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Logistics and Time as a Trade Barrier

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LOGISTICS AND TIME AS A TRADE BARRIER

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by Hildegunn Kyvik Nordås, Enrico Pinali and Massimo Geloso Grosso

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ABSTRACT

This paper analyses the relation between time for exports and imports, logistics services and international trade. Time is found not only to reduce trade volumes, but more importantly lengthy procedures for exports and imports reduce the probability that firms will enter export markets for time-sensitive products at all. Furthermore, a broader range of products are becoming time-sensitive following the proliferation of modern supply chain management in manufacturing as well as retailing. Labour-intensive products such as clothing and consumer electronics are increasingly time-sensitive and many developing countries urgently need to shorten lead time in order to stay competitive in these sectors. The report argues that reforms to this effect can be implemented at relatively low cost also in low-income countries. The study provides case studies as well as econometric estimates of the relation between time, logistics services and trade performance and draws policy implications.

Keywords: trade barriers, logistics services, international supply chains, GATS, trade facilitation.

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EXECUTIVE SUMMARY

This report analyses the relation between time for exports and imports, logistics services and international trade. Time is found not only to reduce trade volumes, but more importantly lengthy procedures for exports and imports reduce the probability that firms will enter export markets for time-sensitive products at all. Furthermore, a broader range of products are becoming time-sensitive following the proliferation of modern supply chain management in manufacturing as well as retailing. Labour-intensive products such as clothing and consumer electronics are increasingly time-sensitive and many developing countries urgently need to shorten lead time in order to stay competitive in these sectors. The report argues that reforms to this effect can be implemented at relatively low cost also in low-income countries.

In some developing countries the time for administrative procedures related to exports and imports *alone* prevents local manufacturers from exporting time-sensitive products. For entrepreneurs in these countries lengthy administrative procedures and inadequate logistics services constitute a substantial disincentive to invest in quality and to upgrade their products, since they cannot meet the reliability requirements typically found in markets for new and differentiated products. Consequently firms are confined to the domestic market and to exporting commodities and low value-added standard products where customers are less demanding.

The paper presents four case studies. The first two present the textiles and clothing sector in Bulgaria and the Dominican Republic respectively. Proximity to major markets gives these two countries the benefit of short lead time, which allows them to specialise in fast fashion products that command a price premium in the market. Both countries have held up exports reasonably well in recent years, in spite of higher production costs than for instance China. Yet, continuous improvements in logistics services are necessary for the two countries to stay competitive.

The third case study analyses the dairy industry in the Kyrgyz Republic. This is a landlocked country in a relatively stagnant region where transit arrangements with neighbours are crucial for export performance. The case study demonstrates how high levels of administrative corruption and state capture, poor quality of physical infrastructure and related services, inefficient institutional arrangements, and non-tariff trade barriers impede regional trade.

The fourth case study looks at exports of cut flowers from Kenya. The case study demonstrates how trade in transport services – in this case air transport – allows Kenya to exploit its comparative advantage in floriculture. At first flowers were transported by passenger flights, creating linkages between the tourism and the floriculture sectors. As export volume grew, dedicated cargo flights have become commercially viable. However, south-bound flights run almost empty due to lack of demand for time-sensitive imports in Kenya. This could become a constraint on future expansion in floriculture as competition increases. Recent developments towards direct imports by retailers are also a challenge to Kenyan exporters because this would shift more of the logistical activities, including packaging and testing to exporters.

The study next presents econometric estimates of the impact of time on the probability to export and on trade volumes for total merchandise trade, trade in intermediate inputs, fashion clothing and electronics. It is found that time has a large and robust impact on the probability to export, and the impact is strongest

in the electronics sector. Time also has a large impact on trade volumes, and again the effect is strongest for electronics. For fashion clothing, time appears to affect the probability to export, but not the trade volume. The study also identifies developing and emerging economies that would benefit the most from reforms that would shorten time for exports and imports. Among these are Albania, Kenya, Romania, Tanzania, Ukraine and Vietnam.

Removing unnecessary barriers to timely delivery is of utmost importance for developing countries. Trade facilitation is the lowest-hanging fruit in this respect. Liberalising logistics services such as services auxiliary to all modes of transport services, other related logistics services and non-core freight logistics services is another policy option where adjustment costs and regulatory capacity requirements are moderate, while gains can be substantial. This is particularly the case in developing countries where access to imported services can stimulate exports of time-sensitive goods. Trade facilitation and reforms in logistics services are, however, complementary. A sharp reduction in time for customs clearance would only reduce lead time if port services can keep up to speed as well – and vice versa. Enhanced liberalisation of transport services, while identified as a higher-hanging fruit in light of the more challenging policy and regulatory environment, could also significantly improve efficiency, including timeliness, and reduce costs.

LOGISTICS AND TIME AS A TRADE BARRIER

1. Introduction

1. It is no coincidence that cities and industrial clusters are located around good harbours or other nodes in transport networks. Easy access to food, industrial inputs and markets goes a long way in explaining the location of economic activities. One would, however, expect that with improved transport and communication technology, economic activity would become more evenly spread across the globe. This has not happened. To the contrary, better communication has led to increased geographical clustering of economic activities while the world's most peripheral countries have become increasingly economically remote over time.[1] This paradox is first due to the fact that as transport, communication and other trade costs come down, more is traded and trade costs remain as important as ever for location of production.[2] Second, remote areas become relatively more economically remote when infrastructure and logistics are improved in central areas. Better roads will encourage investment in bigger trucks that cannot economically service remote areas, better ports encourage investment in larger and faster vessels that bypass smaller ports and so on. For many developing countries this means that integration into world markets requires a long leap forward as far as availability and quality of transport and other logistics services are concerned.

2. Trade costs have both a financial and a time dimension and the latter has become increasingly important. This is best understood at the firm level where non-core activities are increasingly outsourced to outside suppliers who are expected to deliver their inputs just in time. An example can illustrate this: Ford, a car manufacturer, has contracted a logistics firm to organise the supply of components and parts for its factory in Toronto. The logistics firm organises 800 deliveries a day to 12 different points along Ford's assembly line from 300 different parts makers without being more than 10 minutes late on any delivery.[3] It goes without saying that supplies must be kept close to the assembly line in this case. It does, however, not necessarily mean that *suppliers* must be close to the assembly. Intermediary logistics firms can play an important role in matching suppliers and assemblers. In the case of standard components the logistics firms can hold buffer stocks and ensure timely delivery also when suppliers have longer lead time than the final customer demands.

3. Just-in-time is no longer only a feature of advanced manufacturing, it is also increasingly important in the retail sector, where the practice has been coined lean retailing. One example is fast fashion where new models designed on the basis of observed consumer behaviour are introduced at frequent intervals. This usually requires that suppliers are located close to the market where production costs can be relatively high.[4] Nevertheless, it is claimed that the higher production costs are compensated for by not having to resort to seasonal sales to clear the stock. One example of this is American Apparel, which is a vertically integrated clothing firm with production facilities in Los Angeles, employing 3000

---

1 See Redding and Schott (2003), Harrigan and Venables (2004), and Duranton and Storper (2005).

2 World trade increased from 23 to 47% of world GDP from 1960 to 2004.

3 The Economist December 7th 2002, Special Report Logistics.

4 See Evans and Harrigan (2005) for a recent study on U.S. trade in textiles and clothing.

people. It is the largest sewn products facility in USA, and the average wage paid to sewers is $12.50 per hour. The company also has a distribution centre in Canada and offers 2-days air-freight to Europe. It markets itself as a sweatshop-free, socially responsible company, which appears to be a successful competitive factor in addition to the product itself, which is mainly T-shirts for young people.[5] In Europe, Zara, a Spanish vertically integrated fashion clothing firm has rapidly gained market share based on the fast fashion concept. It takes two weeks for a skirt to get from Zara's design team in Spain to a Zara store almost anywhere in the world. Clothing is largely manufactured in Spain and Portugal at higher production costs than rivals that produce in China, India or other low-wage countries. Nevertheless, the company claims that higher labour costs are more than compensated by higher productivity, lower distribution costs and greater flexibility.[6]

4. The purpose of this paper is to shed more light on the extent to which time constitutes a barrier to trade. It will not only focus on how time affects the size of observed trade flows, but more importantly it will look at the probability that trade between two locations will take place at all. In order to do so, it is necessary to include countries that do not trade with each other in the analysis. Delivery time depends on distance between the trading partners, geographical and institutional characteristics and transport and logistics services. The study will attempt to disentangle the causality chain from logistics to delivery time, and from the quality of logistics services to market structure, including trade barriers and regulation of the transport and logistics services sector. It is recognised that the direction of causality can also run from trade to logistics services. Clearly, the higher the volume of trade, the more frequent calls of ships and planes are viable. The relation between trade and logistics services is thus a dynamic one where a virtuous as well as a vicious circle can prevail. This raises an important and intriguing question: Are the major barriers to trade in time-sensitive manufactures facing exporters from e.g. low income countries found at home rather than in the major export markets? If so, how can trade barriers be reduced through unilateral reforms, trade facilitation and liberalisation of the markets for services, and how can aid for trade help?

5. The study is organised as follows. Chapter 2 reviews existing research on time as a trade barrier. Chapter 3 presents case studies on trade in perishable agricultural products (dairy products and cut flowers) and fashion clothing. Chapter 4 presents econometric analysis of exports to Australia, Japan and the United Kingdom comparing total merchandise exports, exports of intermediate goods, exports of fashion clothing and exports of electronics. The three chosen export destinations are developed economies to which imports must arrive either by sea or air. This means that exporters face the same or at least very similar conditions at the receiving end, which allows us to focus on time for exports while abstracting from logistics at the export destination. Chapter 5 discusses policy implications and section 6 concludes.

2. Time, logistics and trade – how are they related?

2.1 The relation between time and trade

6. Time to market has two distinct effects on trade: first, it determines whether or not a manufacturer will enter a particular foreign market. This is a variable with two possible outcomes – enter or not enter. Second, time affects the volume of trade once a market entry is made. David Hummels (2001) made the distinction between these two effects in a careful and detailed study of U.S. imports. He found that an increase in shipping time of one day reduces the probability that a country will export manufactures to USA by 1.5%. Presumably delays due to other causes such as administrative procedures related to exporting or importing, delays on the domestic leg of the transport route - including waiting time for shipment - and delays related to testing and certification of goods will have the same effect on the

5 See http://www.americanapparel.net/mission/workers.html, accessed 01.03.2006.

6 See http://www.inditex.com/en accessed 01.03.2006.

probability of exporting to a particular market as has shipping time. There are three aspects of time that need to be considered when discussing time as a trade barrier:

- Lead time
- Just-in-time
- Time variability

7. *Lead time* is the amount of time between the placement of an order and the receipts of the goods ordered. It depends on the nature of the product e.g. whether it is made to order or if it is a "from the shelf" product. Lead time also depends on planning and supply chain management, logistics services and of course distance to customers and suppliers. Long lead time does not need to be a problem if delivery is predictable and demand is stable.[7] However, if there is uncertainty about future demand, long lead time is costly even when the customer knows exactly when the merchandise will arrive. If future demand has been underestimated, running out of stock has costs in terms of foregone sales and the possibility of loosing customers. If future demand has been overestimated, excess supply must be sold at a discount. Furthermore, the longer the lead time and the more varieties of the product in question are on the market, the larger stocks are needed. It is also important to notice that competitiveness on lead time is not a static concept. When some firms are able to shorten lead time, others must follow in order to avoid punishment in terms of discounted prices or at worst exclusion from the bidding process. The latter can happen when a critical mass of suppliers are able to deliver just-in-time and the customer finds it safe to reduce inbound inventories to a couple of days – or in some cases even a couple of hours' supply.

