2. Theoretical Framework

2.1 Introduction

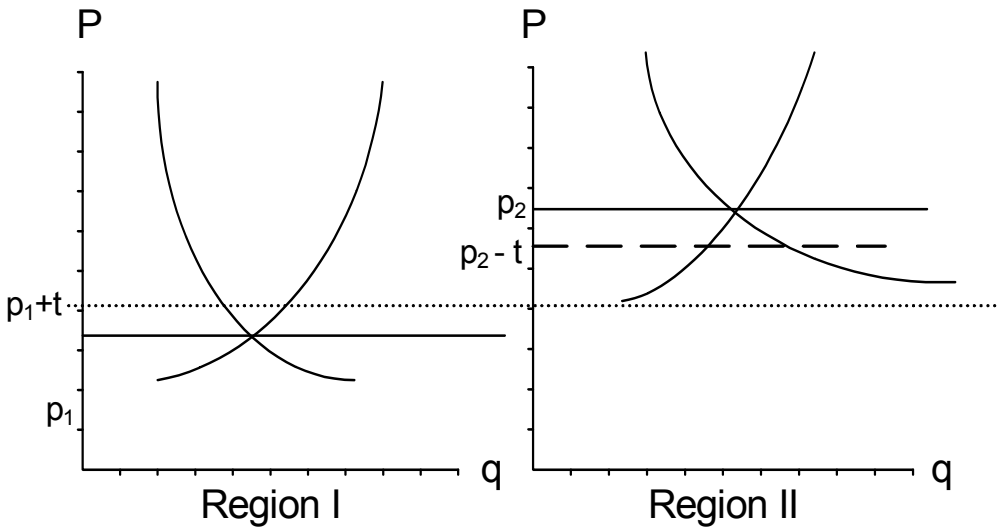
This chapter identifies and discusses the effects of economic integration and the importance of transport costs in explaining the location of economic activities, presents the neoclassical view of how transport infrastructure influences trade between regions, and introduces the concept market integration. It discusses the complexity of the determinants to transport costs and how the market for transport services matters for the final transport costs for freight. The theoretical framework used for this dissertation utilizes a set of different theories in order to develop a suitable model for analyzing market integration in conjunction with the freight transport service sector.

The differences between these ideas are related to the spatial dimension in market integration and, in particular, the lack of an explicit discussion of spatial issues in most of the analysis based on the neoclassical view. The study does not intend to provide a complete picture of all the likely effects economic integration arrangements have on the economy. Such a description would need to be based upon a broad number of theoretical areas, and would be of little use for the aim of this dissertation. Since the present study is based upon a field study of spatial price patterns of a homogenous retail product and freight rates, the focus is primarily on identifying and describing the theoretical linkages between market integration, transport economics and marketing channels.

The aim of the present chapter is twofold. First, the chapter aims at presenting a macro framework based on traditional theories of trade, regional integration together with a discussion of the difference between market integration and market efficiency. This framework highlights the importance of trade costs for economic growth and development. Then the chapter introduces the importance of transport costs by describing and analyzing these costs based on the demand and supply for transport. This theoretical analysis is thus concerned with the relationship between trade costs, spatial market integration, transport and the market for freight transport services.

The second aim of this chapter is to describe the complex relationship between transport costs and the market for transport services by using theories from marketing channels. This part focuses on the complex relationship within the market for freight transport services and this complexity's influence on determination of transport costs.

Figure 2.1 Trade based on difference in supply and demand between two locations Region I and Region II



Source: Based on Rietveld P. & Nijkamp P. (2000: 211)

Figure 2.1 illustrates the standard neoclassical model of interregional trade and the impact of transport costs on trade volumes. In autarky, Region I exhibit lower prices for good X than Region II, because of lower production costs – in other words, Region I has comparative advantages in production of X. Whether trade will occur, and how large the traded volumes will be, depends on the efficiency of the transport system and the transport costs. If the transport costs exceed the difference in price between regions ($p_2 - p_1$), there will be no trade: taking into account the transport costs, imported goods will be more expensive than domestically produced goods. A reduction in transport costs will stimulate trade between the two regions. For example, if transport costs fall to the level

illustrated by ($t - p_1$), goods from Region I will appear attractive in the market of Region II. Consumers in Region II will wish to import good X, while producers in Region I will be interested in exporting good X. Equilibrium occurs when the import demand from Region II is just equal to the export supply from Region I. The equilibrium prices in both markets also change. In the importing region, the price falls, but never below ($p_1 + t$); since it is the lowest possible import price including transport costs. In the exporting market, the price increases, but never above ($p_2 - t$), which is the highest revenue that an - exporter will be able to get from a foreign customer. The new international price will end up somewhere between these two extremes, depending on the supply and demand conditions in the two countries. If transport costs are reduced even more, the scope for international trade increases.

2.2 Regional Integration Theory

This simple analysis only hints at the overall effects of reduced transport costs: the static and partial character of the analysis is mainly able to show that the country or region with comparative advantages is able to increase its output, while the country or region with comparative disadvantages can reduce production of the good in question and focus resources on other activities.

A more comprehensive picture of the effects of improved efficiency in transport systems can be gleaned from theories on regional integration. These theories usually focus on other issues than transport costs – the key elements of most regional integration agreements are reductions in formal and informal trade barriers between the member countries – but the outcomes are often discussed in terms of reduced trade costs: from an analytical perspective, it can be argued that it does not matter much whether the reduction in trade costs emanates from lower transport costs or lower man-made trade barriers.

The theory of regional integration has passed through two phases: a neoclassical stage, which is based on comparative static effects (and in principle reflects the

discussion above) and a more sophisticated stage that draws on insights from modern trade theory and focuses on dynamic effects.

2.2.1 The Neoclassical Analysis of Regional Integration

The neoclassical analysis of the effects of regional integration focused on two phenomena: trade creation and trade diversion (Viner 1953, Lipsey 1957; 1961). Trade creation was said to occur when the introduction of regional trade preferences allowed firms in one of the partner countries to capture market shares held by local firms in another partner country. Since this replaced a relatively inefficient producer (that had benefited from import protection) with a more efficient producer, it was expected that it would on balance improve welfare, both regionally and globally. Regional consumers would benefit from lower prices, and the producer surplus gained in the expanding industry would exceed the producer surplus lost in the contracting industry; at the same time, the rest of the world would not be affected.

