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The importance of value for money when choosing a road route in the municipal sub-plan process

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Betydningen av lønnsomhet ved valg av vegtråse i kommunedelplanprosessen

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English summary

The use of cost-benefit analyses has a long tradition in the road sector. In Norway, all road projects of a certain size must undergo an economic analysis at least once in the planning process. However, previous studies show no or little association between profitability and project prioritization in the National Transport Plan.

In contrast to analyses of projects in the National Transport Plan, we investigate the relationship between profitability and investment recommendation in prioritizing different road alignments within the same project. This process is scheduled at an earlier stage than the project’s cost-benefit analyses in the National Transport. Few earlier studies have looked into this topic earlier.

The choice of road alignment is usually decided in local government sector plans based on an impact assessment. The impact assessment includes a cost-benefit analysis of both the monetized and non-monetized effects of alternative road routes. The analysis clarifies the costs and benefits of the various road alternatives and evaluates the various solutions against each other. The Norwegian Public Roads Administration (Statens vegvesen) is responsible for preparing the assessment. The final report will include a recommendation of which route the Roads Administration believes should be implemented. However, it is the affected municipalities that have the decision-making authority to adopt the plans.

Our study’s point of departure is a dataset consisting of 97 Norwegian road projects with 684 different road alignments. The dataset’s information is collected through reports addressing each project impact assessment. Our main goal was to examine if monetized and non-monetized effects are emphasized in the Norwegian Public Roads Administration’s route recommendation. We also examine if the different monetized and non-monetized effects are prioritized differently, e.g., if NOK 1 in road user utility affects the recommendation equal to NOK 1 of another type of utility. Furthermore, we investigate whether the municipal decision complies with the Roads Administration’s recommendation in a sample of 46 projects and what may explain potential differences in prioritization.

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Key figures from the impact assessment

Monetized effects are always evaluated relative to a scenario where no new significant investments are made. This scenario might cause some investments, for example, by necessary maintenance or upgrading of an existing road. The net benefits for all alternatives are calculated relative to this scenario, where monetized effects always are normalized to zero for this reference scenario. Net benefit, net benefit–investment cost ratio, and the road alignment’s ranking according to non-monetized effects are the three key variables from the cost-benefit analysis. The first two provide two different ways to make an overall assessment of the monetized effects:

- The net benefit is the difference between the estimated monetized benefits and the investment costs of an alternative
- Net benefit–investment cost ratio is a relative measure of profitability and describes how much benefit you get for monetized unit invested.

The ranking of alternatives according to non-monetized effects is made after an overall assessment of non-monetized effects.

The Norwegian Public Roads Administration emphasizes the results of the impact assessment in its recommendation

We find that net benefit is important when it comes to prioritizing between alternative roads within the same project:

- If the net benefit increases by NOK 1 billion, all other things being equal, the probability that an alternative is recommended will increase by approximately 16 percent.

The same is the case for the alternative’s ranking according to non-monetized effects and net benefit–investment cost ratio:

- If an alternative is ranked one unit higher according to non-monetized effects, the probability for recommendation increases by approximately 20 percent.
- Suppose the net benefit–investment cost ratio is doubled, which indicates that the alternative’s benefit is doubled compared to the cost.
In that case, the road alternative has a 145 times higher probability of being recommended.

However, the significance of the latter two findings depends on us taking into account that the reference scenario (for example, necessary maintenance of existing road), i.e., the scenario with net benefit equals zero, (almost) never is recommended. This is probably due to that it is not looked upon as a real alternative in the process. For many projects, all the studied alternatives have negative monetized and non-monetized effects, often causing the reference scenario to be the most profitable alternative.

In short, our results show that the Roads Administration (Statens vegvesen) emphasizes both net benefit, net benefit-investment cost ratio, and the alternative’s ranking according to non-monetized effects. This result contrasts studies evaluating profitability and prioritization between different road projects, where no such associations are found.

The different monetized effects are emphasized equally

Furthermore, we have investigated whether the Roads Administration assesses various monetized effects differently. We do not find evidence for this.

The different non-monetized effects are emphasized differently

Regarding different non-monetized effects, we find that the ranking according to the local environment and outdoor life, as well as ranking regarding natural resources, affects prioritization. Ranking according to other non-monetized effects are not associated with prioritization.

A robustness check of the estimated effects gives qualitatively the same results

The proven relationships described above are analyzed using a logistical choice model. We have investigated these associations in a linear probability model with fixed road project effects as a robustness check. Qualitatively, we find precisely the same effects as we did when analyzing the associations with a logistic choice model.

Does the Roads Administration’s recommendation correspond with the municipal decision?
Finally, we examine the correspondence between the Roads Administration’s recommendation and the political decision in the local governments. Several reasons mean that it is not unreasonable to assume a large degree of agreement between municipal decisions and the Norwegian Public Roads Administration’s recommendation:

- The Roads Administration knows that the council in the local governments usually have the final decision. This might provide incentives to recommend an alternative they know that the local government might accept.

- The Norwegian Public Roads Administration may object to specific alternatives, for example, if the cost is unreasonably high. This can limit how the municipality perceives the real number of alternatives and provide incentives to adopt the Roads Administration’s recommendation. In our data set, we have registered objections for 138 of the 684 possible alternatives.

Among the 46 municipal decisions we have obtained information about, 14 decisions differ from the recommendation. By evaluating the probability for recommendation and local government council decision for these 46 projects, respectively, we find that:

- Local politicians also value profitability, but the association is somewhat weaker than that for the Roads Administration’s recommendation.

- According to what we find for the Roads Administration’s recommendation, ranking according to non-monetized effects seems somewhat more important for the local councils.

Furthermore, we have investigated if the discrepancy between the local authorities and the Roads Administration can be explained. The findings are the following:

- The proportion of politicians on the socialist side and the proportion of women in the municipal council do not seem to affect whether the political decision is in accordance with the Roads Administration’s recommendation.
The local council’s decision seems to be less in accordance with the Roads Administration’s recommendation when the project involves several municipalities and when political fragmentation is high. However, since we only have 46 observations, the estimated correlations are too imprecisely estimated for these correlations to be statistically significant.

The degree of agreement and what can explain differences between the Roads Administration’s proposed road alignment and local government preference are interesting issues that may be the subject of further research.
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Forskningsprogrammet Concept skal utvikle kunnskap som sikrer bedre ressursutnytting og effekt av store, statlige investeringer. Programmet driver følgeforskning knyttet til de største statlige investeringsprosjektene over en rekke år. En skal trekke erfaringer fra disse som kan bedre utformingen og kvalitetssikringen av nye investeringsprosjekter før de settes i gang.

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The Concept research program aims to develop know-how to help make more efficient use of resources and improve the effect of major public investments. The Program is designed to follow up on the largest public projects over a period of several years, and help improve design and quality assurance of future public projects before they are formally approved.

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