

**Discussion Papers No. 205, November 1997
Statistics Norway, Research Department**

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Cost-Benefit Analysis and the Democratic Ideal

Abstract:

In traditional cost-benefit analyses of public projects, every citizen's willingness to pay for a project is given an equal weight. This is sometimes taken to imply that cost-benefit analysis is a democratic method for making public decisions, as opposed to, for example, political processes involving log-rolling and lobbying from interest groups. Politicians are frequently criticized for not putting enough emphasis on the cost-benefit analyses when making decisions. In this paper we discuss the extent to which using cost-benefit analysis to rank public projects is consistent with Dahl's (1989) criteria for democratic decision-making. We find several fundamental conflicts, both when cost-benefit analysis is used to provide final answers about projects' social desirability, and when used only as informational input to a political process. Our conclusions are illustrated using data from interviews with Norwegian politicians.

Keywords: Democracy, cost-benefit analysis.

JEL classification: A13, D61, D70, H43

Acknowledgement: We are grateful to James March, William Lafferty and Kjell Arne Brekke for comments and discussion. Inger Spangen was employed at the Norwegian Institute of Transport Economics while writing this paper.

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1. Introduction

Cost-benefit analysis (CBA) is a well-known technique for evaluation of public projects or reforms. In a CBA, all costs and benefits are valued in monetary terms, and net benefits of the various policy alternatives are calculated. However, although CBA may indicate the efficiency aspect of projects, most economists would agree that it is not suitable for evaluating the political and ethical aspects. Thus, most textbooks on cost-benefit analysis emphasize that a cost-benefit analysis must be supplemented with other information before final decisions are made. Still, cost-benefit analysis seems to have a strong normative appeal to quite a number of people; and politicians and bureaucrats are much criticized, both by economists and others, for not adhering to the results of cost-benefit analysis when making decisions.

In 1981, President Reagan issued an executive order requiring all federal agencies in the United States to prepare a Regulatory Impact Analysis before undertaking any major regulatory action. This rule, which has been confirmed later by later Executive Orders from both President Reagan and President Clinton¹, has usually been interpreted as requiring that federal agencies perform cost-benefit analyses of their proposed regulatory actions. As a result, cost-benefit analysis seems to be much more frequently carried out in the USA than in Europe.² However, this does not necessarily mean that the cost-benefit analysis is taken into account when final decisions are made.

In 1995, Bob Dole and the Republican Party introduced a bill referred to as the «Comprehensive Regulatory Reform Act of 1995» in the United States' Congress (US Congress, 1997). The bill not only required that CBA should be *performed* for every major rule proposed by federal agencies, but also, in effect, that the CBA should be *decisive*. § 623 in the proposed bill is entitled «Decisional criteria», and reads as follows:

«(a) No final rule subject to this subchapter shall be promulgated unless the agency finds that (1) the potential benefits to society from the rule outweigh the potential costs of the rule to society, as determined by the analysis required by section 622(d)(2)(B); and

¹ See Hanemann (1992).

² See Navrud (1992).

(2) the rule will provide greater net benefits to society than any of the reasonable alternatives identified pursuant to section 622(c)(2)(C), including the market-based mechanisms identified pursuant to section 622(d)(2)(B).»

The bill was never approved by Congress. Nevertheless, its proposal illustrates that using CBA as a decision-making mechanism, not only as informational background, does indeed have its supporters.

A popular belief seems to be that political processes are too much influenced by lobbying, log-rolling and politicians' desire to be re-elected; while cost-benefit analysis is regarded as more objective. A basic premise of CBA is that of consumer sovereignty, i.e. that the analysis should respect individual preferences; moreover, every individuals' willingness to pay is given an equal weight in the analysis. This gives CBA a flavor of being, somehow, a fair, and perhaps even *democratic*, procedure for collective decision-making. For example, in discussing the alternatives to CBA, Hanley and Spash (1993) argue as follows:

«Not only is there potential for self-serving action here (so that bureaucrats act selfishly rather than in the public interest), but there is a danger that individuals may lose all control over the process, except in their capability to organize as a lobby group, an in the occasional, and very indirect, way of an election every four or five years. Therefore CBA might, to a degree, be considered to preserve the democratic alternative.»

However, to our knowledge, the relationship between CBA and democratic decision-making has received very little explicit attention in the literature. In this paper, thus, we will consider whether CBA can be regarded as a democratic decision-making process, by comparing the decision criteria implicit in a CBA to the criteria for democratic decision-making proposed in Robert Dahl's (1989) seminal work.

We will first discuss the case where CBA is intended as a final *decision-making* mechanism, and then turn to the case in which CBA is merely used as one piece of *informational input* into a democratic decision-making process. Our conclusions in the latter case will be illustrated by findings from interviews with Norwegian members of Parliament concerning their use of CBA in an actual decision-making process (Nyborg and Spangen, 1996; Nyborg, 1996a).

Dahl's (1989) criteria describe a democratic *ideal*, and most actual decision-making processes fail to meet some of the requirements of this ideal. Similarly, most applied cost-benefit analyses contain

crude simplifications and approximations, or methodological flaws. The scope of our paper, however, will mainly be limited to an analysis of the *democratic ideal* and the *ideal cost-benefit analysis*.