Trade diversion, by contrast, was often expected to reduce both regional and global welfare. Trade diversion occurs when regional trade preferences allow firms from one of the partner countries to capture regional market shares that were earlier held by outside producers. The reason for expecting negative effects in this case is that more efficient producers are displaced by less efficient ones. To get into the market in the first place, when all foreign producers faced the same trade barriers, the outsiders must have been relatively efficient compared with the domestic producers. Hence, outsiders lose when their market shares diminish, and welfare losses in the integrating region itself are also likely, in spite of lower consumer prices and increased regional production: tariff revenue shrink when imports from the rest of the world fall, offsetting the gains in consumer and producer surplus.

However, over time, it has been recognised that the welfare impact of trade diversion may in some cases be beneficial to the integrating region. These situations occur when the substitution possibilities in consumption and/or production are relatively

large, and the cost disadvantages of regional producers (as compared to the most efficient outsiders) are relatively small. If the establishment of a regional integration agreement improves the terms-of-trade of the integrating region, it is even possible that a trade distorting customs union could raise the welfare of the integrating region above that the free trade (Markusen *et al.* 1995). Moreover, as pointed out by Kemp & Wan (1976), it is always possible to define a set of tariffs and subsidies to compensate outsiders, so that the global welfare effects of any customs union – even one with trade diversion – are positive.

However, whether the main impact of regional integration was thought to be trade creation or trade diversion, the welfare effects found in the quantitative assessments were typically very small – often less than one percent of GDP. One reason for the limited quantitative impact of this kind of neoclassical integration is that most regional agreements were between similar countries, where the potential gains from trade creation are relatively small. The members in most regional agreements exhibited similar factor price ratios and industry structures, whereas theory predicted large effects mainly when agreements included countries with widely different comparative advantages.

The neoclassical analysis of integration acknowledge that trade creation and trade diversion result in expansion in some parts of the integrating region and contradiction in other parts, but the determinants of this restructuring process are not very complicated. In the neoclassical world, the pattern of comparative advantage is large driven by factor endowments of each economy. These are believed not to be manipulated in the short term and therefore viewed as more static. Hence, when regional trade barriers are removed, factor price differences will automatically direct trade and/or investments to the appropriate part of the region (Lipsey 1968).

To conclude, the main contribution of the neoclassical integration theory is the systematic exposition of various forms of economic integration by highlighting the importance of the removal of institutional barriers to trade.

2.2.2 The Modern Analysis of Regional Integration

The modern analysis of regional integration is largely based on the assumptions that economies of scale are important and that reductions in formal tariffs are rarely sufficient to achieve true market integration – remaining non-tariff barriers to trade can lead to effective fragmentation of markets even when formal tariffs are very low. The assumption about increasing returns to scale is crucial in modern trade theory, and essentially means that most autarky markets will be characterised by imperfect competition. The smaller the market, the smaller the number of competitors, and the higher the price level. The reduction in trade costs that follows from regional integration is important, because it raises market size, and results both in better opportunities to exploit economies of scale and in an increase in the level of competition. This will reduce the price level, to the benefit of both producers and consumers. The benefits to consumers from lower prices are obvious, but producers also benefit. Unlike in the neoclassical analysis, there is an increase in external competitiveness (thanks to tougher competition and economies of scale), which benefits both import competing firms and firms exporting to third countries. This increase in external competitiveness appears to be an important motive for costly regional integration. For instance, the European Single Market project arguably emerged as a response to tough competition from the US and Japan in industries with significant economies of scale. As long as Europe was fragmented into a large number of more or less insulated national markets, it was obvious that the leading American and Japanese producers would be larger and more competitive than the typical European producers (see Cecchini 1988).

The introduction of scale economies and imperfect competition also results in dynamic benefits from integration. While the benefits in the neoclassical model were thought of as one-time improvements in resource allocation, modern theories stress the existence of cumulative benefits. Larger firms that operate in more competitive markets do not only have a static advantage, but also an ability to grow faster over time. This dynamic advantage is mainly related to the ability of larger firms to take on larger fixed

costs for R&D, which is expected to result in faster innovation, both in the form of new products and more productive technologies.

To achieve these dynamic benefits, it is necessary to go beyond simple integration agreements like preferential trade agreements or free trade agreements, and focus on more complex integration, such as common markets or even currency unions, where producers in the different member countries compete under the same set of institutional rules and restrictions. While the neoclassical model of regional integration is clearly applicable for the analysis of the effects of reductions in transport costs – since simple integration agreements can often be proxied as reductions in trade costs – it is relevant to ask whether modern theories can also be used for the same purpose. The complex institutional changes that follow from sophisticated integration agreements like the European Single Market can hardly by captured by a simple one-dimensional measure such as a reduction in trade or transport costs. However, as long as the analysis focuses on the reduction of transport costs within a single country, it can be argued that it is appropriate to draw on modern theories. The formal institutional environment, including not only laws and regulations but also the currency regime, is already harmonised, and the reduction in transport costs mainly serves to make the relevant market larger.

The modern integration theory emphasises concepts such as economies of scale, imperfect competition but also acknowledges distance and other geographical factors to a higher extent than the neoclassical integration theory, which largely ignore space and location. This shortage of earlier research is highlighted by Frankel (1997), who notes that the neoclassical integration theory does not attempt to explain the geography of trade such as the source or destination, but rather focuses on the total trade of a country. He argues in favour of making geography, a part of trade theory for three reasons; distance between a pair of countries is an important natural determinant of the volume of trade between them; and countries that are located close together constitute a natural trading bloc, by which he mean that a reduction in the trade barriers between them can be economically beneficial.

Concepts like economies of scale, imperfect competition, and competitiveness are all highly relevant when the effects of reduced transport costs in a fragmented national market like Lao PDR are studied.

While the broad macro framework for the present study – which is based on theories of trade and regional integration – highlights the importance of trade costs for economic growth and development and identifies some of the expected effects of reduced trade costs, it leaves one important area unexplored: the market for transport services. The changes in trade costs (including transport costs) are treated as exogenous events or policy variables, and little is said about why and how transport costs vary between locations or change over time. A more thorough understanding of the role of transport costs therefore requires a careful analysis of the market for transport services.

The remainder of this chapter will therefore focus on two issues. First, to bridge the conceptual distance between the theories of regional integration discussed above, which deal with interactions between countries, and the focus area of this dissertation, which concerns interactions between regions in one country, the reminder of this chapter will discuss the relation between market integration and development in some detail. Thereafter, the chapter focus on a theoretical and conceptual discussion of the market for transport services, freight channels with a particular attention on the determinants of transport costs.