8. *Just-in-time* refers to a way of organising production where inbound as well as outbound inventories are kept to a bare minimum and inputs arrive at the factory at the point where they enter the production process. Finally, *time variability* is measured by the (statistical) variation in delivery time. The more variable the delivery time, the larger buffer stocks are needed. Thus, even if the average lead time is low, a high rate of variability can render a supplier uncompetitive and can be more damaging than having long, but predictable lead times.

9. While lead time mainly affects trade volumes, time variability in an environment of just-in-time production systems and lean retailing mainly affects whether or not a supplier will be eligible for bidding on a contract. Nevertheless, lead time can be prohibitively long, reducing trade volumes to zero. Thus, the distinction between the three aspects of time does not perfectly correspond to costs that affect market entry and costs that affect trade volumes, but in general costs that are independent of trade volume (time for administrative procedures, waiting time for testing etc.) mainly affect market entry, while time costs that are proportional to trade volume or value (insurance, storage) mainly affect trade value or volume.

2.1.1 Time as an entry barrier

10. There is not much empirical work estimating time as an entry barrier apart from the study by Hummels mentioned above. There are, however, theory developments that can shed light on the issue. A seminal paper by Kremer (1993) models production as a sequence of tasks and operations that all are essential. This means that if one task, operation or input is missing, the product cannot be finalised and it generates no revenue. The missing task or input will consequently nullify the value of all the tasks and inputs that have been performed in previous production stages. A less extreme version of the theory assigns a quality to the final product and assumes that in order for the final product to have the desired

[7] If demand was known months in advance, orders on the quantity demanded could be placed months in advance as well, and lead time would not matter much.

quality, all inputs must have the minimum required quality. Examples of this abound. A producer of upmarket clothing with high quality fabric and elaborate designs would not choose low-quality thread, zippers or buttons. Likewise, upmarket car producers would not dream of fitting a hundred thousand dollar car with a 50 dollar radio or a plastic dashboard etc. By the same token, there is no point in using high-quality fabric in a bright orange T-shirt made to last for the few months that bright orange is in fashion. Consequently an optimal strategy for an assembler will be to choose the same quality of all inputs. As demand for quality increases with more affluent consumers, demand for low-quality, low-price inputs may decline.

11. Adapted to just-in-time production processes, the theory implies that if just-in-time is introduced at one stage of the production process, it is optimal to synchronise the entire supply chain in order for it to operate smoothly. The chain is as strong as its weakest link and therefore all links should have the same strength. When just-in-time technology is introduced, delayed delivery of a component can hold up the entire production and cause costs that are much higher than the market price of the delayed component. Therefore, no discount can compensate the customer for unreliable delivery time, and firms with high variability of lead time will not be short-listed for contracts that require just-in-time delivery.

2.1.2 Time as a trade cost

12. Studies of the impact of time costs in cases when time can be seen as equivalent to a tariff are more numerous, but the body of research is still relatively small. Direct estimates of the tariff equivalent of time include the study by Hummels (2001). It estimates the tariff equivalent per day in transit to 0.8%, which amounts to a tariff rate of 16% on a 20 days sea transport route, which is the average for imports to USA. It is far and away above the actual average tariff rate.

13. Recent studies that introduce time for exports from the new Doing Business Survey into gravity model estimates find that a 10% increase in time reduces bilateral trade volumes by between 5 and 8% (Hausman et al., 2005; Djankov et al., 2005). These estimates are low compared to estimates of the impact of transport costs on trade flows. Limao and Venables (2001) for instance find that a 10% increase in transport costs reduces trade volume by 20%. The two studies of the impact on time for exports do, however, suffer from a downward bias since they ignore zero trade flows. In section 4 below, estimates taking the zero flows into account are presented and our estimates are generally higher than the two mentioned studies, ranging between 5 and 25% reduction in trade value for every 10% increase in time for exports, depending on sector and export destination.

14. Time costs have been reduced through a sharp fall in the cost of air transport, faster ships and more effective multi-modal transport. The relative cost of air transport has for instance declined by 40% between 1990 and 2004 (Harrigan, 2005) while average shipping time to the United States has declined from 40 to 10 days during the period 1950 – 1998 (Hummels, 2001).[8] A decline in transaction costs leads to more transaction-intensive ways of doing business. Duranton and Storper (2005), for instance find that as transport and communication costs decline, exporters in the machinery industry find it profitable to produce higher quality machines that require more interactions between producer and customer. Just-in-time management techniques have been extended to international production sharing networks, and lean retailers contract directly with suppliers, local as well as foreign. International production networks involve the location of various production stages in different countries and imply that the components embodied in a product have crossed international borders several times before it reaches the consumer. A commonly used measure of vertical specialisation is the import content of exports and it has increased

[8] The shipping time is the weighted average of ocean shipping and air freight.

steadily over the past 35 years.[9] However, the rate of increase appears to have slowed down in recent years and for Denmark and Japan the import share of exports has actually declined slightly since 1990. One possible explanation for this is that more time-intensive production technologies and ever leaner and more sophisticated supply chain management lead to agglomeration of firms in concentrated areas, and that a larger number of activities are located within a country, particularly in large countries.[10]

15. Finally, not only does time affect trade volumes, it also has an impact on f.o.b. prices received by exporters. Several studies have found that suppliers with above average lead time fetch lower prices for their produce.[11] Exporters far from major markets can compensate for this in two, not mutually exclusive ways. First, they can reduce lead time by shipping their exports by air. Second, since air freight is more expensive than sea freight, they can specialise in products with a high value-to-weight ratio. Such products exist in most sectors e.g. cut flowers, peas and herbs in agriculture; brassieres and swimwear in clothing etc. Harrigan (2005) documents that imports to the United States from its more distant trading partners have much higher unit values and are much more likely to arrive by plane. Thus, he finds that unit values are between 19 and 37% higher when imports come from countries located more than 4000 km from the United States and the probability for air shipment is about 5 times higher. The unit value does not increase monotonically with distance, however, and the effect tends to peak at around 7800 km, a distance that includes most of Western Europe and Latin America. Developing countries in Asia and sub-Saharan Africa are located between 7800 and 14000 km from the United States and many of these have structural problems including inadequate air transport infrastructure and related services preventing them from specialising in high value-to-weight products. Harrigan finally finds that the relation between distance and unit price has increased over time during the period 1990-2003. He argues that relative distance may become more important still if the relative cost of air transport comes down further. The implication could be that relatively heavy goods would be increasingly traded *within* regions while trade *between* regions would be more concentrated in high-quality light products. This prediction is worrying for low income countries that are located far from major markets with limited capacity to specialise in high value to weight products. However, as the case studies in section 3 suggest, even low income countries can foster successful export industries in highly time-sensitive industries.

2.2. The role of logistics services

16. Logistics play an important role for whether or not firms will enter international markets and for the price they receive for their product. A case study from Yemen documents that fresh tuna exported to Germany fetched a price of $4 per kilo, while frozen tuna exported to Asia fetched a price of $1 per kilo. About a fifth of total exports was frozen and sold in the Asian market, although it could have been exported to Germany for four times the price, were it not for delays caused by a combination of poor infrastructure and poor transport services. The forgone net income amounted to $480 per ton of exports compared to total sales revenue in Germany of $4000 per ton. Total cost of logistics for this exporting firm was 55% of landed product price.[12] The role of logistics is illustrated in Figure 2.1.

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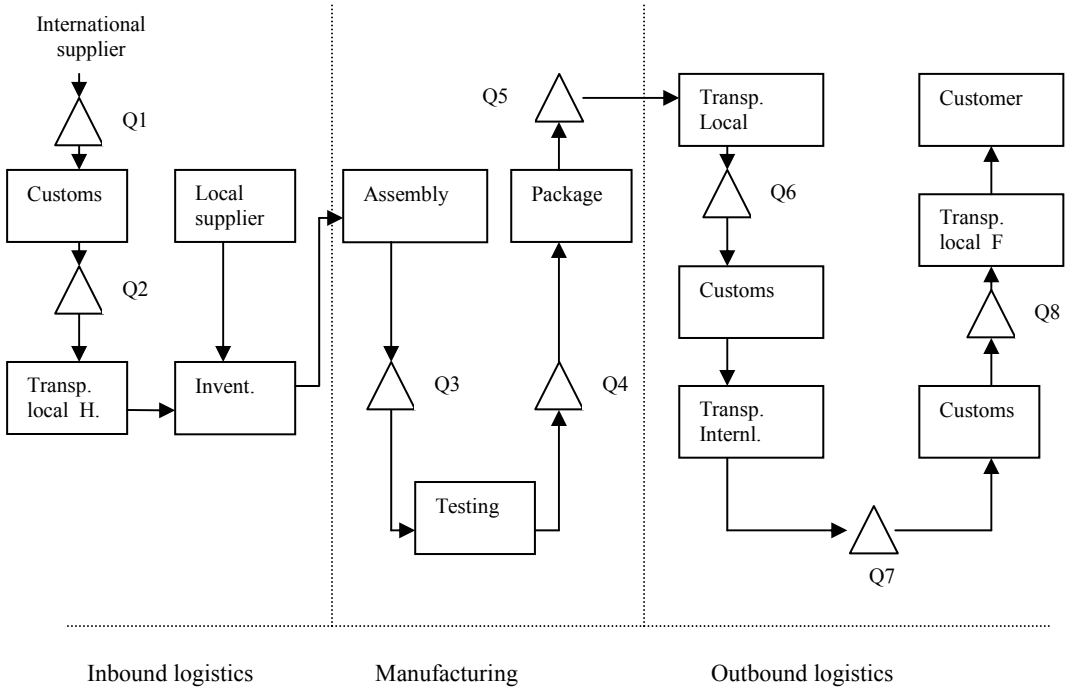
9 Hummels et al. (2001) found that vertical specialisation measured this way accounted for 21% of world trade in 1990, up from 17% in 1970. Chen et al. (2005) found that this share had increased further in a number of OECD countries between 1990 and 1998.

10 See for instance Harrigan and Venables (2004) for a theory predicting such an outcome.

11 See Hummels and Skiba, (2004) and Hummels and Klenow (2005).

12 Devlin and Yee (2005).

Figure 2.1. Material flow



Q1-Q8: Queue for inventory processing; H and F represent home and foreign country respectively

Source: Adopted from Li et al. (2004)

17. The material flow chart starts at the point when imported inputs have been loaded off the ship in the country of destination. Within international production sharing systems, the inbound material flow and related logistics are repeated for a large number of supplies. These are often synchronised by means of sophisticated supply chain management tools, but the less they are synchronised, the larger the inbound inventory needs to be. For example an Egyptian exporter of cotton clothing imports yarn from India and Pakistan and the time for terminal handling, customs clearance and transport from Alexandria to the company's storage facilities is 30 days. Customs clearance including waiting time (Q1) takes at best two weeks. However, time variability when including the lead time of Indian and Pakistani suppliers is substantial and the company keeps storage of yarn corresponding to 4 months of supply in order to avoid stoppages. When the clothing is ready for exports, export documents are prepared (the time unknown). Time for packaging into a container is four hours and it takes two days from the time the container leaves the factory gate until it is loaded on a ship in Alexandria, 220km away. The sailing time to the export destination (New York) is 21 days, which is about average for shipments to USA. It could, however be shorter if export volumes allowed direct shipping as there are many stops along the route that also goes via Canada (Devlin and Yee, 2005).

18. Another critical service in the manufacturing section in Figure 2.1 is testing. Accredited test laboratories can be scarce in developing countries and Q3 can consequently be quite long. In some cases testing facilities that satisfy the customer may simply not exist in small and shallow markets. An example of this was reported in a study of the car industry in India. A local manufacturer of switches for passenger cars could not sell to a foreign affiliate in India because thermal shock tests that satisfied the multinational company's requirements were not available locally and the equipment to perform the tests was too

expensive for in-house testing (Humphrey and Memedovic, 2003). Finally, the price a low-technology consumer good fetches in the market critically depends on to what extent it is differentiated from competitors' products. In mass consumer markets differentiation is often added late in the process, some times as late as at the packaging and marketing stage. Lack of expertise and speed in these areas adversely affects the price the exporter receives in the market.

