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Abstract:
Members of the Norwegian Parliament were interviewed about the decision process concerning national road investments. Most of them found cost-benefit analysis useful, but apparently not as a device for ranking projects. Rather, the cost-benefit ratio was used to pick project proposals requiring political attention among the large number of projects included in the plan. However, information about project-related local conflicts seemed to be used much more extensively for this latter purpose. Attitudes towards cost-benefit analysis varied along the left-right political axis. These findings are shown to be consistent with a hypothesis that politicians rationally maximize subjective perceptions of social welfare.

Keywords: Road investments, cost-benefit analysis, political decision process.

JEL classification: D61, D72, D78, H54.

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1 Introduction

Cost-benefit analysis is a commonly used methodology for evaluating public investment projects. However, although analysts may take great pains to ensure the quality of their analyses, decision makers frequently seem to care little about the results.

This phenomenon may be explained in several ways. Decision makers may not understand the cost-benefit methodology properly, in which case one could possibly amend the problem by providing better explanations. Politicians may care about re-election rather than social welfare, thus not being very interested in estimates of net social benefits. Further, they may reject the ethical and political implications of traditional cost-benefit analysis, or the analyses may simply not fit into the information requirements of a public investment decision process.

Several scholars have studied the use of cost-benefit analysis in actual decision processes, using a variety of methods. Nilsson (1991), Odeck (1991) and Fridstrøm (1994) used econometric methods to identify factors which were influential on the priorities of national and/or regional road administration authorities in Sweden (Nilsson) and Norway (Odeck and Fridstrøm). Navrud (1991) and Kuik et al. (1992) provide verbal discussions of the role of cost-benefit analysis in environmental decision making in Norway and Europe, respectively. Odeck (1994) conducted a survey among Norwegian regional road planning officials, using questionnares distributed by mail, whereas Magnussen (1994) had in-person intervews with Norwegian bureaucrats working with environmental issues about their attitudes to valuation methods.

While the attitudes of planning officials and bureaucrats are clearly important, final decisions are frequently reached in a *political process*. It would therefore be interesting to get a better understanding of how cost-benefit analysis fits into such processes, as an informational basis for political decisions. Personally, however, I know of no examples of former studies where economists have approached this problem simply by asking politicians themselves.

This paper, then, reports some findings from in-person interviews with 16 Norwegian Members of Parliament (the Storting) (Nyborg and Spangen, 1996). More precisely, the group of 16 consisted of all those who were members of the Parliament's Standing Committee on Communications and Transport in the spring of 1993. Since the transport sector is the only Norwegian public sector where cost-benefit analysis has been used in a systematic manner, we chose to study the decision process concerning national road investments. The study was concerned with broad features of the political process regarding national road investments, in addition to its focus on politicians' use of cost-benefit analysis. However, only those results which are relevant to the use of cost-benefit analysis are reported in the present paper.[1]

The paper proceeds as follows: Section 2 describes the survey design, while section 3 gives an overview of the political decision process we were studying. Then, results from the interviews are presented in sections 4 through 7. In section 8, the results are analyzed, using a theoretical model. Finally, some concluding remarks are provided.

[1] Nyborg and Spangen (1996) provide a more detailed description of our data on attitudes towards cost-benefit analysis, as well as results regarding other features of this political process. Unfortunately, the report is only available in Norwegian.

2 Survey design

We interviewed all 16 individuals who were members of the the Parliament's Standing Committee on Transport and Communications (henceforth, the Committee) in 1993, when the Norwegian Road and Roadtraffic Plan 1994-97 (Samferdselsdepartementet [Ministry of Transport and Communications], 1993; henceforth, the Road Plan) was treated in Parliament. The interviews took place in spring/summer 1995, two years after the treatment of the Road Plan. Norway had general elections in the autumn of 1993, and a new Committee was appointed after this. However, in 1995, the members of this new Committee had not yet treated a Road Plan, which is why we chose to interview members of the former Committee. Some of the respondents were therefore at the time of the interviews not Members of Parliament any more, while some had become members of other Standing Committees in Parliament instead.

The interviews were in-person, and took from 90 up to about 130 minutes, with the exception of one shorter interview of 45 minutes. They were based on an interview guide which had been prepared in advance (see Appendix A). Although our study actually included 100 percent of the members of the former Committee, 16 persons would hardly be a large enough sample to draw firm econometric conclusions about larger populations, for example the population of all Norwegian politicians[2]. Our main purpose was to get a general understanding of how this decision process worked, rather than obtaining quantitative data for econometric analysis.

In accordance with this, the interview guide was quite informal. It introduced some main issues we wanted to discuss, but did not suggest specific answers, and respondents were encouraged to talk informally about the issues at hand. This allowed, for instance, that some respondents introduced new issues and points of view which were somewhat surprising to us. Further, it enabled us to get an impression of attitudes simply by observing which issues they chose to emphasize, what words and expressions they used, and so forth.

However, using an informal survey format obviously has some drawbacks as well. Some issues were only discussed by some of the respondents, and we sometimes had to skip questions due to time constraints. Drawing conclusion of the type "all agreed that..." or "a majority said that..." is thus not possible in all cases.

Further, it is well known that an interviewer bias may arise in surveys because the respondent wants to please the interviewer. With an informal interview design, such problems probably arise even easier, and it is more difficult to know afterwards if this happened. We tried to diminish the importance of such problems by not announcing our own attitudes and hypotheses, and restricting our role to that of posing questions and listening, not participating in discussions. Still, one can of course never be quite certain that one has succeeded in being as objective as possible.

In the subsequent analysis of the data, a similar, but perhaps more serious problem arise, because informal statements must be interpreted. It may be tempting to systematically interpret statements in favour of one own's *a priori* hypothesis. I have put much emphasis on trying to avoid this trap, but it is of course still possible that other researchers would interpret the data differently.[3]

[2]Nor would the sample be representative.

[3]The interviews were conducted by my co-author on the original report (Nyborg and Spangen, 1996) and myself, and we were both present at most interviews. Thus, we have at least been able to check that our understanding of respondents' statements was not very different.

To avoid obvious errors and misunderstandings, our notes from the respondent's individual interview, as well as a draft of the final report (Nyborg and Spangen, 1996) were sent to the respondents for comments. They proposed several minor corrections, which have been incorporated into the final version of the material.

3 The planning process: Norwegian national road investments

A brief description of the planning process in the Norwegian road sector may be in order. Norwegian public roads are organized at three different political levels: Municipal roads, which are financed by the 435 municipalities themselves, county level, financed by the 19 counties, and finally the national roads, which are paid for by central authorities. The Road Plan 1994-97, as proposed by the Ministry of Transport and Communications, implied investments in approximately 120 national road projects, amounting to a total investment of approximately 17 billion Nkr, or 2.6 billion USD[4]. About one third of this was intended for projects which had been included in the previous Road Plan, but had not yet been finished. For purposes of comparison, total gross investments in Norway i 1993 were about 176 billion Nkr[5].

The preparations for the Road Plan 1994-97 started about 1990, while the final proposal reached the Parliament in 1993. By then, the proposed projects had been discussed by all affected municipalities and counties, by the Directorate of Road Transportation both locally and centrally, and finally, by the Ministry of Transport and Communications. Each project had been subject to a local land use planning process, and local road planning auhorities had made impact assessments of each project, including (for most projects) a cost-benefit analysis.

This process takes such a long time, and involves so many individuals and administrative and political bodies, at all geographical levels, that when the plan is finally treated by Parliament, considerable expectations are present among those affected. The political interest in the Norwegian road plans, particularly in the sparsely populated areas of the country, has been quite formidable. Historically, funds available for national road investments have been distributed across counties in a fairly similar manner from plan to plan, and it has been politically very difficult to suggest changes in this distribution pattern.

During the planning process prior to the 1994-97 Road Plan, the Committee did a lot of travelling. They visited all counties, as well as several specific proposed project sites, and had meetings with the local population, representatives of local business interests, and other interest groups. When the Ministry of Transport and Communications published their final proposal, the Committee had about 70 hearings with local interests, environmental groups, business representatives and other lobbyists, in about two months time.

The Road Plan is discussed by the Storting (Parliament), but not formally approved by it. The Committee publishes its recommendations, however (Samferdselskomiteen, 1993), and the Government must in practice take its remarks into account. If the committee has no remarks to a project, it effectively accepts it.

Some projects are given individual treatment in Parliament, mainly projects which are

[4] 1993 prices, funding from pay toll not included.

[5] Current 1993 prices, source: Statistics Norway. Note that this figure is for 1993 only, while the previous figure regards a period of four years.

to be financed by pay toll, or especially large projects. Hence, some projects may be formally approved or disapproved by Parliament, although the Road Plan as such is not. Such cases may also imply changes in a formerly accepted Road Plan.

The Committee in 1993 had 6 members representing the Labour Party (which was also in charge of a minority Government at the time), 4 members from the Conservative Party, 2 from the Socialist Left Party, 2 from the Party of Progress (right wing liberals), one Christian Democrat, and one from the Center Party (which has traditionally been especially concerned about the rural districts' interests).

