that conform with real world specification and selection of goals.

With the guiding thought in mind that the principal application of economics is to political decisions, an over-view of the political policy making process is thus seen as germane to our analysis. From such a vantage point we discern how, on any particular policy issue, the policy maker is subjected to influence as to the appropriate goals, their relative importance, and the policy instruments preferred for seeking such objectives. Advice, pressure, and preferences emanate from within the Government sector, from both incumbent and opposition parties, and from various interest groups within the community. From the range of opinions proffered, the decision maker has to distill the objectives desired by the various actors, their relative importance and the appropriate policy instruments. Further, for the mass of unsophisticated voters who rationally know little of the outcomes of specific policies, or even what has been proposed, there is still the need to meet their expectations of general social well-being, and by so catering for this majority group, remain in power.

As indicated above, in this paper we argue that economic policy analysis should take cognizance of the full range of policy aspirations. We suggest that the multiple goals or arguments in the policy maker's preference function should be made explicit, and that economists can and should aid in dealing with all such relevant goals. The parameters of this social preference function can be weighted to reflect a particular preference structure for goals and instruments. This approach has been made operational. In effect, it is achieved by weighting social preference functions and illustrating their outcomes in the light of these specific preferences. This forms the start of an interactive process. By interaction with the decision maker weights can be adjusted and, in the majority of cases, the process converges towards a consensus. To flesh out this structure of approach detailed above, we turn to a consideration of opposing views of the art or science of policy analysis.

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* Research leading to a formulation of these views was supported partially by a grant from the Economic and Financial Research Fund of the Reserve Bank of Australia. The views expressed, however, are not necessarily held by the Reserve Bank. This article is a revised version of a paper presented to the 46th ANZAAS Congress, Canberra, January 1975.

2. An Overview of the Current State of Policy Analysis

Centralized decision-making by elected government is performed in contemporary western style democracies. This may be viewed as a bargaining process undertaken between politicos representing different groups holding conflicting social preferences. Such a method of social choice is seen as a compromise enabling the polity to manoevre around the impasse resulting from the paradoxical outcomes of Arrow's General Possibility Theorem. This delegated political decision-making is based on the assumption,

> "... of a substantial (and unspecified) degree of correspondence between the distribution of preferences in the electorate, over a wide set of policy aims, and the distribution of preferences that would be revealed by careful interviewing of a representative body of national leaders".[1]

In a western style democracy, we perceive the purpose of economic policy analysis to be that of providing the political decision makers with information regarding the impact of alternative policy options on that multi-dimensional measure, the welfare of society. Contemporary economic analyses provide evidence as to the economic efficiency effects, and more recently, the distributional consequences of changes in resource allocation arising from policy proposals. In such an orthodox exercise, arrived at in what has been described as the Benthamite-Fabian tradition, these "ethically neutral economic truths" are served up to Government on the expectation that government will implement the appropriate (in an economic sense) policy. The failure of government to implement what orthodox economists regard as the appropriate measure, results in disillusionment for these advisers. It is no more reasonable for the adviser or the electorate to expect the government to pursue social welfare as the economist or voter views it, than to expect trade unions or private corporations to do so. As Johnson notes, these entities can be characterised as maximizing their pay-off functions scaled in terms of their own objectives, subject to political, physical, economic, and legal constraints.[2]

A further implication of adopting the Benthamite view is that economists eschew political factors, and in their dealings with government conduct exchanges at 'arms length'. This implies that the advisers as technocrats possess a welfare yardstick, but no part of their assessment involves weighing the political possibility of the advice tendered.

> "This approach is a carry-over from an earlier and more naive view of social welfare, in which it was assumed that the economist, as advisor to the policy-maker, could assess the tastes of individuals through some sort of measurement, and then tell the policy-maker what was best for the people — always in terms of their own tastes. *In fact,*

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[1] J.C. de Castro Lopo, *Macroeconomic Management in Mixed Societies*, paper presented to Section 24, 45th Congress ANZAAS, Perth, August 1973, pp. 1-19. (p.10).

[2] H.G. Johnson, "Reflections on Current Trends in Economics", *Australian Economic Papers*, Vol. 10, No. 16 (June 1971), pp. 1-11.

however, it is the political process itself which, together with the existing structure of collective decision-making, expresses these tastes".[3]

What we have endeavoured to suggest is that there is a need for economists to give legitimate expression to objectives other than just orthodox 'economic' ones.