19. The logistics services included in the manufacturing section of Figure 2.1 are often undertaken in-house in developing countries where the market for such services is shallow. This limits the quality of the services since most firms cannot afford to employ specialists in each of the services mentioned. It is usually the case that purchasing services from outside has a much lower fixed cost but somewhat higher variable costs than in-house production. Therefore, small firms in particular would benefit from a broad and rich logistics services market which would allow them to purchase only the amount of expert services they need, saving the fixed costs of in-house logistics provision. In fact a well developed logistics services market reduces the entry barriers for small and medium sized firms both in local and international markets.

20. The dynamics between market size, the cost of services and depth of the services market constitute a virtuous cycle. As export volume increases, there is space for more service suppliers operating at lower costs, allowing for more timely delivery and further export expansion. The case study of exports of cut flowers from Kenya is an example of this. It shows that international air transport services provided the link to international markets. However, it also shows that a thin local market for time-sensitive products imposes a constraint on further expansion as lack of local demand implies that south-bound cargo flights are almost empty. Special economic zones can in some cases create sufficient demand both for logistics services and time-sensitive inputs in otherwise shallow markets. Finally, it should be stressed that improvements in one link in the supply chain will not shorten lead time or reduce time variability unless improvements are made in complementary links as well. More efficient customs clearance services will for instance not reduce lead time if local transport and logistics services remain inefficient and uncompetitive. In Figure 2.1 that would only increase the length of Q2.

2.3. How long does it take to export?

21. The World Bank has recently conducted a survey of freight forwarders in 140 countries on freight time and costs from the factory gate until the cargo is loaded on a ship, including administrative procedures such as acquiring an export or import license, customs clearance, inspection of goods and several other indicators. In some developing countries these time costs alone account for a lead time beyond the requirement of customers in developed countries. Table 2.1 presents regional averages and the top and bottom five countries from the 2005 survey.

Table 2.1. Time for exports and imports

	Time for export (days)	Time for import (days)
East Asia & Pacific	25.8	28.6
Europe & Central Asia	31.6	43
Latin Amer & Caribbean	30.3	37
Middle East & North Africa	33.6	41.9
OECD: High income	12.6	14
South Asia	33.7	46.5
Sub-Saharan Africa	48.6	60.5
Denmark	5	5
Germany	6	6
Lithuania	6	17
Singapore	6	8
Sweden	6	6
Central African Republic	116	122
Iraq	105	135
Kazakhstan	93	87
Chad	87	111
Sudan	82	111

Source: World Bank

22. It is important to note that manufactured exports contain a considerable amount of imports. This is particularly the case in manufacturing industries characterised by international production sharing. Electronics and clothing for instance have typically elaborate international production networks where timely delivery is of utmost importance. In 2001 the import content was 32% of export value in the electronics sector in China, 55% in Ireland, 65% in Thailand and 72% in the Philippines. In the clothing sector import content of exports was 43% in Sri Lanka, 40% in Vietnam, 54% in Ireland, 80% in Botswana and 38% in the Philippines to mention but a few.[13] This means that time for imports is equally important for lead time as is time for exports and we notice that for the bottom five counties, except for Kazakhstan, time for imports is longer than time for exports.

23. Depending on at what point in the production cycle the administrative procedures related to exports can start and whether or not the necessary permits and documents are specific to each shipment or are given to an exporting or importing company for a defined time period, the time for exports and time for imports could overlap to various degrees. In the worst scenario the administrative procedures are repeated for each shipment, the procedures for imports start when an order is received and procedures for exports start when the goods are finished. In such a scenario lead time for exporters in the Central African Republic would be more than 8 months, and exports on a contractual basis to retailers or downstream manufacturers would be as good as ruled out for this reason only. This prediction is largely born out in the data. In 2003 the Central African Republic's exports of manufactured goods were about $24.5 million, almost all of it going to the OECD countries. This underscores both how time to market restricts total exports and how logistical difficulties on the African continent curb trade within the region.[14]

[13] These ratios are calculated from the GTAP database for 2001, which is the only available database that distinguishes between imported and locally sourced intermediate inputs for developing as well as developed countries. See Nordås (2003) for a discussion.

[14] Limao and Venables (2001) estimate that intra-sub-Saharan African transport costs are 136% higher than what is predicted on the basis of distance and economic and geographical features of the countries.

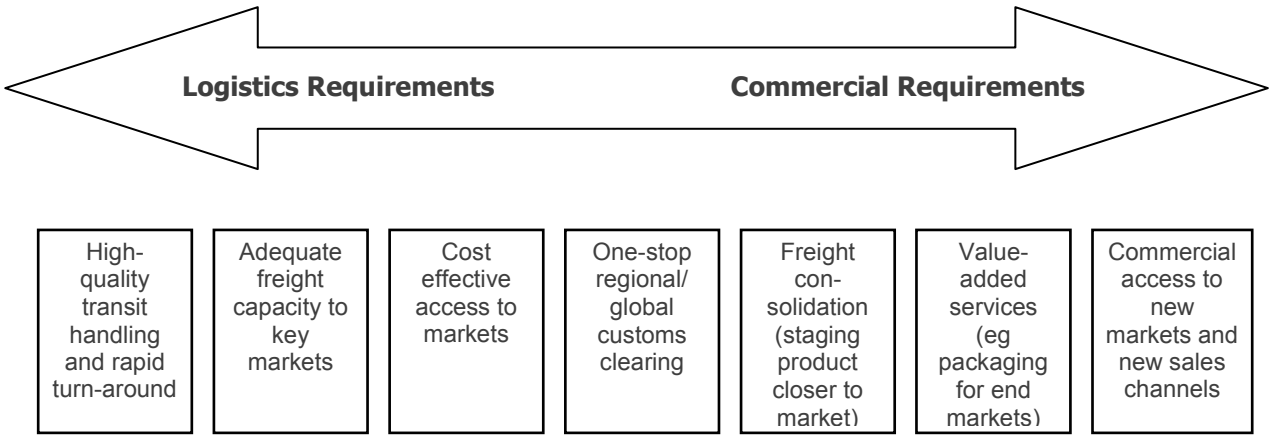
24. While transport time once the cargo is seaborne largely depends on the distance to the export destination, there is considerable time variation among countries with similar distance to export destination due to differences in port efficiency. Clark et al. (2004) for instance find that improving port efficiency from the 25th to the 75th percentile (in a ranking of countries according to port efficiency) is equivalent to reducing the distance by 60%. It is also the case that routes with lower trade volumes are serviced by smaller and often slower vessels, and hence have a longer time to market.

25. To sum up this chapter, market entry barriers are associated with threshold levels of time to market, and a maximum tolerated variance in lead time. The lead time in for instance fashion clothing can be as little as two weeks, while variability in delivery can be as little as ten minutes in the car industry. Timely delivery requires high frequency and high reliability of transport links, which in turn requires a critical trade volume and reasonably good infrastructure. Finally, shorter lead times require higher speed in all links in the supply chain, which probably implies higher capital intensity, given the physical limits of the human body. If the importance of time has increased as the literature review suggests that it has, and if shorter lead time requires more capital-intensive production and logistics processes, then there is a risk that the product range for which developing countries have a comparative advantage could shrink and terms of trade could deteriorate in the absence of reforms.

3. Case studies

26. This chapter looks at case studies from Eastern Europe, Central Asia, Africa and Latin America. Strong logistics and transportation services can enhance the competitiveness of an economy, and conversely, service deficiencies may create entry barriers to and increase cost for firms, especially those competing in the export market. Figure 3.1 presents requirements for trade in time-sensitive goods, focusing on the role of logistics.

Figure 3.1. Logistics requirements for exports of time-sensitive goods



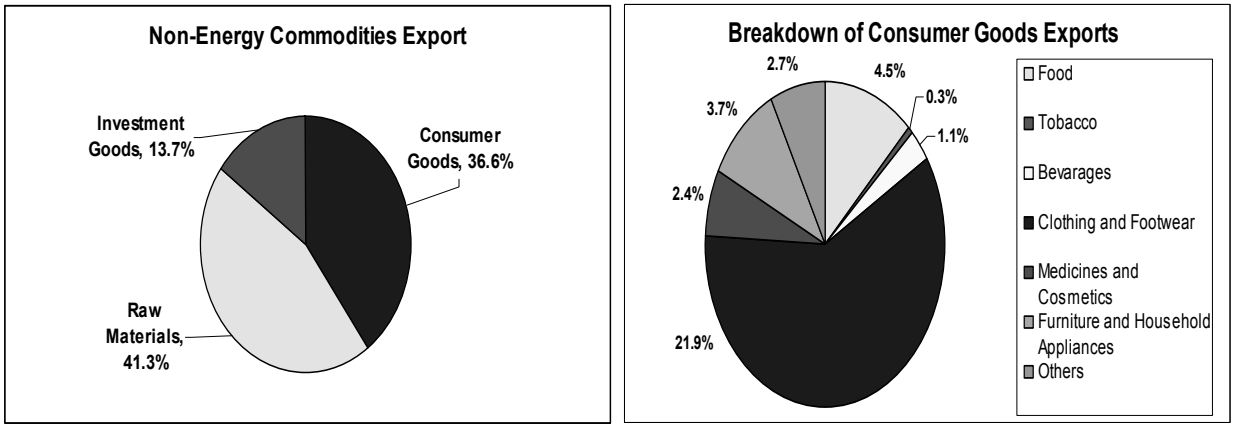
Source: Adapted from Pierce, 2003

3.1 Textile and Apparel Trade: the case of Bulgaria

27. The textile and apparel market is in a process of structural change following the end of quotas on imports under the Multi-Fiber Agreement (MFA) on 1 January 2005. While China's leading role in the sector for large volume production is expected to grow, smaller countries like Bulgaria can carve out a niche in fast fashion products due to its proximity to the European market, its flexibility in textile manufacturing and the quest for agility in logistics services.

28. Bulgaria has been sustaining an increased rate of real GDP growth for the past five years and in 2004 it reached 5.6%, the highest growth rate in recent history and higher than average growth in the new EU members. Its external sector has been characterised by a 7.5% to GDP current account deficit in 2004, below the 9.2 percent level of 2003. The merchandise trade deficit is, nevertheless, increasing as imports keep growing faster than exports, reflecting rapidly growing economic activity and surging oil prices. The deficit is being financed through FDI and other capital inflows (IMF, 2005). As of 2003, non-energy commodities represented 91.6% of Bulgaria's exports, with consumer goods accounting for 36.6% (see Figure 3.2).

Figure 3.2. Characteristics of Bulgaria's exports in 2003



Source: IMF, 2004b

29. The share of textiles and footwear in total exports has increased from 16.6% in 1999 to about 22% in 2003. Trade in this sector is mainly with the European Union — both in terms of imported inputs and exported finished goods. As of 2003, about 90% of Bulgaria's exports were sent to European markets, namely to Italy, Greece, and Germany while more than three-quarters of textile imports were received from EU countries (mainly Greece and Italy). Bulgarian garment manufacturers have also been able to ship higher value garments to the East Coast of the United States using airfreight.[15]

30. Bulgaria's textile industry deals with smaller volume, high-end fashion that typically requires short periods between order and delivery. Orders are usually less than 10,000 units and lead time around 21 days. For comparison typical orders from Asia can amount to more than 100,000 units and lead time can be several months.[16] EU buyers are willing to utilise producers with higher costs if they can guarantee shorter lead times. Since Bulgaria has high production costs relative to China, its exporters rely on an efficient transport and logistics systems.

