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Research Paper

A novel approach to economic evaluation of infrastructure?—Examining the benefit analyses in the Swedish high-speed rail project

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ABSTRACT

The purpose of this paper is to describe a novel approach to economic evaluation of infrastructure, the benefit analyses in the Swedish high-speed rail project, and to analyse what role these can play in the decision-making process. The reports identify benefits from infrastructure investment at the local level and were intended to assist in making co-financing agreements and as a basis for decisions on route-planning and prioritisation of public transport investments. The study finds that the benefit analyses are insufficient as decision bases as they double-count benefits, disregard costs, are methodologically inconsistent and lack comparability. Rather, they seem to fulfil the role of negotiation bids in a process that focuses on measuring the level of commitment and the willingness to contribute financially to the project. It seems that the new method increases the space for political manoeuvring which together with the one-sided focus on benefits risks worsening the optimism bias observed in mega-project planning.

1. Introduction

Economic evaluation plays an important role in transport planning. The standard method for economic evaluation of transport infrastructure in Sweden is the cost-benefit analysis (CBA) (Eliasson and Lundberg, 2010). CBA is an example of a full economic evaluation, meaning that it aims to take all effects (costs and benefits) of a proposal into account (Vickerman, 2007). Since the 1960s CBA has been the focus of much criticism (Turner, 1979; Frank, 2000) leading to a search for alternative and complementary approaches. This paper examines a recent example of an alternative approach: the benefit analyses (nyttoanalyser) in the Swedish high-speed rail project.

The Swedish high-speed rail project will, if it is implemented, be the largest infrastructure project in the country in modern times, arguably even since the construction of the existing railway trunk lines in the mid-19th century (Government Offices of Sweden, 2014). In addition to construction of high-speed rail between the three largest cities (Stockholm, Gothenburg and Malmö) the project involves public transport investment in the metropolitan regions as well as ambitious plans for housing construction. The scale and scope of the project has led the national government to include the local governments along the route to take part in the planning and financing of the project. The details are going to be decided in a negotiation between the national and local governments named the National Negotiation on Housing and Infrastructure (NNHI) or Sverigeförhandlingen in Swedish (Government Offices of Sweden, 2014).

The project has a clearly stated objective to maximise societal benefit (Government Offices of Sweden, 2014). However, the CBAs performed have all deemed the investment to be unprofitable with net present values between −57 and −74 billion SEK (€-6–€-8 billion) (Trafikverket, 2015). The construction costs (currently at between 190 and 320 billion SEK (€20–34 billion)) exclude costs for stations indicating that cost estimates are at the low end. Meanwhile, the government has indicated that the societal benefits need to be seen beyond what is captured in traditional CBA. According to the minister for infrastructure there are additional effects, like labour market effects, that are not included in conventional CBA (SvD, 2015).

At the start of the process, the national government asked the local governments to hand in benefit analysis reports outlining the benefits that they expect to receive from investment in their respective influence areas. These reports were intended to appraise the benefits of the proposed investments on the local level and thereby form a basis for the negotiations on co-financing (Sverigeförhandlingen, 2015). They were also aimed to provide a complement to conventional CBA in prioritising between alternatives (Sverigeförhandlingen, 2016). Instead of giving out firm guidelines or following conventional CBA-methodology, the local governments were explicitly invited to be creative and develop new methodologies for calculating the benefits (Sverigeförhandlingen, 2015).

The benefit analyses are as such a potentially important basis for decision-making in the largest infrastructure project in Sweden in 150 years. At the same time they represent a step away from traditional

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methods and invite the participants to experiment. The vagueness of the instructions and the unclear distinction between the negotiation and planning elements make the process highly ambiguous.

The purpose of this paper is to describe the benefit analyses in the Swedish high-speed rail project and to analyse what role they can play in the decision-making process.

The remainder of the paper is structured as follows. After a description of the research method follows the theoretical framework that introduces conventional economic analysis in the form of CBA that is used as a framework for the analysis. This is followed by the empirical setting and findings-section. The paper ends with an analysis of what role the benefit analysis reports can play in the decision-making process and a discussion on what the benefit analyses might mean for the future of Swedish infrastructure planning.

2. Research method

This study is principally a document study of the benefit analysis reports and associated documents such as the instructions distributed beforehand and the written comments, questions and clarifications attached to the reports. The document study has been complemented with discussions with representatives for the NNHI and representatives for contributors (municipalities and regions) to provide an understanding of the process and background. The author has also attended one presentation where the benefit analyses were introduced by representatives for the NNHI and two presentation meetings organised by the NNHI where the process was described and the benefit analyses were commented on by the negotiators.