At different times economists examining public policy choice from the traditional viewpoint have dismissed legislative enactments arising as a misinformed pot-pourri of policy outcomes. This, however, is a blinkered view. In the heavily criticised field of agricultural policy for example, much can be explained once the position is taken that income transfers to rural producers are a major objective. In other words, here efficiency is not as basic a goal as equity, security, or other goals. In the field of international trade, the erection of protective tariff and non-tariff barriers by the lesser developed countries has been seen to run counter to the economist's perceived workings of the law of comparative advantage. It has been suggested that this urge to industrialise at all costs, resulting in the existence of (high cost) somewhat sophisticated industries such as steel and motor car production in LDC's, has about it many aspects of a public good. The population in general experiences a benefit in the form of pride that their country can produce these goods. They are no longer a 'mine' for the developed countries, nor are they just a nation of 'hog-butchers'.[4]

Governments may also foster research to boost the morale of important sections of the scientific community. Perhaps here though, another objective is sought as well. It has been suggested that some such public investments are legitimate attempts by governments to invest in an effort to change the nation's comparative advantage towards efficient, higher, more technological output. National flag carriers in both the aviation and shipping fields seem to be supported largely for matters of national prestige. Shipbuilding and aircraft construction industries may be kept alive in keeping with the aforementioned objective, and for the purpose of defence capability.

It is our view that these 'non-economic' goals should be given explicit consideration in policy analysis. With this wider spectrum of goals incorporated, it is then possible to provide the decision maker with the costs of pursuing them, and concurrently, the best method of doing so. To deliver a further understanding of the economist's role, we proceed now to a review and analysis of political decision making.

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[3] J.S. Coleman, "The Possibility of A Social Welfare Function", *American Economic Review*, Vol. 56, No. 5 (December 1966), pp. 1105-1122. (pp. 1107-1108). See also J.M. Buchanan, "Politics, Policy and the Pigovian Margin". *Economica*, Vol. 29, No. 113 (February 1962), pp. 17-28.

[4] Rachel McCullock and Professor H.G. Johnson endorse this viewpoint: "However, we should not overlook the possibility that certain non-economic objectives are truly public goods which provide sufficient collective utility to the majority to justify their cost in terms of foregone consumption", R. McCullock and H.G. Johnson, "A Note on Proportional Distributed Quotas", *American Economic Review*, Vol. 63, No. 4 (September 1973), pp. 726-732. (p.726).
See also, B. Munk, "The Welfare Costs of Content Protection: The Automotive Industry in Latin America", *Journal of Political Economy*, Vol. 71, No. 1 (Jan/Feb. 1969), pp. 85-98; and H.G. Johnson "An Economic Theory of Protectionism, Tariff Bargaining, and the Formation of Customs Unions", *Journal of Political Economy*, Vol. 73, No. 3 (June 1965), pp. 256-83.

3. The Process of Policy Making

In this section we draw on particular aspects of what have become known as the 'economic theories of democracy'.[5] Rather than consider in great detail the process by which a particular party gains power, (the central concern of such theories) we confine our attention to the process by which government arrives at a particular stance on a given policy issue. For such a discussion, a consideration of the role of political information is crucial.

3.1 Information and Influence

A number of distinct roles for political information are discerned. For the informed group of voters, such information assists in deciding for which party to vote, and it allows these sophisticated voters to form opinions on policy issues which, in specific cases, may be used to influence government actions. Utilization of information by pressure groups is an important lever by which policy formation is influenced.

As indicated, in this model government formulates policy with the specific view of pleasing as many voters as possible. For the individual voter, satisfaction arises when his preferred policy is adopted. For many policies though, the individual voter may have no specific yearning for information. Other than for that small set of policies dear to him, the voter may be concerned only with a general 'feel' for government performance. For the cared for policies, if the intensity of feeling is strong enough, information may be sought by citizens to form opinions about the proposed relevant legislation. These preferences in turn, if communicated to government, are considered by politicians in their attempts to procure the maximum number of votes.

Downs details tne position:

> "Clearly, the more information a citizen has, the more influence over government policy he is likely to exercise provided he informs the goverment what his preferences are. Conversely, the less a citizen knows about policy alternatives, the fewer specific preferences he can have, and the more likely it is that government will ignore him in making decisions".[6]

If access to such information enables a person to wield influence on the process of government policy formulation, a value attaches to the information. Down indicates that the net value of the information is, of course, the returns available from the information less the costs of attaining the information; for optimal investment the principle of equating marginal returns to marginal cost applies. As it might not be obvious ex ante which particularly policy instrument might prove best in attaining the influencer's goals, the outcome of the wielding of influence is uncertain. A good deal of risk and uncertainty still surrounds such investment in information.