31. Even when all parts of the production process work well, delivery times are tight. While buyers will sometimes excuse late deliveries, recurrent late shipments will leave the impression that the producer is unreliable, even if the responsibility for the delays lies with other players along the logistics chain (i.e. border agencies, logistics service providers, etc.). The logistics of Bulgaria's textile industry is experiencing a number of critical issues that can undermine its competitiveness:[17]

15 World Bank (2004b)

16 World Bank (2004b)

17 This part is taken from Jhaveri et al. (2005) and World Bank (2004b).

a) **Border delays.** Table 3.1 shows that delays are inducing high cost and uncertainty for transport and logistics providers. There are differences in waiting time at different border crossings, which implies continued lack of predictability.[18] Time does not affect all destinations in the same way, but nonetheless, it is clear that the impact of the wait cost is relevant. The typical waiting time at each border crossing is superior if confronted to the average waiting times of 30 minutes registered in Western Europe before 1992. It is also worth noticing that Romania performs better than Bulgaria in terms of border delays and its exports of apparel to EU were three times higher than Bulgaria's in 2004.[19] About 24% of the travel time is spent at borders, while a more realistic waiting time should amount to 2% of travel time (which is the pre-Schengen targeted average).[20]

Table 3.1. Overland transport and border delays for selected routes in South Eastern Europe

	Km	No. of borders	Costs in USD	Average duration in hours	Average of total waiting time at borders per border	Percentage of border time/ duration
Bulgaria						
Sofia – Rome	1639	4	1630	110	6 – 9	43%
Sofia – Berlin	1621	4	1700	100	5.5	31%
Sofia – Athens	755	1	500	22	5.0	22%
Sofia – Istanbul	559	1	300	33	10	30%
Romania						
Bucharest – Rome	1865	3	1100	72	6.7	28%
Bucharest – Berlin	1680	2	920	72	6	17%

Source: World Bank, 2004b

b) Coordination across border agencies, There are as many as six border agencies that must approve a shipment before it leaves Bulgaria. Where approvals and payments are required, the transportation provider has to approach each agency separately. Since other regional border agencies also experience problems with agency coordination, the impact is multiplied. Approval or payment processes are not integrated, and data across agencies is not shared, thus there is significant room for improving the administrative process. The monetary impact of poor coordination among border agencies is well documented in Table 3.1.

c) Coordination of the supply chain network. As there are many steps and several players involved in the movement of goods, coordination becomes critical to assure timely delivery of the shipment to the buyer. Figure 3.3 illustrates the typical flow of goods in the Bulgaria textile supply chain. Goods arrive from overseas suppliers of raw materials to a Bulgarian manufacturer, which in turn produces the garment or commissions the work to subcontractors. Once the finished product is ready, the goods are shipped to the retail outlet in an overseas location passing

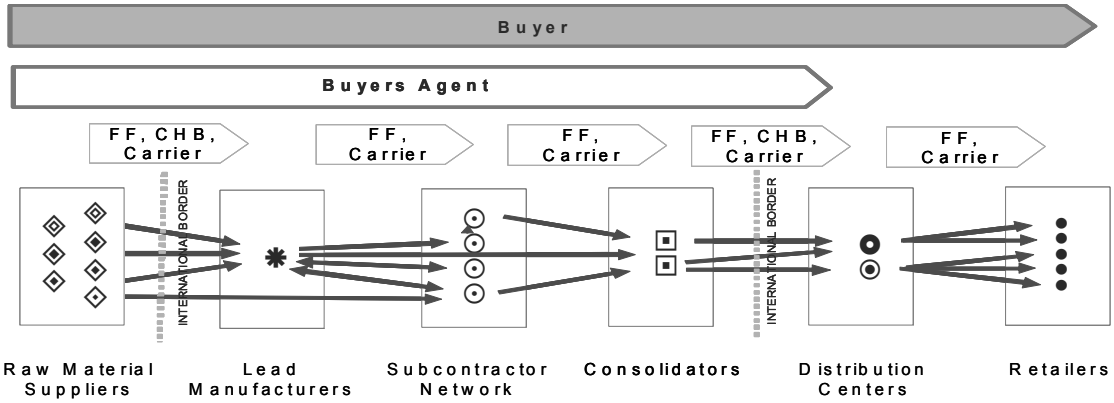
18 Jhaveri et al. (2005) affirm that customs officials indicate the high variability of daily traffic during the week as one reason for delays at border crossing. For example, "regulations in some EU countries prohibit heavy vehicles from travelling during the weekends. Trucking companies in Turkey therefore organise their operations so that trucks transit Bulgaria and Serbia during the weekends to arrive at an EU border Monday morning. Daily traffic at the border can fluctuate from 300 mid-week to 800 on Thursday or Friday". Jhaveri et al. (2005), pg. 48

19 Source: Comtrade.

20 World Bank (2004b)

though a web of consolidators and distribution centres. Between steps, freight forwarders (FF), carriers and customs brokers (CHB) come into play to facilitate the transaction that moves the supply chain from one stage to another. The management of this flow determines the efficiency, reliability, time and cost for the arrival of goods to the market of destination.

Figure. 3.3: Input and Product Flow in the Textile Supply Chain



Source: N. Jhaveri, B. Johnson, S. Stoimenov, 2005

d) Complex customs processes for re-export. As of 2003, about 13.7% of Bulgaria's imports are textile raw materials, the majority of which is processed and re-exported.[21] Producers are exempted from value added tax (VAT) and duties for all materials that are imported for ultimate re-export. However, the customs process for administering the VAT exemptions is complex and adds cost and time delays to the shipment.

32. Bulgarian firms have shown that they can meet global challenges by capitalising on the advantages of proximity to major markets. Continued success depends on keeping ahead of low-cost competitors as far as time to market is concerned, while reducing the cost disadvantage. The textile manufacturers considered in the Jhaveri et al (2005) study reported that transportation and logistics represent 20-40% of the cost of finished goods exported to European destinations. Therefore improvements in transport, logistics and customs procedures are crucial for the sector's future competitiveness. In order to stay competitive the weakest links in the supply chain need to be identified and strengthened ensuring that producers are able to meet buyer demands.

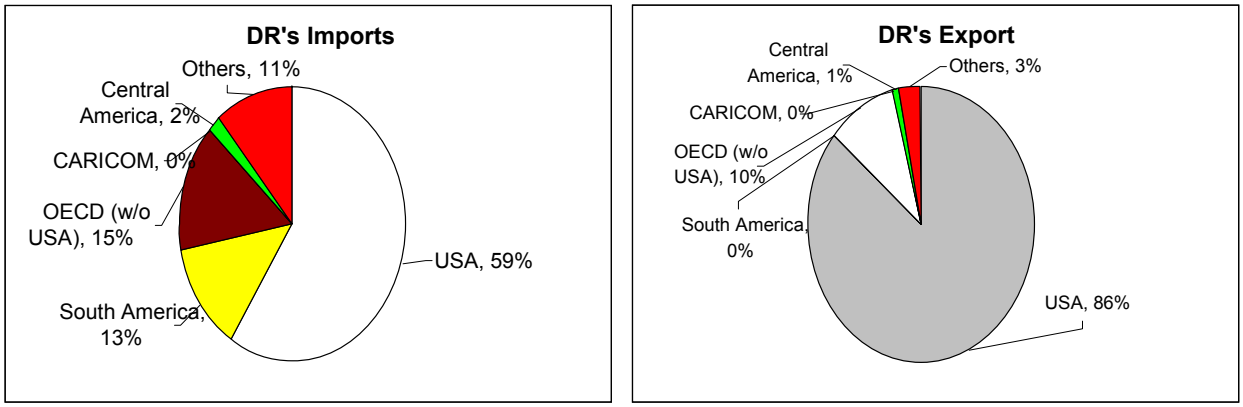
Textile and Apparel Trade: the case of the Dominican Republic

33. We observed the relevance of market proximity for the competitiveness of high-end textiles and clothing in the case of Bulgaria. Across the Atlantic, the Dominican Republic provides another example. The country's trade with the United States accounts for nearly 90% total exports (see Figure 3.4), and exports have been driven by foreign direct investment (FDI) in Free Trade Zones (FTZ) as well as

21 IMF (2004b)

preferential access to the U.S. market.[22] Rules of origin in relation to the preference schemes have favored the creation of production networks that use imported raw materials from the United States.

Figure. 3.4 Dominican Republic Export and Import in 2003 by country of origin/destination



Source: The World Bank, 2005c

34. Initially apparel accounted for about half of the FTZ output, but recently more diversified production has occurred, including electronics, pharmaceutical products and tobacco. The organisational arrangements found in the FTZs are known as the CBI model, which consisted of large assembly plants linked to the production-sharing operations of multinationals.[23] The special conditions associated with the FTZs (duty-free imported inputs, improved infrastructure, ports and communication and simplified export procedures) play a big role for exporters. FTZs have become the motor driving the growth of apparel exports to the US.[24] However, the policy has created a dual economy, with declining inward-looking industrial ventures and shrinking exports of traditional goods on the one hand, and a vibrant export-oriented manufacturing sector taking place in the FTZs on the other.

35. As in the case of Bulgaria, Dominican Republican producers of textiles can use their proximity to the US market to provide quality fashion goods and rapid response to changes in consumer tastes. The lead time of exporters in the Dominican Republic is 4 weeks compared to 10 weeks from China.[25] This has helped Dominican firms to stave off Chinese price competitiveness deriving from larger export volumes. The key to the preservation of this advantage is the presence of well-functioning logistics services along the Dominican textile value chain. Being an island, the operations associated with loading and unloading ships and the movement for the delivery of goods between the domestic market and ports are of particular

22 The Caribbean Basin Initiative (CBI) of 1983, the U.S.-Caribbean Basin Trade Partnership Act (CBTPA) of 2000, and, more recently, the Dominican Republic Central American Free Trade Agreement (DR-CAFTA), which was signed in 2004.

23 Gereffi and Memedovic (2003)

24 "Several other enabling factors laid the groundwork for the take-off of FTZs: a stable macroeconomic environment, simplified institutional framework and requirements for FTZs, the depreciation of the Dominican peso, and the promotion of FDI. As a result, between 1985 and 2003, the number of FTZ parks increased from 3 to 54, the number of firms jumped from 136 to 531, employment in FTZs grew more than five times from 31,000 to 173,000, and the value of exports increased twenty-fold from US$215 million to US$4.4 billion, accounting for 80% of all goods exports and over 50% of total goods and services exports". The World Bank (2005c), pg. 45

25 The World Bank (2005c).

relevance to the Dominican economy. The World Bank (2005c) finds that the Dominican Republic fares relatively poorly compared to the leading regional competitors, especially in the field of port services and customs.

36. The primary weaknesses seem to be port infrastructure and equipment, which is accompanied by inadequate operational management and institutional shortcomings. Dominican port turnaround time shows an average of 12 days for imported goods, which is one third higher than the Latin America and Caribbean region as a whole, twice the average for East Asia, and about six times the average for developed countries.[26] The sources of these long delays are partly associated with disorganised custom operations and partly to weak logistics services. Custom authorities operate in an obsolete legal and institutional framework that has a negative impact on logistics services.[27] The principal shortcoming of customs operation is the presence of a high level of discretion by customs officials, thus contributing to uncertainty. Currently, about 95% of imported and exported cargo is physically inspected, as well as 100% of all documentation, which is a level well above international standards. As seen in Bulgaria, inefficiencies are increased by the involvement of many custom agencies, which contribute to extensive delays due to poor coordination. Not to mention that the presence of a large number of agents adds opportunities for rent seeking behavior.[28]

37. Road transport dominates the Dominican Republic's internal transport system. Container cargo is delivered by the shipping companies through free of charge trailers (for up to 5 days). The major issue in domestic logistics is security. Several shipping companies provide their own security forces to guarantee door-to-door protection as there are risks of shipment losses and damages due to the poor state of some of the roads. Most Dominican ports do not reach the minimum security standards set by the International Maritime Organization and by the customs authorities of developed trade partners (World Bank, 2005c). The introduction of new security certifications require significant efforts to modernise ports as these requirements represent a burden on producer's logistics cost and undermine delivery performances for time sensitive products, including textiles.