2. Cost-benefit analysis

The aim of a CBA is to measure and compare the costs and benefits of proposed policy alternatives in a systematic way. To be included in a CBA, all relevant consequences of a project must be measured in monetary units. The value of each consequence is defined by the amount of money people would have been willing to pay to achieve (or sometimes, avoid) that consequence. Projects (or reforms) are ranked according to their estimated net benefits, that is, total benefits minus total costs. If public funds are limited, making it impossible to implement all projects with positive net benefits, projects are ranked according to their cost-benefit ratios, indicating net benefits *per dollar of public funds*.³

The standard textbook argument for the use of CBA to rank projects is as follows: If total willingness to pay is greater than the project's costs, gainers can compensate losers, and there will still be a surplus - a "net social benefit" - that can be shared somehow. Thus, one does not have to worry about distributional effects when ranking projects: After projects are implemented, the net social benefit can, if desired, be distributed so as to make no one worse off than before. This argument presupposes that means of costless redistributions, independent of the projects or reforms, are available to the government. Such lump-sum transfers are rarely available in practice, however (see Hammond, 1979). It is far from clear why projects should be ranked according to the criterion of whether losers *could* be compensated, if they are actually not *going to* be compensated. In such cases, the theory of cost-benefit analysis requires that distributional concerns are introduced explicitly into the analysis, so that each individual's interests is given a weight consistent with the ethical views of the decision maker (see, for example, Dreze and Stern, 1987). In applied CBA, however, such explicit weights are rarely used. Thus, in the following, we will limit our attention on what we will call *standard cost-benefit analysis*; namely the version of CBA without explicit distributional weights.

The implicit moral philosophy of ranking projects by standard CBA, in a situation where lump-sum transfers are not available, bears quite some resemblance to classical utilitarianism, as represented by

³ Note, however, that in empirical studies the "cost-benefit ratio" is frequently defined as "benefits over costs", not "*net* benefits over *public funds*". It is not easy to see why one would want, theoretically, to rank projects in accordance with the former ratio.

Jeremy Bentham and John Stuart Mill.⁴ Bentham, however, was concerned with maximizing the sum of individual *happiness*, while modern CBA maximizes the sum of individuals' *willingness to pay*. The latter can only lead to a measure of "the greatest happiness to the greatest number of people" under fairly restrictive assumptions: One would have to assume that willingness to pay is a cardinal and interpersonally comparable measure of individual utility; that everyone has an equal marginal utility of income; and that utility can be interpreted as happiness.

None of these assumptions can be derived from standard economic theory; nor can they be tested empirically, given the current state of knowledge. Indeed, the explicit or implicit use of such assumptions have repeatedly been criticized both by economists and philosophers. Moreover, many would object to classical utilitarianism itself, claiming that not only the total, but also the distribution of happiness, or utility, is important; that rights, duties or freedom are important *per se*, or that a good life is not about the greatest amount of happiness, but also dignity, understanding, or personal or collective achievements (Sen, 1987; Sen and Williams, 1982, Hausman and McPherson, 1996). Hence, the formulation of social goals that is implicit in CBA is by no means uncontroversial.

The criticism that distributional concerns are not taken into account could, theoretically, be amended by introducing explicit welfare weights into the analysis. However, perhaps an even more important problem is that the methodology requires assuming that the decision maker, or "the social planner", is clearly defined as a *person (or organization) with an unambiguous objective function*. In practice, cost-benefit analysis is usually applied in cases where final decisions are to be reached through *collective* decision-making processes. The assumption of a well-defined social welfare function is generally quite inappropriate in such cases (Arrow, 1951): Even if all decision makers agreed that society's goals could be represented by a mathematical social welfare function, there may be no agreement whatsoever concerning what this social welfare function should look like; since decision makers may hold quite different views regarding what is good or bad for society.

The question of how well suited CBA is for situations in which society's objectives are not well-defined, however, appears to have received surprisingly little attention in the literature. Thus, our aim with this paper is *not* to discuss whether the utilitarian objective function of a standard CBA should be replaced with another objective. Rather, we will take as our starting point that there are multiple

⁴ Note that although the classical utilitarians maintained that society's goal should be the greatest happiness for the greatest number of people, they did not believe that the nation-state should impose this principle on citizens through centralized action (for example through laws).

individuals participating in the political processes, holding different normative views and different personal interests, and ask whether aggregation of preferences as this is done in a CBA can be regarded as a democratic procedure for reaching collective decisions in such a society.

Before proceeding, we find it useful to make one particular distinction. Both in welfare economics and in the theory of democracy, the notion of “interests” is often used. However, when speaking of an individual’s interests in economics, one is usually thinking of the individual’s selfish concerns, although this is rarely made explicit. In the theory of democracy, however, “interests” is sometimes understood, rather, as the individual’s conception of what is good for society. In the language of welfare economics, the former corresponds to the individual’s *utility function*, while the latter is usually formalized as *subjective social welfare functions*.

It is sometimes claimed that the theory of CBA is general enough to allow for any kind of individual motivation. Nevertheless, which notion of “interest” we use turns out to be very important in some contexts. While it is true that CBA (with some modifications) allows individual utility to depend on others’ utility, it is *not* general enough to capture situations in which individuals apply subjective social welfare functions when asked to value a social change rather than using their utility functions (Nyborg, 1996b). This would require a theory for cardinal and interpersonally comparable measurement of subjective social welfare perceptions, which is not provided by the standard theory of cost-benefit analysis. It is not obvious that such measures would be meaningful at all, let alone summing them up and interpreting the result as a measure of social benefits. Hence, unless otherwise stated, we will assume that it is monetary measures of individual utility, not subjective social welfare functions, that are aggregated in a CBA.