3.1 Cost-benefit analysis in the Norwegian Road Plan

Studies of the Road Plan 1990-93 (Odeck, 1991, Fridstrøm, 1994) indicate that it is very difficult to see any correlation between the *a priori* estimated cost-benefit ratios and actual priorities concerning Norwegian national roads. In the present study, we have tried to get an understanding of whether the politicians we interviewed actually used the provided cost-benefit analyses; if so, *how* they were used, and finally, what other factors were regarded as important information.

The Norwegian Directorate of Public Roads has recently published updated guidelines of cost-benefit analysis of new road investment projects (Statens Vegvesen, 1995a). However, when the Road Plan 1994-97 was published, the old guidelines (Statens Vegvesen, 1988) were still used. The central indicator emerging from the recommended procedure was a *cost-benefit ratio*, defined such that a project was termed *socially efficient* (or "socially profitable") if the cost-benefit ratio exceeded 1. The cost-benefit ratio was calculated as

$$R = \frac{(B - C)}{I}$$

where B is net present value of estimated benefits, C is net present value of the project's negative effects, and I is net present value of the investment costs[6]. The numbers in the numerator were calculated in a schematic fashion with fixed unit prices, no site-specific valuation studies being used. Among the benefit components included were saved time (with different unit values attached to business travel, travel to and from work, and other travels), consumer surplus related to new traffic (travels which would have not occured in a baseline scenario), changed frequency of accidents, and noise[7]. Other environmental issues were described verbally or in physical units in the impact assessments, but were not valued in monetary terms.

Detailed impact assessments and cost-benefit calculations are made by local officers in the Directorate of Public Roads. However, in the Road Plan itself, most projects are given a very brief description in addition to the estimated cost-benefit ratio (about 50-200 words, depending on the size of the project). The information provided here is mainly technical, such as length of planned tunnels or roads, relation to other projects, time horizon of the construction period; or expected effects on traffic, such as "reduced traffic in the town center" or "reduced congestion". Total investment costs, and required funding in the Road Plan period from Government and pay toll, respectively, are also reported.

[6] "Benefits" and "costs" are defined in accordance with Statens Vegvesen (1988), implying that C comprises elements such as for example increased vehicle operating costs, but *not* investment costs, which are counted in the denominator.

[7] In the new guidelines, unit prices of the latter two have been revised substantially upwards, and some new components, such as local air pollution, have been included.

In order to understand the respondents' attitudes to the provided cost-benfit analyses, we asked them to comment both on actual priorities they had made in the Road Plan (section 4), to discuss an example of a project which they had not encountered in Parliament (section 5), and to give a more general statement (section 6).

4 Judgement of projects in the Road Plan

4.1 Important projects

We asked the respondents to state some projects which they

- regarded as especially important
- were against
- were particularly uncertain about.

Most of our respondents could not remember any projects which were particularly important to them, or they were certain that there were none. Many referred instead to general political goals, or types of projects, such as improving the situation for the business sector, or developing the main transport corridors, or avoiding rockslides. Some of them gave us examples of such projects, but without claiming that those were more important than others.

About one third of the respondents said particular projects had been especially important to them, without referring to general priorities or principles. Some of these projects, but not all, were located in the respondent's own home county. Looking at statements from different parts of the interviews as well, we found that approximately one third of the respondents either argued generally for the interests of their own county, or mentioned a project in that county as a top priority project.

Many respondents also found it difficult to pick projects they were against. However, the project "mainland connection to Magerøya", which connects the tourist attraction of Nordkapp to the mainland by means of a tunnel, had clearly been more problematic than most. Over the time period 1994 - 1998, this project is estimated to require 455 mill. Nkr (approx. 70 mill. USD) of government funding. The cost-benefit ratio was estimated to 0.5. 11 of 16 respondents said that they were against it or were sceptical about it, and in addition 2 found it difficult to evaluate. Nevertheless, the project was finally approved. One representantive of the Labour Party told us the following story: "On an election campaign tour, a prominent Labour Party member gave a promise about this project. To be loyal, we supported it; but now I really don't understand why we did so", he/she explained. A representative of the Conservative Party told us that the project survived because "there were no better alternatives in Finnmark county".

Various reasons were given for why the representatives were in favour of or against particular projects, or why they found them difficult to evaluate. Most arguments concerned either specifically local concerns, or the importance of developing central transport corridors. 4 of the 16 persons used the cost-benefit ratio as an argument to support their views on this.

4.2 Evaluation of three projects from the Road Plan

The Road Plan 1994-97 mentions 17 new investment projects with an estimated cost-benefit ratio of below 1, amounting to total investment costs of more than 2 billion Nkr.[8] The majority of the Committe had no critical comments to any of these; the only negative remark from the Committe was a minority objection from one person, who thought that one of the projects was unnecessary. If the estimated cost-benefit ratios were actually used by the politicians, one would perhaps expect them to give some explanation of why they passed such projects in spite of their low cost-benefit ratios.

Thus, we picked three projects from the Road Plan, asking the respondents to explain their views on these cases. The first concerned the construction of a bridge and a tunnell, connecting the island of Ytre Bremanger (1800 inhabitants) to the mainland. The cost-benefit ratio of this project was roughly calculated to 0.2. The second project concerned the improvement of a trunk road in a rural area in the county of Nord-Trøndelag. In this case, the cost-benefit ratio was estimated to 0.3. Hence, none of these projects were socially efficient according to the guidelines of the Directorate of Public Roads, and they were special in the sense that the cost-benefit ratios were unusually small. In 1993, the Committee made no remarks to any of these proposals, implying, effectively, acceptance.

The third project was an improvement of a national road in an urban area, connecting the two towns of Fredrikstad and Sarpsborg. The project was aimed at reducing traffic congestion problems, as well as improving safety. This project had an estimated cost-benefit ration of 3.1, but a minority in the Committee wanted to reduce or cut the funding to this project.

Many respondents did not remember these projects, and could thus not explain their previous judgements to us. With some exceptions, however, few of those who did remember seemed concerned about the cost-benefit ratios.

Two representatives from the Conservative Party had reacted negatively to the mainland connection of Ytre Bremanger, and told us that one reason was its unusually low cost-benefit ratio. They did not seem to interpret this as a final evaluation of the project, however, but as a clear indication that they ought to take a closer look at this particular proposal. One explained that he/she was personally strongly against this project, and preferred another local project instead. Still, he/she did not want to go against it. The reason was that there was local consensus that this project ought to be given priority, and he/she wanted to respect local opinions on this. The other was doubtful about the project, but got informal signals that the Minister would put much emphasis on getting this proposal through. This person then felt that the project was not large enough to justify a political conflict. Hence, none of them took any action to stop it.

One representative of the Party of Progress told us that the high cost-benefit ratio of the Fredrikstad/Sarpsborg project was a good reason to support it, and that he/she would generally put much emphasis on the cost-benefit ratio. This person did not remember the two other projects, however, making it impossible to discover why he/she did not make a remark against those.

These three persons were the only ones who mentioned that cost-benefit ratios had had an influence on their attitudes towards these three projects. Some respondents mentioned

[8] In this figure, proposed funding for continuing projects from the 1990-93 Road Plan, which accounts for about one third of the total investments, is not included, since the cost-benefit ratio for such continuation projects is normally not reported in the Road Plan. On the other hand, funding required to continue unfinished projects from the 1994-97 Road Plan after 1997 is included.

other examples of such influence in other parts of their interviews. Thus, for 5 of the 16 persons interviewed, it appeared that cost-benefit analyses had actually had an impact on their attitudes to a specific project. This does not necessarily imply that there was no such impact on the 11 others, only that we were not able to identify such effects during the interviews.

No-one reacted negatively to the low cost-benefit ratio in the project which was part of a trunk road. There seemed to be a general agreement that cost-benefit analysis is not well suited to measure the desirablity of improving smaller parts of trunk roads, and that it was nevertheless necessary to keep a certain standard on these roads.

Four persons (Labour Party, Socialist Left Party and Christian Democrat) responded to our questions about these projects with objections to the cost-benefit methodology in general. None of them seemed worried about the low cost-benefit ratio in the first two projects.

5 An example: Mainland connection to Vassøy

A political decision may be influenced by several complicating factors, such as political negotiations, tactics etc. This may make it difficult for politicians to discuss their decisions openly afterwards. Hence, we also asked the respondents to comment on a project which they had not encountered in Parliament. The project concerned the proposed mainland connection of the island of Vassøy, close to the town of Stavanger. The project description was taken from Statens Vegvesen (1995b), where it was used as an example of how to carry out impact assessments and cost-benefit analyses. However, we rearranged the data somewhat, to reduce the amount of time required to get an overview of the project.

To begin with, respondents were provided with a very brief desciption of the project (see Appendix A, question 4). The description was about as detailed as most project descriptions in the Road Plan. Then we informed them that we had calulated the cost-benefit ratio of the project to 1.3, not including environmental costs and traffic accident costs.[9] We then asked whether this information was sufficient to evaluate the project.