Lessons from the Textile and Apparel Cases

- Buyers are willing to source from producers with higher costs if they can guarantee shorter lead times;
- Special Economic Zones can play a big role for developing country exporters when they attract investment in infrastructure that support logistics operations;
- Customs clearance delays and poor coordination across border agencies constrain textile exporters;
- Infrastructural modernisation and procedural smoothening are keys to improve time performances at border crossings.

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26 The World Bank (2005c).

27 "Customs documentation requirements such as the bill of sale, consular certificate, manifest, bill of loading and customs declaration are excessive and typically duplicate information. Indications of the logistics system's poor functioning is a frequent absence of the bill of loading which guarantees the integrity of the merchandise during transport, implying a laxity that is far from international standards". (The World Bank, 2005c, pg. 37).

28 There is hope that the newly inaugurated state-of-the-art Caucedo port, will contribute to improvement of port performance (The World Bank 2005c).

3.3 The Dairy Industry in the Kyrgyz Republic

38. The development of the five landlocked Central Asian counties (Kazakhstan, the Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan) depends critically on transit to major markets. However, many of the bilateral relations are currently characterised by suspicion and distrust and lack of cooperation on transit issues. Lack of cooperation is estimated to add 25 – 40% extra transit time, which is equal to adding 25 – 120% to the cost of transport.[29] More than 50% of the time for cargo moving from Almaty to Europe (through Moscow), for example, is spent waiting at border facilities (See Annex Table A.1). If this waiting time was reduced to a level of five hours at each border, transit time would be reduced by more than 50% to about 5 days. In addition to cost of delays, payments of unofficial rents are frequent. These can amount to US$10-20 per stop by traffic police to US$1,000 for the provision of escort services for high value or excise shipments.[30] Therefore, it is not surprising that decisions on route selection seem to relate to factors other than distance, and that small countries in the region such as the Kyrgyz republic are mainly confined to regional trade in stagnant markets.

39. The dairy industry in the Kyrgyz Republic is a good example of the relation between logistics services and trade in highly time-sensitive products. The Kyrgyz Republic has an estimated market size of around US$6.5-7.0 million for dairy products. With around 1,400 workers employed in the sector, the dairy industry consists of a number of large dairy farms around region of Chui, which supply most of the milk processed in the capital, Bishkek. However, the sector has registered an overall drop in domestic production and consumption in recent years.[31] Among the major causes of this decline were the dearth of appropriate support services, such as farm sanitary-epidemiological control and breed selection and the lack of both a 'cold chain' and a formalised infrastructure for the distribution of milk.[32]

40. The World Bank (2004b) studied a medium size private dairy processing facility with annual sales in 2002 of approximately 110 million som (US$2.75 million), which was producing, among many diary based products, butter, cheese, ice cream, and powder milk.[33] The enterprise was capable of producing approximately 270-300 tons of milk per day with an annual volume of around 12,000 tons. Raw milk providers were small dairy farmers, all of which were located within a radius of 160 km. The firm exported about 50% of the output to regional markets including Russia, Pakistan, Afghanistan, and Kazakhstan. Neighbouring Kazakhstan was the most natural export market for processed dairy products, although it was increasingly affected by a number of market barriers, which limited market opportunities. For example, Kyrgyz enterprises were able to bring goods to markets in southern Kazakhstan within three days prior to 1998. However, shifts in trade regulations and customs procedures enforced later by the Kazakh authorities raised the delivery time to as much as 15 days.[34] These delays added significant pressure on dairy processors, and some Kyrgyz suppliers ended up losing market share in southern

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29 World Bank (2005a).

30 World Bank (2005a).

31 World Bank (2004b).

32 This affected the quality of the milk, as it played a role in the decrease in fat content and the raise in bacterial count of the milk. (World Bank , 2004b)

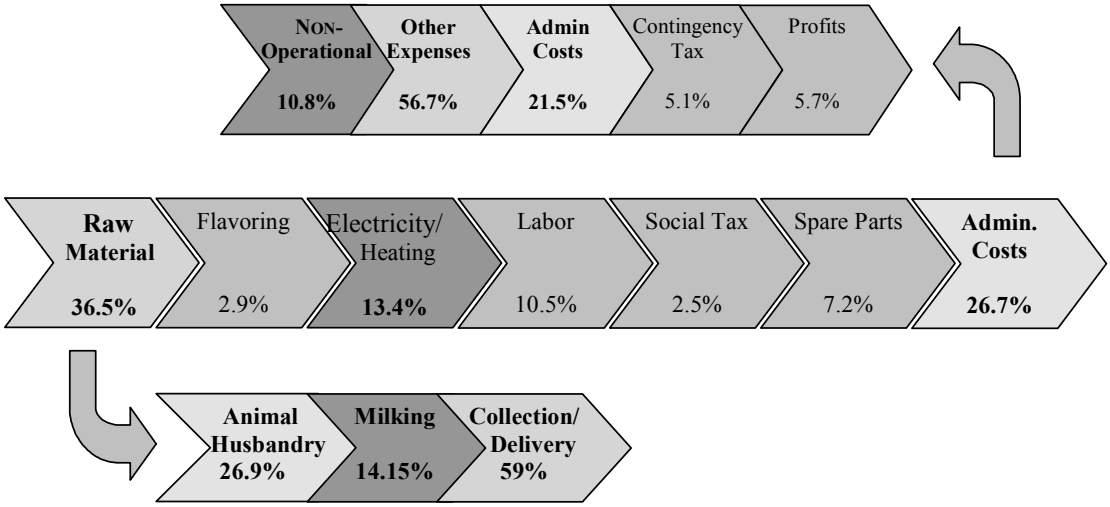
33 As of June 1, 2004, 1 US$ was equivalent to 43.85 Kyrgyz Som.

34 In particular, the new procedures added several days to process a passport for the delivery, extra 3-4 days before funds arrive to the customs office to clear the 16 percent VAT payment (which was paid by Kazakh import agents), and as many as 7-8 days to absolve practices related to export documentation. While this is happening, the dairy processor has to cover hotel accommodation of drivers and security personnel, and, in the case of dairy products, find a way to keep the cargo refrigerated, all of which adds extra costs. (World Bank 2004b)

Kazakhstan because of their inability to compete. The recently completed Business Environment and Enterprise Performance Survey also confirmed the perception of an increase in customs formalities for Kyrgyz firms from the 2002 level (Annex Chart A.1).[35]

41. The value chain for ice cream production is presented in Figure 3.5. The cost of raw material, mainly raw milk, is obviously the largest component in the value chain, but it is noticeable that collection/delivery accounts for as much as 59% of the cost of producing a litre of milk for a small dairy farmer. The raw milk is delivered to processing facilities in the capital through an informal system of connections of dairy farmers, which are usually concentrated in one or more villages.[36]

Figure 3.5. Ice Cream Value Chain for Kyrgyzstan



Source: The World Bank, 2004a

42. Delivery trucks often have to travel a 160-170 km round trip to deliver milk to processing facilities in Bishkek. Hence, fuel costs can reach as much as 731 som per day, and can be even higher if the driver decides to take side roads to avoid encounters with the traffic police which might request the payment of informal 'fees' (see Annex Chart A.2 for a complete cost breakdown). With the perishable nature of the product and the urgency associated with its delivery, the truck driver may be charged even more by the traffic police when under pressure to complete the travel before the milk spoils. There is then a trade-off between increased fuel costs when taking the longer route in order to avoid traffic police; and high fees, risks of delays and even risks of having the driving license confiscated for a few days when taking the direct route. Since raw milk represents the principal factor in the value chain, the competitiveness of processed dairy products is predominately determined by the ability to control the costs of milk production, especially those associated with collection and delivery. For ice cream the absence of a well-organized 'cold chain' for the distribution is particularly damaging, especially for exports.

43. To conclude, small land-locked transition economies like the Kyrgyz Republic face many difficulties in accessing foreign markets as they depend on the ability to foster good transit relations. When, on top of that, domestic logistics structures are deficient, the capability of local companies to compete for market shares internationally is critically undermined.

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35 Kazakhstan and the Kyrgyz Republic are currently working on the establishment of a 'one-stop shop' for customs that aims at reducing customs procedures and cut waiting time and costs (ADB, 2005).

36 World Bank (2004b)

Lessons from the Dairy Products Case

- Dairy products require a well organised logistics support structure to avoid product spoilage;
- Domestic administrative barriers can undermine a product's ability to reach markets on time;
- Time sensitive products seem more likely to face undocumented administrative cost;
- Land-locked economies depend on their ability to foster good transit relations with neighbors.

3.4 Cut flowers in Kenya

44. Against a background of overall economic decline, the Kenyan floriculture sector has grown rapidly over the past several decades. The sector has emerged as one of the country's main sources of foreign exchange alongside refined petroleum products, coffee, and vegetables. Kenya's cut flower production amounts to 4.3% of the world market for cut flowers. The country is the largest exporter to the EU, where it supplies no less than 62% of all roses sold.[37] This has been a remarkable success story that started in the 1980s with basic open-field flowers and then turned in the 1990s to higher-value greenhouse flowers. Recently, the industry profited from the inflow of new foreign investment, particularly from Israel and the Netherlands, which brought more technology advances, production skills, and market know-how.

45. The initial development and growth in horticulture was favoured by spillovers from the tourism sector (UNCTAD, 2005). Frequent passenger air connections with Europe provided cargo space for transporting freshly produced cut flowers at a time when volumes would not justify the use of dedicated cargo planes. Later, expanding export volumes led to investment in cargo facilities as they became more economically justifiable. The sector currently provides employment to around 50,000 workers. Although a wide range of flower varieties are cultivated in Kenya, rose production dominates.

46. International trade in cut flowers requires cold storage and transportation facilities and well-organized inland and air-freight delivery systems in order for the flowers to remain fresh. Meeting these requirements has been a major challenge for Kenyan exporters facing inadequate infrastructure, transport and storage facilities at airports, limited air freight capacity and air routes, and the overall high cost of transport. [38] Box 3.1 illustrates the importance of transport and timeliness for the market price of the product.

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37 USTR (2005); The World Bank (2005b)

38 Among the factors that limit the penetration of flowers in the US market, there is the fact that Kenya does not currently qualify for the U.S. Federal Aviation Administration's Category One certification and, consequently, air-freighted exports destined for U.S. markets must first be shipped to other countries that qualify. USTR (2005).

Box 3.1. Broken Hearts and empty wallets

Valentine's Day registers a lot of business for cut flowers and 2006 was no exception. Getting the roses to the destination market on time is crucial for growers in developing countries. Any minimal time delay impacts their market positioning for such a cut-flower rich festivity. The following story is emblematic.

"The Friday before Valentines was a top day at the auction for growers. Some growers sold their Red Calypso's and other red variety roses for more than EUR 1 per stem on that day, whereas normally they would get 20 cents or less. A couple of Ugandan growers had shipped their roses on a cargo flight destined to arrive on Thursday evening so they could sell on Friday as well. The flight was delayed and flowers were sold on Monday. The price they received was 20 cent on average. While a good price for Uganda, it represented a potential loss of 80 cents per stem! This particular shipment carried 500 boxes with 800 stems each. The total (potential) loss can be calculated: 500 x 800 x 0,80 = EUR 320.000 (!). One solution for the growers would be to switch from that airlines and select a more reliable (but more expensive) company. However in countries like Uganda and Zambia there are not many alternatives".

Source : Authors' interview with CBI staff on 23 February 2006.