The material includes in total 57 reports (total 3470 pages) out of which two are sent in by companies (one government owned airport manager and one privately run airport), three are sent in by consortia (one involving regional level organisations, municipal level organisations and academic institutions and two involving only municipal level organisations), eight are sent in by regional level governments and the remaining 44 are sent in by municipalities. All reports are written in Swedish and were handed in to the NNHI on October 1st 2015. They were then commented on and revised editions were made public, together with the comments, on the dedicated government website in the end of November 2015. This paper is based on the revised reports as well as the comments from the government and the corresponding answers from the contributors as they were presented on the official website. The instruction document, including amendments, and the committee directive that outline what the government expected from the reports have also been used for the analysis. All documents are available in Swedish on the NNHI website.

The reports were read and analysed in an explorative and qualitative manner. This approach was chosen to allow the study to address the full content of the reports, that are quite diverse and that were unclearly defined from the outset. In reading the reports, patterns emerged that have formed the basis for the characterisation. The aspects used for the characterisation are collected in a table (Table 2). The aspects are formulated as questions that are answered either yes or no, where this is applicable. In some aspects, such as to what extent instructions have been followed, the scale yes/no/partly has been used. Further specification is given in connection with the presentation of the results.

An explorative approach as used for this study can be criticised for being too unstructured. This has been addressed in two ways. Firstly, the analysis has been focused around the benefit areas that the NNHI pointed out. Secondly, the categorisation has been shown to three of the consultants involved with producing the reports and their comments have been used to make clarifications, particularly with regards to definitions of categories.

The study can be categorised as a case study as it focuses solely on the content of the benefit analysis reports in the NNHI. The study does not include any observations of the use of the benefit analyses in the process but is concerned merely with analysing their content. This can be considered a drawback given that the use might reveal other purposes for the reports beside those considered in the documents themselves. Earlier research has pointed to a difference in what information reports contain and how they are actually used in practice (Prior, 2003; Sager and Ravlum, 2005). However, given the purpose of this paper, assessing the benefit analyses in terms of content has been an active choice. What the reports are actually used for in the process is considered to be part of another, albeit also interesting, study.

3. Framework for the study

The benefit analyses were intended to appraise the benefits of a number of alternative public transport and railway infrastructure investment proposals. As such, they can be considered as a tool for economic evaluation. In short, *economic evaluation is the comparative analysis of alternative courses of action in terms of both their costs and consequences* (Drummond et al., 2005). The keywords here are evaluation and comparative. For an evaluation to occur; alternatives need to be compared. If not; we are dealing with descriptions.

In distinguishing between different types of analysis, it is useful to ask if both costs (inputs) and consequences (outcomes) are examined and whether there is comparison between different alternatives. As economic evaluation is intended to aid decision-making, the methodologies used need to facilitate comparison between alternatives. Methods for economic evaluation are therefore ideally made to be transparent in terms of for example revealing assumptions and motivating valuation methods, being clear about definitions and limitations and preferably by performing sensitivity analyses for central and uncertain parameters. (Drummond et al., 2005; Trafikanalys, 2012)

CBA is the method for economic analysis most commonly applied in Swedish transport planning (Eliasson and Lundberg, 2010) and is therefore going to be used as a framework for analysing the benefit analyses. In essence, CBA asks whether the sum of the amounts the individuals in society would be willing to pay for a project exceeds the costs associated with it (Grant-Muller et al., 2001) (Bristow and Nellthorp, 2000). CBA makes this comparison by assigning monetary values to predicted outcomes of policy proposals, ideally including all welfare effects regardless of whether they are in the end realised as financial returns or not (Vickerman, 2007). The values obtained are turned into discounted net present values to facilitate comparison over time. The net present values can be compared to identify which one of a set of proposals provides the most efficient alternative (i.e. the highest return on investment) (Grant-Muller et al., 2001; Vickerman, 2007).

A cost-benefit analysis appraises benefits and costs at societal level, but does not make judgments on how the benefits and costs are distributed (Trafikanalys, 2012). As such, it is a tool well suited to aid decision makers in deciding what investments to make, but less well suited to identify winners and losers and thereby determining burden-sharing. In the case of high-speed rail, there is evidence that local government budgets are positively affected by increased economic activity after receiving a high-speed rail station (Hernández and Jiménez, 2014). However, this effect is dependent on the actual service level (Willigers and van Wee, 2011), the local accessibility to the stations (Vickerman, 2015) and might involve a degree of relocation rather than genuine improvement (Hernández and Jiménez, 2014). Finally, Albalate and Bel (2012) have noted that it is mainly large cities that receive benefits, intermediate and smaller cities might instead see resources drained away. All this invites caution in estimating local effects as a basis for financial contribution.

4. Empirical setting and findings

This section introduces the empirical setting and the findings of the study. In the first part, the empirical setting is introduced by explaining the rationale for the NNHI and describing the context of the benefit