

Wider impacts of local railway investment

Erik Magnus Sæther, Partner
Oslo Economics
Norway



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Concept Symposium 2012

Wider (economic) impact of local railway investment «A user perspective»

Erik Magnus Sæther, Oslo Economics*



Photo: Tobias B Köhler

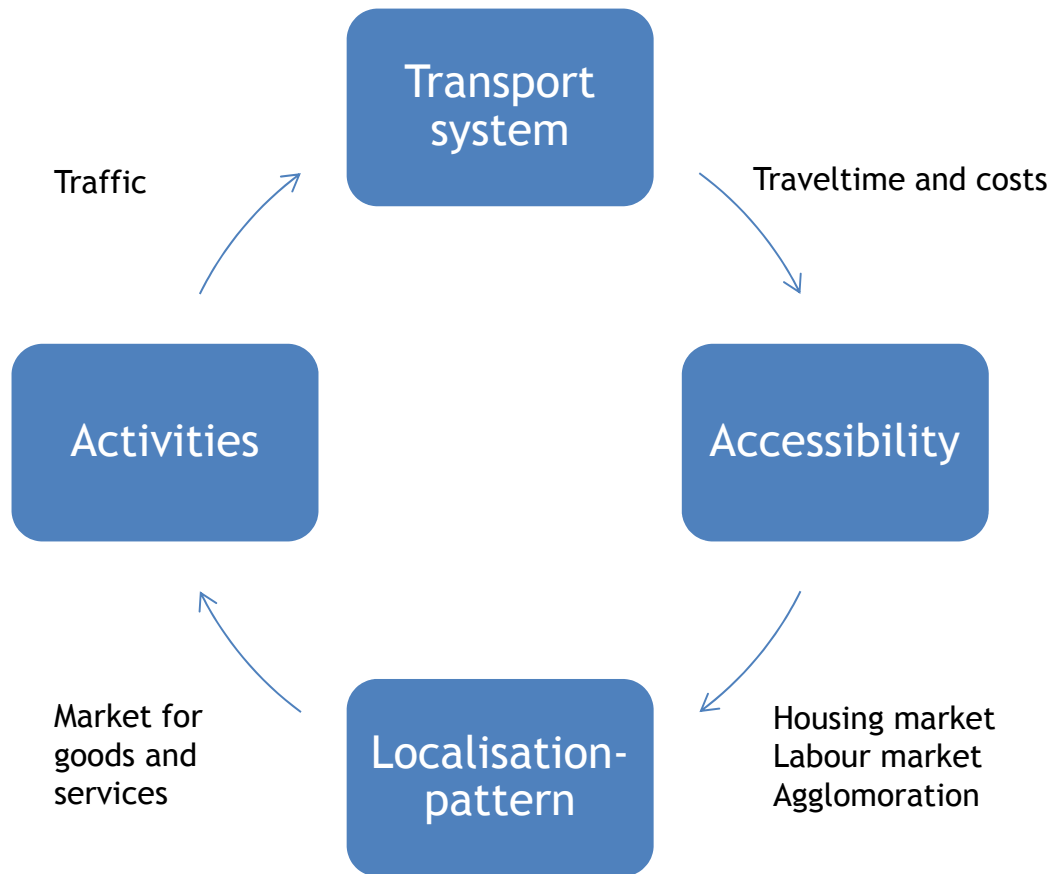
*Thanks to Line Bakken, Håkon Hagtvat and Aleksander Møll

Rail investments contribute to regional development

How do we handle such knowledge in the investment analysis?

- The development of a *high capacity, reliable and high frequency train service with acceptable travel time* will impact the future population pattern, business development and public services.
 - Such projects contribute to larger labor markets, access to more suppliers and exchange of expertise.
- The extent to which the development of rail will contribute to regional enlargement is related to how much workers are willing to travel
 - The number of train commuters has increased in recent years. This is partly related to house prices and the geographical division of labor.
 - When travel time reaches 60-70 minutes, there are relatively few who are willing to commute.
- What is the size?
- How should we relate to the increasing number of WEI analyses?

The benefits of infrastructure investments may be estimated too low (or too high)



By using the traditional methodology there is a risk of either over - or under investing in infrastructure due to:

- Wider economic impacts are not included
- Transport model features/properties

The interaction between transport, land use and activities:
(Wegener 1995, Ecoplan and Biro Widmer 2004 and Cowi 2012)

National Rail Administration handbook: Wider economic benefits are now included



Productivity effects of increased density

- Increased proximity between firms has a positive effect on productivity, including access to larger labor markets, access to more suppliers and exchange of expertise.

Changes in living facilities due to increased density

- Investing in infrastructure links residential areas closer to jobs, service features and urban centers, and thereby contribute to raise the quality of the living facilities.

Increased labor supply

- Improvements in infrastructure can influence how employees value the balance between salary and travel disadvantages, and contribute to increased employment and greater flexibility in the labor market.

