



# Transportation policy and road investments



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## ABSTRACT

This paper analyses which factors can explain the planned funding for 83 different stretches of roads in the Norwegian national road network during the ten-year period from 2010 to 2019. Previous studies have focused on the extent to which Norwegian politicians use the results of cost-benefit analyses when they prioritise various road projects. In contrast, we analyse how road characteristics, prior to the planning period (2009 and earlier), influence the amount of money to be spent on the roads. Broadly speaking, the multiple regression analysis shows that the technical characteristics of the roads and their environmental impacts do not have a substantial influence on the funding decisions. The most prominent explanatory factors seem to be the total traffic on the roads under consideration. Thus, our analysis does not support critics of the allocation of funding to Norwegian roads who claim that regional policy considerations largely decide the allocation of road funding. The opponents' critics, however, gain support from the fact that, due to frequent start-ups and stops in Norwegian road building, no economies of scale seem to exist. Another result worth noting is that roads located in constituencies that, relative to the number of inhabitants, are overrepresented in the Norwegian Parliament receive more funding. This does not necessarily mean that politicians are particularly concerned about the people in these constituencies but rather that they perceive high political returns for investing in these constituencies.

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## 1. Introduction

How can the allocation of public funding to different stretches of roads be explained? Or, indeed, why do some infrastructure projects receive more funding than others? Several studies have sought to answer such questions, including the seminal work by (McFadden, 1976) and more recent ones by Mackay (2001), Lambrinidis et al. (2005) and Kemmerling and Stephan (2008). Focusing on the regional allocation of infrastructure investments, these studies have shown that population and population density, efficiency and redistribution criteria, a replication of previous investment decisions because of bureaucratic inertia, and the expected political return of the investments all play significant roles in the allocation of infrastructure investments. Nevertheless, the literature on the allocation of public investments is still considered limited (Kemmerling and Stephan, 2008; Tsekeris, 2011).

In Norway, econometric analyses of the factors influencing investments in transportation infrastructure have focused on the influence of cost-benefit analyses (CBAs), which is a seemingly reasonable approach given that appraisal by means of a CBA is a common method for evaluating public investment projects (Nyborg, 1998). However, these studies have found that the

relationship between the results of cost-benefit analyses and investments is, at best, weak (Fridstrøm and Elvik, 1997; Odeck, 1996). The seemingly weak relationship between CBAs and investments has been explained by a reluctance among politicians to accept the normative premises of CBAs (Sager and Ravlum, 2005), and moreover, politicians would appear redundant if they were simply to accept the result of an expert technique (Nyborg, 1998). The apparent weak explanatory power of CBAs can also be explained by the fact that a CBA aims to maximise social welfare, but this is not the only objective of the transportation policy in Norway. The objectives of the Norwegian transportation policy are to “provide an effective, universally accessible, safe and environmentally friendly transportation system covering Norwegian society's transportation requirements and encouraging regional development” (Norwegian Ministry of Transport and Communications, 2009).

As there is nothing mechanical about the process of implementing public policies either in Norway or anywhere else (Blondel and Manning, 2002), this study is designed to test in depth how different factors influence the planned allocation of funding for transport projects. More specifically, we analyse how specific characteristics of different stretches of Norwegian roads influence their planned funding. The specific characteristics include (1) their importance for car drivers and businesses, (2) their quality, (3) their environmental impacts and (4) the characteristics of the constituencies in which the roads are located. The analysis is

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based on data of planned funding that terminates at the end of 2009 of 83 specified road stretches for the ten-year period 2010–2019 and characteristics of the same roads (explanatory variables) in 2009 and earlier. All analysed stretches of roads form part of the Norwegian National Road Network (NRN) and comprise approximately 90 per cent of all evaluated NRN projects for the actual period.<sup>1</sup>

The remainder of this article is organised as follows. [Section 2](#) briefly presents an overview of the Norwegian national road network and the planning procedure prior to funding being allocated to different roads. [Section 3](#) defines the variables and data used in the study. [Section 4](#) outlines the econometric specification of the model estimated and presents and discusses its results. Lastly, the main results are summarised in [Section 5](#).