2.3 Spatial Market Integration

Spatial market integration is defined as the extent to which demand and supply shocks arising in one location are transmitted to other locations within a market rather than the broader scope regional integration discussed above (Fackler 1996; McNew 1996; McNew & Fackler 1997; Fackler & Goodwin, 2001). The spatial market integration theory borrows its theoretical foundation from the modern integration theory as its focus dynamic effects of integration. Observing direct flows of traded products between two spatially distinct markets is a sufficient but not necessary condition for some degree of

spatial market integration (Barrett & Li 2002). Direct trade linkages between regions are not necessary for spatial integration because if regions belong to a common trading network then price changes may be transmitted indirectly through the trading network (Fackler & Goodwin 2001).

Markets that are not well integrated may transmit inaccurate price information that distorts marketing decisions and contributes to inefficient product movements (Goodwin & Schroeder 1991). Within a completely integrated market, the price of a homogenous goods will converge, and the economic law of one price will hold: competition will drive down consumer prices to production cost plus necessary transaction costs.

The efficiency of the market system is important for sales of industrial goods, but also for sales of handicrafts produced by local households, and for the households' ability to access consumer products at local markets (Sadoulet & de Janvry 1995). Efficient distribution systems with low transaction costs are expected to transfer goods produced elsewhere to the local consumer at a competitive price, at the same time as local producers can get a competitive price for their commodities (Carter & Ferrin 1995; Pelton *et al* 2002). Geographical factors such as location, distance to markets, and road accessibility naturally have a significant impact on the costs of intermediate and final goods (Christaller 1933; Hoover 1948; Berry 1967; Gramlich 1994). This means that transaction costs – including trade costs, transport costs and costs for retrieving information about prices and market conditions – can have a direct effect on households' opportunities to increase their income by participating in the market economy (Arrow 1969; Wen 1997; Gannon & Liu 1997; Banister & Berechman 2001).

This is of special relevance in countries where large parts of the population are involved in agricultural production based on self-sufficiency and where production within individual households determines the levels of consumption (Ali & Pernia 2003; Deaton 1997). Self-sufficiency and isolation are seldom voluntary phenomena, but rather

consequences of poor transportation infrastructures and high transport costs (Ahmed and Rustagi 1984).

Market integration has usually been conceived in terms of the co-movements or long-run relationship between spatial price patterns (Fackler 1996). However, market integration is neither necessary nor sufficient for market efficiency, so that tests for integration do not always generate correct inference regarding spatial market efficiency (Fackler 1996; McNew 1996; McNew & Fackler 1997; Fackler & Goodwin 2001; Barrett & Li 2002). It is often argued that the conventional methods assume stationary spatial marketing margins, stationary transfer costs, and/or that markets are linked by a constant trade pattern for example in a distribution system of a specific product. However, these assumptions are often violated and so the resulting test of market integration can be misleading and have adverse consequences on policy decisions.

The development of a model testing market integration for markets of a particular commodity represents one attempt to make the distinction between market integration and market efficiency. When data on prices, transfer costs and trade flows are simultaneously available, a test for the degree of market integration can be conducted (Deaton 1988). In cases where it has been used to analyze the effects of marketing policy changes on spatial market efficiency, the effect of policy changes is assumed to take time to be implemented. This is explained by the assumption that it may take some time for the traders to learn and understand new marketing policy changes, assess its implications for reorganizing their businesses, make new investment and disinvestment decisions, and to access resources required to make the necessary adjustments in response to policy changes.

Knowledge of the time path of effects of market reform on spatial market efficiency would be very useful for properly assessing the effects of marketing policy changes, and for designing marketing policies, institutions and marketing and transport infrastructure (Fafchamps & Gavian 1996). Thus, there is a need to improve and extend the standard methods for testing market integration so that it allows for gradual transition

between spatial market efficiency states as a result of changes in the policy environment, and to develop a test of whether structural changes in spatial market efficiency are statistically significant. However, this implies access to time series data on transfer costs which are rarely available, particularly in developing countries. As a result, most empirical studies have assumed transaction costs are equal to a constant plus a serially uncorrelated error for a given marketing policy regime (Sexton *et al*. 1991; Fafchamps & Gavian 1996; Baulch 1997; Barrett & Li 2002; Penzhorn & Arndt 2002).

However, this assumption is very restrictive, particularly when the objective is to analyze the effects of policy changes including changes improving the transport system. This is because if transaction costs are assumed to be equal to a constant plus a serially uncorrelated error when they actually fluctuate systematically over time, then the models may misinterpret spatial price changes as evidence of inefficiency when they are actually just a rational response to changes in transaction costs. Thus, there is a need to go beyond the conventional constant transaction cost assumptions and find better ways of using data that are available to construct more appropriate inferences about historical movements in transaction costs including changes in the market for freight transport services.

Moreover, an improved market situation reduces the width of price bands (Sadoulet & de Janvry 1995; Badiane & Shively 1998) and households are able to increase the diversification of income earning activities and interact at markets in order to sell oversupply and access necessary input goods. Binswanger *et al.* (1989) highlight imperfect markets with high transaction costs and identify the following conditions to have relevance for the degree if market integration:

- Geographically scattered population with low population density.
- High transportation costs as a consequence to lack of transportation infrastructure.
- Seasonal rainfall causing seasonal demand for agricultural labor

• Simple technologies without significant economies of scale

2.3.2 Differences between Market Integration and Market Effeciency

In spatial price analysis, the terms market efficiency and market integration are very widely used and sometime the terms are used interchangeably. However, there has been a growing recognition that these two terms are related but not equivalent, and that there is a need to distinguish between them (Fackler 1996; McNew 1996; McNew & Fackler 1997; Fackler & Goodwin 2001; Barrett & Li 2002). Market efficiency is an equilibrium condition whereby all potential profitable spatial arbitrage opportunities are exploited. Spatial efficiency is reached when the optimal amount of trade in a particularly product between two or more geographical locations takes place. This optimality condition requires difference in price between two location to be less than or equal to transaction costs. If there is no trade, a spatial price differential less than transactions cost is also consistent with spatial market efficiency. However, if the spatial price differential is greater than transaction costs, the market is inefficient either with or without trade.