3. Criteria for democratic decision-making

The political ideal for the Norwegian political system, and for many others, is to be a living democracy. As for most ideals, one can hardly expect to quite live up to it in the real world. In practice, one might want to picture the ideal of democracy along several dimensions, such as the number of participants in the various decision processes, and the participants’ degree of freedom in laying down the premises for their decisions. An important aspect of democracy is further that its final decisions are binding for all members of society. This is an important rationale for the principle that everybody has a right to participate in the decision process.

In this study we have chosen to take as a starting point the criteria for democratic decision-making proposed by Robert Dahl (1989). His criteria are as follows:

3.1. Effective Participation

This means that all citizens have the same opportunity to participate in the decision process, and to express their opinion. According to Dahl (1989, p. 109);

«Throughout the process of making binding decisions, citizens ought to have an adequate opportunity, and equal opportunity, for expressing their preferences as to the final outcome. They must have adequate and equal opportunities for placing questions on the agenda and for expressing reasons for endorsing one outcome rather than another».

3.2. Voting Equality at the Decisive Stage

The second criterion is that in the final decision on an issue, each citizen has an equal vote:

«At the decisive stage of collective decisions, each citizen must be ensured an equal opportunity to express a choice that will be counted as equal in weight to the choice expressed by any other citizen. In determining outcomes at the decisive stage, these choices, and only these choices, must be taken into account» (Dahl, 1989, p. 109).

This does not necessarily mean that there must be voting equality in each stage of the decision process; but in the final stage, everyone has one vote. Hence, citizens may have unequal opportunities to promote their interests or views in preliminary phases of a case; but in the final, decisive stage, no such inequalities should ideally be allowed, and everybody has one vote, neither more nor less.

This criterion builds upon the fundamental ideal of equality in the theory of democracy, postulating that all human beings are born with the same intrinsic value. It is further assumed that each individual is himself or herself the best judge of his or her own interests.⁵ These two premises lead to the conclusion that all adults are qualified to govern themselves, and moreover, they are equally qualified to do so.

The concept of “interest” in this respect is broadly defined:

⁵ A few exceptions are usually made from this rule, namely children and mentally retarded persons.

«A person's interests may be, and usually are, broader than merely one's private or self-regarding interests» (Dahl, 1989, p. 73).

3.3. Enlightened Understanding

To make a reasonable decision, one clearly needs factual information about the issue at hand. Hence, equal access to information is important:

«Each citizen ought to have adequate and equal opportunities for discovering and validating (within the time permitted by the need for a decision) the choice on the matter to be decided that would best serve the citizen's interests» (Dahl, 1989, p. 112).

The assumption underlying this criterion is that citizens do not initially know which decision they think is best for society. Rather, this is to be clarified through the democratic process. Thus, open public debate - implying liberty of speech - and equal access to information are crucial in a democracy.

Note, once again, that citizens are assumed to discuss what is in society's interests, or all citizens' interests, not simply their own personal well-being. Each citizen's ability to judge what is good for himself, for other citizens, and for the community, is a fundamental premise of democratic theory. Furthermore, Dahl regards the community as more than simply the sum of everybody's purely selfish interests:

«Because a community is not simply an aggregate of individual persons, but consists also of the relation among them and among various subsystems, it follows that the characteristics of a community are not reducible to individual characteristics» (Dahl, 1989, p. 73).

3.4. Control of the Agenda

Finally, the citizens, or demos⁶, must control which issues should and should not be placed on the agenda of the democratic decision-making process:

⁶ The demos are the participants of the democratic process.

«The demos must have the exclusive opportunity to decide how matters are to be placed on the agenda of matters that are to be decided by means of the democratic process» (Dahl, 1989, p. 113).

If issues of vital importance to the community can be kept outside of democratic control, the decision process is not considered democratic by means of Dahl's criteria. It doesn't help if the decision process seems to be organized in a democratic way, if people are only allowed to decide on unimportant issues.

The requirement that the demos decide the agenda is not incompatible with delegation of issues, for example to underlying administrative agencies. The condition for such delegation, however, is that the delegation can be withdrawn. Thus, it is the citizens themselves who are considered to be best suited to define the limits for what they are competent to decide upon, and what should be left to experts.

4. Cost-benefit analysis as a ranking mechanism for public projects

In this section, we will analyze the case where CBA is intended as a *mechanism for making final collective decisions*. Although most economists stress that CBA should be supplemented by other information, we believe that the Republican initiative discussed in the Introduction provides ample evidence that CBA is, sometimes, regarded as a decision-making mechanism, not only as a positive piece of information. Below, we will go through Dahl's criteria for democratic decision-making one by one, and discuss the performance of CBA with respect to each of them.

4.1. Effective Participation

This is an aspect of democratic decision-making for which, in one sense, CBA performs particularly well. Although only a representative sample is usually included in willingness-to-pay-surveys, the basic intention is that the willingness to pay of *all* members of society should count equally. This feature is clearly attractive, especially when compared to some political processes in which lobbyists and politically powerful groups can have a substantial influence on final decisions, relative to groups who have no strong spokesmen. CBA does not only take into account those interests that are clearly articulated and forcefully agitated, but equally incorporates *any* individuals' willingness to pay.