47. Kenya's transportation and logistics services have been affected by the progressive deterioration of the economic situation in the 1990s. This is reflected by the perception expressed by Kenyan firms, which find transport infrastructure to be a much more serious constraint than do firms in other countries. While 37% of firms found transport a "major" or "severe" constraint to doing business in Kenya, the figure was just 23% in Uganda and Tanzania, and 19% in China.[39] However, the main source of discontent with transport infrastructure seems to be the dramatic deterioration in road quality which has increased vehicle maintenance and trucking costs and undermined firm competitiveness and profitability. When surveyed by the World Bank, nearly three-quarters of firms reported roads to be "poor", "very poor" or "not available".[40]

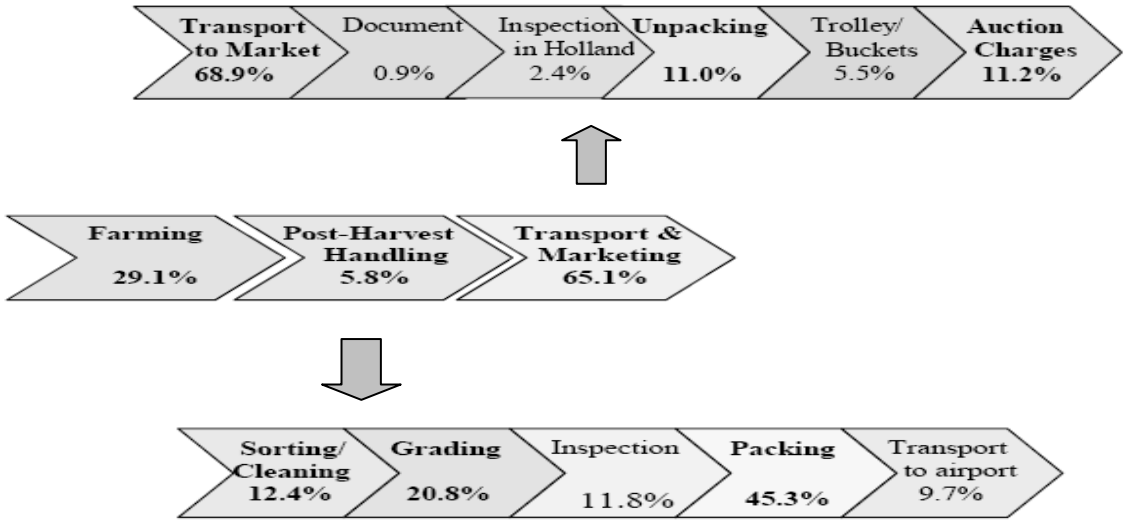
48. The impact of transport and logistics becomes even more evident when looking at the value chain analysis on a medium-sized producer of roses. As seen from Figure 3.6, transport and marketing constitutes the largest cost element. The detailed break-down of transport and marketing costs are shown in the upper part of the figure, while the detailed break-down of costs of post-harvest handling is shown in the lower part of the figure. Both consist mainly of logistics services. Packing accounts for the largest cost share of post harvest handling. This service can be of critical importance when flowers are sold directly to supermarkets as discussed later.

49. Transport to market consists of two major actions. First, the clearance/inspection process is performed and cargo is loaded on a plane; after that the cargo is shipped and delivered to the auction. These activities are usually managed by freight forwarders or by the exporter directly. They prepare a seasonal master plan in collaboration with airlines. It is based on the estimated size of the cargo, negotiated rates, flight schedules and the designation of a carrier for the shipment.

39 The World Bank (2004c)

40 The World Bank (2004c)

Figure 3.6. Value chain for rose marketing to Holland: an example from a typical medium sized farming operation[1]



1. The Value Chain Analysis is indicative, as it takes into consideration several examples contained in World Bank (2004b).

Source: The World Bank, 2005

50. A week before shipping, the exporter is required to book cargo space through a freight forwarder by providing detailed information on the shipment. After receiving the documents, the freight forwarder reserves space with a charter or a commercial airline. Normally, medium scale growers rely on their own insulated or refrigerated trucks, where flowers are kept at a temperature range of between 2 – 4 C° during delivery. On the day of shipping, growers have to deliver the shipment 4 hours prior to flight departure. See Annex Chart A.3 for a process flow map for document clearance to export cut flowers and the steps required for the airfreight to clear inspections.

51. When the documentation is done, the freight forwarder consolidates and loads the consignment onto an airplane. Over 90% of Kenya's flowers are carried through four dedicated air freight forwarders. Charters carry more than 80% of the total weight of cut flower cargo exported from Kenya. Utilizing commercial airlines is usually more expensive and demands advance reservation to lock up space. With a high volume of exports to European and other destinations, one of the main challenges facing the cut flower exporting business is the lack of south-bound traffic. At present, south-bound flights operate at 20% capacity utilisation. The consequence is increased pressure on freight forwarders to either increase the cost for the export cargo or reduce the frequency of flights to Kenya.

52. There are also charges linked with clearing agents, and these encompass all costs incurred by the cargo at the arrival destination, including: a) clearing costs; b) airline handling charges; c) transport from airport to auction; d) warehousing charge; and e) document and processing fees. The World Bank team's interviews with freight forwarders indicated that inspections in Europe are becoming increasingly stringent, especially as environmental, safety and social standards are enforced strictly.

53. Most of developing countries' cut flowers are still being sold through the large central wholesale auction markets in the Netherlands (See Box 3.2). However, large supermarkets require delivery of packaged and bar-coded shelf-ready products and increasingly source directly from producers. Several large producers in developing countries are responding by consolidating their systems through the

functional integration of growing, transporting, and marketing flowers, the latter through locally established representative offices in key markets. Smaller growers need to find a way of integrating into such channels. At present between 4,000 and 5,000 small and medium farmers are engaged in cut flower production in Kenya accounting for 5 – 13% of total exports. Typically, small and medium farmers cultivate between 0.4 – 30 hectares of land with small growers performing open cultivation, while medium growers setting up greenhouses.

Box 3.2. Dutch auction

"About 40 percent of Kenyan flowers enter European wholesale markets through one of the seven flower auctions in the Netherlands….. After the flowers are collected and checked for quality, ripeness, grading, and packing, selling takes place with the help of computerized "auction clocks," which provide information on the grower, product, quality, unit of currency, and minimum purchase required. The financial transactions are settled immediately following the auction process, and flowers are then distributed to the buyers, who repackage and box the flowers for further air or land transport. The auction provides matching between suppliers and buyers and is a practical market entry point, especially for small growers."

Source: The World Bank (2002) pg 99.

Lessons from the Cut Flowers Case

- Cut flowers require the availability of reliable air transport services and on-time performance;
- State of freshness at the time they reach the market is critical for market positioning;
- Refrigerated trucks and good quality roads are essential;
- Packaging, design and presentation as well as appropriate labeling are needed to enter markets.

4. Econometric analysis

54. This chapter presents econometric analyses of exports to Australia, Japan and the United Kingdom, focusing on the role of time. Since intermediate inputs enter into the production process of downstream customers, one would expect that time plays a more important role for intermediate inputs than for final goods, although time is increasingly important also for consumer goods with the proliferation of lean retailing. Among consumer goods fashion clothing has been shown to be particularly sensitive to time and the most time sensitive clothing items are women's and girls' clothing (HS categories 6104, 6106, 6204, 6206).[41] The electronics sector is the sector where vertical fragmentation and international supply chains are most developed and this sector is included in the analysis as well (SITC rev 2 categories 75, 76, 77). Although electronics is classified as a high-technology sector, a number of developing countries including China and the Philippines have entered international supply chains in this sector mainly in labour-intensive activities.

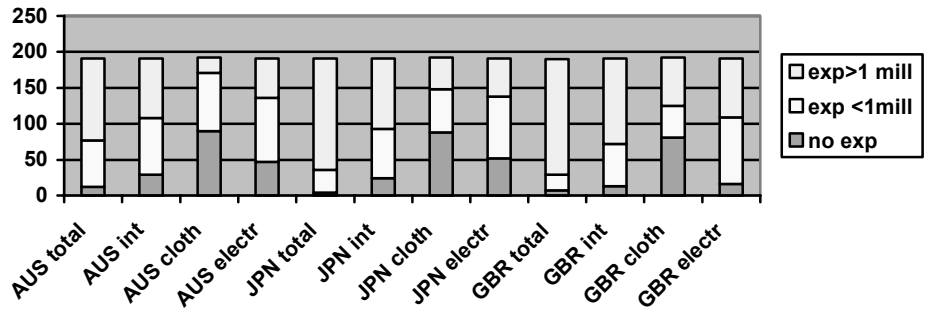
[41] Evans and Harrigan (2005) could not reveal which categories are replenishment goods due to confidentiality. However, a (somewhat dated) study by Courault and Parat (2000) found that women's and girls' ready to wear clothing had the fastest turnover in France in 1995.

4.1 Descriptive statistics

55. The data includes a panel of 192 countries (see Annex Table A.2) covering the period 1996 to 2004. It is assumed that the countries for which the reporters (Australia, Japan and UK respectively) have no registered import in the Comtrade database, imports are zero.[42] Data on control of corruption and GDP are from the World Bank.[43] The regressions including time for exports and imports are based on cross-sectional data for 140 countries in 2004.

56. The three reporters are different in country size, geography and industrial structure. One indicator of particular relevance to this study is the remoteness index, which is measured as the weighted average distance to all other countries, weighted by GDP in 2000. This index is about 13000 km for Australia, 7900 km for Japan and 6000 km for the United Kingdom. Australia therefore probably has higher natural barriers to trade than for instance the United Kingdom. This is also reflected in the trade data as illustrated by Figure 4.1 which shows the number of countries not exporting or exporting less than $1 million of total merchandise exports, intermediate inputs, fashion clothing and electronics respectively for the three importers. Only 10 countries in the sample, all small economies, do not export more than $1 million to any of the three export destinations.

Figure 4.1. Number of countries exporting to Australia, Japan and the United Kingdom in 2004



Source: Comtrade

57. For all three countries, imports are more concentrated for intermediate inputs and electronics than it is for total merchandise trade and more concentrated still for fashion clothing. Japan is the largest economy among the three and it also has the largest number of suppliers of total imports. In fact only 3 among the 191 countries included in the database (excluding Japan) did not export at all to Japan in 2004. However, more countries export intermediate goods, electronics and fashion clothing to the UK than to Japan.

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42 This may not be strictly accurate since there is a category for "unspecified". Nevertheless, the trade included in "unspecified" represents a tiny share of the total and such trade would probably not represent flows of trade based on regular supplier relationships.

43 http://www.worldbank.org/wbi/governance/govdata/ and World Development Indicators (CD-rom). GDP for Chinese Taipei is not included in the World Development Indicators and is taken from the Republic of China National Statistics http://eng.stat.gov.tw/ct.asp?xItem=12700&CtNode=1561 and converted to U.S. dollar at the nominal exchange rate.

4.2 Gravity model estimates

58. The analyses start with estimates including the core variables in the gravity model only, which are gross domestic product (GDP) of the exporter and the distance between the exporter and the market, adjusted for the distance to all other markets.[44] In addition as is standard in this type of analysis we control for common language, having been part of the same colonial empire and whether or not the exporter is an island or landlocked.[45] This is a useful exercise in order to ensure that our results are in line with other studies using the same methodology, and the results are presented in Annex Table B.1. The gravity model is next extended by including control of corruption as a first proxy for lead time and time variability. As documented in sections 2 and 3, time for administrative procedures related to exports and imports is a very significant part of total lead time and it is furthermore strongly correlated with control of corruption.[46] Control of corruption can therefore be seen as an instrument for time for administrative procedures related to exports and imports and it is available biannually for the period 1996-2004, while time for exports and imports is available for 2004 only. Finally, time for exports and time for imports are included in the regressions for 2004. As for the distance variable, it is time to market relative to other exporters that matters and the time is therefore normalised by dividing the absolute time by the mean for all countries (denoted *reltime* in the equations below).