2.4 Transport Costs

Until the 1960s, transport costs were seen as one of the main factors explaining the location of economic activities. This view lost some of its importance during the early 1970s, mainly related to two reasons. Firstly, a number of empirical studies during the 1960s and early 1970s showed that there was no simple relationship between transport investments and development. In some cases improved transport to peripheral regions even led to the closure of economic activities due to increased competition from imports (see e.g., the discussion in Hilling 1996). Secondly, patterns of industrial location changed. As a result, regional development and later internationalization and globalization came to be seen as processes influencing the location of large multinational corporations (Massey & Meegan 1979; Fröbel *et al.* 1980). Even if low transport costs were recognized as a prerequisite for the process of dispersion of production facilities that ensued, it was generally assumed that transport costs were (and would remain) so

low that they no longer had any importance for the location of production – instead access to cheap labor and input goods gained importance, and agglomeration became an increasingly important location determinant (Bairoch 1988).

Dicken (2003) discusses the decreasing importance of distance from a historical perspective, as a result of improved transportation technologies, but does not go further in explaining the underlying links between economic development, improved transport infrastructure, and reduced costs of transport services. The discussion about the diminishing importance of transport costs reveals a number of problems. First, the average per unit costs of transportation of a certain distance has been reduced, but overall transport costs have generally not decreased, because the amount and length of transport used in production processes have increased as rapidly as the unit costs have decreased (Dicken 2003). Thus in spite of reduced unit transport costs for a given freight distance, the size of the transport sector as a share of GDP has generally not decreased (Baldwin & Martin 1999 and Hummels 2007).

Secondly, although unit costs of transport and communication have decreased, the reduction is not uniform across all types of commodities and consignments, all types of communication, and all origins and destinations (Gallup *et al* 1999). In fact, transport and communication costs depend increasingly on the availability of infrastructure and the density of demand for specific links (Combes & Lafourcade 2001). Here, developing countries – in particular, poor landlocked countries– face particular problems in connecting to the international transport network (Venables 2001).

Thirdly, although international trade and production have grown rapidly and products are increasingly transported around the world, the percentage of the work force even in industrialized countries producing directly for a non-local market has only changed marginally during the last hundred years. Merchandise production has become more and more efficient and employs a decreasing share of the work force. Therefore, even if transport costs related to production of specific goods have fallen, their share of the total production costs may not have (Hummels 2007). It also means that the local

production environment and production for the local market remain important in spite of globalization.

Fourthly, the current trend towards globalization implies an externalization of production and service functions that used to be performed in-house, and a regrouping of enterprises at a larger national, international or global scale. As a result, transport costs have often become more difficult to trace because they are part of intra-firm transactions or hidden in aggregated payments to suppliers and subcontractors. However, more importantly, internal transport, communication, and storage costs have become partly substitutable with external transport and communication services. Enterprises no longer attempt to minimize their external transport and communication costs. Instead they try to minimize their total logistic costs, including the costs of both internal and external transports, storage, and transaction costs, covering the costs of both internal and external communication of negotiating contracts and favors with other enterprises and public authorities. These costs are often much larger than the external transport and communication costs.

The possibility of substitution between internal and external logistic costs increases the importance of the local and regional production environment, comprising both private production and service enterprises and public infrastructures and services, which can help to increase efficiency. Therefore transport costs rarely seen as an isolated element, as they were in the old location theories, but rather as an integral part of the dispersed production process. At the same time, the different modes of transport must be seen as related to each other as links in a transport chain – of which other services such as storage, packaging, forwarding, trade finance and insurance may also be part. Thus, the effect of a transport investment cannot be studied at the level of the individual investment. To understand the effect of transport on economic development one must focus on the transport system as a whole and the way it is integrated into the processes of production, distribution and consumption.

In this much broader perspective transport is now attaining new importance as a factor structuring economic development (Evans & Harrigan 2005). For instance, access to more efficient transportation and logistics services can facilitate changes in both the composition of trade and the destination of trade flows. This can be illustrated with reference to the location decisions in e.g. the textile industry. Initially, production was concentrated either to the main markets or the sources of raw materials. Over time, access to cheaper and faster transportation services facilitated specialization and outsourcing of production to locations with low wage costs. However, shorter product life cycles and demand for shorter transport times have began to outweigh the advantages provided by lower wage costs, leading to relocation of production facilities. Evans & Harrigan (2005) give some examples of apparel production outsourced from the United States to Asia that has relocated to higher wage locations in the Caribbean and Mexico; similarly, Eastern European apparel producers have recently been able to win market shares from East Asian producers, in spite of higher labor costs Short production cycles and more uncertain demand for the products can also be motives for agglomeration as firms need to locate near suppliers (Harrigan & Venables 2006).

An important observation in this context is that cost reductions in the transport sector are not only driven by technical progress, but also by government intervention. Deregulation, liberalization, and infrastructure investment are examples of public interventions that are likely to influence the level of competition in the market for transport services. Increased competition, in turn, can be an important driving force for reductions in transport costs. An illustration of this is the deregulation of international air traffic, which has not only led to the emergence of new low-costs carriers, but also forced incumbent carriers to reduce their prices.

In recent years, there have been an increasing frequency and importance of interactions between markets at all spatial levels, from local to global as described above. Efficient transport systems are crucial in order to overcome the friction of distance as enterprises expand in order to enter new markets on all spatial levels. There have also

been an increase in the importance of national and international production networks, where production units are geographically separated from each other, located at different places, in order to exploit differences in production costs and make use of the specific comparative advantages of each region or country. Reliable and efficient communications networks together with well functioning distribution systems are essential for the operation of these global production networks, which arguably constitute the essence of our modern global complex economic system (Nijkamp *et al.* 1990). Countries with well developed markets where institutions and actors interact with relatively high efficiency have been the main objects of study in extant academic literature (see for example Aschauer 1989a, b; Munnell 1990 and 1992; Gramlich 1994 on issues related to infrastructure investments and productivity and Bowersox *et al.* 2000; Button 1993; Hoyle & Knowles 1993; Ligt & Wever 1998 for research related to transport and logistics).

Efficient market systems with low transaction costs are able to transfer goods and services to the final consumers at a low price. Weakly developed economies with a large share of the population living in rural areas often suffer from low levels of access not only to the global markets, but also to domestic services such hospitals, schools and markets due to insufficient transport networks (Warr 2005).

Academic literature provides a number of indications of a renewed interest in the relationship between transport and development. It is evident in the increased focus on geography, space and agglomeration economies in new economic geography, growth, and international trade theories (Brakman 2003 and Krugman 1997), and in the increased focus on trade and services in studies of local as well as global development. But maybe it is most evident in more recent attempts to establish links between transport and economic development at the macro level in studies of globalization (Janelle & Beuthe 1997) and in studies of the long development cycles which are sometimes explained in terms of shifts in sources of energy and means of transportation (see e.g. Rodrigue *et al.* 1997). However, these different approaches generally stop short of studying the

increasing integration between transport, production, and distribution taking place in the globalizing economy.

