Extended abstract: Regional repercussions of a new Oslofjord fixed-link

Introduction

The Oslo-fjord works as a barrier against functional integration in a densely populated area of Norway. The fjord acts as an obstacle against regional labour market integration, as well as a delay element in the passing of freight between the east and west side of the fjord, and between the industry regions of Western-Norway and the continent. A new fixed link across the Oslofjord will potentially break up the existing regions and facilitate commuting across the fjord, which in turn will stimulate the regional integration of local labour markets, thus creating a larger potential for economic growth. Reduced travel times and increased reliability for inter-regional freight flows will potentially reduce monopoly power and increase competition in imperfect markets.

Theories on the socio-economic impact of infrastructure investments are mainly based on transport time and transport costs, which in turn affect factors like access to markets, localization of economic activity, specialization, economies of scale, increased competition and reduced monopoly power, risk and uncertainty, employment, labour markets, land use, stock and flow relationships, seller - customer relationships, service availability and leisure activities. It is through the reduction in generalized transport costs that the broader economic effects of infrastructure investments manifest itself (SACTRA 1999; Leitham, McQuaid et al. 2000; Bråthen, Eriksen et al. 2003; Holvad and Preston 2005; Gjerdåker and Lian 2008).

Infrastructure investments and improved accessibility lead to both redistributive and generative growth, favouring some regions and actors at the expense of others. In this paper, we employ a newly developed SCGE (Spatial Computable General Equilibrium) -model in order to analyse the direct- and indirect effects of two different investment alternatives for a new Oslofjord fixed-link.

Wider economic impacts

In a traditional and well specified CBA (Cost -benefit analysis) it is assumed that all relevant benefits from the infrastructure investment are captured in the analysis. Most manuals for transport appraisal focus on the direct transport user benefits and costs, such as:

- The transport users and merchandise owners time- and reliability benefits
- Profits from public transport companies and other companies in the transport sector
- Public budget effects
• Accident costs, emission costs, noise costs, etc.

A traditional CBA assumes perfect competition in all markets. From economic theory we know that with a reasonable degree of perfect competition only the benefits accrued by the users of the infrastructure should form the net benefit in the CBA (Kanemoto and Mera 1985; Jara-Díaz 1986). Adding spillover effects in a perfect competitive environment will only result in double counting (Mohring 1993). When price equals social marginal cost, the effects of the traffic improvement on secondary markets will be nothing more than transformed forms of the utility devolved by the traffic users in the primary market. Hence, partial considerations are sufficient when markets are characterized with a reasonable degree of perfect competition.

Market imperfections in the transport using sectors will, independent of the market structure in the transport sector (SACTRA 1999), produce utility effects not cancelling out. Such market imperfections may lead to an under estimation of the user benefit in the CBA. Wider economic benefits are benefits not captured in the direct user benefits in a well-constructed CBA, after allowing for technological external effects (Vickerman 2007).

One of the main reservations against using CBA as a decision support tool in transport appraisal lies in the method’s inability to incorporate the wider economic impacts of new or improved infrastructure (OECD 2002). The most important economic effects not captured in a traditional CBA can be summarized in four categories (DfT 2005; DfT 2008):

- Agglomeration effects
- Labour market effects
- Increased production in imperfect markets
- Increased competition in imperfect markets

There is a large literature on the socio-economic effects of transport infrastructure investments (Mohring Jr and Williamson 1969; SACTRA 1999; Graham 2007; Venables 2007; Vickerman 2007; Lakshmanan 2010), applying a wide array scientific methods. We consider spatially detailed models to be the approach best suited to analyze the rippling effects in the economy of large infrastructure investments, and employ a SCGE –model in order to analyze the indirect impacts cause by general equilibrium repercussions.

**Methodology**

SCGE-models are spatial extensions of numerically solvable general equilibrium models, and capture the interactions between the different sectors and regions of the economy. The model builds upon an equilibrium reference data set that contains all transactions in the economy for a base year. The SCGE –model is a solvable system of equations that reproduce the equilibrium data set. In a general equilibrium model the trade-off problems between the different economic agents in the economy is solved through the price mechanisms.
The basic structures of the SCGE model are:

- Regions: 19 Norwegian counties
- 1 foreign region for imports and exports
- 2 production factors, labour and capital
- Intermediate inputs
- Economic agents: regional households, regional sectors, federal government, virtual investment bank, virtual agent for transport and trade margins.

The model database:

- National Social Accounting Matrix (SAM)
- Data on NUTS 3 level: regional value added, gross fixed capital investments, wages and employees by sector.
- Inter- and intra-regional freight flows for Norwegian NUTS 3 regions based on commodity flow survey data.
- Freight transport costs within and between regions from the National freight transport modeling system.
- Inter- and intra-regional passenger transport flows and passenger transport costs from the National passenger transport modelling system.

The main advantages of SCGE modelling for transport appraisal lies in the ability to compare outcomes of different equilibrium states (Tavasszy, Thissen et al. 2002). In the paper, we compare the following equilibrium states for the different investment alternatives:

1. Reference alternative prior to the investment
2. Counterfactual equilibrium assuming perfect competition in all markets, thus calculating the direct benefits of the investments.
3. Counterfactual equilibrium assuming imperfect competition in industrial sectors, thus calculating the total benefits of the investments.

By comparing the calculated total benefits to the calculated direct benefits, we are able to calculate the indirect benefits of the two different concepts for crossing the Oslofjord.

Multiregional SCGE-models typically aim at quantifying regional effects of transport infrastructure investments or changes in transport policy. An infrastructure investment or policy change lead to changes in the trade costs, which in turn produce repercussions in the transport using sectors and other related markets. SCGE-models embrace the entire economy, making these models particularly suited for analyzing wider economic benefits of transport investments through the link between the transport sector and the transport using sectors, acknowledging that an exogenous change in one sector may produce repercussions throughout the economy.
References