4.2.1 Time and distance and the likelihood of entering the market

59. This section analyses the determinants of entering an export market. For many countries the export value is just a few thousand dollars in some years while no exports are registered in other years. As mentioned in section 2.1, trade barriers that determine market entry are related to fixed costs. It is, however, conceivable that occasional, small export volumes can take place without traders having incurred the fixed cost of establishing a supplier relation; e.g. the occasional bargain. In order to capture the determinants of market entry on a more sustainable and regular basis, regressions are run where the entry/non-entry cut-off rate is set to $1 million.[47]

The regression is the following:

$$\rho_{ij} = \Phi\left(\alpha_0 + \alpha_1 \ln gdp_i + \alpha_2 \ln reldist_i + \alpha_3 reltime + \sum\nolimits_n \alpha_{in} x_{in}\right) \qquad (1)$$

This is a Probit equation where ρ_{ij} is as a measure of the probability that a firm in country *i* will export to country *j*. The parameters, α_i represent a measure of how the probability of entering the market changes with variable *i*. A positive coefficient means that the probability improves as the variable

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44 An exporter takes a decision on which countries to export to based on, among other things, the distance to the market in question *relative to all alternative markets*. The absolute distance between the country pairs is therefore adjusted by the exporters' weighted average distance to all other countries (denoted *relrem* in the equations). The distance is weighted by GDP in 2000. See Anderson and Wincoop (2004) for a recent discussion.

45 It is common practice to introduce a dummy for whether or not the country pair in question shares a common border. This dummy relates to land borders and none of these countries have a land border, except the border between Northern Ireland and the Irish Republic. The border dummy is therefore omitted.

46 The correlation coefficients are -0.64 for control of corruption and time for imports and -0.62 for control of corruption and time for exports. The better is the control of corruption, the shorter the time for imports and exports. See the case study in section 3.3 for anecdotal evidence.

47 This cut-off rate is somewhat arbitrary. Robustness checks were run for higher and lower values. It is found that a cut-off value around $ million gives the best fit, but even when the cut-off rate is zero the results are qualitatively the same except in those cases where all or almost all countries export to the country in question, where the variation in the data is too small to get significant results.

increases. The results are presented in tables 4.1 and 4.2 which report probability of exporting more than $1 million to each of the three markets. Robust standard errors are reported in parenthesis and ** and * indicate significance at a 1 and 5 percent level respectively.[48] The fashion clothing industry is a relatively small sector in most countries and here we have estimated the probability that exports are positive rather than a cut-off rate of $1 million.[49]

60. In all regressions the probability of exporting to each of the three reporters increases with the size of the exporting economy. This finding suggests that there are scale effects in trade, most probably due to fixed costs related to searching for customers in foreign countries, setting up or entering distribution networks, complying with product standards etc.[50] The scale effect is smaller for clothing than the average for total exports. Better control of corruption significantly improves the probability to enter all three markets in the time-sensitive products, and the impact is particularly strong for intermediate inputs to Australia and Japan and for electronics to all three markets. The coefficients are somewhat lower for the United Kingdom to which most countries in the world export.

61. From Table 4.2 it appears that time for exports is particularly important for exporting electronics and intermediate inputs, the latter especially to Australia and Japan, while time also has a significant effect on the probability to export fashion clothing to the United Kingdom. It is finally noted that geography (distance, island, landlocked) matters less when time for exports is controlled for, suggesting that geography matters partly because it is related to time. Countries can therefore to some extent overcome geographical disadvantages by reducing the behind the border time for exports.

62. There is one possible problem with using time for exports as an explanatory variable for probability to export. Transport capacity and frequency of call clearly depend on trade volumes, and causality could therefore run in the opposite direction. The results' robustness to this possible problem was tested and the results were in fact strengthened by this robustness check.[51]

63. The parameters in tables 4.1 and 4.2 do not provide much information about the magnitude of the effects reported except giving the direction of change (see the technical annex for an explanation of the estimated coefficients). Figure 4.2 illustrates the relationship between time for exports and probability to export for intermediate inputs to Australia and Japan and for fashion clothing and electronics to the United Kingdom respectively. The probability of exports falls off the most steeply with time for exports in the electronics sector (this applies to exports to Australia and Japan as well). It is also noticeable that the predicted probabilities for exports tend to be either high or low, with relatively few countries in the middle. Yet, the countries in the middle are the most interesting from a policy point of view, as will be elaborated below.

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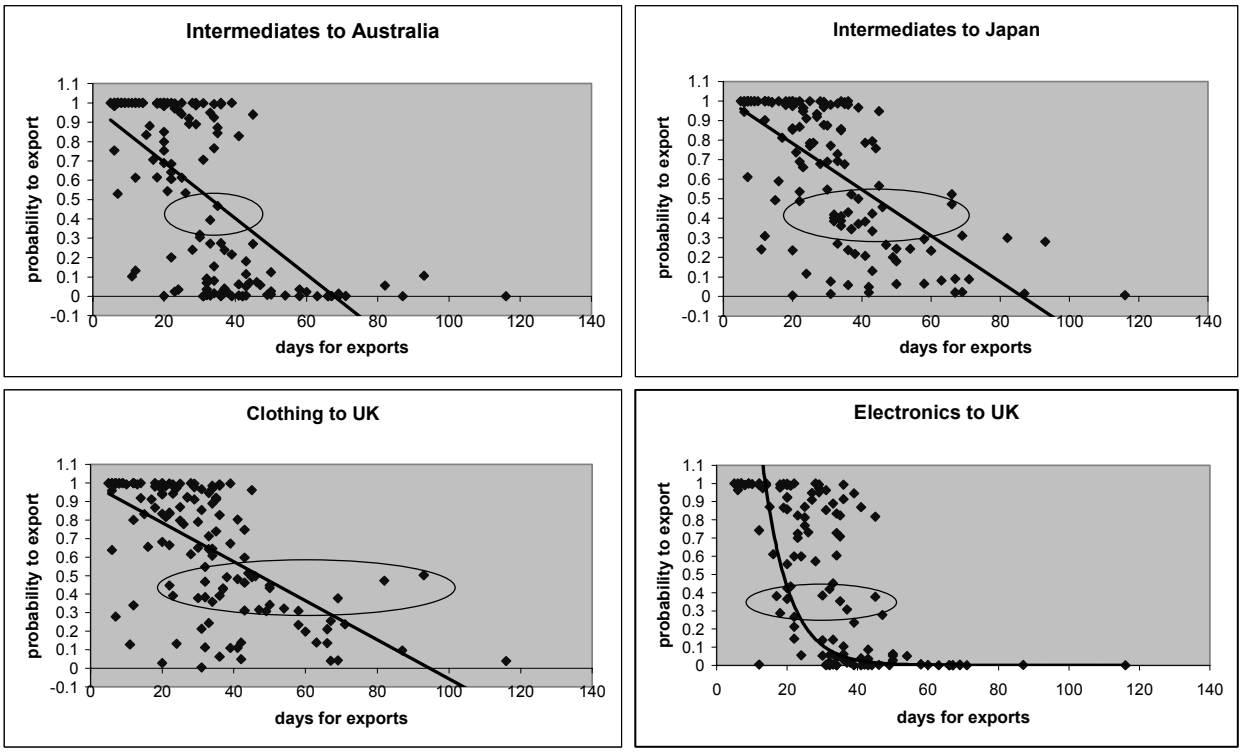
48 Robust standard errors are robust to possible problems of heteroskedasticity

49 The colony =1 dummy variable for Australia and Japan predicts success perfectly for total and intermediate goods exports and total exports respectively and the observations for which colony=1 are dropped.

50 Without scale effects it is difficult to explain why not all firms producing an exportable in a country engage in exports and that a country that exports a certain good exports only to a subset of all countries that import the good in question.

51 The test was done by using an instrument variable for time; the number of signatures needed for exporters from the World Bank Doing Business Survey. This is a variable that is highly correlated with time for exports (correlation coefficient 0.77), but there is no reason to believe that it is correlated with the error term. The parameter estimates were similar and their statistical significance was even stronger than when using the direct measure of time.

Figure 4.2. Predicted probabilities to export



64. One important insight from probit analysis is that it gives some guidance to which countries would benefit the most from reforms. The impact of an improvement in timeliness is likely to be largest for the countries with predicted probability to export below, but not too far below 0.5. These countries are close to fulfilling the conditions for market entry, but are not quite there yet, and reforms could have a significant impact. For those countries where the probability is close to zero, more thorough reforms are probably needed in order to enter export markets for time-sensitive products. For those with a probability well above 0.5, the relevant policies are more related to enhancing export volumes, diversifying exports beyond the region and entering export markets in even more time-sensitive products within each sector. The ovals included in the figures encircle the countries with the estimated probability to export between 0.3 and 0.5. Among the countries with probabilities in this range in more than one sector and to more than one market are Albania, Belarus, Bosnia and Herzegovina, Kenya, Romania, Tanzania, Ukraine and Vietnam (see Annex table B.2 for the full list). Some of the countries encircled actually do export in spite of the odds. An example of this is Cambodia's exports of fashion clothing, which can be explained by industrial policies promoting this sector and proximity to other large-scale exporters who have integrated Cambodia in regional supply chains. Small island economies such as Samoa and other small and remote countries such as Tajikistan have relatively high natural barriers to trade and a low probability to export even if time for exports is relatively short. A final note of caution is, however, called for. Although these results help identify which countries would benefit the most from reform, results must be used with caution and combined with other indicators and considerations.

4.2.2 Distance and time and trade volume

65. In this section the determinants of export volume, given that the country in question has entered the export market, are estimated using the gravity model. We focus on the role of distance and time. The following equation is estimated:

$$\ln m_{ij} = \beta_0 + \beta_1 \ln gdp_j + \beta_2 \ln reldist_{ij} + \beta_3 reltime + \sum \beta_n x_n + \beta_{u\eta} \overline{\eta}_{ij} + \varepsilon \qquad (2)$$

Lower case m represents imports, i = (Australia, Japan, UK), and the summation represents the control variables.[52] The results are presented in Tables 4.3 and 4.4 where the first includes control of corruption and the second time for exports. The parameters in these regressions are elasticities, and thus give an estimate of the percentage change in exports as a result of a one percent change in the variable in question (everything else equal).

66. Exports of intermediate inputs and electronics increase more than proportionally with the exporters' GDP, while exports of clothing increase less than proportionally with the exporters' GDP, suggesting that large and/or rich countries export more intermediate products and electronics while small and/or poor countries export more fashion clothing. Cultural and institutional similarities as represented by common language and/or having belonged to the same colonial empire also appear to facilitate trade. Control of corruption, which as argued above is closely related to both timeliness and supply reliability, also has a large and statistically significant effect on trade volumes, particularly to countries such as Australia. The impact is strongest in electronics, which is perhaps the most time-sensitive of all major industrial sectors. For exports of fashion clothing, control of corruption appears not to matter for export volumes, but as shown in Table 4.1, control of corruption is important for whether or not fashion clothing is exported at all. This effect is captured when doing the two-step analysis presented in this study, but it is missed when doing gravity regressions only, as in most previous work on the determinants of bilateral trade flows.

67. A similar pattern is found when introducing the direct measure of time for exports as reported in Table 4.4. For exports of clothing to the United Kingdom there are no statistically significant variables except for exporter's GDP.[53] All countries in the dataset had positive exports to Japan in 2004, so the standard gravity methodology is used for that regression.[54] The other regressions are run according to equation 2 above. The geography variables (island and landlocked) are omitted since they were not significant and did not add explanatory power to the regressions. They appear in other words to be irrelevant for export value when time for exports is controlled for. It is observed that time for exports is important for market entry (see Table 4.2) in the fashion clothing sector, but not for subsequent trade flows. For intermediate exports, exports of electronics and total exports, time for exports has an impact on both export values and market entry, and the impact is largest for electronics.