2.4.1 The Standard View of Transport Costs

In the most simplistic neoclassical theories of economics, the transportation sector is largely non-existent. The simplest models abstract from geography and space, and the actors in the market are assumed to interact without the friction caused by distance: the neoclassical economy can be thought of as a "point economy" where all economic activity takes place at the same point in space. However, the importance of geography has gradually been recognized even in mainstream economics literature (with *New Economic Geography*, represented e.g. by Nobel laureate Paul Krugman, as a particularly important area of research). Specific models for analyzing the transportation sector have also emerged. The purpose of this section is to describe the neoclassical perspective on the market for transportation, in particular transport demand and transport supply.

Similar to other partial equilibrium models, the simplest models for the transport sector identify a limited number of factors that are expected to influence the demand for any particular type of transportation, e.g. truck deliveries, and another set of factors that influence the supply of that specific kind of transportation. For example, Button (1993: 90) uses the following equation to illustrate transport demand:

$$Q_d = f(P_1, P_2, \ldots, P_n, Y, T)$$

Here, Q_d, which is the quantity of transport demanded in the market, is a function of the transport price (P_1), the prices of substitutes and complements ($P_2,...,P_n$), income (Y), and taste or preferences (T). This equation essentially treats transport as a homogeneous good and not as a bundle of services. A more sophisticated view of the market for transports would recognise that a transport system consists of a wide variety of services that are differentiated in terms of mode of transport, time and place. In his more complex setting, transport demand is not only a function of the price but also dependent

on time, access to the transport service, quality measures, reliability and competition on the market for transportation services.

Transport supply is typically expressed in terms of the capacity of transport infrastructure and transport modes within a spatially defined transport system during a specific period of time. Transport supply can be divided into the infrastructure (measured by capacity), services (frequency) and networks. The mass of freight transported per unit of time and space is commonly used to quantify transport supply. The set of variables influencing transport supply differs between different modes of transportation. For road and rail transport, supply is often dependent on the capacity of the routes and vehicles utilized in the process: this is called modal supply. Modal supply occurs when one mode influences the supply of other modes, or when several modes compete for the same infrastructure. By contrast, for air and maritime transport, supply is strongly influenced by the capacity of terminals, such as airports and ports. These modes are strongly dependent on transhipment capacity, and therefore described as intermodal.

The market for transport services is complex and there are several considerations to made when analysing the relationship between transport demand and transport supply:

- Entry costs. These are the fixed costs associated with the initial investment during construction of transport infrastructure and rolling stock and the variable costs arising during the operation of transport services such as maintenance, labour and fuel. These costs serve as thresholds for entry on the market for transportation services (Banister & Berechman 2001). Entry costs differs between modes of transport, with maritime, rail and air transport recording very high entry costs. The trucking sector has an advantage as entry costs are lower and trucking companies can adapt to changes in the demand for transport services. High entry costs imply that transport service providers will consider fluctuations in demand seriously before expanding by increasing their fleet or investing in new infrastructure. In situations with lower entry costs, transport service providers are able to respond more rapidly to fluctuations in demand: new firms are able to

enter when demand is high, while incumbents may leave without substantial losses if demand falls rapidly. This is in sharp contrast to the situation with high entry costs, when it may be equally rare to see new entrants as incumbents that leave the market. As a result, markets with high entry costs tend to be oligopolistic, while transport services with low entry costs tend to have more operators and higher competition.

- Regulation and public sector involvement. Transport markets are heavily dependent on public sector investments in infrastructure. The provision of transport infrastructure, especially roads, has commonly been the responsibility of governments (Taaffe *et al*. 1996). As a consequence, transport costs are often fully or partly financed by the government, and governments therefore control the use of the resource through various types of regulations. The government is also responsible for maintenance and in many developing countries transport infrastructure is one of the larger expenses for the government.

- Elasticity of demand. Refers to the variation of demand in response to a variation of the cost. Variations in transport costs have different consequences for different transport modes, although transport demand has a tendency to be inelastic (Hoyle & Knowles 1998). For users of transport services engaged in production of goods where freight costs are a small component of the total production costs (i.e. where the value/freight cost ratio is high), variations in transport costs have a limited effect on the demand for the final good, and hence for transport demand. Conversely, for goods with low value/freight cost ratios, demand elasticities tend to be relatively high. Moreover, industries where timely deliveries of input are crucial can be very sensitive to the quality of transport services: production delays caused by transport problems can be very costly. For these industries, it is common that the price elasticity of demand is low, although the "quality elasticity" may be very high.

2.4.2 Transportation Services as Facilitator of Economic Development

Historically, the development of transportation networks has reflected and induced settlement, industrialization, and urbanization. An idealized sequence of transportation development includes (1) scattered ports, (2) penetration lines, (3) development of feeders, (4) beginnings of interconnection, (5) complete interconnection, (6) emergence of high priority routes (Button 1993). Spatial interaction is the movement of goods between areas, countries, cities, and even places within cities. Transport improvements have resulted in convergence between cost space and between time and space.

Various studies have provided empirical evidence on the relationship between socioeconomic development and road transportation. Poverty is more pervasive in areas with no or unreliable road access (Gibson & Rozelle 2003). For example, in Nepal, there is a considerable difference in poverty between areas not connected by roads, where 70 percent are poor, and the national average rate of poverty, which is 42 percent. (Lebo & Schelling 2001). In Bangladesh, enrollment of girls in primary schools is three times higher in connected villages compared to unconnected areas (ibid). In Andhra Pradesh, India, the female literacy rate is 13 percent higher in villages with access to all weather roads compared to villages with limited road access (Gannon & Liu 1997). As these figures indicate, one of the major causes of poverty is geographical isolation. Improving the access and mobility of the isolated poor might provide opportunities to decrease poverty by increased access to markets and public services (IFAD 2001). With better access to transportation, previously isolated population groups can break away from their involuntary isolation and forced self-sufficiency, and increase their welfare by participating in market exchanges (Jacoby 2000). Lower transportation costs will be beneficial both because they will contribute to lower prices for those goods that are imported from other locations, and because they may rise the prices of the goods that can be produced locally (Hine & Riverson 1982).

In a broader context, these same forces can serve to raise the welfare of countries that become more integrated with their neighbors or with the world economy. Regional integration tends to reduce trade costs and facilitates the separation of production from consumption by reducing costs of market distortions induced by national policies. This means that the underlying comparative advantages can play a greater role, which may result in increased agglomeration (Tamura 1996). However, if transaction costs become small, then differences in costs across locations become less important, and the factor cost considerations of the neo-classical model becomes more important.

