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Summary:

Regional effects of investments in infrastructure – a literature survey

The idea that investments in infrastructure stimulate regional development and economic growth is central to transport policies. Several analyses demonstrate a relationship between transport infrastructure and economic growth, but the direction of causality is unclear, and the mechanisms on which this relationship is founded are not well understood. Evidence suggests that investments in infrastructure produce benefits additional to those revealed by cost-benefit analyses. A broad research effort that encompasses a variety of methods is needed to assess the effects of investments in infrastructure. Accumulating a database of case studies may provide enhanced insights into the mechanisms involved, as well as providing a basis for drawing general conclusions on the necessary conditions for investments to generate growth.

The report is based on a study of theoretical and empirical analyses of the relationship between investments in transport infrastructure and regional development. The first part of the report reviews various theoretical perspectives on the *effects* of investments in infrastructure and the *conditions* that are required for the investment to generate growth. Theories on the effects of investments take as point of departure transport costs and travel time, which in turn are assumed to impact on factors such as market access, location of companies, employment, land use, warehouse and delivery structure, and changes in settlement, labour market, service and leisure.

The argument that investments in infrastructure stimulate economic growth is not unambiguous, however, and the report also discusses some of the counter-arguments. These arguments are related to issues such as the share of transport costs of total production costs, crowding-out of investments, and redistributive rather than generative growth. Transport investments are in many cases a necessary, but not sufficient, condition for growth. The potential for growth varies with economic, political and investment factors, local geographical circumstances, type of infrastructural project, and characteristics of affected industries and companies.

The second part of the report examines selected Norwegian and foreign empirical studies on the relationship between infrastructure and regional development. The Norwegian studies focus on mechanisms and effects such as economies of scale, labour markets, regional trade, market access and regional integration. The foreign studies encompass different types of infrastructure investments in the UK, USA, Sweden and Spain. The studies differ as to level of analysis, method and

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focus area, and although not directly comparable, they provide insight into the type of studies performed and the kind of conclusions that can be drawn.

Even though the theoretical and empirical studies referred to in the report cannot demonstrate a direct *necessary* relationship between investments in infrastructure and regional development, they render probable the claim that such a relationship exists, only that it is contingent on geographical and sector-specific characteristics and other contributing or counter-acting forces. The findings of a study will also be affected by the spatial and temporal perspective on which the analysis is based.

In macro level analyses, such as production function studies, there are methodological challenges related to the availability of adequate data, the operationalisation of variables for transport improvements and regional development, and the direction of causal relationships. Another complicating factor is that the full impact of infrastructure investments only becomes manifest over time, and that there may be decreasing returns on aggregate investments in transport infrastructure. Findings from macro analyses may be difficult to interpret due to lack of detailed insights into the mechanisms at work, and also since they conceal important sectoral and spatial variations.

Micro analyses with a local or regional focus may therefore provide enhanced insights into how regional differences in transport quality affect logistical operations and the locational decisions of companies, and into how increased opportunities for travel affect land use and households. In micro studies, the methodological challenges relate to choice of adequate control areas, the influence of other factors than transport, the contrafactual problem, and generalisation of findings.

Accumulating a database of case studies may provide enhanced insights into the mechanisms involved, as well as providing a basis for drawing general conclusions on the necessary conditions for investments to generate growth. It is particularly important to investigate the effects of improving poorly linked networks and critical bottlenecks.

Methodological challenges apart, the aim of studying investments in infrastructure is to gain insight into all facets of how improvements in transportation contribute to the modernisation and economic development of society. Systematic and cumulative research activities may provide a basis for generalisation and generate knowledge on the kind of regional effects to be expected in given situations. This is particularly important in Norway, where the concern for business and regional development plays an important role in transport policies. Systematic analyses, not only of traffic and construction costs, but also of broader developmental effects, should be mandatory for every large infrastructure investment.