



**Infrastructure investment and
housing development: interna-
tional comparison of models
for cost-benefit analysis**

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Summary

Transport Analysis is responsible for monitoring the international development of models used in cost-benefit analyses. The purposes of this study are to improve our knowledge of socio-economic models of the correlation between infrastructure investment and housing development, and to draw conclusions about the existing opportunities to develop the models used in Sweden. The work has focussed on Denmark, Norway, the Netherlands, Great Britain, Germany, and the USA.

All countries share similar goals with respect to their cost-benefit analyses. One primary objective is to enable the efficient allocation of public resources. Another is to create a structured and comparable basis for decision-making, so that various initiatives can be compared with one another.

The starting point of cost-benefit analyses is often the assumption of functioning markets in which there is perfect competition. Taking this approach makes it possible to capture the effects of infrastructure initiatives on the transport market, which is termed the “primary market”. Any effects on the housing market, a “secondary market”, can then be viewed as redistribution, either between industries, in that benefits in the form of, for example, improved travel times for inhabitants are realised (e.g., in changes in property prices), or between geographic areas, in that people and companies move between areas, preferably to regions with good accessibility. In cost-benefit analyses at the national level, geographical redistribution within the country is generally viewed as a zero-sum game that does not result in any net contribution to society. On the other hand, for example, in regional economic analyses, incomers to a region are viewed as a net plus for its economy. All countries apply the foregoing rationale as an argument for exercising caution when dealing with effects on the housing market.

All countries are aware that the assumption of perfectly functioning markets is unrealistic, which means that there may be indirect effects, i.e., wider economic benefits/impacts, that could have greater or lesser significance. Such effects mainly comprise the function of the labour market, agglomeration effects, and how well the product markets are functioning.

The term “housing development” is not clearly defined, but in the study of cost-benefit analyses in the countries in question, several terms have been identified as having some connection to housing development. This pertains to effects on:

- property values
- housing construction
- urban development
- housing quality
- land use
- population structure

It is worth noting that only in Sweden is the need to expand housing construction being discussed so clearly. However, this observation is based more on the current political debate than on, for example, manuals for cost-benefit analyses.

In the study, a total of seven correlations between transport system initiatives and housing development have been identified, as illustrated in Figure 0.1.

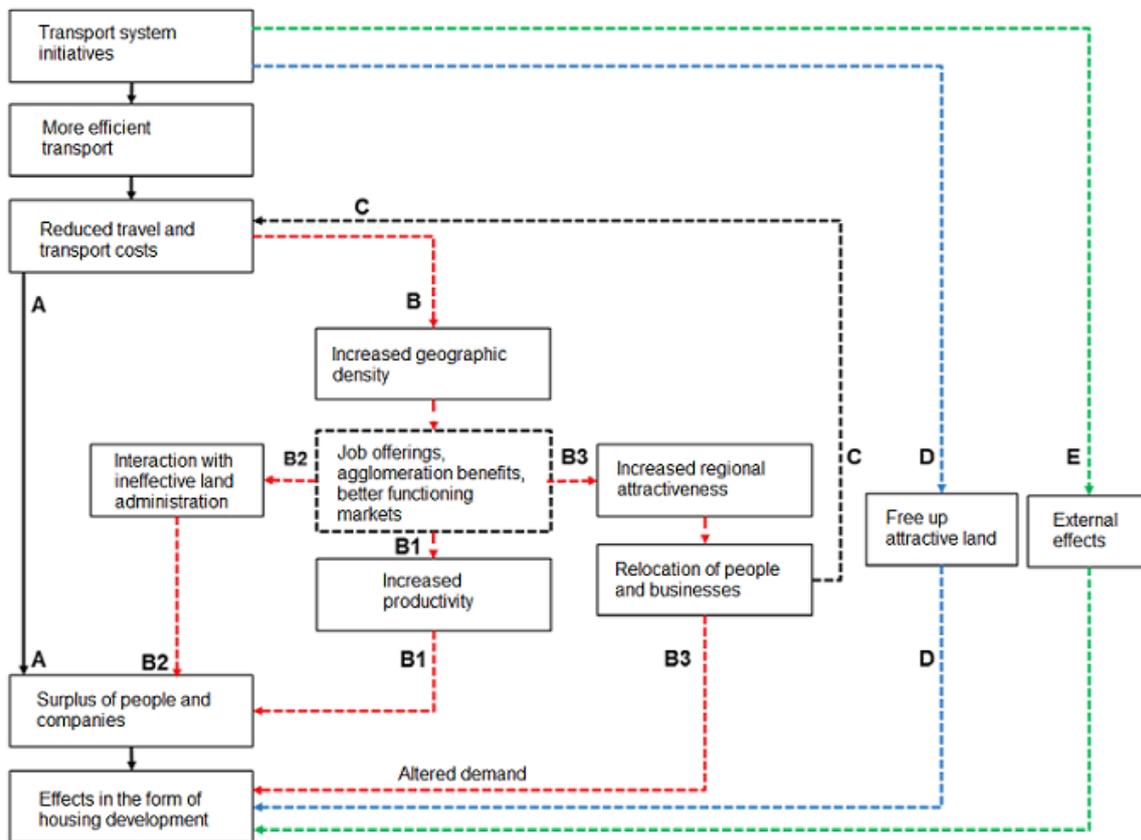


Figure 0.1. Theoretical correlations between transport system initiatives and property market effects.

The seven correlations are as follows, and are described in greater detail in Section 3.3:

A. Improved travel times are realised in part in the form of housing development. All countries agree that this is a common redistribution effect between markets.

B1. Increased geographic density. Wider economic benefits are realised in part in the property market.

B2. Increased geographic density – interaction with ineffective land administration. Ineffective land administration that is not being adapted in step with demand to enable socio-economically optimum matching between supply and demand has been reported in the Netherlands.