Increased production in markets with imperfect competition

- High transportation costs can in some circumstances be perceived as barriers in the market and reduce competition. In such cases investment in transport infrastructure can contribute to increased competition, with associated positive economic impacts.

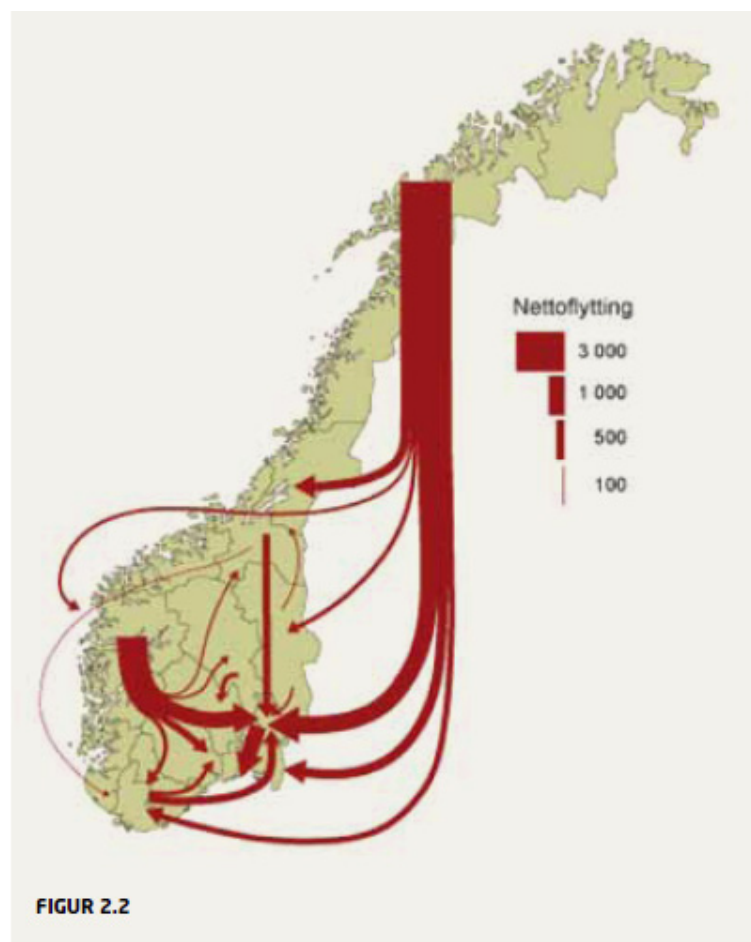
Interaction between transport supply and land use

- The quality of transport services affects the location of housing and jobs.

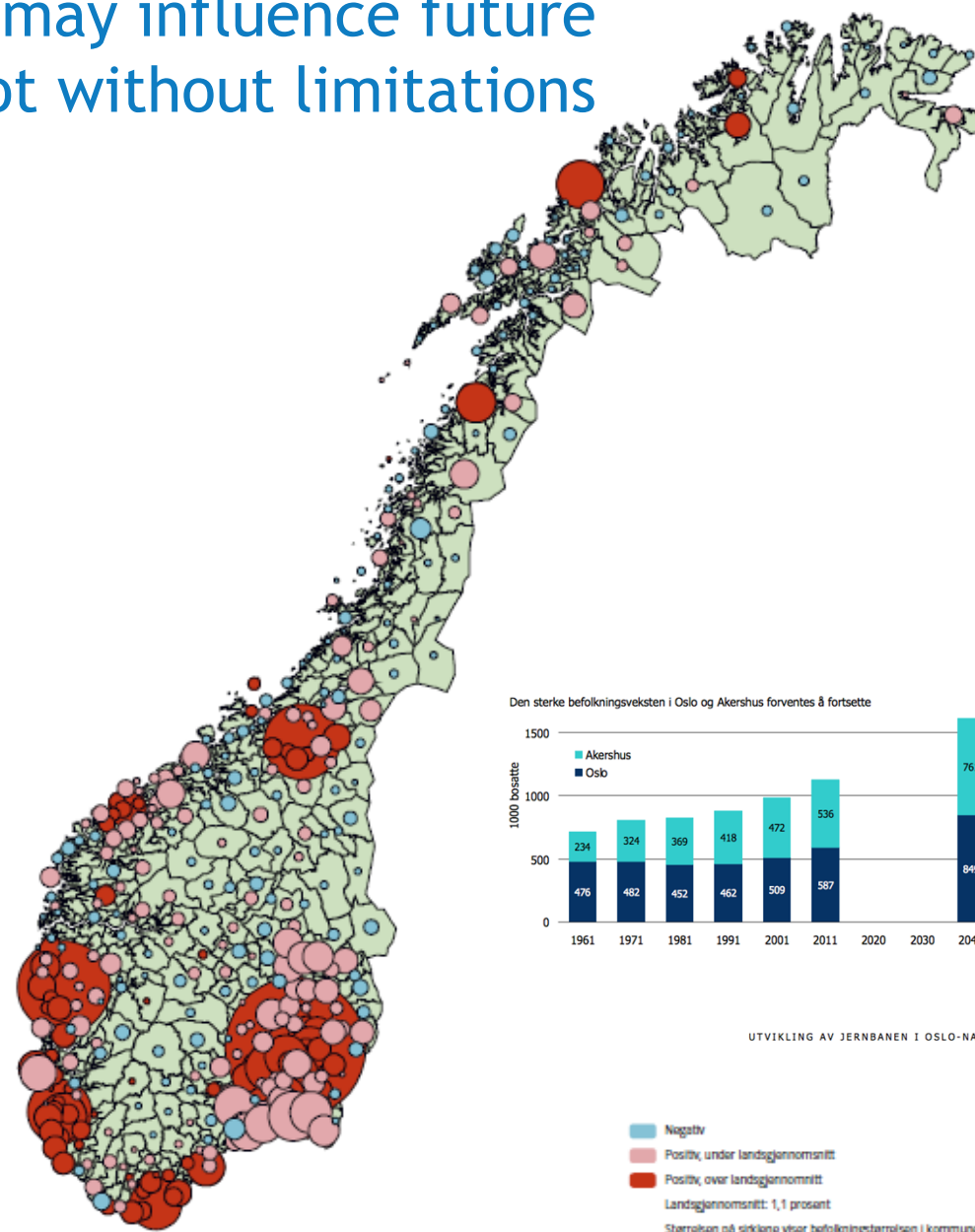
Changes in price rates and other parameters as a result of non-marginal changes in the transport market