While party preference decisions are indicated in the ballot boxes, the communication of policy preferences to the decision-maker is more costly and complex. In general, those

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[5] The most general model is provided by A. Downs, *An Economic Theory ofDemocracy* (Harper and Row, New York, 1957). A resume of this, and competing sociological theories of democracy, is given in B.H. Barry, *Sociologists, Economics and Democracy*, (Macmillan, London, 1970).

[6] Downs, op. cit., p.249.

wishing to influence government policy making in a particular area must be continually aware of developments in that area. The expense of information gathering and search is such that no one person can be fully informed on all policy issues. Those willing to invest resources in information gathering in a specialized field are most likely to be those who stand to gain most from the investment. In many policy areas, those who stand to gain are those who earn their income in the area of specialization. Thus, we expect that producers are more likely to exert influence than consumers, since they can better afford to invest in the required information and bear the costs of communicating opinions to government. A census of organisations registered as lobbyists in countries where registration is mandatory reveals the truth of this matter. Consumer advocates are, with few exceptions, conspicuous by their absence. It follows that in the cases where conflict is inherent, government policy decisions in a democracy almost universally exhibit a bias towards producers and against consumers. This bias exists 'not because the various agents concerned behave irrationally, but because they behave rationally'.

Recent developments dealing with the economic theories of democracy, tell us that swaying or 'tilting' towards producers may be acceptable to the electorate,[7] but this response by government to informed industry lobbyists is subject to the whole portfolio of government policies living up to the mass of voters' expectations of government performance. This leads us to consider this policy performance pressure incident on the political decision maker.

3.2 Policy Influence Through Performance Rating

The traditional view of democracy sees the voter's choice as that of making comparisons ex ante, between the alternative policy proposals of the parties vying for election. This ballot-box choice is usually seen as analogous to a consumer shopping about and choosing between products before purchasing. Cell, in contradistinction, regards not proposals, but actual policy decisions as inputs which affect the voter's personal index of ex post utility.[8] Voters therefore tend to judge policy adoptions by crude, after the event evaluations.[9] The more voters adopt this approach, the more choice is delegated to the politicians; but influence over policy is not forfeited. In contrast to the voters, the politician's lot is that of predicting the effect of policy outcomes on the electorate. Thus in the words of Cell, politicans:

> "'. . should redirect attention from the difficulties of forecasting untested policies to the implications for electoral influence of retrospective reactions to actual policy changes".[10]

In order to proceed a clear demarcation needs to made between the prospective and retrospective facets of elections. To start the process, consider the government is selected

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[7] See T.E. Josling, "Agricultural Policies in Developed Countries: A Review", *Journal of Agricultural Economics*, Vol. 25, No. 3 (September, 1974), pp. 229-264.

[8] See D.C. Cell, "Policy Influence without Policy Choice", *Journal of Political Economy*, Vol. 82, No. 5 (Sept/Oct. 1974), pp. 1017-1026.

[9] This does not conflict with the Downsian analysis. Cell's work builds on Downsian foundations, and both support in large measure, a rational state of public ignorance concerning most policy proposals emanating from the government or opposition.

[10] Cell, op. cit., p.1019.

prospectively on the basis of voter predictions as to the utility to be derived from electing particular candidates and parties. Having experienced a term of its selection, the electorate will retrospectively express its evaluation of this government at the next election. Thus, once a government has been elected, it is the possibility of censure by the voters at the *next* election that prevents government from ignoring completely the wishes of the electorate. Hence retrospective evaluation provides control of government by the electorate. How does this process affect policy enactments?

Although voters need to predict performance to select an initial government, they do not need to predict and weigh the detailed outcomes of every policy measure to express their choice and so influence government decisions. To outline this proposition, it is necessary to accept that support for government in subsequent elections depends, in large measure, on the utility consequences of past policy decisions: that is, voters use a performance standard to evaluate overall government actions. At each election, individual voters compare their assessment of past government performance with their own personal expectation of how government should perform. This performance standard is personal and may be considered as analogous to a minimum supply price for support of the incumbents. Aggregation over voters gives a rising supply schedule of voter support. Government attempts to buy support via its policy proposals and adoptions to ensure continuity of office. As indicated, the level of support so gained largely varies with the effect previously enacted government policies have on voters' utility. It follows that although voters may have no knowledge of the great number of specific policy alternatives proposed, and merely expect a pre-determined level of government performance, they nevertheless exert a pressure on politicians to find and enact the electorate's preferences. Paradoxically then, voters pressure governments to promote their utility without any clear understanding of how their expected standard is to be achieved.