Road transport costs in developing countries are generally high. Rizet and Hine (1993) found in a comparison between Pakistan and three Francophone African countries that road transport costs in the African countries were 4–6 times higher than in Pakistan. The large difference was both related to African input costs that were much higher and African productivity that was much lower than in Pakistan. Although there are probably large differences in the productivity of the trucking industry among different African countries, it seems generally to remain poor. Trucks seldom drive more than 25,000 km and return freight is rare, both of which have a strong influence on the final price. There are a number of structural reasons for low productivity: the highly seasonal nature of the demand for transport, the generally low population and production density, general insecurity which makes night driving an exception in many countries, and the widespread use of old second-hand trucks, which need frequent repair.

A recurrent complaint of the trucking industry in many developing countries has been the poor maintenance of the roads, which leads to high accident rates and high costs of vehicle operation and maintenance. However, the poor maintenance standard has to a large extent been due to a rapid deterioration of roads caused by the inability (or unwillingness) of many governments to enforce axle load regulations (Fepke 1996).

A major change in the conditions for the trucking industry in many developing countries therefore has been the decision of the governments to strictly enforce axle load

regulation, (though hard pressed by the donors involved financing road construction, which made this a precondition for further support to road rehabilitation). Although enforcement of the axle load regulation reduce payload and led to increased transport rates, it also increase the travel speed (which with the heavy overloads were often very low) and reduced the vehicle maintenance costs and road maintenance costs.

However, high transport costs are not just due to structural factors, but often also to poor management and a non-competitive market (Hine 1982). One of the reasons for the limited development of the trucking industry in developing countries has been that freight service operators have been under state ownership and large private industries generally operated their own in-house fleet of trucks. In the freight service sector this served to limit the development of an independent domestic trucking industry and reduced the productivity of transport: generally it is more difficult for in-house transport to secure return freight and utilize vehicles outside the peak periods than it is for a transport company serving several customers (Bonnafour 1993). In agriculturally related transport with large seasonality this has been problematic (Dawson & Dey 2002).

As a result, the independent trucking industry in developing countries was developed primarily to serve the transit traffic between the ports and the landlocked countries (McCormick & Pedersen 1999; Banomyong 2000; 2004). However, since the mid-1990s increased competition due to trade liberalization has been changing this pattern rapidly. Many large manufacturing enterprises are now selling their trucks and outsourcing their transport services to specialized transport firms. Interestingly Alokan (1995) draws the opposite conclusion from Africa, where Nigeria went through structural adjustment that was associated with a restriction of imports and therefore had a different impact than in Eastern and Southern Africa. While transport to a large extent was outsourced during the oil boom in the 1970s (and the early 1980s when the economy was based on heavy borrowing) when it was easy to import, structural adjustment in Nigeria led to a more inward looking economy and also an increase in in-house transportation.

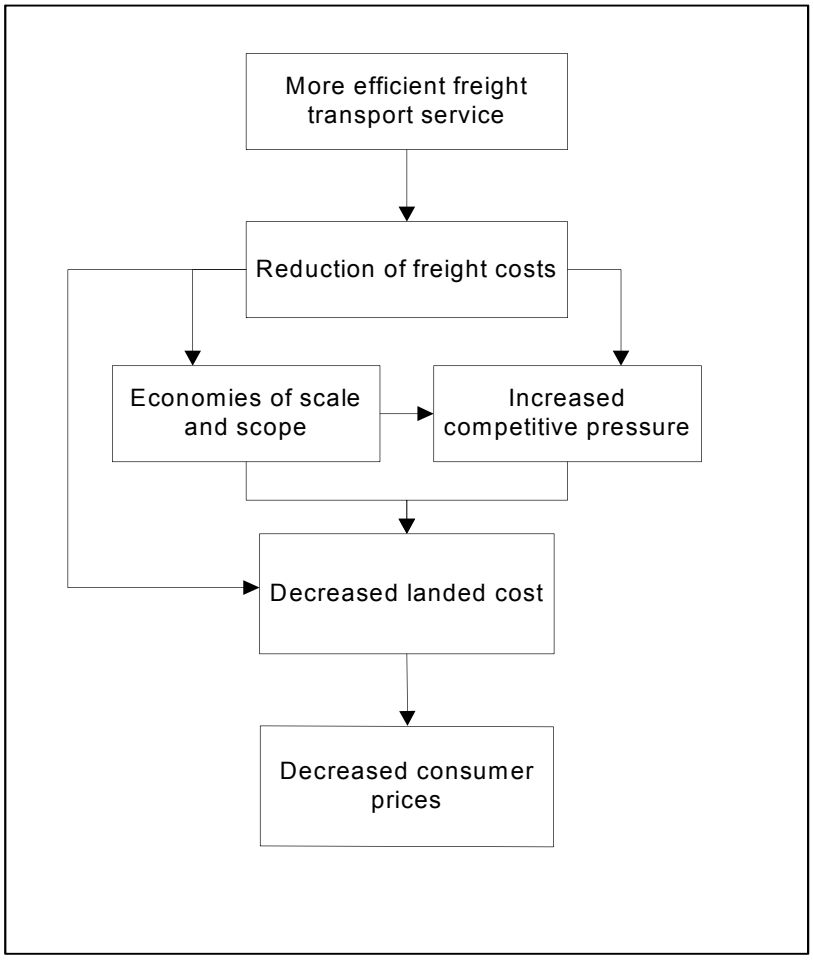
2.5 Freight Transport

Emerging markets that are dominated by a self-sufficiency economy based on production of agricultural products give room for households to manage the exchange and distribution of goods without the involvement of specialized firms providing logistics services such as transportation, packaging, and storing. Connectivity to markets is a starting point for the development of a marketing system and the process can provide interesting insight to how the markets function before intensive integration with external (international) markets has taken place. Exchange relationships in marketing and freight channels often relate to firm to firm relationships to solve the end consumers' final demand which can be illustrated by intermodal transport when several transport modes are used for transport activity.

In the context of emerging markets, there might be scope for focusing at the household level and the household's interaction with markets when studying and estimating the efficiency of freight channels and how well markets mechanisms function to connect demand and supply. The basic approach would be to use locally produced goods such as agricultural products such as rice, consumer goods such as beer with one domestic manufacturer and imported goods and estimate the transaction from the point of entry on the market until it reaches the final consumer.