*B3. Increased geographic density – **increased in-migration, out-migration, and internal movement due to increased regional attractiveness.** In-migration and outflow merit study for reasons related to distribution policy and can affect the property market.*

C. Increased in-migration results in more improved travel times (user benefit). If an infrastructure initiative results in greater regional population growth than was assumed in exogenous assumptions, then there is reason to believe that the user benefits will increase as well.

D. Exploitation effects associated with freed-up land. Both Sweden and Norway report that freed-up land contributes to the national economy; at the same time, these countries warn of the risk of double counting.

E. Reduced negative externalities. If the initiatives reduce, for example, noise, then existing properties may become more attractive.

The countries studied are discussing various challenges to be addressed in terms of how housing development should be handled in their cost-benefit analyses. These challenges can be divided into *theoretical* and *practical/pragmatic* challenges; see Table 0.1.

Table 0.1. Challenges associated with handling housing development in cost-benefit analyses of transport infrastructure.

		Sweden	Denmark	Netherlands	Norway	Great Britain	Germany	USA
Theoretical	Many/most initiatives have only marginal effects outside the transport market	X	X	X	X	X		
	The effects are captured in the primary market, i.e., risk of double counting	X	X	X	X	X	X	X
	Relocation or redistribution, i.e., no net impact at the national level	X	X	X	X	X	X	
	Delaying the effects increases the uncertainty	X				X		
Pragmatic	Methods or data are lacking	X	X		X	X	X	
	Situations are specific/unique and the purpose of the infrastructure determines the analytical focus			X	X	X		X
	Complex correlations that are difficult to systematise	X		X	X	X	X	
	Models are resource-intensive	X		X	X	X		X

Many countries are engaged in studies and/or testing involving the use of land use–transport interaction (LUTI) models. Traditional cost-benefit analyses are based on exogenous assumptions, for example, that population development and economic growth will be independent of the infrastructure initiative in question, whereas LUTI models attempt to capture the interaction between infrastructure, accessibility, and decisions made by households and businesses as to where they should locate. The hope here is in part to describe

the economic returns of various projects more precisely. Large-scale LUTI models can also help clarify redistribution effects between regions and industries. Only the Netherlands are LUTI models systematically used in the process of deciding what infrastructure initiatives should receive state appropriations, albeit with a high degree of freedom.

There are many LUTI models, which are often expensive and complicated to develop and use. This study has found no documentation of the extent of the benefits of such models compared with those of other methods, such as sensitivity analysis, based on other exogenous assumptions pertaining to land use. There are also other ways of broadening and deepening the basis for decision-making, depending on the prevailing assumptions and objectives. There appears to be a great need to adapt the models to specific situations, making it difficult to determine the extent to which LUTI models could be used to supplement current cost-benefit analyses and impact assessments. These models could probably play a role in complex scenarios in which the interaction between infrastructure and land use is unclear.

Based on the lessons learned in the studied countries and on comprehensive analysis, several opportunities to develop Swedish cost-benefit analyses have been identified, and are presented in Table 0.2. However, realisable development depends on other development needs, and on how the available resources in the area are prioritised.

Table 0.2. Opportunities to develop Swedish cost-benefit analyses.

CORRELATION	OPPORTUNITIES
A. Improved travel times realised in part in the form of housing development	<ol style="list-style-type: none"> 1. Focus on quality assurance of both traffic forecasts and travel time assessments. 2. Perform sensitivity analyses of exogenous assumptions to describe how cost-benefits are affected. 3. Study systematic value changes in the property stock with different types of infrastructure initiatives. The region/municipality likely has a major impact on the results.
B1. Wider economic benefits realised in part in the property market	<ol style="list-style-type: none"> 4. Model the employment effects of expanded job offerings and matching in the labour market. The labour market plays a major role in the development of the housing stock.
B2. Interaction with ineffective land administration	<ol style="list-style-type: none"> 5. Perform a broader analysis of how administration interacts with demand for housing, and deepen the analysis of gentrification when existing areas are to undergo conversion.
B3. Increased in-migration and internal movement due to increased regional attractiveness	<ol style="list-style-type: none"> 6. Expand our understanding of threshold effects, economies of scale, and “critical masses” in relation to the population structure and property market. 7. Deepen our understanding of how people decide where to live, and analyse what parameters interact with accessibility. 8. Study the feasibility of expanding cost-benefit analyses with quantitative parameters, for example, taking regional neglect into consideration, as is done in Germany. 9. Deepen the analysis of land use–transport interaction models to clarify the potential to capture the interaction between infrastructure and land use, and assess the value of such models in social planning.
C. Increased in-migration results in more improvement in travel times	<ol style="list-style-type: none"> 10. Performing sensitivity analyses of improvements in travel times should suffice to capture much of the variation in socio-economic benefits.
D. Exploitation effects in connection with released land	<ol style="list-style-type: none"> 11. Freed-up land can boost the national economy. Develop a module that analyses the property market, any pent-up demand, and any differences between exploitation costs and the willingness to pay.
E. Reduced negative externalities	<ol style="list-style-type: none"> 12. Derive empirical correlations for how property values and rent levels depend on noise levels and traffic volumes in order to describe, for example, co-financing potential. 13. Study Germany’s methods for describing urban development potential and integrate any similar documentation into our socio-economic impact assessments.



Trafikanalys är en kunskapsmyndighet för transportpolitiken. Vi analyserar och utvärderar föreslagna och genomförda åtgärder inom transportpolitiken. Vi ansvarar även för officiell statistik inom områdena transporter och kommunikationer. Trafikanalys bildades den 1 april 2010 och har huvudkontor i Stockholm samt kontor i Östersund.