A point worth noting is that, contrary to Paretian welfare postulates, interpersonal comparisons of utility are the substance of politics, and subject to the forces on them (producer-bias and performance rating) politicians must, and do, make them constantly. On this point Downs indicates:

> "Interpersonal comparisons are in fact the essence of politics, because its function is the settlement of conflicts between men. Furthermore, since we have defined utility as a measure of benefit, and since all conflicts concern benefits, these comparisons are at root utility comparisons".[11]

In practice, these interpersonal comparisons do not impose insuperable problems [12], especially in a community in which the underlying value consensus is relatively homogeneous. However, we have seen that the electorate expects the political decision makers to perform these evaluations on its behalf. Dorfman outlines this position:

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[11] Downs, op. cit., pp. 66-67.

[12] Such as those suggested as possible by the Arrow paradox. See K.J. Arrow, *Social Choice and Individual Values* (John Wiley and Sons, New York, 1951). The further concept of a community of interest and its importance in a policy context is illustrated by G.R. Winter, "Concepts in the Analysis and Development of Economic Policies for Agriculture: A Survey", *Canadian Journal of Agricultural Economics*, Vol. 22, No. 2 (July 1972), pp. 83-153, especially pp. 138-140.

> "Instead, we shall assume that the goals of the government are the goals of the socio-economic groups that comprise its body-politic with, however, varying degrees of attention to the interests of the different groups. From this point of view, different political parties would be distinguished not by differences in their objectives or programmes but by differences in their degrees of attentiveness to the interests of various socio-economic groups. What a government so motivated seeks to maximise is some function of the welfares of these socio-economic groups, as perceived by themselves".[13]

It is a to a consideration of just such social welfare functions, with the appropriate 'attentiveness to interests', i.e. weights for different goals, that we turn to now.

4. Social Preference Functions: Formulation and Operationality

4.1 Traditional Social Welfare Functions[14]

To this point we have not been specific as to the arguments which go to make up the social welfare function. Orthodox practitioners advocate the use of the Paretian postulates to evaluate public policy. Put crudely, this principle rests on the value judgement that if at least one person is made better off, and no one worse off, welfare has improved. Such an individualistic approach necessarily entails consideration of an ordinal social welfare function. The major failure of the Pareto principle is that it is silent in situations where the welfare of some is increased at the expense of the welfare of others. As we have seen, interpersonal comparisons are the essence of politics. Thus in practical policy analysis e.g. cost-benefit analysis, the underlying social welfare function ignores the restrictions on interpersonal comparisons of utility implied by the Pareto principle. The basic objective is to maximize social welfare while adhering to the remaining Paretian postulates, which entails maximizing the difference between social benefit and social cost. In this approach the distributional consequences of changes in resource allocation arising from policy measures are considered to be irrelevant.[15] In some instances this rejection of distributional consequences can be justified. However in other cases distributional, as well as other 'non-economic' consequences that we have alluded to, may be overriding.

Several approaches, while still rudimentary, allow explicit consideration of the consequences for such goals as distributive justice to be formulated. These include:

(1) the simple listing of the consequences for distribution of a proposed measure;

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[13] R. Dorfman, "General Equilibrium with Public Goods" Chapter 10 in *Public Economics*, J. Margolis and H. Guitton, eds., (International Economics Association, Macmillan, 1969), (p.257).

[14] There is a common usage of the term social welfare function that is indiscriminate from social preference function, or objective function, in the literature of policy analysis. See for example, C.K. Rowley, *Antitrust and Economic Efficiency*, (McMillan, Studies in Economics, London, 1973), especially Chapters 9 and 10. For a contrasting account of the restricted precise usage see A.K. Sen, "Planners' Preferences: Optimality, Distribution and Social Welfare" Chapter *8* in J. Margolis and H. Guitton eds. op. cit., pp. 201-221. In our case we adopt the broader connotation.

[15] For comment on this point see J.V. Krutilla, "Welfare Aspects of Benefit-Cost Analysis" *Journal of Political Economy*, Vol. 69, No. 3 (June 1961), pp. 226-235.

(2) the use of explicit weights to select the optimal policy; these weights being revealed by past government project selection.[16]

(3) weighting gains and losses according to social scales of deservedness, e.g. marginal rates of taxation.[17]

Another departure from the Paretian postulates best categorised as being representative of the traditional approach might be mentioned. This concerns the imposition of overt value judgements on the social welfare function.[18]

4.2 Further Formulations and Estimation

The information provided to the decision maker to date does not take cognizance of the wide range of objectives which are regarded by the various actors in the decision process as influencing social welfare. In attempts to overcome this problem, recent quantitative economic policy analyses adopt what have become known as social preference functions (SPF) as their objective functions.[19] Here the arguments of the social preference function relate to the objectives considered relevant by the participants in the decision-making process, e.g. government, opposition, producer, and in some cases, consumer interests. In these instances, the resulting SPF may reflect a number of competing goals with varying degrees of incommensurability, e.g. treasury costs and environmental protection issues.