10 representatives responded "no". 5 said it was not sufficient, but that they could make a preliminary evaluation on this basis. One person said "yes".

When asked what additional information they needed to evaluate this project, 13 persons told us they wanted information about the local people's views. Several wanted to know, in particular, whether there were local conflicts involved, and if so, the arguments of both sides. "Local views" can of course be interpreted in various ways. One specified that he/she wanted the opinion of his local party group, two referred to "local politicians", probably meaning the municipality or county councils, while the others seemed to think of local people more in general, without specifying what kind of information this could be.

5 persons said they wanted to go and see the project site for themselves. When asked why this would be useful, an important argument was that in addition to getting a visual impression, this was a good opportunity to see local people and get their views on the issue; "to know if the local population really wants this, or if it is actually just the mayor who

[9] In Statens Vegvesen (1995b) a preliminary version of the new guidelines were used, implying that the cost-benefit ratio was calculated as net social benefits per Nkr public funding. Hence, a project would be regarded as socially efficient if the cost-benefit ratio were above 0. We re-calculated the cost-benefit ratio complying to the old guidelines, in order to provide information on the same format as in the Road Plan 1994-97.

wants a monument", as one respondent said.

Further, 6 persons wanted more information about environmental or aesthetic effects. 6 persons wanted to know more about the project's effects on the business sector and local employment.

One person said that he/she missed information about the monetary value of accidents and environmental effects, which we had excluded from the caclulated cost-benefit ratio of 1.3.

Apart from this, the following information was mentioned by 1 respondent: More knowledge about the current ferry connection, information about the alternative of better ferry connections instead of a bridge, the professional judgements of the Directorate of Public Roads, demographic information about the inhabitants of the island, whether there was a physician on the island, and general information about the economic/cultural development on the island.

Note that we did not offer any response alternatives. Thus, if 5 persons said they wanted to go to see the site, this does not necessarily mean that the other 11 did not want this, but that they did not mention it.

5.1 A more inclusive cost-benefit ratio

By incorporating the fixed unit values (or unit costs) for traffic accidents and noise estimated by the Directorate of Public Roads, we calculated a new and more inclusive cost-benefit ratio. The respondents were informed that noise was the only environmental variable which was included, and that the fixed unit values were based on estimated willingness to pay. They were also informed that the unit cost associated with accidents was adjusted considerably upwards (in accordance with the new guidelines), as compared with the previous values used by the Directorate. The reason for this was partly that the new figures were estimated on the basis of consumers' willingness to pay for risk reductions, while the previous figures were based on estimated material damages, medical expenses and lost productivity.

Respondents were told that this new and more inclusive cost-benefit ratio was estimated to 1.17, and were asked to comment on this. We asked whether this provided sufficient information to evaluate the project. In some cases it was evident from the respondent's earlier statements that such a question was irrelevant, for example because they had said that they would always need information about local views. These respondents were asked whether they felt this new indicator provided additional information.

Only one person said that the more inclusive cost-benefit ratio was sufficient for him/her to evaluate the project. This was a person who had responded earlier that the more narrow cost-benefit ratio was not sufficient, but who apparently felt that the analysis was more acceptable when additional factors were included.

4 persons said that the cost-benefit ratio of above 1 was a preliminary indication that the project was acceptable. 3 of them would anyhow require judgements from local people. One would ideally like to have more information, but said that in practice one did frequently not have time for this.

10 respondents stated quite clearly that the extended cost-benefit ratio did not give sufficient information. Another person did not state this explicitly, but said that he/she was sceptical to the possibility of measuring the value of noise and accidents in monetary units.

Some respondents pointed out that the more inclusive ratio gave additional information

simply because it was lower than the more narrow one, implying that noise and accidents contributed negatively.

A total of 4 persons gave different responses to the questions of whether the two versions of the cost-benefit ratio gave sufficient information. One person was not satisfied with the first version, but found the second version (the more inclusive) sufficient. Three other respondents were more or less content with the first version, but found the second too speculative.

5.2 Which factors were important?

After this discussion of cost-benefit ratios as informational background for decisions, the respondents were given a list of expected consequences of the project "Mainland connection to Vassøy" (see Appendix B; a summary of the list is provided in table 1). We told them that this was a summary of the consequences listed by the Directorate of Public Roads (Statens Vegvesen, 1995b). They were asked to read through the list, and then tell us which of the listed consequences they would consider important when evaluating the project.

The responses are summarized in table 1, which also reports values attached to the various benefit components by the Directorate. Each person was allowed to choose more than one factor as "important". Some respondents empasized factors which were not mentioned in the list, or which were too general to fit into the table below. Such responses are summarized in table 2.

The tables should be interpreted with caution; it is, for example, not always entirely clear whether the respondents pointed out factors which seemed important in this particular case, or those factors they more generally regarded as important. Moreover, in retrospect we think that the provided description of operating costs may have been somewhat confusing. Note that the brief description provided in the "Description" column is only included to facilitate an overview; the list presented to respondents (Appendix B) was somewhat more detailed. If no value is reported in the table, the item was not subject to monetary valuation in the Directorate's analysis.

The value of time was considered as important by 7 respondents. In addition, 2 persons said that they would put emphasis on time savings in the business sector, but not in people's spare time. Three persons were explicit that they would not regard saved time as an important item, or they were sceptical to the entire concept of "value of time".

Nearly all respondents mentioned environmental concerns as an issue which should be considered. 8 of them said they thought this was important. One was explicit that he/she would not be concerned about this.

4 persons put much emphasis on comparing the proposed mainland connection to alternatives which were based on a continued and possibly improved ferry service, instead of a bridge. 3 persons wanted to know the judgements of the Directorate of Public Roads.

As discussed earlier, most of the politicians in our survey put a large emphasis on local views. For a few, this seemed to be decisive in some cases, particularly if the local view appeared to be unanimous. One respondent said that local conflict is a prerequisite for the case to cause any discussion in Parliament at all.

Local views seemed to be important for two reasons. First, several persons said that if there were problems related to the project that they ought to know about, this would become apparent in the local political process. The local population, or perhaps local politicians, is thus regarded as a kind of alternative expertise. Secondly, some representatives

Consequence	Value *Mill. Nkr*	Important *No. of resp.*	Description
Time use	+55	7 (9)	Reduced travelling time
Vehicle operat. costs	-22	4	Longer driving distance to Stavanger
Transport quality		5	More flexible travelling
Accident costs	-7	5	0.5 more person injury acc. pr year
Noise etc.	-1	7	10 more pers. exposed to noise 3 households must move
Recreation		5	Noise in areas of recreational use
Natural env.		2	Affects national bird reservation
Aesthetic		6	Bridge in open landscape
Agric./fishing		1	Small effects
Geological/water		2	Some private wells are closed
Local developm.	+1	5	Increases avail. housing area
Regional effects	-1	3	30 min. longer sailing time to Sandnes
New traffic	+8	2	More frequent travels to Stavanger

Table 1: Respondents' views on the importance of various consequences. Valuation (source: Statens Vegvesen 1995a. + (-) means positive (negative) consequence) and number of respondents regarding each consequence as important.

Consequence/factor	
Local opinions	14
Effects on the business sector	14
Environmental effects, general	8
Comparison with ferry based alternatives	4

Table 2: Other factors which were regarded as important. Number of respondents.

were concerned about local democracy, and felt that they were not in a position to tell local people which projects to give priority to.[10]

A large majority of our respondents regarded the interests of the business sector as important, although expressing varying degrees of concern. 9 of them said that time use in business is more important than time use in people's spare time, and some said that they did not think the latter was important at all. Some emphasized that travels to/from work and school were important.

At least half of the respondents felt that the information about business sector effects from the Directorate of Public Roads and Ministry of Transport was generally insufficient. Several of them pointed out that they frequently got a lot of information about this, but mainly from the concerned parties themseves. It seemed to us that this was an issue of main concern and probably often decisive for political priorities, but still, politicians based their judgements on this almost entirely on information from lobbyists and interested parties.

5.3 Consistency with the cost-benefit analysis?

Were the representatives' weighing of different factor consistent with the way these factors are weighed in the cost-benefit analysis? To look at this, let us for a moment disregard the fact that local views seemed to be important or even decisive in some instances, and just look at the politicians' weighing of those factors which were actually included in the impact assessment.

The time we had to our disposal did not allow us to go into a very detailed discussion of the project, and some misunderstandings or misinterpretations may therefore have occured. Respondents further differed quite a lot with respect to how detailed comments they gave on this point. Hence, the results, which are summarized in table 3, should be interpreted with some care.

One person was explicit that he/she gave weight to the various factors in accordance with their estimated values. None of the others' weighings were quite consistent with the cost-benefit analysis.