However, since we must assume that CBA aggregates individuals' utilities, rather than their views about a good society, this argument assumes that the "preferences" referred to by Dahl are, also, limited to personal interests.⁷ On the other hand, if "effective participation" is interpreted as a requirement that all citizens has an equal *and adequate* opportunity to express his views about what is *best for society*, rather than simply what is best for himself, the performance of CBA as regards this criterion becomes, instead, particularly poor: Indeed, *no* citizen is given the opportunity to express his views about this. As Dahl (1989, p. 95) points out; "A's wanting to satisfy his desire for hamburger is certainly not equivalent to A's wanting the government to maximize his opportunity to eat hamburgers." In a CBA, however, one can measure an individual's willingness to pay for a hamburger; while it is hardly meaningful to measure his willingness to pay to ensure a policy maximizing his opportunity to eat hamburgers.⁸

Would it be possible to introduce a new kind of CBA, in which one did aggregate social opinions, rather than personal interests? This would require an assumption that individuals' ethical views, not only their utility functions, are exogenously fixed, not affected by the political debate. Collective choice would then be determined by the greatest willingness to pay, not by the best argument. The problem remains that CBA is a tool for aggregation, not for discussion. In the theory of democracy, on the other hand, the discussion itself is considered to be important, since ethical or political preferences are regarded as endogenous to the political process.

4.2. Voting Equality at the Decisive Stage

In standard CBA, the "vote" cast by each individual is her willingness to pay. In one sense, one might say that there is voting equality under this procedure, since each individual's willingness to pay is given an equal (implicit) weight in the aggregation.

However, there is an important sense in which voting equality does not hold for standard CBA. Under majority voting, each voter has exactly the same number of votes (under the simplest voting schemes,

⁷ Note that a utility function can be altruistic in the sense that A's utility is dependent on B's utility. Such utility functions can be aggregated in a CBA. An altruistic utility function is conceptually not the same as a subjective social welfare function, though: If an individual's views about what is good for society ranks alternatives differently than her utility function, she has two different, and conflicting, preference orderings over social states. How she ranks social states will then depend on the context. In some contexts, she might find it reasonable to take on a role as an agent for society; while at other times, she may feel that it is appropriate to look only to her own personal interests. Her personal interests, however, may be altruistic or not. See Nyborg (1996b).

⁸ See also Sagoff (1988).

one). This means that the maximum support that any one voter can give to an alternative is equal for each voter. In a CBA, in contrast, the maximum support an individual can give is bounded by his budget constraint; implying that an individual who has a lot of money has, in effect, more votes than the individual with little money. This constitutes a serious violation of the principle of voting equality.⁹

Jeremy Bentham argued for the principle of “everybody to count for one, nobody to count for more than one” (Dahl, 1989, p.86). Dahl’s interpretation of Bentham’s statement is as follows:

“We ought not to measure Jones’ happiness in shrunken units because he is an illiterate laborer and Smith’s in larger units because he is an artist of exquisitely refined tastes” (Dahl, 1989, p. 86).

The violation of voting equality, in the sense explained above, would hold even if one could find some way to aggregate social rather than personal values. In the latter case, wealthy individuals are given a greater opportunity to promote their personal interests; in the former case, these individuals’ ethical or political views are given a larger influence than poorer citizens’ opinions.

Some may object that the requirement of voting equality would be met if distributional weights were introduced in the CBA, compensating for the individual income differences. Note, however, that having an equal *influence* is not necessarily the same as having one’s *needs* taken equally into account. In a democratic procedure, citizens can choose to use their influence to ensure that individual needs are given an *unequal* weight, for example by putting larger emphasis on the needs of individuals considered to be especially badly off. Further, one could easily imagine a benevolent dictator who gives the same weight to everyone’s needs, but who is still a dictator in the sense that he himself makes all important decisions. Thus, a fair weighing of personal interests is not necessarily equivalent to a democratic procedure.

4.3. Enlightened Understanding

A narrow interpretation of this requirement is that everybody should have the same access to information. In a well conducted CBA, based on well conducted willingness to pay-studies, such a

⁹ It is sometimes argued that the choice of numeraire does not matter in CBA. This is, however, not generally true (Brekke, 1997). Even in those special cases where the choice of numeraire does not matter, CBA allocates more “votes” to those that are generally better off in the status quo.

requirements may be met, as all respondents to willingness to pay-surveys are usually faced with the same questionnaires, containing the same information. (It is, of course, still possible that some individuals have *a priori* information about the issue at hand.)

However, the criterion of enlightened understanding is based upon a line of thought which is very dissimilar from standard CBA. In a CBA, preferences are assumed to be exogenous, and the problem is to measure them accurately in a cardinal and interpersonally comparable way. Once this has been done, the socially best solution can simply be calculated. Now, information may be required for individuals to express their preferences in a way that is relevant for a CBA; they may, for example, be uncertain about the causal relationships between the proposed changes and certain variables they care about. Hence, one should ideally use individuals' *informed* preferences in a CBA (Harsanyi, 1997). Note, however, that the information a citizen needs in this context concerns solely the causal relationships between projects and this individual's own utility, since the theory of CBA is based upon aggregation of personal rather than social values. Once each individual has reported his value, there is no room for public debate in CBA as a final decision mechanism.