In the main these studies proceed in their quest of weighing the outcomes of multiple policy attributes by employing two broad classes of "utility" in producing their SPF's. Firstly, where the various dimensions of utility can be amalgamated, a single overall utility function

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[16] This approach has been suggested by A. Maas, "Benefit-Cost Analysis: Its Relevance to Public Investment Decisions", *Quarterly Journal of Economics*, Vol. 80, No. 2 (May 1966), pp. 208-226. See also, B. Weisbrod, "Income Redistribution Effects and Benefit-Cost Analysis", in S. Chase (ed.), *Problems in Public Expenditure Analysis*, (Brookings Institute, Washington, 1968), and M. McGuire and H. Garn, "The Integration of Equity and Efficiency Criteria in Public Project Selction", *Economic Journal*, Vol. 79, No. 316 (December 1969), pp. 882-893.

[17] See J.V. Krutilla and O. Eckstein, *Multiple Purpose River Development*, (Johns Hopkins, Baltimore, 1958).

[18] "I am also willing to accept that there is a role in CBA for the 'postulated' price, i.e. for a client (say a Minister of Transport) to say that for the purposes of this analysis I want variable X valued at Y represents a precise statement about the client's policy trade-off between X and the other variable in the analysis." A.A. Williams, "Cost-Benefit Analysis: Bastard Science?" and/or Insidious Poison in the Body Politick", *Journal of Public Economics*, Vol. 1 (1972), pp. 199-225.

[19] Two basic approaches are noted in the literature dealing with these SPFs i.e. the explicit and implicit approaches. G.C. Rausser and J.W. Freebairn, "Estimation of Policy Preference Functions: An Application to U.S. Beef Import Policy", *Review of Economics and Statistics* Vol. 56, No. 4 (November 1974), pp. 437-449 provide a comparison of these alternatives and come out in favour of an explicitly formulated SPF.

may be employed.[20] Elements of this function might be related additively[21] or multiplicatively.[22] Secondly, where amalgamation cannot be performed and marginal rates of substitution between goals cannot be stipulated, lexicographic functions are adopted.[23]

Our previous overview of the policy making process indicates that, in addition to being a source of information as to the relevant goals to the inserted in the SPF, further recourse to the political process is essential, particularly in relation to the formulation and reformulation of weights to be applied to the various arguments of the SPF. Rausser and Freebairn discuss in some detail three approaches to the specification and estimation of weights for the SPF.[24] The direct approach entails interviewing those involved in the decision making process.[25] A second method derives SPF weights based on past government decisions. Although this approach has been utilized empirically by some writers (Rausser and Freebairn themselves, for example), it is open to the criticism that such procedures assume that the intentions of government's past decisions are in fact fulfilled, so that there is a correspondence between ex post results and ex ante intentions.[26] The third approach revolves around the investigator specifying what he, as a technocrat, considers to be appropriate weights.[27] In practice, elements of all three approaches may be used to delineate both the range of arguments in the SPF and the weights to be applied to the various objectives. Subsequent upon specification of the SPF, the economist using his technical tools and skills can aid in evaluation of the expected outcomes of the alternative policies.[28] By investigating alternate SPF formulations and weightings, the decision maker is made aware of the ramifications of adopting them. It is

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[20] See R.L. Keeney, "Utility Functions for Multi-Attributed Consequences" *Management Science*, Vol. 18, No. 5 (January 1972), pp. 276-287.

[21] R.J. Aumann "Subjective Programming" in M.W. Shelly and G.L. Bryan (eds.), *Human Judgements and Optimality* (Wiley, 1964), pp. 217-242.

[22] R.L. Keeney, *Multiplicative Utility Functions* Technical Report, MIT Operations Research Centre, March 1972.

[23] J. Encarnacion, "Constraints and the Firm's Utility Function", *Review of Economic Studies*, Vol. 13 (April 1964), pp. 113-120.

[24] Rausser and Freebairn, op. cit..

[25] Costs of interviewing, the availability of decision-makers to be subjected to interview, and the reliability of information so gained are disadvantages of this approach.

[26] This point is made by A.K. Dasgupta and D.W. Pearce, *Cost Benefit Analysis: Theory and Practice*, (Macmillan, 1972).