The considerably largest benefit item, according to the Directorate of Public Roads's calculations, was saved time, estimated to 55 mill. Nkr. The judgement of 9 persons who did not mention this as important, or were explicit that it was not important to them, is classified here as being "in considerable discrepancy" with the cost-benefit analysis.[11] The same is true of 3 persons who put a main emphasis on factors which were not given a monetary valuation at all, or had an estimated value of not more than 1 mill. Nkr. We did not include those who merely said that such factors were important, only those who seemed to put very much emphasis on them.[12]

The judgements of the other respondents have been classified as "in some discrepancy"

[10]This latter attitude might seem strange, since these projects are financed by the Government, not local funds. However, funding for national road investments have traditionally been shared between counties according to a more or less fixed key. If the total amount available for each county is fixed, regardless of needs or other factors, it is perhaps less unnatural to let local priorities decide the allocation of funds within each county.

[11]It is possible that some of these would have said that time use was important if asked directly. However, they were asked to point out important consequences from a list, with time use on top of the list; hence, we were fairly close to a direct question.

[12]These included one person who was mainly concerned about the possibility of constructing new housing areas close to Stavanger town, (local development, 1 mill. Nkr), one who put a main emphasis on natural environment and recreation issues (no valuation), and one who would not accept that the bridge would block the sailing passage to the nearby town Sandnes (regional effects, 1 mill. Nkr).

Consistent	1
Some inconsistence	3
Considerable inconsistence	12

Table 3: Consistency between the respondents' weighing and the valuation in the cost-benefit analysis. Number of respondents.

with the cost-benefit analysis. One of them put quite much emphasis on the possible increase in housing areas, valued to 1 mill. Nkr, but did not at all mention traffic accidents, which were valued to 7 mill. Nkr. Another was concerned about noise (1 mill. Nkr) and aesthetic issues (no valuation), but did not think traffic accidents was an important factor. Finally, one person did not mention vehicles' operating costs, which was estimated to 22 mill. Nkr, but put much emphasis on aesthetic concerns and accidents.

5.4 Would more inclusive valuation be of help?

A natural question is whether such inconsistencies would diminish if more factors were valued in monetary terms. For example, the lack of monetary valuation of aesthetic factors is probably due to lack of available empirical estimates rather than a belief that aesthetics is not important. Monetary valuation of this might therefore bring the analyses more in accordance with the views of those politicians who put an emphasis on aesthetics.

However, there was a fairly large degree of *disagreement* concerning which factors were regarded as important. For example, some respondents stated quite clearly that they did not regard time use as important, while others regarded this as the most central consequence. Some maintained that they would not bother about effects on birds or wildlife, whereas others regarded this as an essential concern. For the consequences "recreation", "aesthetics", "local development" and "new traffic", there was not even agreement on whether the project would have positive or negative effects. Some thought, for instance, that new housing areas on the island would be an advantage; others were worried that this would introduce disturbances into a currently peaceful, safe community with almost no cars. One said that "a nice bridge may be like a piece of jewellery in the landscape", while another expressed the view that "I do not think bridges are beautiful, and some look extremely bad".

Hence, it seems quite impossible to establish weights (values) which could incorporate the views of all respondents in our survey, even just approximately so. The Norwegian Directorate of Public Roads is currently introducing new guidelines of cost-benefit analysis, taking into account several factors which were not previously included. Based on our data, it seems natural to guess that some politicians will think that the new method is more in line with their own views than before, while the situation will be the opposite for others.

6 General attitudes to cost-benefit analysis

6.1 Should cost-benefit ratios be important?

In the Committee's comments to the Road Plan 1994-97 (Samferdselskomiteen, 1993, pp.33-34), one can read the following:

Response	Number	Comment
Yes	9	4 Conservatives, 2 Party of Progress, 3 Labour
No	3	2 Left Socialists, 1 Labour
Other	4	2 Labour: In doubt
		1 Christ. Dem, 1 Center Party:
		No yes/no response

Table 4: "Should the cost-benefit analysis be given a large weight?"

> The majority (all exept the Socialist Left Party) (...) wants to emphasize that although cost-benefit analysis does not by itself provide a sufficient basis to evaluate social profitability, it should be given a large weight in addition to analyses of regional and environmental effects.[13]

This quote was read to the respondents, who were then asked: "Do you think that the cost-benefit analysis ought to be given a large weight? Why/why not?"

The responses are summarized in table 4.

The only respondents who did not support this formulation in 1993 were the two representatives from the Socialist Left Party. However, a representative of the Labour Party replied "no" as well, and two additional Labour Party members were in severe doubt. They said they were not sure that they would have expressed themselves like that today, and that they were afraid that the cost-benefit analyses were used too uncritically. Two representatives from the Christian Democrats and Center Party, respectively, did not provide us with clear yes/no responses; they both felt that the cost-benefit ratio is a useful indicator, and that it should "mean something, but not everything".

6.2 Attitudes to valuation of non-market goods

Some of the listed consequences of the proposed mainland connection to Vassøy were measured in monetary units, some in physical units, and some were measured both ways. Several respondents provided general comments on this.

14 of the 16 respondents expressed scepticism, in one way or another, towards monetary valuation of non-market goods. Of these, two doubted that the prices used by the Directorate of Public Roads were correct, but did not seem to have fundamental objections to monetary valuation in general. 9 persons expressed more general objections, for example by maintaining that some goods *ought not* to be measured in monetary units, by arguing that environmental issues should rather be evaluated politically, or claiming that the valuation exercise did not seem meaningful to them.

Some were critical to valuation of one non-market component, but not another. For example, one person was negative to monetary valuation of human lives, but put large emphasis on time costs, which included time use for people outside of the labour force. Only one person was explicitly and uncritically positive to monetary valuation of environmental goods. On the other hand, this person did not find the concept of "value of time" meaningful.

[13]My translation. "Social profitability" is a direct translation of a Scandinavian term which is used quite equivalently to "efficiency" by economists. However, in public debate, the term is frequently used synonymously to "socially desirable", which might not always be the same as "efficient". The term "socially profitable" seems to imply a somewhat stronger normative hint than the term "efficient", but is at the same time more open to interpretation.

In the list of consequences, accident costs were measured both in physical units (an estimated 0.5 additional accidents with person injury each year, due to the project) and monetary units (7 mill. Nkr, net present value). We asked whether the reported monetary value was useful as additional information to the physical unit figure. 7 respondents replied "no". It seemed that many found the monetary figure difficult to interpret, while the meaning of the physical unit figure was more intuitively apparent. One said that the monetary figure was "just confusing". Another would generally not put emphasis on estimates from willingness to pay-surveys, because "the questions asked in such surveys are too hypothetical". One person felt that valuation of human lives was problematic, and thus preferred the physical figure.

3 respondents found the monetary valuation of accidents interesting. However, one of these three argued that it is important to visualize the effect accidents have on social security budgets and other public costs. This was a person who generally did not approve of monetary valuation of environmental goods, and it would perhaps be more appropriate to interpret his/her statement as expressing interest in the implied costs for public budgets, rather than a broader estimate of social welfare effects of accidents.

6.3 General opinions about the inclusiveness of the cost-benefit indicator

Discussing the Vassøy example, several respondents expressed general opinions on what they felt ought to be included in a cost-benefit analysis. 5 persons thought that as much as possible should be included. Two of them were a bit ambivalent about this, however, since they regarded monetary valuation of environmental goods as difficult and perhaps even undesirable. One of them therefore said that an alternative was to calculate a narrowly defined cost-benefit ratio, intended to only incorporate traditionally "economic" concerns, and judge the importance of other factors more intuitively. The other specified that he/she would need environmental information in physical units as well. Two of the above mentioned 5 people said that a narrowly defined indicator would be interesting in addition to the more inclusive one.

The reasons these 5 respondents gave for wanting an inclusive cost-benefit ratio were somewhat different. One said that taking as much as possible into account was required for the use of cost-benefit ratios as an objective decision criterion. Another wanted to make the environmental effects more visible.

On the other hand, 4 persons clearly expressed that they generally preferred a narrow indicator, comprising only those effects which have traditionally been regarded as "economic" (such as, for example, an indicator based on the project's expected effects on national income). One said that the more inclusive cost-benefit ratio was too "abstract and diffuse". As he/she said, "welfare and environmental issues are things I can deal with as a politician". Another felt that the analysis became less objective when for example environmental effects were included.

One person would prefer to have both a narrow and an extended version. He/she regarded the narrow version as more reliable; the extended version is interesting as well, but involves at the same time more subjective judgement. This person spoke of him/herself as generally sceptical to numbers: "You cannot derive the politically correct solution simply by calculating it".

For one person it did not matter much what was included, since he/she found the cost-

benefit ratios quite meaningless anyhow. This person said, however, that a very narrowly defined cost-benefit indicator might be useful. The rest of the respondents did not express any particular views on this issue.

Several respondents specified that they would need information in physical units, regardless of what was included in the cost-benefit ratio. Such information might for instance be the expected change in number of traffic accidents with person injuries, the percentage of wilderness area in the county which will be affected, or the change in number of persons affected by noise above some specified level.