Mapping the evolution of freight channels in an emerging market can contribute both to the understanding of how efficiency of markets mechanisms can be measured and how these measures can be applied in other contexts where market mechanisms are under development. The focus in the academic research related to freight channels is on developed economies where there is a well developed institutional framework to govern markets by rules and regulations, where the exchange of information is transparent and where there is well developed infrastructure to support the physical distribution of the products.

Figure 2.2 Effects of Efficiency Gains in the Freight Sector and Redistribution Effects from Interregional Trade



Source: Based on Rietveld P. and Nijkamp P. (2000: 212) and Engström (2004: 5)

Figure 2.2 captures the earlier discussion linking the relationships between increased interregional trade, decreasing transport costs and the importance of an efficient freight sector. According to Figure 2.2 decreased transport costs will have three effects. Firstly, a direct effect on the landed cost which will decrease as a consequence to lower freight costs.

However there are two indirect effects which also influence the landed costs. The economies of scale and scope will be expanded as the manufacturing industry. Recalling the theoretical discussion about trade costs in section 2.1 where interregional trade is depended on the price difference between the trading regions. If trade costs in one region decrease then the scope for exporting goods from this region will increase. Figure 2.2 link the discussion about increased competitive pressure within the transport service with the increased competition between manufactures which at last results in lower consumer prices.

The following section discusses the organization and management of freight transport channels in general. There are three different foundations of management and organization of the freight transport channels. The foundations include power, trust and commitment, and market setting. The latter is used in those channels where no pronounced leadership exists. The firms might, in this case, be of equal size. The first two bases, power and trust and commitment are to be seen as two extreme foundations. When power determines how the organization and management issues in the freight transport channel are dealt with, there is one dominating actor setting the rules for how the channel should be operated. The different bases for exerting power typically result in many firms involved having some degree of power. In the other extreme, where trust and commitment is the base, decisions, organizations, and management of the channel are taken to a certain degree in consultation between the involved actors. Between these two extremes, we find the market-based solutions in which a combination of the extremes is used in forming the freight transport channel. In a context with low levels of transport and communication technology, trust becomes of large importance as exchange of information can be hard and time consuming.

2.5.1 Channel Concepts

There are numerous channel concepts and the following presentation is aimed at presenting the key concepts related to marketing, distribution, freight, logistics channels and supply chains (Weitz & Wensley 2003). A theoretical framework can be developed

from the extensive literature relating to channels with a simple definition for marketing channels as *"the group of channel members to which a set of distribution tasks has been allocated"* (Rosenbloom 2004: 21). The evaluation of theory on channel structure emerge from emphasize on the length of the channel to the study of the intensity and functional responsibility within the channel (Ibid; Robicheaux & Coleman 1994; Stern *et al.,* 1996).

The distribution channel refers to the actual movement of goods providing time, place and possession utilities (Bucklin 1966). Stern & Heskett's (1969) definition focuses on the different actors in the channel: *"A channel of distribution shall be considered to comprise a set of institutions which perform all of the activities (functions) utilized to move a product and its title from production to consumption."*

Later on, end-user requirements and channel members resources were introduced in the analysis of the structure but still focus was on the dimension of channel length (Bucklin 1966). Functional specialization and its implication for time usage and cost effectiveness were applied by Mallen (1973) by introducing the business function's purpose to minimize total distribution costs. Sharma & Dominguez (1992) take this development a step further and propose a relationship between macroeconomic factors and channel length. They argue that a nation's economic development and typical channel length varies as long the nation's economic development. Channels are often longer during early stage of the development but shorten as the economy grows as a consequence to increased efficiency. Sharma & Dominguez (1992) proposed a framework for analyzing channel evolution via a comprehensive model for analyzing the environmental forces that affect channel length. Their explanatory variables included economic development; adherence to culturally entrenched shopping behaviour, management style, government intervention and the degree of urbanization. Samiee (1993) proposed similar variables for studying distribution structures in developing economies. The evolution towards shorter channels may be explained by two phenomena: (i) as the economy further develops and becomes more service oriented, there is less of a

need for indirect channels; (ii) the growth of urban centers encourages vertical integration in channels in order to improve efficiency.

The present study focuses on the market integration of a homogenous retail product, the physical flow of the specific product and the determinants of freight tariffs in the Lao freight transport service sector. In the much broader concepts distribution and marketing channels include actors which are not only involved in the physical distribution for example by providing coordination of the services, perform loading and unloading or stock taking. Therefore this dissertation narrows the scope of freight transport channels to define the concept as a set of interdependent organizations involved the dynamic process of moving a product towards the location of consumption.

2.5.2 Determinants of Freight Tariffs

Freight tariffs can be categorized as a combination of terminal costs and line-haul costs. Terminal costs are fixed costs and are incurred regardless of distance involved. Line-haul costs are variable costs that are related to transport distance, road conditions and level of maintenance. Specific freight tariffs are determined by two sets of factors. The first set of factors relates to the nature of the commodity and include following variables:

1. loading and packaging costs;
2. vulnerability to loss or damage;
3. shipment size;
4. regularity of movement;
5. special equipment and services and;
6. elasticity of demand, where elasticity of demand is the degree of responsiveness of a good or service to changes in its price.

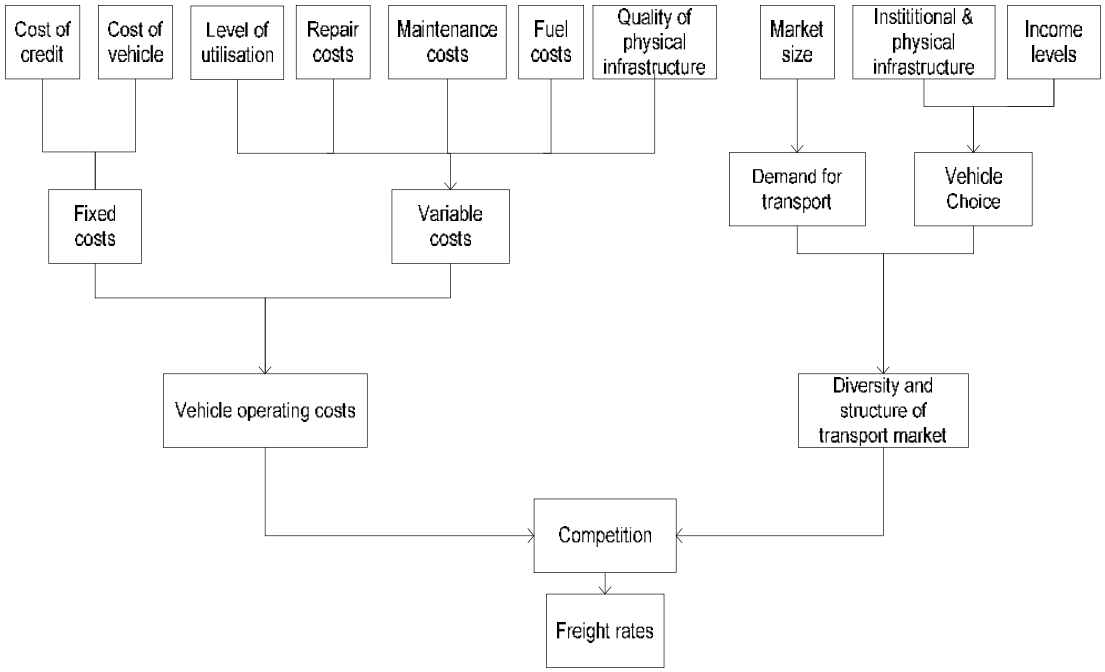
The second set of factors relates to the characteristics of the market for freight transport operators and the routes which include:

1. carrier competition;
2. route demand and;
3. backhauling.

Transport rates are also affected by the nature of the policies governing the mode of transport. For example, shipping is characterized by market orientated principles while aviation traditionally has been based on government intervention and strong regulations. Transportation costs are of crucial importance for industries that are raw material seekers and market seekers, but less important for industries dealing in materials and final products that are of very high value in relation to their weight. This dissertation is concerned with the role of transportation as a facilitator of the demand for an increasingly integrated national market in Lao PDR.

An important point to note in connection with the efforts to improve transport infrastructure is that just roads are not sufficient to generate further growth and integration (Dawson and Barwell 1993). A road in itself is not a sufficient condition for socio-economic development and economic growth, but rather a necessary condition, in the sense that the road makes up one part of the enabling environment. Ellis and Hine (1995) argue that decreasing transport costs are also dependent on Vehicle Operation Costs (VOC) and the level of competition on the transport market.

Figure 2.3 Determinants of a Transport Tariff



Source: Adopted from Ellis and Hine (1995)

In order to understand the structure of the freight system in a national transport system, it is important to identify the components affecting the size of the transport tariffs. Figure 2.3 sets out a basic framework linking the major features of the market to the final tariff. The left side deals with vehicle operating costs and those factors that affect fixed and variable costs. The right hand side of Figure 2.3 deals with the operating environment of the transport service providers, including factors related to market structure such competition and market size. A component such as availability of credit can influence both sides of the model as cost of credit directly influences the vehicle operating costs but also the choice of vehicle. These components are grouped under institutional infrastructure and include the degree of regulation in the market and the back up infrastructure serving reparation and sale of vehicles.

Vehicle Operating Costs are divided into fixed and variable costs. Fixed costs are a function of the price of credit and vehicle price where the lower cost of vehicles and credit influence the fixed costs to be lower.

Variable costs are a function of repair costs, maintenance costs, level of utilization, fuel costs and the quality of the physical infrastructure i.e. road quality and road coverage. Limao & Venables (2000) show that poor infrastructure accounts for more than 40 percent of predicted transport costs. The higher the quality of the road infrastructure, the lower the costs that is needed to be devoted to reparation, maintenance and fuel will be. However, these factors also have a direct impact on variable costs. Changes in either fixed or variable costs will obviously influence total costs, and may also affect he final transport tariff. How closely underlying costs are reflected in the final tariff depends on market conditions and competition.

Competition is perhaps the main factor influencing the efficiency of transport service providers. If price-cost margins are reduced by the entry of lower-cost competitors, this forces incumbent transport service operators to increase utilization and employ more efficient operating practices to ensure survival on the market. One of the determinants of the level of competition is the number of operators and the number and diversity of vehicles. Also the local conditions, such as the business environment and the openness of the local economy at the origin of the transport service provider, have an impact on the level of competition. This is especially important in the context of an economy in transition towards a market economy (Leinbach 2000).

Transport demand at large is determined by the size of the market. In rural areas, demand is related to population density and the intensity of agricultural production. Vehicle choice is affected by the type and quality of physical and institutional infrastructure, the vehicle backup service available, and the income level. Physical infrastructure affects the type of vehicles operating, for example, during the wet season or in mountainous terrain, where there may be a need for better trucks which higher capacity.

Institutional infrastructure influence the way policy makers promote the use of certain modes of transport. Institutional infrastructure also encompasses the availability of credit, and provision of markets. Vehicle back up services are related to the availability and quality of mechanics, repair facilities and the availability of spare parts. Section 2.5.2 discussed the market for transportation. Here, a more focused discussion of the determinants for road freight tariffs is conducted. Instead of distinguishing between supply and demand side determinants, the relevant literature typically distinguishes between the effects of VOH and market conditions.

2.6 Summary and Conclusions

The previous theoretical sections have been included for a particular purpose – they all serve to reflect and discuss the effects of economic integration and the importance of transport costs in explaining the location of economic activities by presenting the neoclassical and the modern views of how trade costs such as transport infrastructure influences trade between regions. Reduction in artificial trade barriers have implied that the relative importance of transport costs as a determinant of trade has increased (Amjadi & Yeats 1995).

The chapter focuses on the creation of economic interaction between countries and regions. Regional integration leads to increased economic activity between member countries due to the reduction of transaction costs, including not only customs duties and other regulatory barriers to the movement of goods, services and factors of production, but also transportation costs. As a result, the economies of the participating countries will be stimulated and may increase their growth rates. This is the positive effect from increased economic interaction. The negative effects from regional integration can occur in the form of new or higher tariffs and quotas on goods from third countries (countries outside the agreement), which leads to trade distortion. The individual country may not be able to set individual quotas or tariffs against countries outside the agreement. In these cases some products may become very expensive, which benefits producers located inside the agreement, and this may result in a welfare loss. Domestic producers who were

not able to compete with the producers outside the agreement will get an advantage and protection because of the expanded market (the area of economic integration).

An important conclusion of the theoretical discussion about regional integration is that transportation costs can be used to reflect barriers to market integration on a domestic spatial level as illustrated in Figure 2.1. Integration of a domestic market is rarely hindered by customs duties or other regulatory barriers to the movement of goods thus giving high priority to transport costs. The theoretical discussion about transport costs and its determinants hold a crucial importance for domestic market integration. This chapter highlights the importance of transport costs and market characteristics of the freight transport sector. Economies of scale, imperfect competition, and competitiveness within the freight transport sector are highly relevant for the level of domestic market integration.