[27] This approach has been adopted in G. Fromm, "The Evaluation of Economic Policies", in T.H. Naylor (ed.), *The Design of Computer Similation Experiments*, (Duke Univ. Press, Durham, 1969) and H. Theil, *Optimal Decision Rules for Government and Industry*, (North Holland, Amsterdam, 1963).

[28] Technical approaches to performing the economist's functions are considered in the next sub-section.

our view, that only when faced with the results of alternative specifications can the decision maker legitimately make a choice of policies:[29]

> "An interactive process may thus ensue which, hopefully, could converge towards some kind of consensus. The social welfare function is on this approach regarded in effect as a social learning process rather than fixed *ab initio*".[30]

Exploratory trade-offs can then be made in explicit terms in an effort to render the various goals commensurable and reach an optimum social welfare position. The value of dealing with the actual decision maker in this final trade-off situation, rather than lower-level officials, is emphasized as the 'first best' approach.[31]

However a compromise approach may be necessary in real world applications. The availability of decision makers may be limiting or the costs of such interviews deemed prohibitive. Besides, the decision maker may not be able to define his preferences in advance, or may not wish to reveal his judgements prior to obtaining commitments from others in the bargaining and conscensus search of the actual political process. For these reasons the compromise adopted, which seeks to retain elements of the learning process, is to employ a set of social preference functions in the analysis and provide to the decision maker the range of policies selected on the basis of these criteria. As far as possible the set of functions should encompass the objectives and intensities of preferences of those the policy is encumbent on.[32]

An important issue that arises in the context of the outright and modified social learning process espoused above is to what extent the economist as adviser can, or should, adopt a completely passive role and accept political direction, or seek to influence policy outcomes. In this debate the authors are influenced by such eminent researchers as Sir John Hicks, Worswick, and Nath, among others. Essentially, as Hicks in his recantation asserted, a policy analyst is responsibly for policy 'in the round'; all elements whether labelled economic or 'non-economic' must be encompassed in his analysis, and indeed, advocacy.[33] Worswick's

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[29] Mishan dissents from our view: "I do not take to this idea. If there is to be any consensus on the weights to be used in a cost-benefit analysis, it should be reached in advance of, and therefore independently of the critical sets of weights yielded by any particular project. If, on the other hand, the more extreme view is taken that no set of weights can properly be regarded as more valid than any other set ("It all depends on your social welfare function!"), then no project can ever be wholly rejected: for there will always be a conceivable set of weights which, when applied to a given set of numbers, will render the algebraic sum positive". E.J. Mishan, "Flexibility and Consistency in Project Evaluation", *Economica*, Vol. 41, No. 161 (February 1974), pp. 81-96.

[30] Dasgupta and Pearce op. cit., pp. 91-92.

[31] See M.K. Muhtoo, "Investment Analysis Techniques with Emphasis on Cost-Benefit Analysis and Renewable Resource Planning", *World Agricultural Economics and Rural Sociological Abstracts*, Vol. 12, No. 2 (1971), pp. 1-35.

[32] For an illuminating example see, R.C. Cotter and E.Helpman "Optimal Income Taxation for Transfer Payments Under Different Social Welfare Criteria". *Quarterly Journal of Economics*, Vol. 88, No. 4 (November 1974), pp. 556-670.

[33] J.R. Hicks, "Preface — and a Manifesto", in *Readings in Welfare Economics*, K.J. Arrow and T. Scitovsky (eds.) (George Allen and Unwin, London, 1969), pp. 95-99, especially, pp. 96-97.

view is that academic economists err by leaving the design of policy too much to government; they are content to play the role of critic. Further, his prescription is for economists to take up an influencing role based on their particular knowledge and skills.[34] Nath, in keeping with Worswick, believes that as long as the economist makes explicit his value judgements and premises there is no reason for him to refrain from adding to the set of choice criteria one to which he leans. In this manner the policy analyst, quite correctly, may use this forum to promote policies that accord with his value judgements. Nath terms such a personal yardstick a comment-making social welfare function.[35]

The outcome of this ferment is that decision makers are now provided with greater and more relevant information. Nonetheless, it is recognized by the authors that the decision is still essentially political in nature, and this is where the final decision rests.[36]

4.3 Operationality

We now turn to a brief consideration of the operational nature of the proposed procedures. A common view seems to be that practical adoption is, as yet, premature. For example, after listing some alternative approaches to the specific problem of the incorporation of multiple objectives into cost-benefit analysis, a recent public investment report concludes:

> ". . . none of these innovations for project appraisals have yet been developed to a state suitable for general practical application to analytical problems".[37]

Contrary to this view, we discern several avenues by which the economist may provide empirical operationality to the learning process he initiates.