6.4 Practical use of cost-benefit analyses

Having a political intention to put a heavy weight on cost-benefit ratios when evaluating a project is not the same as actually doing so. We have therefore tried to distinguish between generally positive attitudes to cost-benefit analysis and actual use of them, by looking at whether there were indications throughout the interviews that the analyses influenced respondents' views on particular projects. We also looked at more general comments, for example on why, or when, cost-benefit analyses may be useful.

6.4.1 The cost-benefit ratio as a "final answer"

None of the respondents in our survey appeared to use the cost-benefit ratio as a "final answer" in the sense that they automatically ranked projects in accordance with the cost-benefit ratio. Several of them pointed out that if decisions were made that way, politicians would be redundant. People expect a politician to participate more actively in the evaluation process than simply adhering to the results of a mathematical calculation.

One might also imagine that when funds had been allocated between counties, the cost-benefit ratio could be used as a criterion to allocate funds within each county. It did not appear to us that any of the respondents systematically used such methods.

Three respondents seemed to think of the cost-benefit ratios as an indicator which could *ideally* provide some kind of final evaluation. However, all of these three had some reservations:

One representative of the Conservative Party obviously put a large emphasis on the cost-benefit ratio in his/her judgements of projects, and during the interview several examples of this were mentioned. This person was concerned that not all relevant factors are presently included in the Directorate's analyses, and therefore felt that it is necessary to apply subjective judgements in addition to the analyses. He/she claimed that if more factors were included, the analysis would become more objective, and less subjective judgement would be required.

However, the same person also wanted to support some projects with a low cost-benefit ratio because he/she thought that road construction is an efficient way to subsidize rural districts. He/she argued that subsidizing firms directly could lead to negative incentive effects, inducing firms to produce inefficiently because they expect the government to help them again later, while getting a better road is a once-and-for-all investment with less such incentive effects. Thus, he/she did not systematically rank projects in accordance with the cost-benefit ratio, although putting much emphasis on it.

Another Conservative expressed the view that projects really ought to be ranked according to their cost-benefit ratios, but felt that this was difficult in practice. "One feels

symphathy towards people, even though it doesn't pay," he/she explained. Moreover, this person was very concerned about local culture and regional development, factors which are (at least partially) not included in the cost-benefit analyses. The interview with this person did not reveal any examples that his/her positive attitude towards cost-benefit analysis had influenced actual decisions.

A representative from the Party of Progress expressed a very clear opinion that projects should be ranked in accordance with the cost-benefit ratios. He said that "the Party of Progress really would have liked to only have new projects in Eastern Norway[14], but we could't do that". The party supported some projects with low cost-benefit ratios to keep rural areas populated, he/she told us. However, this person was somewhat sceptical to the quality of the analyses, and said that using cost-benefit ratios as the only informational basis for decisions was out of the question. He/she further expressed a strong preference for projects in his/her own home county[15], which indicates that other considerations than cost-benefit ratios played a role as well.

6.4.2 An indicator for cases requiring political attention

11 respondents, not including the three mentioned above, appeared to interpret the cost-benefit ratio as an indicator which could be used to sort out *projects they ought to take a closer look at.* They used phrases like, for example, "alarm signal", "rough selection" and "starting point for questions" to describe this. Such an interpretation does not necessarily imply acceptance of the normative implications of cost-benefit analysis, but is more like some kind of screening mechanism, which may be used simultaneously with other screening devices. This may be fairly similar to the way many people use newspapers' book reviews, deciding which books to read on the basis of the review, but evaluating the quality of the book, independently of the review, after reading the book oneself.

Respondents seemed to use somewhat different strategies regarding when they reacted to cost-benefit ratios by seeking more information about a project. A *special* ratio, in the sense that it was dissimilar to that of most other projects in the plan, seemed to catch the eye, while it was not necessarily essential whether it was above or below 1. "If the ratio is 0.6, the internal rate of return is still fairly good, compared to the bank interest rate", one person said (probably thinking of the relatively high real discount rate of 7 per cent currently used in the calculations). Another said that if the cost-benefit ratio is very large, for example 6 or 7, one can be fairly sure that it is a good project, since minor revisions of the analysis will then probably still leave the project with a good rating.

One person told us that he/she "felt sure about projects with a cost-benefit ratio of above 1, while other projects must be subject to a closer scrutiny". However, this person also said that if the ratio was low, he/she would not put much emphasis on its size. This may seem like as statement that the cost-benefit ratio doesn't really matter at all. A more reasonable interpretation is perhaps that he/she takes a closer look at projects with a low cost-benefit ratio, but makes his own evaluation of those projects after considering the additional information available (like in the book review example).

However, the 11 persons who seemed to think of the cost-benefit ratio as a such screening device differed quite substantially in their attitudes towards this device. For a few

[14]This part of Norway has the largest population density, and therefore also frequently larger cost-benefit ratios on projects, since the main benefit component is usually saved time.

[15]Which was not, by the way, in the Eastern part of Norway!

Use/interpretation	Number	Party
Final evaluation (some reservations)	3	2 Co., 1 PP
Screening device, positive or neutral attitude	7	2 Co., 1 PP, 3 La., 1 Ce
Screening device, negative attitude	4	3 La., 1 CD
No use	2	2 SL

Table 5: Use/interpretation of the cost-benefit ratio. Co. = Conservative Party, PP = Party of Progress, La. = Labour Party, Ce = Center Party, CD = Christian Democratic Party, SL = Socialist Left Party.

persons, this indicator had clearly initialized collection of additional information in particular cases. Others were generally positive, but we could not identify specific projects where this prompted action on their part.

Four respondents (3 Labour Party, one Christian Democrat) were obviously very sceptical to cost-benefit analysis. We find it unlikely that cost-benefit ratios played a large role, even as a screening device, for these persons. One of them said, for instance; "if my own conclusion is supported by the cost-benefit analysis, I will use that cynically. If the analysis does not support my view, it doesn't bother me much". Another said that "I have the feeling that they can get anything out of those calculations". A third was afraid that politicians are too uncritical towards cost-benefit analysis.

6.4.3 No use whatsoever

Two respondents, both representing the Socialist Left Party, did not appear to put any emphasis on cost-benefit ratios at all. One of them explained: "My weighing of interests is different from that implied by the cost-benefit analysis. I feel that I have consistency in my own evaluations. The analyses would have been more relevant to me if they were, to a larger degree, in accordance with my own judgement. But presently, they are not."

The other claimed that a cost-benefit ratio is almost meaningless to him/her, and had a strong feeling that one tries to quantify something "which cannot really be quantified". "Anything can be put into the analyses", he/she said. This person still thought that a very narrowly defined cost-benefit ratio might be interesting.

7 Political parties and cost-benefit analysis

When we had finished all interviews, our impression was that both general attitudes and practical use of cost-benefit analyses to a large extent followed the traditional left-right political axis. It is, however, not so easy to judge such a claim on objective grounds. A statement that cost-benefit analysis should be given heavy weight, for example, may be interpreted in several ways, and may also be motivated be several factors, such as political agreements and compromises. During the interviews, we had the advantage of observing the expression on respondents' faces, the tone of their voices and so on, but such keys to interpretation is of course difficult to summarize in a written article.

7.1 An index of attitudes to cost-benefit analysis

To provide a rough summary of the politicians' attitudes to cost-benefit analysis, we have constructed an index, based on several of the items which were discussed. Responses to each question used in the index were given a particular score, and each respondent's scores were added to yield a final score for each. The most negative attitude possible would result in a total score of 0, while the most positive attitudes possible would result in a score of 12. Our results are reported in table 6.

The questions used to construct the index, and the attached scores, were as follows:

1. *Does the cost-benefit ratio provide sufficient information to evaluate a project?* Those responding "yes" on question 5a or 5b (see Appendix A), got 2 points, "no" responses on both questions got 0, while a "conditional yes" on one of these questions gave a score of 1.

2. *Should the cost-benefit ratio be given a large weight?* Those who said "yes" got 2 points, "no" gave 0 points, while conditional or unclear responses gave 1 point.

3. *Respondents' use of and interpretation of the cost-benefit ratio* (table 5). The largest score possible was 4, implying that the respondent ranked projects more or less automatically in accordance with the cost-benefit ratios. (This score was not given to anyone.) A score of 3 was given to persons who indicated that they would ideally regard cost-benefit ratios as a final evaluation of projects, although they had some reservations. Those who regarded the cost-benefit ratio as an indicator of projects to look more closely at, and seemed to have a neutral or positive attitude to this indicator, got 2, while those who regarded it as an indicator but clearly were negative to it, got 1. Finally, those who found no use of the cost-benefit ratio at all got 0 points.[16]

4. *Did the interview reveal examples that the respondent's attitude towards any specific project was influenced by its cost-benefit ratio?* If the answer was clearly "yes", 2 points were given; if specific examples were mentioned, but it was not clear whether the cost-benefit ratio had actually influenced the judgement or was just used as an ex post argument, 1 point was given, and finally, if "no", 0 points were given.

