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# 1 Freight Transport and Economic Growth – Two Inseparable Twins?

The way economic interactions take place is changing rapidly. Decreasing trade barriers and increasing ambitions of managers have led to a new perception of economic and geographic space, resulting in a massive increase in world trade over the past decades. GATT/WTO rounds have caused a substantial reduction of tariff and quota regulations while physical trade barriers have been steadily decreasing due to declining transport costs fostered by technological improvements in transport and logistics. Looking at the numbers, from 1948 to 1998 world merchandise trade grew at 6% annually, and has therefore increased three times faster than GDP growing at an average annual rate of 1,9% over the same period of time.<sup>2</sup>

Massive increases of world merchandise trade

Specialization and concentration in production, growing separation of stages in value-creation as well as the increasing internationalization of economic activities of companies lead to growing transport volumes as well as to increases in average transportation distances. Historically, economic growth has gone hand in hand with increases in freight transport. Over the past decades the value-added process has become even more transport intensive. Between 1985 and 1998 freight transport performance measured in tkm increased by 54% in the EU, while GDP grew by 35%.<sup>3</sup> From 1970 to 2000 road freight intensity, measured in tonnes-kilometers/Euro of GDP, in the EU 15 countries has increased by 1% p.a.<sup>4</sup>

Increases in freight transport intensity of GDP

Though the numbers seem to be telling straightforward a certain story, in the political debate other imperatives are set by multiple stakeholders. Due to rising public concerns over emission and noise pollution from freight transport ad-

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2 WTO, (2007)

3 Gilbert, R.; Nadeau, K.; (2001)

4 European Commission, Directorate General, Joint Research Centre; (2003b)

Decoupling is a key issue  
in the EU White Paper on  
Transport Policy

ditional increases of freight transport are getting more and more contentious. For example, the EU White Paper on Transport Policy from 2001 identified the decoupling of economic growth from freight transport growth as one of the key issues to be tackled on the way towards more sustainable transport.<sup>5</sup> According to this proposition, freight transport growth is to be reduced without limiting economic growth. In order to achieve this, the relations between these two factors need to be scrutinized thoroughly.

The present study aims at analyzing the structural relationship between freight transport and economic development in detail in order to provide deeper insights into the coupling between these two factors. In this context two main aspects are considered:

It is important to scrutinize  
the link between GDP and  
freight transport

1. Since one is not able to deduce a form of causality from the empirical correlation between economic growth and freight transport it is important to further explore the underlying mechanisms linking these two factors. Simply because GDP and freight transport show similar patterns of growth, this does not necessarily imply that there is an underlying causal relationship. Thus, in order to be able to provide further information on the link between these two factors it seems to be essential to examine their relationship in theoretical and empirical models.
2. Due to the fact that large-scale expansion of existing transport infrastructure networks in the European Union are regarded as rather contentious and given the indication that there exists a close link between transport, trade and economic growth, it is of special importance that infrastructure capacity is directed towards its most efficient use. Therefore, it is necessary to gain insight into user preferences concerning transport services.

Gaining insight into user  
preferences

Firstly, the analysis concentrates on the nature of the relationship between economic development and freight transport growth and thus on the decoupling potential. Secondly, it aims at providing insight into the effects of changes in transport conditions on the economy in order to be able to estimate the impacts of transport policy measures influencing transport conditions.

Previous studies on the relationship between transport and economic growth were mainly concerned with the impact of

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5 European Commission; (2001)

(further) infrastructure investment on output (growth). In doing so, they focused on the “input” variable investment instead of looking at the transportation actually happening on roads, rail, by sea and in the air. Thus, the direct link between an input variable and economic growth has been scrutinized. Opposed to this, the present study aspires to analyze the underlying mechanisms behind the relationship between transport and economic growth more thoroughly. In this analysis the connection between transport and output is not a direct one but rather intertwined with its influence on production structures and processes, location and plant size decisions, distribution structures and processes and other characteristics of industrial organization. Trade determines the degree of specialization, of economies of scale, of exploitation of comparative advantage, of competition and of generation and diffusion of technological progress. With that form of scrutiny of the relationship between transport costs and trade and subsequently between trade and output, the present study examines the impact of changes in transport conditions on output.

Analyzing the underlying mechanisms behind the relationships between freight transport and economic growth more thoroughly

The results of this study widely confirm theoretical propositions and empirical evidence in the literature. Therefore, it is essential to enhance the efficiency of the transport sector also by providing an adequate transport infrastructure in order to foster trade and economic growth. However, it is not appropriate to take into account only transport costs, as this is often done. Rather, it is essential to consider qualitative aspects explicitly, especially as they tend to gain in importance due to production processes becoming more complex and production techniques like just-in-time or just-in-sequence being adopted on a larger scale.

Lower trade barriers and better transport conditions do foster economic growth

Since there seems to be a substantial lack of in-depth studies of the demand side<sup>6</sup> and since political decision-makers and business people have to use the existing transportation network in an efficient way given the public concerns over further infrastructure investment and given that transport still seems to be very important for promoting economic well-being in developed economies, it seems to be worthwhile to come up with a combination of two methods. This

6 Holtz-Eakin (1994) also underlines the need for microeconomic research due to the lacks of macroeconomic models: “Because there likely are narrow circumstances in which the productivity effects are positive, future research in this area should be devoted to making more precise the microeconomic linkage between the provision of infrastructure and the nature of the production process.”

**The combination of two analytical approaches**

combination of two analytical approaches is important for two reasons: First, the macroeconomic perspective provides us with further insight into the relationships at the aggregate level while second, the microeconomic approach allows us to find out more about the desiderata of the users of the existing transport infrastructure, or more specifically, examines the actual needs and wants of commercial users with respect to the transport system.

Following that reasoning, the major aim for the second part of the present study is to quantify the relative importance commercial users of the transport system attach on qualitative aspects of transport services, such as speed or reliability of punctual arrival versus monetary costs. This was done by surveying logistic departments of manufacturing and distribution companies with an adaptive conjoint analysis to get deeper insights into their preferences concerning different aspects of transport quality. This allows determining which characteristics of transport services matter most for commercial users, and therefore will facilitate to design transport policy measures that help to make the best possible use of the given infrastructure.

The present study is organized as follows: chapter 2.1 summarizes the existing literature focusing on the impact of infrastructure investment on output (growth) as well as on studies on the relationship between transport costs and trade, between trade and economic growth. Additionally, studies on the location decision, production structure and economic growth are examined.

**An econometric analysis between transport costs and trade volume and between trade volume and GDP at the regional level**

The empirical part starts in chapter 2.2 with an econometric analysis of the relation between changes in transport costs and trade volume, which subsequently affects economic growth. Chapter 2.2.1 applies gravity equations to analyze the effect of transport cost on trade volume on a regional level. The relation between trade volume and GDP growth is studied empirically in chapter 2.2.2.