The first approach utilizes mathematical programming for the explicit incorporation of multiple objectives. Contrary to the expectation quoted above, we believe that for problems such as the public investment analysis which concerned these researchers, the linear programming method outlined by Candler and Boehlje would in fact prove operational.[38] Here the approach is to provide an interactive process with the output from the linear

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[34] G.D.N. Worswick, "Is Progress in Economic Science Possible?", *Economic Journal*, Vol. 82, No. 324 (March 1972), pp. 73-86 (especially p.86).

[35] S.K. Nath, *A Reappraisal of Welfare Economics* (Routledge and Keegan Paul, London, 1969).

[36] For those who would see our advocacy as leading to an undesirable 'politicisation' of the public service, or at least of those policy advisers employed therein, Clark's recommendation of a 'policy secretariat' might be considered "to separate this function from the "normal" professional duties of public servants". Perhaps the Labour Government has been inovatory in this role already, with its special ministerial advisory staff recruited largely from outside the public service. See, G. Clark, "The Australian Department of Foreign Affiars — What's Wrong with our Diplomats", *The Australian Quarterly*, Vol. 47, No. 2 (June 1975), pp. 21-35, especially p.34.

[37] Bureau of Agricultural Economics, *Eton Irrigation Proposal, Queensland*, Economics of Water Resource Development, No. 2, Australian Government Printing Service, Canberra, 1973.

[38] W. Candler and M. Boehlje, "Use of Linear Programming in Capital Budgeting with Multiple Goals", *American Journal of Agricultural Economics*, Vol. 53, No. 2 (May 1971), pp. 324-330.

programming analysis becoming the input into the decision makers unspecified utility function. Given this output the decision maker is asked to suggest the direction of relative changes in weights to improve the solution. By this interaction, with the decision maker acting in the role of an adaptive 'black box', an optimal solution can be searched for without ever explicitly defining the decision makers' preference function. Incommensurables are included in this format by scaling the multiple objectives in terms of one goal as numeraire. A related linear programming analysis, but dealing directly with the public sector and based on a learning process involving the decision maker is provided by Simpson and Scott.[39] These workers optimize what might best be termed a policy preference function, where political weights that can be varied are attached not to explicit goals or objectives, but to the projects themselves. What Candler and Boehjle and Simpson and Schott have in common, besides the linear programming algorithmic selection procedures is that both suggest that the best locale of active decision making is after policies are selected and a plan emerges. Essentially, their rationale hinges on the observation:

> "It is easier to choose between two alternatives than to provide a comprehensive set of decision rules for making a choice".[40]

Nevertheless both procedures employ a utility function of multiple objectives expressed as a numerical linear objective function.[41]

A further mathematical programming approach, termed goal programming, provides an alternative to the models outlined to date. Using this method it is possible to set target achievement levels on any particular goal, adopt a lexicographic social preference function by using pre-emptive priority weightings, and in general, deal more adequately with problems of incommensurability among goals or sets of goals.[42] In effect goal programming deals with the planning process by translating a set of given goals into a set of sub-goals that are more operational and controllable. Additionally, these sub-goals can usually be expressed in terms which are immediately understandable and acceptable to the decision makers, yet the process is evaluated in the light of an overall preference relation which is based on Aumann's utilities.[43]

For the general problem, optimal control theory provides another mode of analysis.[44] In our opinion, the discontinuities of functional relationships describing many of the processes

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[39] D. Simpson and S. Scott, "Efficiency in Public Spending: A New Approach", Discussion Papers in Economics, Finance and Investment, University of Stirling, Discussion Paper No. 9.

[40] Candler and Boehjle, op. cit., p.328.

[41] See K.C. Kapur, "Mathematical Methods of Optimization for Multi-objective Transportation Systems", *Socio-Economic Planning Sciences*, Vol. 4 (1970), pp. 451-467, especially p. 456-7.

[42] The recent book by S.M. Lee, *Goal Programming for Decision Analysis*, (Averbach Publishers, Philadelphia, 1972), indicates many areas in which goal programming has and can be applied.

[43] Aumann, op. cit., pp. 232-3.