5. *Did the respondent express a general attitude towards cost-benefit analysis?* 2 points if a generally positive attitude was expressed, 1 if the attitude seemed to be relatively neutral, and 0 if negative views were put forward.

The weighing implied by this procedure is, admittedly, somewhat arbitrary. However, we tried several other ways of coding the data as well, by including or omitting some of the issues, or changing weights somewhat. This implied only minor changes in the picture which emerged, however. The main conclusion which can be drawn seems to be that respondents' attitudes to cost-benefit analysis to a large extent coincide with the traditional political left-right axis, with the Socialist Left Party on the left hand side (being most negative), and the Conservatives and the Party of Progress to the right (as the most positive ones).

[16]The "double weight" given to this question may be justified by the fact that its answers are composed by using information from several parts of the interviews, see section 6.4.

0	1	2	3	4	5	6	7	8	9	10	11	12
SL		La		Ce	La	La	Co	Co	PP		Co	
SL		La					Co					
		La					La					
		CD					PP					

Table 6: An index of attitudes towards cost-benefit analysis. 0=most negative, 12=most positive.SL=Socialist Left Party, La= Labour, CD=Christian Democrat, Ce=Center, Co=Conservative, PP=Party of Progress.

7.2 Did respondents understand the methodology?

The finding that attitudes towards cost-benefit analysis varied according to political parties in our survey can be explained in several ways. Obviously, it may simply be a coincidence; although true in the Committee of Transport of the Storting in 1993, attitudes may be quite different in other samples of politicians at other times, and there may not be any similar pattern to be found in larger populations. After all, the Committe did not consist of more than 16 persons.

Secondly, scepticism towards economic analyses may be founded in a lack of understanding of the methodology involved. Although this explanation sounds a bit odd to me, one might of course believe that right-wing politicians are better informed or have a better understanding of economic analysis than those oriented more to the left.

It is difficult to find support for this latter view in our data. We did not explicitly try to discover whether respondents' understanding of the cost-benefit methodology was satisfactory, and the interviews do not provide a sufficient basis for firm claims about this. Still, after discussing project evaluation with most respondents for nearly two hours (with approximately half of the time allocated to cost-benefit analysis), we could not identify any respondents who had clearly misunderstood major features of the method.[17] A few respondents demonstrated a considerable insight, including both one of those who were most positive and one of those who did not find cost-benefit analysis useful at all.

Some respondents told us, however, that they felt the cost-benefit methodology was too complicated and difficult to understand. "It took several years before I got a proper understanding of it", one person said. We asked some of the respondents to give an interpretation of the cost-benefit ratio or the associated term "social profitability" (see footnote 13), and this question revealed some vagueness and confusion. One said, "I think of the rate of return. For most people I suppose this is associated with business, efficiency, profits". Another replied "regarding firms, I think of economic profitability, but when it comes to people, 'profitability' means well-being, travelling to work, and so on; the practical issues in everyday life are important".

Although both these statements are fairly vague, they may illustrate a confusion about the interpretation of the cost-benefit ratio. The first of the two statements seems to refer to a "narrow" version of the cost-benefit ratio, while the person expressing the second clearly has a broader interpretation in mind, including welfare effects as well as narrowly defined economic ones.

Does this reveal that the respondents had an insufficient understanding of the method-

[17]This is obviously a subjective statement, since "major" is not defined; a more critical observer might have disagreed with me on this.

ology? The answer is, in my view, not quite obvious. The cost-benefit ratio, as traditionally calculated by the Norwegian Directorate of Public Roads, lies somewhere in between the "narrow" and "broad" interpretations referred to above. I find it very difficult to give a precise verbal interpretation of this measure myself, except by providing a fairly detailed explanation of how it is calculated. It incorporates time costs in people's spare time, and for people not in the labour force, as well as a loosely calculated cost of noise, intended to reflect welfare effects; it can thus not be regarded as a measure of, for example, projects' effects on national income. On the other hand, many factors which may be important for individual well-being were not included in the calculations used in 1993, such as air pollution and other environmental effects; thus, it is not at all clear that the cost-benefit ratio can be interpreted as a comprehensive measure of social welfare.

Consequently, I have chosen not to interpret the vagueness of respondents' interpretation of the cost-benefit ratio as revealing a lack of understanding; rather, vague responses may reflect a good understanding of a vague concept, although I do not claim that this was actually the case here.

8 A theoretical discussion of the results: Are politicians rational and benevolent?

8.1 Are cost-benefit ratios useful for rational politicians?

In section 6.4.3 above, I cited one respondent explaining why he/she did not find cost-benefit analysis useful. This statement is interesting because it may give a key to explain the observed pattern in table 6. To repeat: "My weighing of interests is different from that implied by the cost-benefit analyses. I feel that I have consistency in my own evaluations. The analyses would have been more relevant to me if they were, to a larger degree, in accordance with my own judgement. But presently, they are not."

This seems to point directly to a vital issue in applied cost-benefit analysis, namely that certain normative assumptions are baked into the analysis, being so integrated in the entire framework that it is very difficult indeed to interpret the results without accepting them. Hence, the more one disagrees with the normative content of these assumptions, the less useful are the results. This can be demonstrated using a simplified model of decision makers' behaviour. The following is based on Nyborg (1995), where more details can be found.

Our set of decision makers consists of several persons (the Committee, or in some instances, the entire Parliament). Several decision mechanisms may be relevant for our respondents, depending on the context: Negotiations with people within or outside of the Committee, majority voting in the Committee, and in some cases, majority voting in Parliament. All of these clearly imply some kind of aggregation of different individuals' opinions, meaning that individual decision makers must make up their minds about the projects before a collective decision is reached.

Assume that each participant in the decision process has his/her own perception of social wefare, i.e. a social welfare function, which may differ from that of the others:

$$W^j = V^j(\omega_1^j, ..., \omega_n^j, Z) \tag{1}$$

where W^j is social welfare as judged by decision maker j, ω_i^j is person i's well-being as

judged by j (n = number of individuals in society, of whom some are also decision makers), and Z allows for inclusion of variables with intrinsic value. The latter is here taken to mean variables which are regarded as important *per se*, not only due to their possible effects on individual well-being. This may for example be the view that certain rights and duties should be respected, religious concerns, or the view that nature has an intrinsic value.

Assume that the aim of a politician j is to maximize W^j. This may be interpreted as though politicians are benevolent, in the sense that they rationally maximize what they think is best for society. The formulation (1) is, however, general enough to be interpreted as a description of politicians who put different emphasis on the interests of different people for political-strategic reasons. It also allows for policy makers who regard themselves as representatives of some subgroup of the population and therefore attach less weight to the interests of other groups in society. For example, a person who regards himself mainly as a representative of his own county may put more emphasis on the interests of people living there. This does not necessarily imply that he does not understand the interests of people elsewhere, or that he just thinks of re-election; he may simply regard looking after his own voter' interests as his role in the political game, expecting representatives from other counties to fulfill a similar role. If such interpretations are used, "a numerical representation of political aims" would perhaps be a more appropriate term than "a social welfare function".

To make sense of this, we must say something about how politicians perceive ω_i^j, the individual well-being entering into the welfare functions. Now, since we are trying to describe an applied political process, and there is no generally accepted way to measure well-being, we may simply assume that politicians make intuitive judgements about how well off they think different people are, based on information about people's income, their access to local public goods, and their characteristics:

$$\omega_i^j = \nu^j(x_i, y_i; \alpha_i) \tag{2}$$

where x_i is i's real income, and y_i is the supply of local public goods available to i[18]. Thus, for our purpose, y_i might describe roads. α_i is a vector describing i's characteristics, for instance age, sex, socioeconomic group, etc.

In the absence of costless lump-sum transfers, an applied cost-benefit analysis must explicitly or implicitly be based on a specific social welfare function. Traditional cost-benefit analysis can be interpreted as being based on a utilitarian social welfare function (assuming that as many factors as possible are included in the analysis). In addition, it is based on the assumption that willingness to pay is a cardinal and interpersonally comparable measure of individual well-being, with the marginal utility of income being equal for all individuals.

Thus, such a cost-benefit analysis will be consistent with politician j's own judgement if the following sufficient conditions are fulfilled:

$$\frac{\partial V^j}{\partial \omega_i^j}\frac{\partial \nu^j}{\partial x_i} = \frac{\partial V^j}{\partial \omega_k^j}\frac{\partial \nu^j}{\partial x_k} \text{ for all } i,k \in \{1,...,n\} \tag{3}$$

i.e. the politician attaches an equal weight to marginal income changes for all individuals, and

$$\nu^j(x_i, y_i; \alpha_i) = C^j u_i(x_i, y_i) \tag{4}$$

[18]For a discussion of this approach of subjective judgements of individual well-being, see Brekke et el. (1994).

where C^j is a positive constant[19], and $u_i(x_i, y_i)$ is a numerical representation of i's revealed (or stated) choices, expressed by i's willingness to pay to ensure the project. (3) and (4) imply that the decision maker accepts willingness to pay as a cardinal, interpersonally comparable measure of individual well-being, and that social welfare can be calulated simply as a sum of these. Further, to have consistency between the politician's priorities and the cost-benefit analysis, we must have

$$\frac{\partial V^j}{\partial Z}\triangle Z = 0 \tag{5}$$

which means that the decision maker is not concerned about changes in intrinsic variables due to the project.