- Today's framework assumes constant prices. Some larger projects do not meet this condition, and can change the value of a parameter assumed to be constant. E.g. the influence of prices of labor, capital and product and property market.

Infrastructure investments may influence future population patterns, but not without limitations



Kilde: Statistisk sentralbyrå
Kartgrunnlag: Statens kartverk



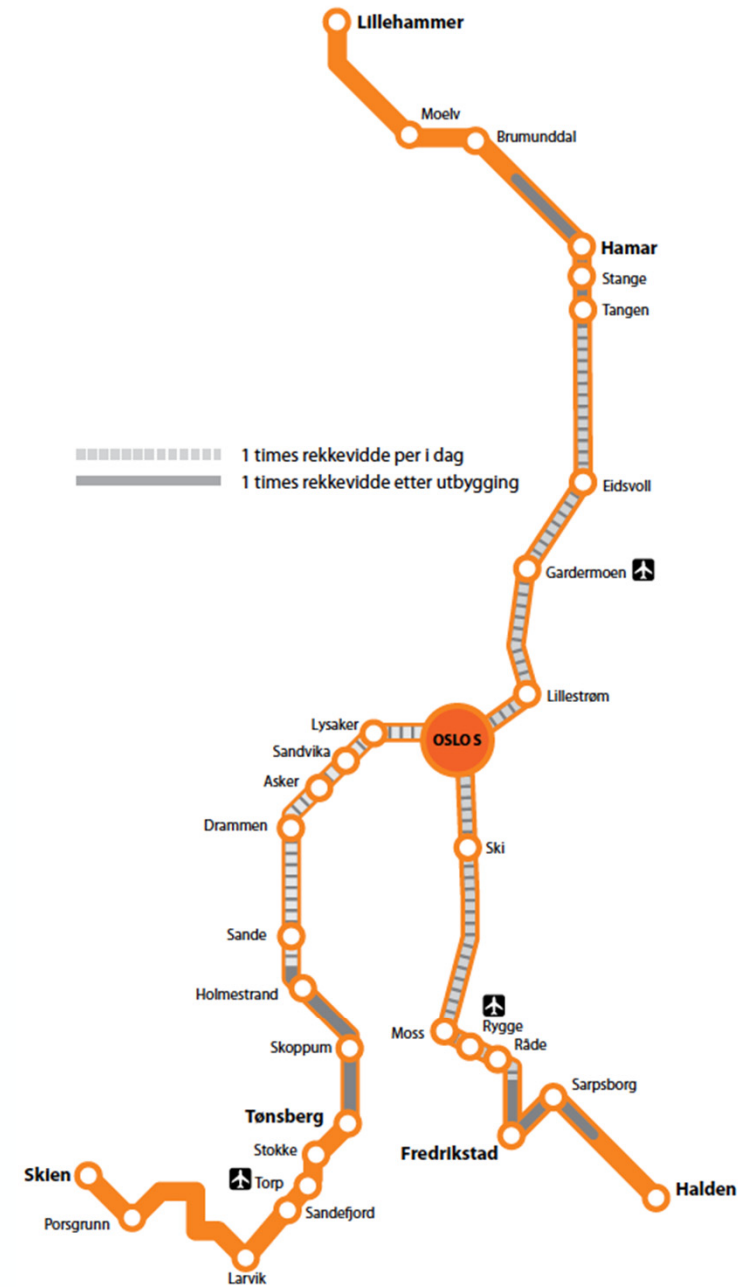
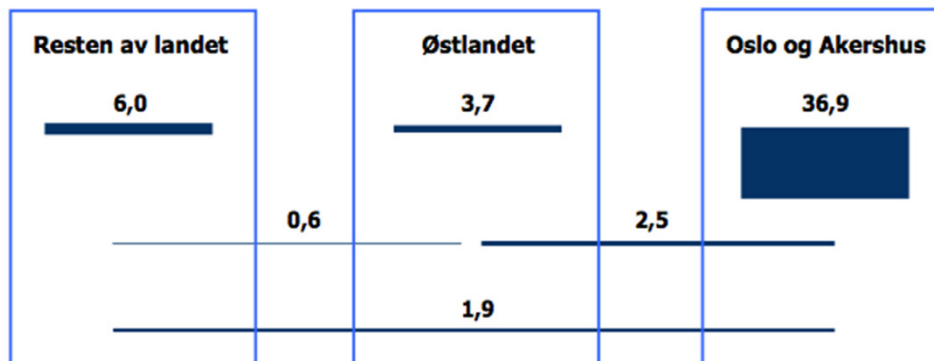
Figur 1.2.5 Gjennomsnittlig befolkningsendring per år. Kommuner, 2005-2009
Kilde: SSB Kartgrunnlag: Statens kartverk