[44] Rausser and Freebairn, op. cit., provide an example.

of goal achievement limit the use of this method in many real world cases.[45]

It is possible to characterise the overall interactive learning policy process as a form of open system simulation. In the main, the sub-models mentioned to date in this section are categorised as analytic models. An outright systems approach relinquishes analytic algorithms for structured search techniques. Such systems approaches have been suggested as being particularly suitable for multi-attribute decision models.[46] The argument advanced for relinquishing analytic methods and adopting simulation are outlined in the exchange debated by Candler, Cartwright and Penn, and Thompson.[47]

This brief survey would not be complete without acknowledging the promising avenue of direct multiattribute utility analysis. An interesting application of this method is provided by Keeney's decision analysis involving airport facilities for Mexico City.[48] The overall function governing project selection was comprised of arguments expressing the dimensions of cost, safety, airport capacity, noise level, social disruption and access time. Interaction with high level decision makers was employed to transform this incommensurable set of objectives into the relevant set of attribute utility functions. To provide a common expected utility score for the ranking of projects Raiffa's probabilistic method was employed. Both additive and multiplicative overall utility functions were explored.

5 Conclusions

We have advanced the plea that economic policy analysis should shed its ties to the orthodox view exemplified by a Benthamite-Fabian perspective of government as a simplistic server of the public good. To take its place, policy advisers may be better served by considering the government as a rational maximising unit with its own objectives; principally that of political survival. Accordingly, re-election pressures on this political structure do not enable the governing party to stray too far from the wishes of the mass of voters. While producer-bias no doubt exists, and results in income transfers to such groups, an excessive policy tilt towards these pressure groups may not be santioned by the electorate. If such policies result in voters' expectations of government performance not being met, the incumbent party may well lose office.

Further, we argue for incorporation of the multiplicity of decision makers' objectives into

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[45] For an advocacy of the programming method in such cases see, O. Morgenstern and G.L. Thompson, "An Open Expanding Economy Model", *Naval Research Logistics Quarterly*, Vol. 16, No. 4 (December 1969), pp. 443-457.

[46] See E. Johnsen, *Studies in Multi-Objective Decision Models*, (Student Litteratur, Lund, 1968), especially chapter 10, and G. Fromm and C. Taubman, *Policy Simulations with an Econometric Model* (The Brookings Institution, Washington D.C., 1968).

[47] See W. Candler, W. Cartwright and J.B. Penn, "The Substitution of Analytic for Simulation Algorithms: A Comment", *American Journal of Agricultural Economics*, Vol. 55, No. 2 (May 1973), pp. 235-239 and S.C. Thompson, "The Substitution of Analytic for Simultation Algorithms: A Response", *American Journal of Agricultural Economics*, Vol. 55, No. 2 (May 1973), pp. 240-241.

[48] R.L. Keeney, "A Decision Analysis With Multiple Objectives, the Mexico City Airport", *Bell Journal of Economics and Management Science*, Vol. 4, No. 1 (Spring 1973), pp. 101-117.

formal policy evaluation procedures. For years these overall views have held sway in the almost unaided decision-making process of the professional politician. Our preference then, is to advance the policy-making art by making them explicit. Only when faced with predictions of the realised outcomes of alternative weightings can they (the decision makers) reasonably make an informed choice.

To advance the state of the art in the sense of general operation and adoption, we endorse the empirical construction of a social preference function or range of functions, whose arguments reflect the full range of objectives deemed relevant by the participants in the decision-making process. Concurrently, a set of weights reflecting the intensity of preferences of those involved in policy formation would be specified. Through use of an interactive feedback, involving a re-weighting and learning process entered into with the political decision maker, the consequences of adopting alternative social preference functions and alternative weightings may be evaluated. Additionally, we have detailed methodology by which the economist can operationalize his part in the process.

We have argued that the role of the economist is not simply one of explaining the consequences of alternative policies to the decision makers, but that he may participate actively in the generation of economic policy. To accomplish this task he may derive the welfare and policy consequences of employing a social preference function to which he leans; always with the provisio that he makes his value judgements explicit.

By assisting the decision maker to consider his objectives explicitly, and, as far as practicable, by indicating via quantative measures the consequences of adopting any particular set of goals, economists can aid more effectively the now isolated political decision maker. In the interests of advancing the economist's potentially valuable role in public policy-making, we commend to you this emphatic endorsement by Dorfman:

> "If the economist could free himself of his lofty disdain for the considerations foremost in the mind of the practising government official, he might enhance the sympathetic understanding between himself and officials. With the best will in the world, there is only one way for him to do that. He must accept that a government can no more violate its political constraints than it can transgress its production possibility set, and he must build these constraints into the core of his thinking, as we have done, instead of grudgingly admitting that in the end his recommendations have to be warped in the interests of political feasibility".[49]

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[49] Dorfman. op. cit., p.283.