## 2. The Norwegian national road network and planning procedure

### 2.1. The Norwegian national road network

The Norwegian road network has a total length of approximately 93,000 km. The most important roads make up the Norwegian national road network (NRN) and are maintained by the national government. This network is approximately 10,500 km long and has 350 long bridges (> 350 m), approximately 450 tunnels and 18 ferry services ([Norwegian Public Roads Administration, 2010](#)). Although only 11 per cent of the road kilometres in Norway are part of the NRN, NRN roads account for approximately 44 per cent of all vehicle-kilometres travelled on Norwegian roads ([Gustavsen, 2009](#)). Together, the NRN and Norway's national harbours, railway hubs and airports constitute the national transportation network. The NRN is illustrated in [Fig. 1](#).

### 2.2. The planning procedure for national road expenditures

The Norwegian government presents its transportation policy in the National Transport Plan (NTP). The plan is produced every four years, covers a period of ten years and aims to provide a hierarchical framework and technical basis for decision making ([Norwegian Ministry of Transport and Communications, 2009](#)).

The procedure to develop the plan begins when the government informs the Norwegian Public Roads Administration (PRA) about its policy objectives immediately after publishing the previous transportation plan. The regional offices of the PRA then provide a list of projects in their regions that can help to meet the policy objectives. Based on the priorities as determined by the regional offices and in cooperation with the Norwegian National Rail Administration, the Norwegian Coastal Administration and Avinor AS (the owner of the Norwegian airport network) a proposal for the next NTP is assembled and submitted to the government. After receiving and reviewing the stakeholders' comments, the government assembles the NTP and sends it to Parliament for ratification. The planning procedure is illustrated in [Fig. 2](#).

Following ratification by Parliament, the Norwegian Public Roads Administration then prepares an action plan ([Norwegian Public Roads Administration, 2010](#)). This plan is the most important reference for how the policy objectives of the NTP are to be implemented. The last action plan for NTP 2010 to 2019 lists all planned expenses for each of the roads that were part of the Norwegian NRN as of January 1st, 2010.

It is important to note that even though the NTP is ratified by the Parliament, it is not a binding budget document ([Welde et al., 2013](#)). Road projects tend to reach the public agenda following local initiatives that gain momentum through the media ([Haanæs et al., 2006](#)). The result is that the funding priorities may change during the NTP period in question (2010–2019). Nevertheless, the selection of projects included in the NTP is the result of careful assessments conducted by the PRA (e.g., cost-benefit analyses) and the involvement from politicians on several different policy levels ([Welde et al., 2013](#)). Therefore, the NTP is the most reliable source of information with respect to the planned future spending on different stretches of roads. Oral information from the bureaucrats working with the NTP also affirm that the priorities of the NTP are, for the most part, implemented. Because the action plan prepared by the Public Roads Administration is based on the priorities as determined by the NTP, the members of Parliament constitute the decision makers in this context.

For the 2010–2019 planning period studied in this article, the government announced that to achieve the overriding transportation policy objectives, it intends to spend approximately NOK 220 billion<sup>2</sup> on the Norwegian national road network (the 83 stretches of roads).

## 3. Descriptions of data sources and variables

The data set used in this study is collected from The [Norwegian Public Roads Administration \(2010\)](#), the Norwegian National Road DataBase (NRDB) and the Norwegian Parliament ([www.stortinget.no](#)). A detailed description of the models' variables is provided herein.

### 3.1. The amount of money allocated (IN)

IN is the dependent variable and the amount of money, measured in 2010–NOK, that is planned to be spent on repairs and improvements for each stretch of the 10500 km of the national road network in the ten-year period from 2010 to 2019. The average amount to be allocated to each of the 83 stretches of roads is NOK 1302 mill, with a range from 2 mill NOK to 6953 mill NOK.

### 3.2. Road length (RL)

All other factors being considered equal, it is more costly to build and maintain longer roads. This is intuitive because more resources are needed to plan, build and maintain long roads. Therefore, we assume that there is a positive relationship between the money planned to be spent on a stretch of road and the length of that stretch of road. The average length of the 83 roads in our sample is 102 km. The shortest road, located in the capital city of Oslo, is only 2 km, and the longest road, located in the northern part of the country, is 655 km.

### 3.3. Average traffic volume (AT)

Traffic volume is an important determinant influencing how Norwegian roads are built ([Directorate of Public Roads, 2011b](#)). That is, roads with a substantial amount of traffic are built according to higher engineering standards, and as such, these roads require more resources. Moreover, rutted roads are one of the most important triggers for road maintenance in Norway ([Hjelle, 2007](#)), and ruts develop more quickly on roads with high volumes of traffic. As a result, the expected lifetime for road surfaces varies

<sup>1</sup> We were not able to find the values of the explanatory variables used for all projects.

<sup>2</sup> 1 NOK=USD 0.17.

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