Hence, in a society where public decisions were made by strict use of the cost-benefit criterion, freedom of speech may be helpful for individuals trying to determine their informed rather than uninformed preferences; but would have a much less vital role than in the type of democratic processes Dahl seems to have in mind. Any ethical or political considerations are made once and for all by choice of the methodology. There is no room for a process towards a "reflective equilibrium", as discussed by Rawls (1971), in which one can test the soundness of one's own ethical principles by examining the actual consequences they have in different cases, and adjusting the principles if one finds that some of their consequences are unacceptable.

We conclude, thus, that the condition of enlightened understanding is not *violated* by CBA. However, we also find it difficult to claim that the condition is actually *satisfied*, as the language of Dahl's criterion and that of CBA seems to originate from two totally different worlds. The point is that in CBA, this criterion is largely irrelevant, since preferences are not assumed to be shaped through public discussion. This irrelevance illustrates the fundamentally different character of CBA as a decision-making mechanism compared to the processes one usually has in mind when discussing democratic procedures.

4.4. Control of the Agenda

Theories about democracy pose certain requirements on how a decision-making process is *organized*, not on which decisions should be arrived at. One interpretation of control of the agenda is that citizens should be free to emphasize not only efficiency, but also distribution, rights, and other concerns in their choice of final decision.

The fact that only individual *utilities* are aggregated in a CBA, while moral concerns and political principles are not up for discussion, might obviously be regarded as limitations of the agenda. Another limitation is that all concerns must be expressed in *monetary units*, while verbal statements or statistics in other units than money are not allowed to influence decisions.

However, one may object that if citizens decide, through a democratic process, that a certain type of decisions should be made according to the results of cost-benefit analyses, this is an instance of demos delegating their power, which is not excluded by the requirement of control of the agenda. For example, citizens may want to use CBA for decision-making regarding certain public enterprises whose main goal is precisely that of efficiency. An important requirement would then be, however, that the demos can withdraw this delegation of authority whenever they find it appropriate to do so.

4.5. Summary: CBA as a democratic decision-making mechanism

There seem to be several important conflicts between Robert Dahl's criteria for democratic decision-making processes and CBA used as a decision-making mechanism. CBA clearly does not satisfy the requirement of voting equality, since "votes" are allocated according to each individual's budget constraint, which obviously differs between individuals. Regarding Dahl's other three criteria, the performance of CBA depends to some extent of the interpretation both of CBA itself and of Dahl's requirements.

A main problem is that public discussion has no role in CBA, since personal interests are taken as the *exogenous* starting point and the *only* valid argument for or against a project. Once CBA is accepted as the decision mechanism, there is in reality no decisions left to be made by citizens and politicians. Consequently, the individuals who get the most influence are, in fact, those who design the practical tools for undertaking applied CBA. This may of course be tempting for those of us who are economists; but that does not make the procedure democratic.

5. Cost-benefit analysis as informational input to a democratic decision process

Most applied CBAs are not decisive for public choices, and they may not even be intended as final answers to projects' social desirability. Rather, they are provided as *informational input* to a political process which involves many decision makers, possibly among a large amount of other information regarding projects' consequences. It is then up to each individual decision maker to decide if she wants to put any emphasis on CBA when evaluating the desirability of proposed projects. In such cases, CBA cannot be regarded as a decision-making mechanism. However, provision of adequate information to citizens is an important requirement for democratic decision-making. In this section, thus, we will discuss *CBA as informational background to democratic decision-making processes*.

Most contemporary democracies are representative systems, in which the population elect politicians to represent them in the political bodies. In a representative democracy, hence, there are two types of political decision-makers; the people, who participate in elections and in public debates, and the politicians, who make decisions on behalf of the people. We find the discussion on CBA as informational background relevant for both these groups of political actors.

When discussing CBA as informational background, rather than as a decision-making procedure, the criteria of Voting Equality and Control of the Agenda may seem less relevant. As informational input, CBA does neither determine who has a say in the final decision, nor on the issues that can be put on the agenda. Thus, we will focus on the two remaining criteria, Enlightened Understanding and Effective Participation.

Enlightened Understanding requires that each citizen (or representative) should have "adequate and equal opportunities for discovering and validating (...) the choice on the matter to be decided that would best serve the citizens' interests" (Dahl, 1989, p. 112). Ideally, then, every citizen and politician should have access to information which enables him or her to arrive at a well-founded evaluation of the issue at hand, according to his or her own ethical or political (social) preferences.

The problem of identifying information which satisfies this latter requirement was studied in Brekke, Lurås and Nyborg (1996) and in Nyborg (1997).¹⁰ As a starting point for the discussion, consider the

¹⁰ Note, however, that in these papers, social preferences were assumed to be exogenously given; while in the theory of democracy, an important concern is that citizens' ethical and political views may change during the course of a public debate (this may, indeed, be the most important purpose of the debate).

extreme case in which CBA provides the only information available to decision makers, and in which only an aggregate indicator are reported for each alternative (net benefits, or a cost-benefit ratio, depending on whether public funds are limited or not).