InterCity seems to be a good case

InterCity responds to key drivers

- Intercity involves half of the population, 47 % in 2060
- *Travel within the transport corridor, not only commute to Oslo city centre*
- *Scarcity of labour in cities*
- *An aging work force*
- *Reduced availability of land*
- *Clima change and expected regulations*
- *Lower acceptance of road investments*

Figur 2.6 Jernbanereiser i Norge 2005. Millioner reiser per år. Kilde: SSB



Commuting increases the number of alternative workplaces for employees, and widens the market for employers

- The labour market is characterized by more competence intensive and more flexible forms of affiliation
- Employees skills and competence are increasingly important for business development
- This implies that the most important resource (human) for regions are mobile, and often relies on commuting
- A mobile workforce facilitates efficient connections between demand and supply of skills, which is a key element for regional competitiveness

There are changing commuting patterns and a more flexible labour market

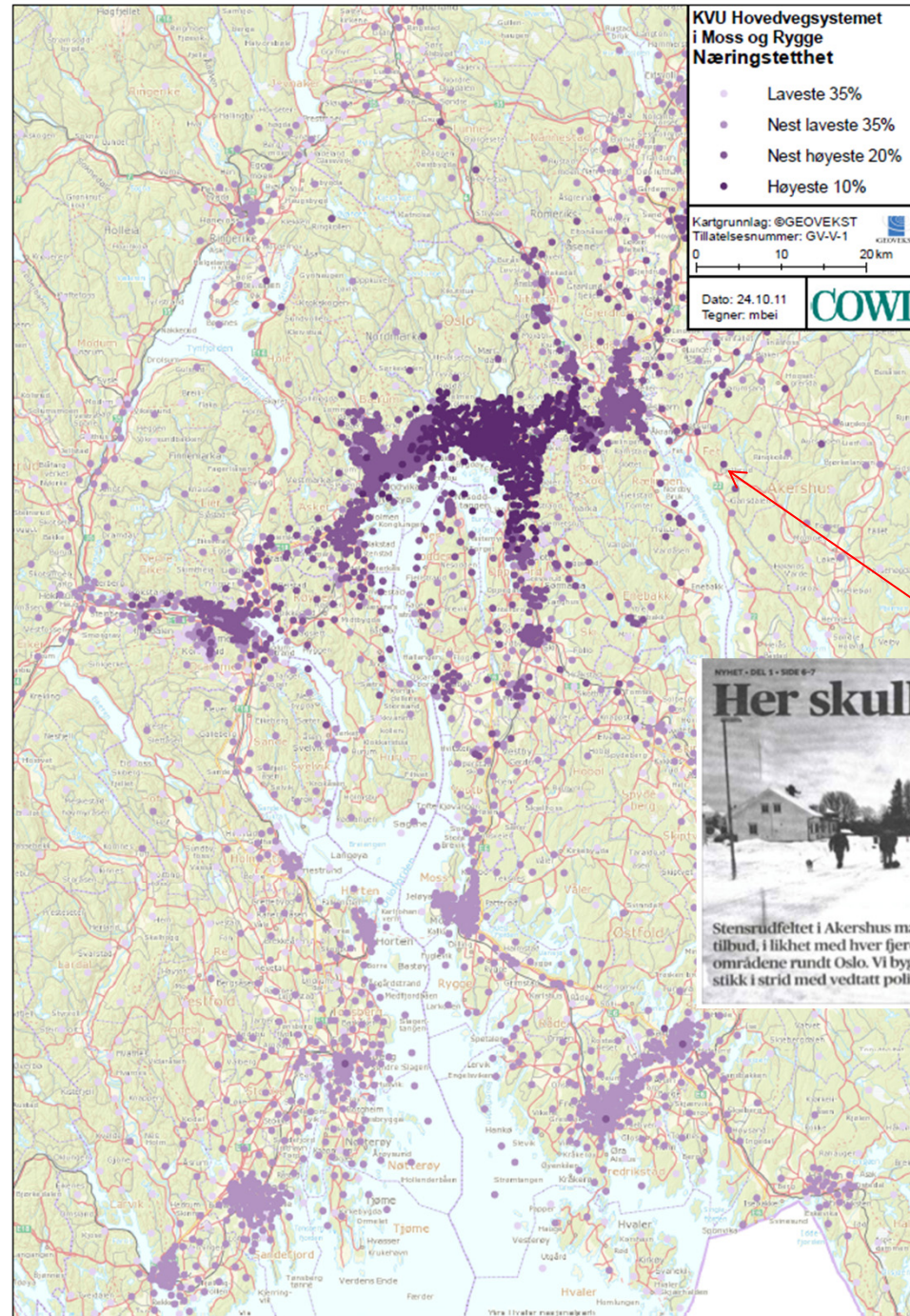
- Commuting to Oslo from municipalities in the region between 80-150 km more than doubled from 1990-2007
 - Partly due to population growth in surrounding regions (8 %), but mostly because the average share of commuting to Oslo doubled from 2,2 to 4,5 %.
 - While 53 % of the commuters in 1990 were from urban areas in the intercity network, this share rose to 65 % in 2007
- Flexible working hours, possibilities for working at home, and for working on the train or bus may have made long-distance commuting more attractive
- Both national and regional governments have a vision for tying the cities in the eastern region together in a multicore network, in line with new principles for regional plans to relieve the larger cities
 - Trains are an important element in this development and also increases the possibility to exploit competencies and workplaces in a larger region