One can think of many common political views which fit quite badly into this. Putting larger emphasis on income effects for groups with lower incomes in the status quo is, for example, inconsistent with (3) - (5). Regarding road construction, there seemed to be a consensus among the respondents in our survey that one must put larger emphasis on the interests of people in rural than urban districts; otherwise the allocation of investments would be unfair.[20] This view is inconsistent with the conditions above, however. The same is true for the view that nature has an intrinsic value, or that loss of well-being resulting from self-induced events (such as smoking) should count less than losses which the individual had no opportunity to avoid (such as children being exposed to air pollution from a new road).

A politician who believes that his view of social welfare (or alternatively, political goals) is such that (3) - (5) are fulfilled, can generally use the conclusion of a cost-benefit analysis in his evaluation of projects. But what about those who do not trust this? Even if the cost-benefit analysis were conducted in the best possible way, a cost-benefit ratio is not more than one number. This is insufficient information to deduce an evaluation or ranking in accordance with another welfare function.

If the politician had no other information, it may still be rational to use the cost-benefit ratios; after all, an evaluation which is not quite in accordance with one's own may still be better than a total arbitrariness. But in practice, the politicians frequently have easy access to alternative information; for example, from lobbyists. If this information, although it may be biased, enables the politician to estimate the project's contribution to social welfare according to his/her own views, in may well be rational to overlook the cost-benefit ratios altogether, and base the judgement on the alternative information instead.[21]

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[19]If only a ranking of projects is required rather than a cardinal measure of projects' effects on social welfare, condition (4) can be rewritten as

$$v^j(x_i, y; \alpha_i) = \Psi^j(u_i(x_i(b), y(b)))$$

where Ψ^j is a monotonously increasing function.

[20]Since y_i is a local public good, putting equal weight on each person's willingness to pay implies that each person living in a densely populated area should (ceteris paribus) have access to more local public goods than a person living in a sparsely populated area.

[21]Nyborg (1995) discusses what kind of information decision makers will generally need to evaluate projects in accordance with their own perceptions of social welfare.

8.2 Political parties and the normative contents of the analysis

The reasoning above demonstrates that it may be rational for politicians to overlook cost-benefit ratios or net benefit estimates, and that this depends on the political/ethical views of the politician. This could explain the pattern which emerged in table 6. For this to be the case, however, we must argue that left-wing politicians have political views which are less in accordance with the implicit assumptions of cost-benefit analysis than those politically more to the right.

In our survey, all respondents seemed to argee that the interests of rural areas should count more than is implicitly done in the cost-benefit analysis. Many of them, including persons who were generally in favour of the cost-benefit method, used this as an argument to support some projects with low cost-benefit ratios. However, due to the local public good character of roads, the geographical aspect is in a somewhat special position.

More generally, condition 3 above is consistent with a view that the distribution of well-being in society is optimal. It should not be too controversial to say that socialists, and to some extent social democrats, tend to find this distribution unjust. It therefore seems reasonable to believe that left-wing politicians would find that their own evaluation of projects are not in accordance with the cost-benefit analysis more frequently than right-wing politicians. Moreover, the Norwegian Socialist Left Party has for a long time been very concerned about environmental issues, and it is possible that this concern should be regarded as an intrinsic value variable in this respect (conflicting with condition 5). It also seems fairly reasonable to believe that the Christian Democratic Party, which is specifically concerned about Christian values, would care about intrinsic value variables, such as rights and duties.[22] Thus, the fact that attitudes towards cost-benefit analysis to a large extent followed the left-right political axis in our survey, seems to be consistent with the hypothesis that politicians use the information provided in a rational way, pursuing their subjective perceptions of social welfare, or alternatively, their political goals. Note that this consistency holds even under the hypothesis that politicians are purely benevolent in the sense that they maximize subjective perceptions of social welfare. The observation that some politicians do not care about cost-benefit analysis is thus not sufficient evidence to support a claim that these politicians do not behave in a rational and benevolent manner.

8.3 Indicators for projects needing political attention

In our survey, a cost-benefit ratio did obviously not provide sufficient information for most respondents to evaluate a project. Several said, however, that the cost-benefit ratio was sufficient to make a *preliminary* evaluation. None of our respondents seemed to regard cost-benefit ratios as final answers to the question of which projects ought to have priority. The problem did not seem to be that the methodology was not sophisticated enough; apparently, most of them wanted to make their own judgement instead of relying on someone else's.

However, 14 out of 16 respondents still said that they found the provided cost-benefit ratios useful. So what did they use it for? As already noted, our impression was that the main use of cost-benefit ratios was as an indicator of *which projects they ought to collect more information about*, as explained in section 6.4.2. The Road Plan contains a large number of projects, thus politicians have to trust the Directorate of Public Roads and

[22]Both the Center Party and the Christian Democratic Party are usually spoken of as "in the centre" politically.

Ministry's judgement to some extent. Consequently, they need a device to pick the cases in which they think additional political judgement and discussion is needed.

However, the cost-benefit ratio was not the only indicator used for determining projects receiving political attention, nor did it seem to be the most important one. *Indications of conflict* seemed to figure much more prominently. All respondents in our survey expressed some concern about local views. Some refused to evaluate a project without being informed about this. Several wanted to know if there were local conflicts involved, in which case they wished to hear the arguments of both parties. It is not always easy to tell how one could measure whether there are local conflicts, but several indications were suggested by respondents themselves: Observations that resolutions from local political bodies (municipal or county councils) were not unanimous, disagreement appearing at meetings with local people during the Committee's study tours to each council, or the appearance of lobbyists in Parliament.

As explained above, the cost-benefit ratio, as it has traditionally been calculated by the Norwegian Directorate of Public Roads, is hard to interpret accurately. Nevertheless, a cost-benefit ratio can probably be used as a rough indicator of whether the invested money will have any effects at all, and also some kind of rough indication of the magnitude of those effects relatively to the invested amount of money. If someone suggests to invest in a project which will benefit no one, but also harm no one except through their tax payments, there will not necessarily be any local conflicts about the issue. But the cost-benefit ratio will presumably be low, signalling that although there does not seem to be any conflicts, the project may be a waste of money. Similarly, a very high cost-benefit ratio may be a signal that this project actually has a significant effect for many people.

On the other hand, cost-benefit ratios do not provide any information about conflicts of interest, an issue which is really at the heart of politics. Nor does it tell if there are other important political issues at stake than pure distributional effects, for example that the project threaten someone's perceived property right, or that it implies unpermissible (to some) encroachment on the natural environment. Information about local conflicts may be a fairly good indicator of such factors, although it requires that the local democracy (or at least, the public debate) is working, in the sense that people who are against a proposed projects are actually taken notice of.

Hence, if both cost-benefit ratios *and* indications of local conflicts are used as signals of projects needing extra attention, one may be able to pick fairly well both projects which hardly benefit anyone or are relatively expensive, projects which have large effects with relatively small investment costs, projects which are associated with conflicting interests, and projects which are politically controversial for other reasons. When additional information has been gathered, however, there is no particular reason to believe that politicians' final evaluations will be in accordance with the results from the cost-benefit analysis.

9 Concluding remarks

Many of the politicians we interviewed used the provided cost-benefit ratios provided in the Road Plan, but most of them did not use them as a device to rank projects. Rather, they were used as indicators helping to identify those projects in a large plan which could not be accepted without further questions. Another indicator of the same which seemed to be used much more extensively, however, was indications of local conflicts. These two

indicators could possible work out well as complementaries, since the former may warn decision makers about projects which have small effects compared to the amount of money invested, while the latter is better suited to pick up conflict of interest and other politically important features.

Most guidelines on applied cost-benefit analysis are designed in accordance with the purpose of ranking projects. If the cost-benefit ratio is actually used for another, somewhat different purpose, it might be worth considering whether this ought to have consequences for the way it is calculated.

An important finding in our survey was that politicians' attitudes towards cost-benefit analysis varied across political parties, with representatives of the parties to the left being most sceptical, while politicians more to the right were more positive. This may be quite consistent with an hypothesis that the politicians in our survey rationally maximize their own perception of social welfare, as was shown in section 8.1.

A final remark may be in order. In our data, there was some evidence that the total amount of money allocated to construction of national roads had been quite generous, as compared to other parts of the Norwegian Government budget. It seemed to us that the respondents thought of their role more as that of choosing whom to say "yes" to than that of saying "no". For example, when asked which projects they were against, several respondents could not remember any. We also asked what kinds of projects were finally put up against each other, for example whether a project in county A may be chosed instead of a project in county B, or if such final choices were restricted to ranking of projects within each county. Many respondents reacted to this question by looking a bit puzzled, as though the thought of having to put two projects up against each other was quite unfamiliar. Further, some maintained that if county councils were given the authority to allocate road investment funds themselves, they would have chosen to have less road investments, using some of the money for hospitals and schools instead; which might of course indicate that funds are regarded as more sparse in those sectors.