In this case, all decision makers are able to evaluate alternatives according to their own ethical views if and only if 1) all decision makers agree that willingness to pay is an ordinal measure of an individual's well-being, and 2) all decision makers are socially indifferent to marginal redistributions of income between any two members of society, and 3) all decision makers agree that no other aspect of the alternatives than their effects on individual well-being is important (Nyborg, 1997).

These are strict requirements; naturally, they correspond to the implicit normative foundations of CBA, which were discussed in the Introduction. If some decision makers accept these normative premises, but others do not, citizens (and politicians) will *not* have "adequate and equal" opportunities to evaluate the social desirability of alternatives: Decision makers who do accept the normative assumptions can rank alternatives on the basis of CBA. Those who do not accept the premises, on the other hand, may not be able to use the reported cost-benefit ratios or net benefits estimates at all. It is impossible, on the basis of one number only, to calculate what the evaluation would have been like, had it been based upon a different ethical foundation. Hence, if only cost-benefit ratios or net benefits are provided, citizens' opportunity to evaluate the alternatives is neither equal nor adequate (or, it is adequate for some citizens only).

Dahl's criterion of *Effective Participation* requires that all citizens have an equal and adequate opportunity to *express reasons* for their preferences about outcomes. Even for those who accept the normative foundations of CBA, it may be very difficult to articulate any specific reasons why a particular alternative is or is not desirable, if only aggregate information has been provided. He or she would not be able to defend or attack particular features of a project: For example, when confronted with a claim that a project will have severe effect on children's' health, a cost-benefit ratio gives no indication of whether this is true or not. It is a final evaluation that has been provided, no specific *reasons* for this conclusion.

The assumptions that only aggregate indicators are reported, and that this is the only information available, are hardly plausible in most practical situations. Firstly, like a traditional impact assessment,

CBA is based on a factual description of the consequences of various alternatives.¹¹ CBA differs from the former mainly in that all consequences are valued in monetary terms, and aggregated into a single number (net benefits or cost-benefit ratio), indicating the alternative's social desirability. Usually, analysts will report both aggregate indicators and more disaggregated information. If reasonably comprehensive descriptions of the alternatives are provided, this additional information may give sufficient information for *all* citizens to make their own, well-founded evaluations.¹²

Note, however, that if the most useful information is the disaggregated part, it is not clear why one should use CBA in the first place, instead of a traditional impact assessment.¹³ The main difference between providing only a disaggregated list of consequences, or providing estimates of net benefits or cost-benefit ratios *in addition* to this list, is that in the latter alternative, an evaluation from a certain normative point of view is provided.

Is this harmful or useful, from the point of view of facilitating a democratic decision-making process? Our view is that it is not harmful *per se* - on the contrary: Freedom of speech is a fundamental part of democracy, and providing information about cost-benefit ratios or net benefits estimates can be regarded as equivalent to arguing for a specific political point of view. That citizens take part in the public debate, each from their respective political viewpoints, is essential to keep democracy vital. Hence, as long as net benefits estimates/cost-benefit ratios do not represent the only information available, these estimates can be regarded simply as political arguments, which should not be censored: Although a decision maker may not, at the outset, agree with the normative premises of CBA, he may still find it interesting to know the conclusions reached by someone who does.

However, the criterion of Enlightened Understanding may be interpreted to mean that the government has a basic responsibility to provide factual information to its citizens and their representatives in the legislative assembly. To be democratic, a decision-making process must entail some mechanism for providing the most important information to every decision maker. It is our opinion that providing

¹¹ By "impact assessment" we mean a list of important consequences, measured in monetary units where this is most natural, in physical units, or by verbal description where numerical quantification is not feasible. In an impact assessment, different units of measurement can be used for the different variables that are reported.

¹² Too much detail can also prohibit a sufficient understanding, though. See Nyborg (1997).

¹³ Moreover, disaggregated information is not always passed on to decision makers, even if they are included in the original research reports. For example, the Norwegian Directorate of Public Roads routinely calculates cost-benefit ratios for new road investment projects; but when the Ministry of Transport and Communication presents its long term plan for new road investment to the Parliament, total investment costs and the cost-benefit ratio has frequently been the only economic information provided about each project (Ministry of Transport and Communications, 1993).

estimates of cost-benefit ratios and/or net benefits is *not* part of such a fundamental responsibility. Such estimates cannot be used to arrive at one's own evaluation unless one subscribes to a very specific ethical view; further, they are difficult to use as arguments in a public debate, due to their character of final and clearly non-neutral answers, and their lack of specificity.

6. CBA as informational input: Some empirical evidence

To our knowledge, there is no widespread practice of using CBA as a final decision-making mechanism. When it comes to CBA as informational input, however, experiences are more extensive. Below, we will summarize some results from a survey we conducted among Norwegian politicians concerning their treatment of a long-term plan for national road investments (Nyborg and Spangen, 1996; Nyborg, 1996a). We believe that these results illustrate some of the arguments made above concerning CBA as informational input to a political process.

6.1. CBA more acceptable to politicians on the right

In the survey, we interviewed each of the 16 individuals who were members of the Standing Committee of Transport and Communication of the Norwegian Parliament in 1993, when the Norwegian Road and Roadtraffic Plan 1994-97 (Ministry of Transport and Communications, 1993) was treated in Parliament. The transport sector is the only public sector in Norway in which CBA has been used in a systematic fashion, and cost-benefit ratios are calculated routinely for every proposed national road investment project. During the interviews, respondents were asked to discuss the decision process concerning the Road Plan, and their use of CBA in this political treatment.