Proximity to train stations are important

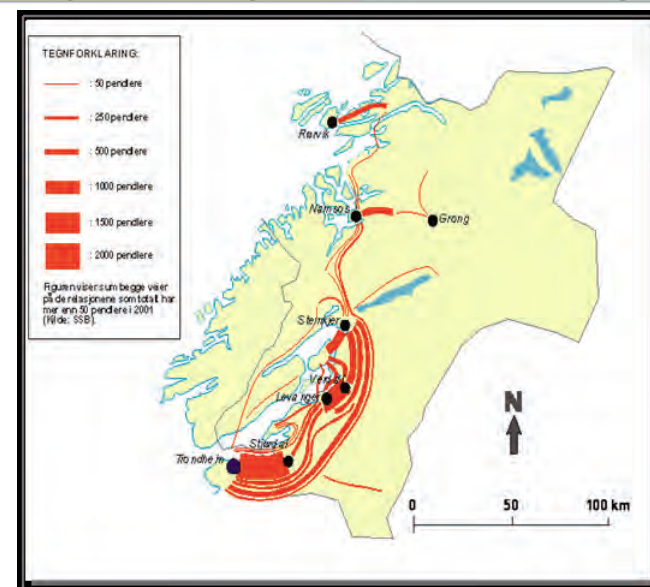
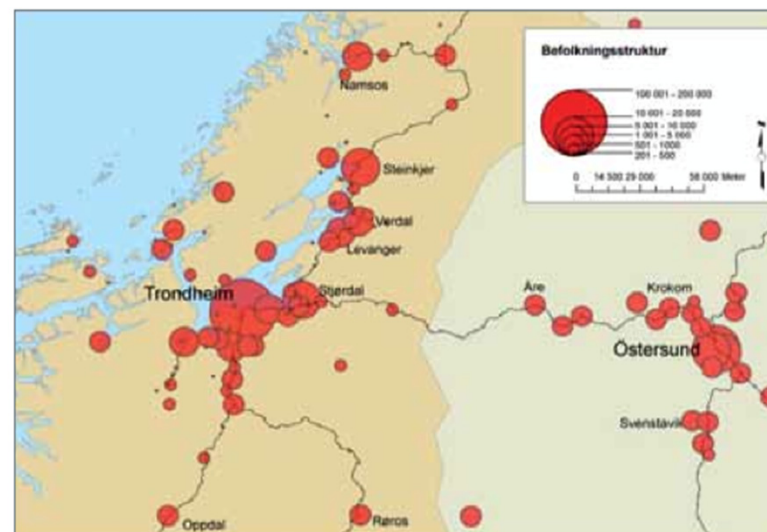
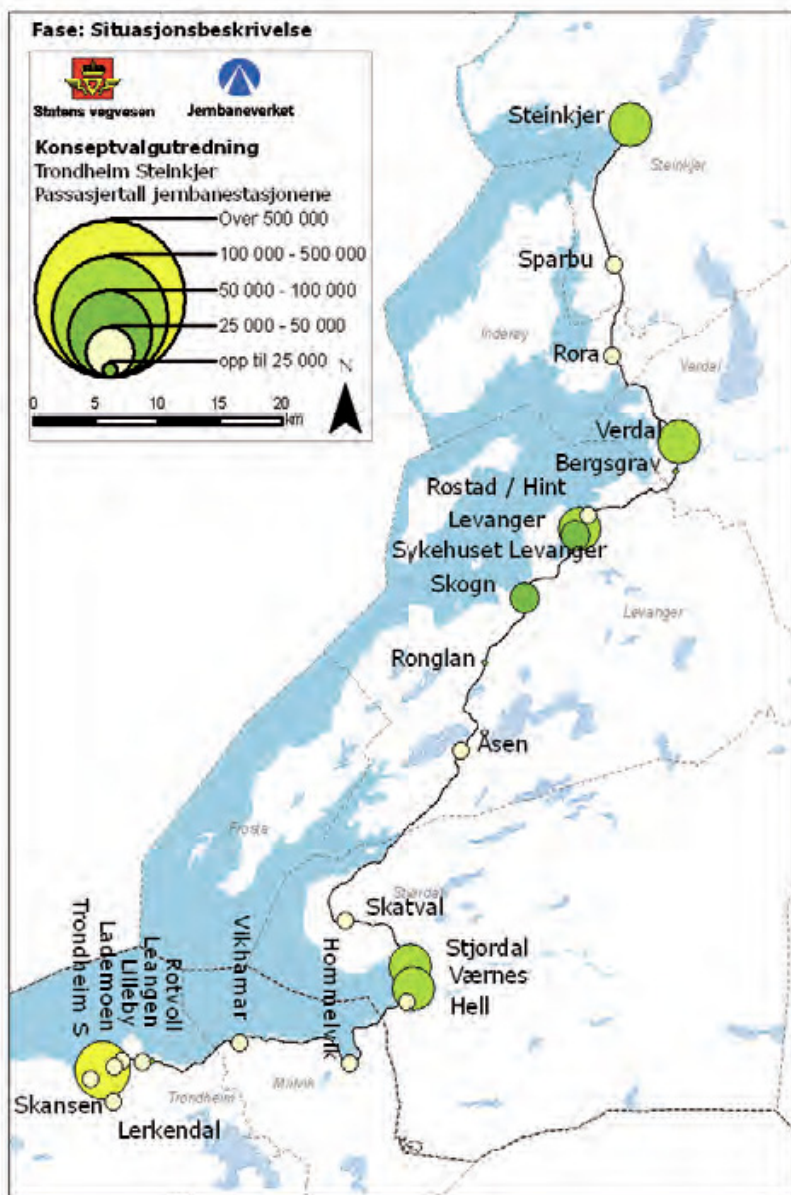
- More than 60 % of long distance commuters live within 10 km from an InterCity train station
- The majority also works in the inner city or close to stations served by intercity trains
- It is assumed that the modern commuting pattern is characterized by an urban interaction between workers living in the center of a smaller city and working in central Oslo
- The effect of train station proximity, implies that InterCity trains are an important part of this picture

Will people live close to the transportation hubs?

- The planning is based upon further growth in the hubs and nearby the rail infrastructure
- Another development will impact the estimated benefits