If it is true that the budget restriction did not bind too tightly, this may have contributed to a political situation where efficiency was less important. Thus, it would have been interesting to see whether politicians in a different budgetary situation have other attitudes than the ones we observed.

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Appendix A:

Interview guide

1. The Road Plan process

To get a better understanding of your judgements about the Road Plan as a member of the former Standing Committee of Transport and Communications, we need some information about how this plan was treated by the Committee; such as, for example, what kind of issues the Committee made decisions about, and what these decision were based on. Can you tell us, briefly, how the Committee treated the Road Plan 1994-97?

a) Were the contents of the Road Plan discussed before the Ministry's proposal was put forward?

b) Did you, and/or other members of the Committee, have any contact with the Minister/the Ministry of Transport and Communications during the treatment of the plan?

c) Which organizations, politicians from local counties, and political party groups were you in contact with, and what influence did this contact have on your judgements?

d) What was the Committee most concerned about in its treatment of the plan?

e) What did members of the Committee disagree about? Was disagreement expressed to a larger extent in plenary debates in Parliament than in the Committee, or did the same views emerge at both occasions?

f) Was the Road Plan judged in connection with other plans, for example the Railway Plan?

2. Judgement of some main issues in the Road Plan

We would like to know your judgement of the following issues in the Road Plan:

a) The size of the total budget

b) The distribution of funds between counties

c) The amount of projects which start this plan period, but must be finished in the next (implying economic restrictions on future Road Plans)

d) The amount of projects which were started or decided upon in the previous Plan period

e) The distribution of funds between trunk road investments, other national road investments, public transport infrastructure, pedestrian and bicycle roads, and environment and safety measures

f) The distribution of funds between investments and maintenance

g) The technical norm for road standards

3. Evaluation of projects

We have a list here of all projects included in the Road Plan 1994-97.

a) Were any of these projects particularly important for you to accomplish? If so, why?

b) Were you against any of these projects in particular?

c) Did you find any of these projects particularly difficult to evaluate? If so, why?

d) Did you put little emphasis on any of these projects because they were simple to evaluate or because they were or little importance to you?

e) Do you think the Ministry of Transportation or the Road Directorate could be allowed to make decisions on any of these projects?

f) Do you think it is important that Parliament makes decisions on any of these projects?

4. Cost-benefit analysis and priorities

a) The project "Mainland Connection to Ytre Bremanger" (Sogn and Fjordane county) had a cost-benefit ratio of only approximately 0.2. The Committee had no comments to this project. Can you describe why you thought this project should be carried through?

b) The Committee had no comments to the project "E6 Mediå-Okshammeren" in Nord-Trøndelag county. Which were the reasons to give this project priority, in spite of a cost-benefit ratio of only 0.3?

c) The project «Rv 109 Freskovegen-Råbekken» (Østfold county) had a cost-benefit ratio of 3.1. The Committee Members from the Center Party and the Socialist Left Party wanted to withdraw, resp. reduce, the funding for this project. What was your judgement of this project?

5. Example: Mainland Connection to Vassøy

We will now present a hypothetical road investment project, «Mainland Connection to Vassøy», to get your evaluation of various aspects of this project.

Langøy and Vassøy are two islands within the municipality of Stavanger, which are located close to the town center, about 4 km away. Vassøy is the only island with a population of some size, 500 inhabitants, which is not connented to the mainland. Transportation betweeen the islands and the center of Stavanger is currently operated by an express boat and a ferry, departing once every hour, and twice every hour during rush hours. In order to reduce costs, frequencies will probably be reduced to approximately half of the current level outside of rush hous.

A mainland connection will make the town center more accessible to inhabitants on the islands. brdge connection will cost 60 mill. Nkr (present value). Saved ferry operating costs will amount to a total of 33 mill. Nkr .

Based on data from the Road Directorate, we have calculated the cost-benefit ratio of this project to 1.3. Hence, it is defined as being «socially profitable». Accident costs and environmental costs are not included in this figure.

a) Does the cost-benefit ratio provide sufficient information for you to decide on this project?

b) If no, what other information would you need to be able to evaluate this project?

The Road Directorate is currently developing a new method to calculate the cost-benefit ratio. In the proposed new guidelines, costs of traffic accidents are based on people's willingness to pay to reduce risk exposure, and this has lead to a considerable upwards adjustment of the accident costs. The Road Directorate has also estimated some environmental unit costs based on willingness to pay-surveys.

If accident costs and costs of noise (according to the Road Directorate's new guidelines) are included, the cost-benefit ratio for the Vassøy project becomes 1.17.

c) Does this new cost-benefit ratio give you sufficient information to make up your mind about this project?

We have made a summary of the consequences of the project, according to the Road Directorate's impact assessment. Please read through this list of consequences (Appendix B).

d) Which of these consequences would you put most emphasis on in your evaluation of this project?

e) Are there issues you are concerned about which are not included in this list?

f) Do you think that one should try to valuate more of the consequences in monetary terms, or are there consequences which are valued in this example which you think should not be measured in monetary units?

6. General views on cost-benefit analyses

In the Commitee's recommendations to the Norwegian Road Plan 1994-97 (pp.33-34) the following statement can be found:

"The majority [all except the Socialist Left Party] shares the view that cost-benefit nalysis is an important part of the social-economic analysis. The majority wants to emphasize that although cost-benefit analysis on its own does not provide a sufficient basis to evaluate social profitability, it should be given heavy weight in addition to analyses of regional and environmental effects.»

- *Should* cost-benefit analysis, according to your point of view, be given a heavy weight? Why/why not?

7. General, project evaluation

a) Which projects were put up against each other in the treatment of the Road Plan?

b) Were other circumstances, such as «unanimity in the county council», «equal road standards in all parts of the country», or «the profile of the political party» sometimes important for your view on road investment projects?

c) Did you sometimes feel that «most of it was, in reality, decided in advance», or did you feel that the Committee had good opportunities to direct road investment policy?

d) Do you have suggestions of changes in the exposition of the Road Plan, or the way it is treated, which could lead to a better political control with the road policy?

e) Are there important issues regarding the Committee's treatment of the road policy which we have not mentioned so far, and which you would like to comment on?

Appendix B:

Consequences of a mainland connection to Vassøy

	Consequences of a bridge connection to Vassøy
Time costs	Reduced total travelling time. Bus passengers: 1 hour's frequency, ½ hour's frequency during rush hours. *Saved time costs: 55 mill. Nkr.*
Vehicles' operating costs	Longer driving distance between Vassøy and Stavanger. *Increased operating costs: 22 mill. Nkr.*
Transport quality	New boat equipment in about 5 years' time will give small risks of operating breaks. A bridge will imply that more transport methods become feasible (bus, car, bicycle). *Small positive consequence (+)*
Accident costs	More traffic in a currently almost car-free environment. 0.5 more person injuries per year. *Increased costs: 7 mill. Nkr.*
Local environment	10 more persons bothered by noise. 3 households must move. Considerable decrease in local recreational areas. *Increased costs (noise): 1 mill. kr Medium negative consequence (- -)*
Recreation	Regional recreational area used for day trips by private boats from Stavanger town. The island will be more exposed to noise, which will reduse its use value. *Small negative consequence (-)*
Natural environment	Some reduction in bird population on Hestholmen, a national bird reservation. *Medium negative consequence (- -)*
Aesthetics (landscape)	The Langøy area's flat and open landscape will be changed with a new, dominating element (bridge). *Medium negative consequence (- -)*
Agriculture and fishery	High quality agricultural soil, incorporated into the green structure of town, will not be affected. *No consequence (0)*
Georesources and water	Private wells for 5 households will must be substituted by connection to the municipal water supply. *No consequence (0)*
Local development pattern	The municipality of Stavanger has a limited access to housing areas close to its center which are not in conflict with agriculture and parks. The bridge will provide a basis for 300 new housing units, and more effective public services. *Saved costs: 1 mill. Nkr. Small positive consequence (+)*
Regional effects	Extra sailing time of 30 minutes to Sandnes. *Increased costs: 1 mill. Nkr. No consequence (0)*
Benefits from new traffic	The mainland connection will lead to more frequent car travels. For instance, it becomes easier to get to the municipal center and the local center. *Saved costs: 8 mill. Nkr.*
Project costs	The municipality must invest in new ferry equipment within 5 year. Costs of the bridge alternative: • Investments in road/bridge: 60 mill. Nkr. • Operation/maintenance of road/bridge: 2 mill. Nkr. • Operation of bus, county budget, 10 mill. Nkr. • Pay toll funding: 30 mill. Nkr. *Investments: 60 mill. Nkr.* *Saved operating costs: 33 mill.Nkr.*

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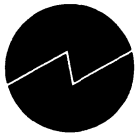

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