One striking result from this survey was that attitudes towards CBA varied along the traditional left-right political axis, with politicians on the left being much more sceptical than those on the right. The two representatives of the Socialist Left Party did not appear to find CBA useful at all. Several representatives of the Labour Party, as well as the Christian Democrat representative (considered to be in the centre), expressed varying degrees of uneasiness. On the other hand, the representatives from the Conservative Party and the Progress Party (right wing liberals) were typically much more positive. The most positive respondent was a Conservative, who apparently felt that if the methodology could be further improved, projects should fairly automatically be ranked according to the cost-benefit ratio.¹⁴

¹⁴ However, this person believed that road investments is a good way to subsidize rural districts, since it may have less adverse incentive effects than subsidizing local firms directly. Thus, he/she would still support *some* projects with a low cost-benefit ratio.

To us, the problem did not seem to be a lack of understanding of the CBA methodology. For example, one of the Socialist Left representatives demonstrated a very thorough understanding of the method, and expressed his/her scepticism by pointing out several trade-offs generally implied by CBA that he/she did not approve of. Note also that the Socialist Left Party was the only party to propose a reduction in total road investments, as compared to the Government's proposal, while the Conservative Party and Party of Progress wanted an increase. Hence, suggesting that leftist politicians lack concern for the scarcity of public funds can hardly explain our findings in this case.

To us, the most natural explanation, and the one that is most consistent with our data, seems to be that of ideological differences. As pointed out in the preceding sections, one requirement for CBA to rank projects in accordance with a politician's normative views is that she is *indifferent to marginal redistributions of income* between any two members of society. Leftist parties have traditionally been very concerned about distribution issues, and have tended to emphasize the interests of the poor and low-income groups. Thus, CBA can hardly be expected to be consistent with the political views of leftist parties.

Other ideological explanations are possible as well. For example, political parties may have diverging views on the relationship between the individual and the nation-state; leftists may be more inclined to think of the community's interests as something more than a sum of individual interests. Also, in any society, parts of the resource allocation is organized in markets, while other parts are not. CBA represents, in one sense, an attempt to expand the limits of the market as a resource allocation mechanism. Different attitudes to CBA may, thus, also be rooted in different attitudes to markets as a resource allocation mechanism.

Ideological differences such as these may imply that the CBA methodology is not perceived as politically neutral. If no other information were available, this would clearly violate the requirement that everyone should have an equal opportunity to evaluate the alternatives. In the case of the Norwegian Road Plan, however, the decision process was organized in a way that allowed plenty of information to be communicated. The Committee of Transport and Communications collected vast amounts of information through hearings, travels, meetings with other party members, local interests and lobbyists, formal questions to the Ministry, information about the treatment in local political bodies, and so on. In addition, there were public debates in the media concerning many of the projects. Fortunately, it did not seem to us that those who were sceptical to CBA lacked the factual information

they needed to make a judgement. However, the information they received was neither systematic nor impartial, and the effect of this is difficult to assess.

6.2. CBA as a “political actor”

Several other studies have found little correlation between a priori estimated cost-benefit ratios and actual ranking of Norwegian national road projects (see Fridstrøm and Elvik, 1997; Odeck, 1991). This has generally been regarded as a problem¹⁵. A popular explanation seems to be that politicians lack understanding of the method, or that they are mainly concerned about re-election, not social welfare.¹⁶

In our study, most respondents reported that they found cost-benefit analyses useful. At the same time, most of them did not really seem to put much emphasis on these ratios when they actually ranked projects. This seems fairly inconsistent if one regards CBA as neutral efficiency indicator, as many economists appear to do. However, if cost-benefit ratios are regarded, instead, as the reported conclusions of *one political actor*, expressing its well-founded, but subjective evaluation, the above observation is less surprising.

This view on the role of CBA in a political decision process is consistent with many observations from our study. One important finding was that those politicians who actually used the cost-benefit ratios did not seem to use them for ranking purposes. Rather, they used cost-benefit ratios as a warning signal, indicating which of the projects from the large plan they needed to take a closer look at. For example, if a proposed project with a particularly small cost-benefit ratio passed the preliminary administrative treatment, politicians may react to the low ratio by asking if the project was particularly expensive or had small measurable effects, and why it was still considered important by those who proposed it. After receiving this information, however, politicians would evaluate the project according to their own discretion, which may not coincide with the CBA evaluation.

Another indicator for projects requiring political attention, however, which seemed to figure much more prominently than cost-benefit ratios, was *indication of local conflicts*. Some politicians were convinced that local people’s opinions should, as a principle, be heard and emphasized. Politicians also seemed to regard local people as a kind of alternative expertise. In this respect, local people’s

¹⁵ See, for example, the newspaper commentaries to our original study by Hauglid (1996) and Aftenposten (1996).

¹⁶ Note, however, that if voters are concerned about social welfare, politicians seeking re-election would have to behave as if they were concerned about social welfare too; thus, we are not entirely convinced by the latter explanation.

views and the results of a CBA can be regarded as two pieces of information of a similar kind: Well-founded, but subjective opinions about the issue at hand.