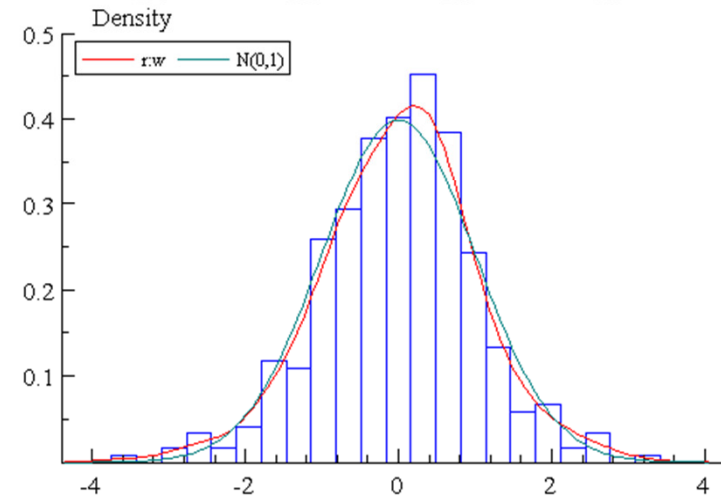
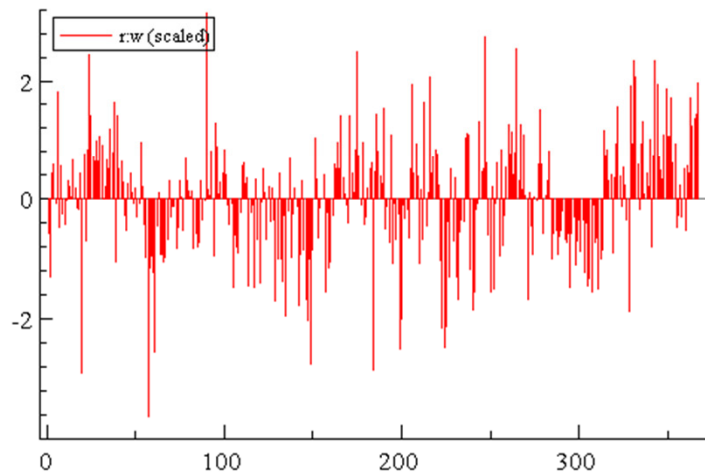
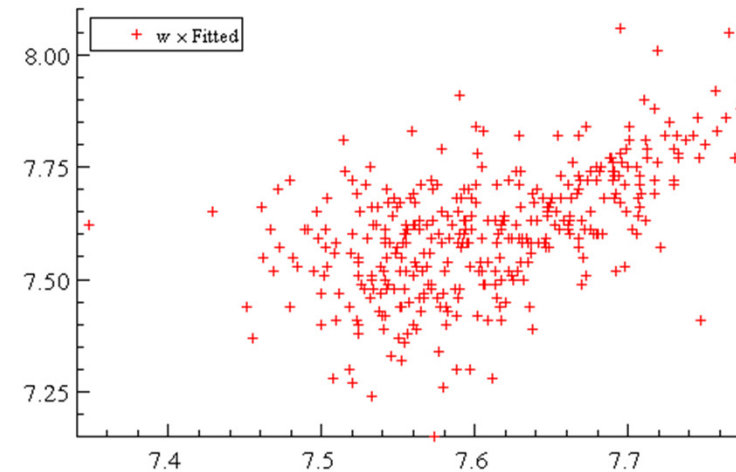
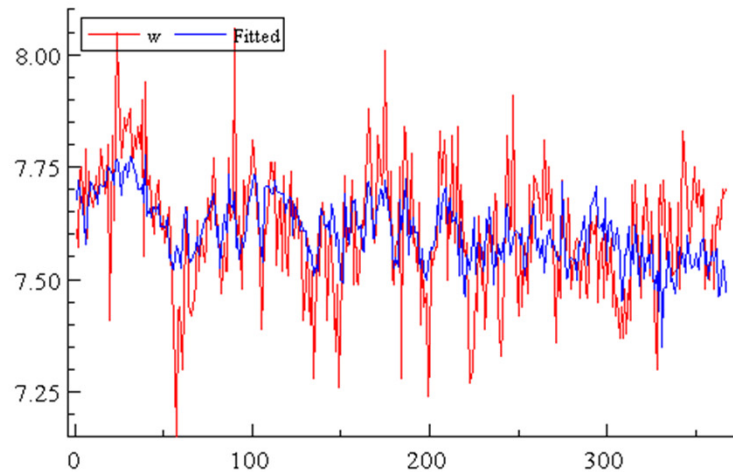
What is the case for other regions?



SVV, JBV KVV

oslo**economics**

The process and results of WEI-analyses is difficult to assess



The estimation is complex and has its weaknesses

«We do not question the conceptual argument, but ask if available empirical measurements of agglomeration economies and their relation to transport infrastructure are suitable for inclusion in applied project assessment.»

«Reverse causation, unmeasured confounding factors, and sensitivity to the range of sample variance pose problems for estimation».

Estimating the agglomeration benefits of transport investments: some tests for stability

Daniel J. Graham[†] and Kurt Van Dender[‡]

Imperial College London

Joint Transport Research Centre of the OECD and the International Transport Forum

Abstract

The case for including agglomeration benefits within transport appraisal rests on an assumed causality between access to economic mass and productivity. Such causality is difficult to establish empirically because estimates may be subject to sources of bias from endogeneity and confounding. They may also be sensitive to the range of sample variance in agglomeration being used. The purpose of this paper is to demonstrate some of the key difficulties that the researcher faces in estimating agglomeration economies and to show how these can affect the calculation of agglomeration benefits for the appraisal of transport projects. The results show a high degree of sensitivity to treatment for unobserved heterogeneity and to differences in the sample variance of agglomeration. A key conclusion is that we are unable to distinguish agglomeration effects from other potential explanations for productivity increases, most notably functional heterogeneity. Consequently, the agglomeration effects of transport investments cannot be interpreted causally.