7. Conclusions

In this paper, we have studied the extent to which use of cost-benefit analysis (CBA) is consistent with Robert Dahl's (1989) criteria for democratic decision-making. Our conclusion is that when used as a mechanism for reaching final collective decisions, CBA implies severe inconsistencies with Dahl's criteria. One important conflict is that in CBA, "votes" are allocated according to the individual's budget constraint, which differs between individuals; while the principle of voting equality is fundamental to democratic decision-making. Another important problem is that CBA as a decision mechanism does not allow for public debate and a resulting change of political preferences during the process, since one is simply adding up exogenously given values.

When CBA is merely used as *informational input* to a democratic decision-making process, the main problem is that the method is not politically neutral. If lump-sum transfers are not feasible, CBA cannot rank projects without relying on specific normative and controversial assumptions, such as indifference to marginal redistributions of income in society. In this case, the results of a CBA can be regarded as one political actor expressing its well-founded, but subjective opinion. When regarded this way, it is hardly surprising that politicians, like the Norwegian politicians we interviewed, say that they find cost-benefit ratios interesting, but still put a very limited emphasis on those ratios when making their actual decisions. This view can also explain our observation that politicians on the left were far more sceptical to CBA than those to the right.

This political biasedness of CBA does not necessarily represent a democratic problem, however, since politicians are free to disagree with, or overlook, political statements they do not find convincing. Rather, it represents a reason to expect that the political importance of CBA will be limited. To enable decision makers with varying political views to make well-founded judgements, it is crucial that relatively *disaggregated* information is available; while final evaluations, like those emerging from CBA, may be of less importance. One might still ask, however, whether providing CBAs is a fundamental public responsibility; and whether it is reasonable for the government to provide this kind of analyses without also providing analyses based on competing political foundations.

References

- Aftenposten (1996): Hva vi gjør med oljemilliardene, *Aftenposten*, March 2, p. 6.
- Arrow, K. J. (1951): *Social Choice and Individual Values*, Cowles Commission Monograph no.12, New York: Wiley.
- Brekke, K. A. (1997): The Numeraire Matters in Cost-Benefit Analysis, *Journal of Public Economics* **64**, 117-123.
- Brekke, K. A., H. Lurås, K. Nyborg (1996): Allowing Disagreement in Evaluations of Social Welfare, *Journal of Economics (Zeitschrift für Nationalökonomie)* **63**, 303-324.
- Dahl, R. A. (1989): *Democracy and its critics*, Yale: Yale University Press.
- Drèze, J., and N. Stern (1987): «The Theory of Cost-Benefit Analysis», in A. J. Auerbach and M. Feldstein (eds.): *Handbook of Public Economics*, Vol. II, Amsterdam: Elsevier Science Publishers (North-Holland), 909-990.
- Fridstrøm, L., and R. Elvik (1997): The Barely Revealed Preference Behind Road Investment Priorities, *Public Choice* **92**, 145-168.
- Hammond, Peter J. (1979): Straightforward Individual Incentive Compatibility in Large Economies, *Review of Economic Studies* **46**, 263-282.
- Hanemann, M. W. (1992): «Preface», in S. Navrud (ed.): *Pricing the European Environment*, Oslo: Scandinavian University Press, 9-35.
- Hanley, N., and C. L. Spash (1993): *Cost-Benefit Analysis and the Environment*, Cheltenham. Edward Elgar Publishing.
- Harsanyi, J. (1997): Utilities, Preferences, and Substantive Goods, *Social Choice and Welfare* **14**, 129-145.
- Hauglid, S. B. (1996): Veienes nytte, *Dagens Næringsliv*, April 18, p. 2.
- Hausman, D. M., and M. S. McPherson (1996): *Economic Analysis and Moral Philosophy*, Cambridge: Cambridge University Press.
- Ministry of Transport and Communication (1993): *Norsk Veg- og vegtrafikkplan 1993-97*, St.meld. nr. 34 (1992-93).
- Navrud, S. (ed.) (1992): *Pricing the European Environment*, Oslo: Scandinavian University Press.
- Nyborg, K. (1996a): Some Norwegian Politicians' Use of Cost-Benefit Analysis, Discussion Papers 169, Statistics Norway.
- Nyborg, K. (1996b): The Political Man and Contingent Valuation: Motives Do Count, Discussion Papers 180, Statistics Norway.

Nyborg, K. (1997): Project Evaluation With Multiple Decision Makers, unpublished note, Statistics Norway/Stanford University.

Nyborg, K., and I. Spangen (1996): *Politiske beslutninger om investeringer i veier. Intervjuer med medlemmene i Stortingets samferdselskomité*, TØI notat 1026/1996, Oslo: Institute of Transport Economics (in Norwegian, with English summary).

Rawls, J. (1971): *A Theory of Justice*, Oxford: Oxford University Press.

Sagoff, M. (1988): *The Economy of the Earth*, Cambridge: Cambridge University Press.

Sen, A. K. (1987): *On Ethics and Economics*, Oxford and Cambridge: Blackwell Publishers.

Sen, A. K., and B. Williams (eds.) (1982): *Utilitarianism and Beyond*, Cambridge: Cambridge University Press.

United States' Congress (1997): A Bill to Reform the Regulatory Process, and for Other Purposes, 104th Congress, 1st Session, S. 343.

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