Keywords: Agglomeration, transport, causality, heterogeneity, confounding.

JEL classification: R42, R12.

[†]Author for correspondence: Centre for Transport Studies, Imperial College London, London, SW7 2AZ, UK, Tel: +44 20 7594 6088, Fax: +44 20 7594 6107, Email: d.j.graham@imperial.ac.uk

[‡]Joint Transport Research Centre of the OECD and the International Transport Forum, Tel: +33 (0)1 45 24 95 98, Email: kurt.vandender@oecd.org

Calculations of WEI is normally 5-20% of traditional benefit. What is the case for the Norwegian analyses?

Railway	Methodology	Size of impacts annually (MNOK)	Time before full effects (years)	Size of impacts NPV (BNOK)	Total traditional benefits (BNOK)	Share of calculated benefits
Trondheim - Steinkjer	Productivity effects of increased agglomeration	100	5	1,2	3,7	32 %
Intercity	Simulation of productivity changes from increased commuting	260	50	5,5	54	10 %
High Speed Railway	Sensitivity tests for 15-30 % of total benefits	N/A	N/A	8-14	45	15-30 %
Development of railway in Oslo	Productivity effects of increased agglomeration	N/A	N/A	10,8	123	9 %
Road						
E-39 Aksdal-Bergen	Productivity effects of increased agglomeration	26	N/A	0,5	10	4-5 %
Trondheim - Steinkjer	Productivity effects of increased agglomeration	600	5	5,7	4,6	124 %
Bergen-Stavanger	Simulation of wage increases from enlarged labour markets	10 000	40-60	29-68	12	242-567 %

Note: This is not an exact comparison, use with care. Errors may occur

What is done in other Nordic countries?

Guidelines?

- Sweden: wider economic benefits lays outside the scope of the analysis (Den samhällsekonomiska kalkylen 2005)
- Denmark: Not mentioned in guidance material from government authorities.

What has been done in practice?

The high speed train assessment in Sweden has calculated WEB (based on the samlok-modell), *but* not included in the cost-benefit analysis:

- Increase in number of jobs
- Labour force is positively affected
- Income effect (better match)

Regional effects of a Fehmarn belt fixed link from 2006. Primarily analyzing the effects on the labor market by investing in transport.

Four effects:

- Increased labor supply
- Employment effect
- Productivity effects
- Increased taxes

Copenhagen Economics (2006)

We support the further developement of framework...

Further investigation of elements such as (COWI 2012):

- Productivity gains from market integration and agglomeration/cluster deveopement.
- Correction for imperfect competition in the transport using sectors.
 - Considered as a proportion of benefits for businesses.
- Benefit of increased employment beyond individual valuation.
 - First estimate the projected increase in employment as a result of improved transport services. Then calculate taxes related to increased employment.

...but are not ready to directly include the WEI estimates in the cost-benefit model

There are many other issues that must be taken into consideration in the investment decision

- Other important effects that are not priced
 - Impact on public services infrastructure? Landscape
- Weaknesses of the standard CBA-models in the transport sector
 - Too complex and too simple?
 - Traffic growth from other investment projects (e.g. airport)
- The uncertainty of the WEI-estimates

We look forward to the new guidelines from the Ministry of Finance

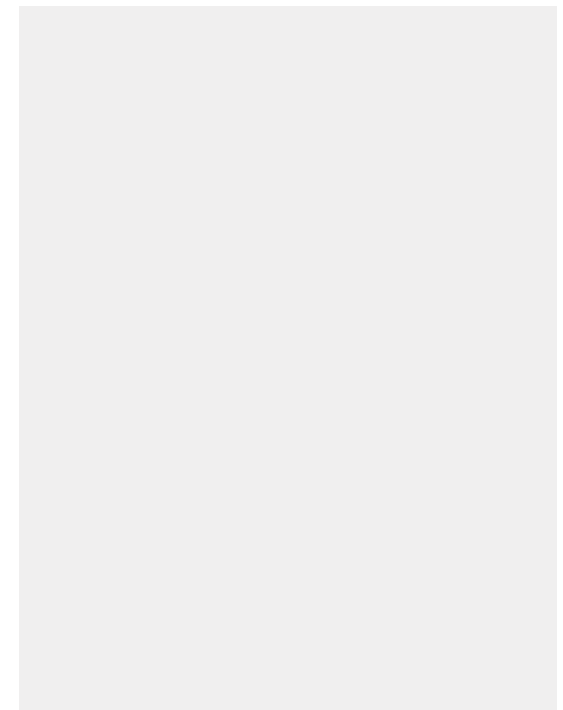
osloeconomics

Erik Magnus Sæther
ems@osloeconomics.no

Besøksadresse:
Dronning Mauds gate 10
0250 Oslo

Postadresse:
1540 Vika, 0117 Oslo

www.osloeconomics.no



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