68. To summarise this chapter, the econometric estimates indicate that scale, relative distance, and time for exports are important determinants of whether or not an exporter will enter a particular export market and time is also important for trade volumes, particularly in the electronics sector. The results underscore the importance of reliable deliveries within international production networks. Such networks can be an important source of technology transfer for developing countries. Finally, the analysis can help identify countries that would benefit the most from reforms aiming at reducing time for exports.

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52 The estimation technique is a full maximum likelihood Heckman regression where the selection function is whether or not exports take place and the cut-off rate is zero. The number of zero observations (censored observations) in each regression is reported in the tables. The second to last term in the equation represents the inverse Mills ratio which in turn adjusts for sample selection bias from including only positive trade flows. The regressions for total exports to Japan presented in table 4.4 is, however, done by means of ordinary least squares since all countries in the sample exported to Japan in 2004.

53 Since the clothing sector was subject to a number of trade measures such as MFA quotas or preferential access to the EU, trade in fashion clothing are probably highly influenced by trade policy measures.

54 Data on time for exports was not available for the three countries that did not export to Japan (see Figure 4.1).

Table 4.1. The impact of control of corruption on the probability to export

	Australia				Japan				United Kingdom			
	Total	Interm	Clothing	Electr	Total	Interm	Clothing	Electr	Total	Interm	Clothing	Electr
Lngdp	0.80**	0.93**	0.49**	0.62**	0.50**	0.55**	0.49**	0.80**	0.86**	0.80**	0.50**	0.62**
	(0.06)	(0.06)	(0.04)	(0.06)	(0.06)	(0.05)	(0.04)	(0.10)	(0.08)	(0.06)	(0.04)	(0.04)
Lnreldist	-1.04**	-1.32**	-0.60**	-0.57**	-0.89**	-1.40**	-0.73**	-1.05**	-0.32	-0.92**	-0.30*	-0.62**
	(0.29)	(0.19)	(0.13)	(0.20)	(0.23)	(0.18)	(0.14)	(0.20)	(0.26)	(0.19)	(0.14)	(0.14)
Island	0.33	0.66*	0.14	0.45*	0.42*	-0.66**	0.41*	1.00**	0.28	0.55*	0.37*	0.55*
	(0.23)	(0.28)	(0.19)	(0.23)	(0.20)	(0.20)	(0.18)	(0.34)	(0.23)	(0.23)	(0.19)	(0.22)
Landlocked	-0.11	-0.30	0.03	0.19	-0.40**	-0.19	-0.05	0.67**	-0.49**	-0.40**	-0.17	-0.48**
	(0.15)	(0.21)	(0.13)	(0.20)	(0.16)	(0.14)	(0.13)	(0.25)	(0.19)	(0.15)	(0.14)	(0.19)
Language	0.24	0.38	-0.19	0.38					1.87**	0.85**	0.29	-0.08
	(0.17)	(0.23)	(0.15)	(0.23)					(0.35)	(0.26)	(0.21)	(0.21)
Colony			0.12			-1.87**	-1.49**	-0.42	-0.86**	-0.23	-0.08	0.57**
			(0.64)			(0.32)	(0.28)	(0.31)	(0.30)	(0.23)	(0.16)	(0.17)
Lncorr	1.45**	2.05**	0.73**	2.15**	-0.00	1.27**	1.05**	1.57**	0.43	0.47*	0.76**	1.42**
	(0.25)	(0.28)	(0.18)	(0.24)	(0.22)	(0.24)	(0.22)	(0.21)	(0.29)	(0.24)	(0.20)	(0.26)
N	827	827	832	827	816	830	830	830	835	835	835	837
Pseudo R^2	0.53	0.65	0.38	0.61	0.30	0.47	0.40	0.66	0.46	0.52	0.39	0.57

Table 4.2. The impact of time for exports on the probability to export

	Australia				Japan				United Kingdom			
Variable	**Total**	**Interm**	**Clothing**	**Electr**	**Total**	**Interm**	**Clothing**	**Elelctr**	**Total**	**Interm**	**Clothing**	**Electr**
Lngdp	0.69**	1.11**	0.45**	0.86**	0.71**	0.56**	0.55**	0.89**	1.78**	0.89**	0.59**	0.73**
	(0.14)	(0.20)	(0.09)	(0.12)	(0.24)	(0.13)	(0.11)	(0.16)	(0.49)	(0.21)	(0.13)	(0.14)
Lnreldist	-0.76*	-0.93**	-0.15	-0.14	-1.88*	-1.37**	-0.80*	-0.68	0.27	-1.06*	0.40	-1.00**
	(0.35)	(0.42)	(0.34)	(0.39)	(0.65)	(0.46)	(0.39)	(0.46)	(0.99)	(0.50)	(0.33)	(0.37)
Island	0.18	0.69	0.20	0.58		-0.97	0.53	0.67	-0.25	-0.09	0.18	0.61
	(0.51)	(0.63)	(0.60)	(0.57)		(0.57)	(0.57)	(0.77)	(1.22)	(0.66)	(0.57)	(0.71)
Landlocked	-0.07	0.06	-0.13	0.13	-0.41	0.12	0.17	0.91	-0.69	-0.95*	-0.02	-1.43
	(0.38)	(0.54)	(0.33)	(0.38)	(0.49)	(0.38)	(0.35)	(0.60)	(0.65)	(0.42)	(0.36)	(0.76)
Language	0.08	0.24	0.05	0.38					5.51**	1.88*	-0.32	0.03
	(0.48)	0.67	(0.41)	(0.40)					(1.93)	(0.79)	(0.64)	(0.69)
Colony						-1.84	-1.73	0.22	-2.85*	-1.10	-0.15	0.63
						(3.64)	(2.61)	(18.09)	(1.22)	(0.60)	(0.55)	(0.50)
Ln reltime	-0.74*	-1.48**	-0.49*	-0.95**	-0.62	-1.21**	-0.46	-0.88*	0.35	-0.24	-0.71*	-0.82*
	(0.31)	(0.41)	(0.26)	(0.34)	(0.53)	(0.39)	(0.28)	(0.38)	(0.62)	(0.40)	(0.30)	(0.42)
N	135	135	134	135	119	135	135	135	135	135	135	135
Pseudo R^2	0.47	0.69	0.35	0.65	0.44	0.49	0.39	0.66	0.72	0.58	0.45	0.66

1. In regression for Japan the regression explained fully the probability to export for the islands, so these observations were dropped in the regression for total exports. The same goes for the colony variable in the regressions on Australia

Table 4.3. Gravity regressions with control of corruption

	Australia				Japan				United Kingdom			
	Total	**Interm**	**Clothing**	**Electr**	**Total**	**Interm**	**Clothing**	**Electr**	**Total**	**Interm**	**Clothing**	**Electr**
Lngdp	1.35**	1.37**	0.69**	1.77**	0.99**	1.24**	1.23**	2.07**	1.10**	1.24**	0.86**	1.34**
	(0.04)	(0.04)	(0.13)	(0.08)	(0.05)	(0.06)	(0.08)	(0.26)	(0.03)	(0.03)	(0.11)	(0.04)
Ln reldist	-2.15**	-2.03**	-1.58**	-1.78**	-1.54**	-1.99**	-2.05**	-3.16**	-0.47**	-0.74**	-1.14**	-0.93**
	(0.15)	(0.15)	(0.22)	(0.26)	(0.19)	(0.19)	(0.23)	(0.66)	(0.09)	(0.10)	(0.19)	(0.13)
Island	-0.09	0.42	0.19	0.09	0.31	-0.38	0.86*	0.45	0.14	0.28	1.04**	0.87**
	(0.25)	(0.26)	(0.41)	(0.37)	(0.28)	(0.28)	(0.36)	(0.93)	(0.17)	(0.19)	(0.41)	(0.25)
Land-locked	-0.26	-0.18	-0.08	1.45**	-0.48*	0.19	0.14	-0.08	-0.48**	-0.47**	0.37	-0.68**
	(0.19)	(0.20)	(0.32)	(0.44)	(0.21)	(0.22)	(0.31)	(0.73)	(0.13)	(0.15)	(0.38)	(0.20)
Language	0.42*	0.12	0.51	0.42					1.23**	0.65**	-0.96*	0.63**
	0.19	(0.20)	(0.32)	(0.35)					(0.13)	(0.20)	(0.41)	(0.26)
Colony	3.66**	4.84**	-5.49**		-0.19	-1.71*	-1.51	-1.47	0.27	0.24	1.42**	0.24
	(0.91)	(0.90)	(1.33)		(0.69)	(0.79)	(0.86)	(2.54)	(0.16)	(0.18)	(0.37)	(0.23)
Ln corruption	2.63**	3.21**	-0.29	4.37**	0.61*	1.73**	0.19	4.79**	1.28**	1.37**	-0.83	2.09**
	(0.23)	(0.24)	(0.74)	(0.42)	(0.26)	(0.26)	(0.36)	(1.00)	(0.17)	(0.19)	(0.45)	(0.25)
N	832	832	832	832	830	830	830	828	837	837	837	837
Ow censored	70	163	427	304	13	127	359	235	22	42	325	66

Table 4.4. Gravity regressions with time for exports

	Australia				Japan				United Kingdom			
	Total	Interm	Clothing	Electr	Total	Interm	Clothing	Electr	Total	Interm	Clothing	Electr
Lngdp	1.35**	1.50**	0.79**	1.69**	1.13**	1.34**	0.74**	1.68**	1.15**	1.33**	0.90**	1.55**
	(0.09)	(0.10)	(0.21)	(0.21)	(0.07)	(0.11)	(0.23)	(0.28)	(0.07)	(0.08)	(0.23)	(0.10)
Lnreldist	-2.10**	-2.06**	-1.55**	-1.40*	-1.75**	-1.56**	-1.32**	-2.16**	-0.19	-0.67**	-0.77	-0.74**
	(0.30)	(0.33)	(0.39)	(0.62)	(0.29)	(0.38)	(0.50)	(0.46)	(0.20)	(0.22)	(0.44)	(0.29)
Ln reltime	-1.48**	-1.62**	0.07	-2.34**	-0.52*	-1.01**	0.78	-1.57**	-0.78**	-0.95**	0.27	-1.19**
	(0.29)	(0.32)	(0.44)	(0.82)	(0.25)	(0.34)	(0.47)	(0.43)	(0.23)	(0.25)	(0.61)	(0.33)
N	136	136	136	136	135	135	135	135	136	135	135	135
Ow censored	3	13	47	25		14	48	30	3	6	46	8
Adjusted R^2					0.74							

5. Policy implications

69. The preceding discussion has highlighted a number of areas for consideration to policy makers in order to effectively reduce lead time and its variability. Among these, the liberalisation of trade and investment in transport and related logistics services figures prominently. There is ample evidence that appropriately designed liberalisation and introduction of competition in these sectors can improve efficiency (including timeliness), reduce costs and expand service access to users. Nevertheless, although in recent years important reforms have been undertaken in some subsectors, transport and related logistics services remain among the sectors most protected from international competition. And, notwithstanding the potential benefits, progress on bound multilateral liberalisation of transport services under the GATS has so far been modest.

Maritime transport services

Cargo shipping services

70. Shipping remains by far the main mode for international transport, carrying close to 80% of trade in goods in terms of volume (WTO, 2001a). The cargo shipping industry can be broadly divided into liner and bulk shipping. Liner shipping concerns mostly ships designed to carry modular containers involving regularly scheduled arrivals and departures from advertised ports. Bulk shipping consists of carrying single cargoes in large volumes (e.g. iron or coal) ordinarily carried out for individual shippers on non-scheduled routes.[55] Liner shipping services, while affected by an array of governmental regulations to ensure both economic and social objectives, have experienced the highest level of trade liberalisation relative to port and especially air and land transport. Nevertheless, there is still scope to relax some remaining restrictions which could contribute to enhance efficiency in the sector. In addition, competition restraining practices among shipping lines pose the risk that the benefits of government reforms may be captured by private shipping firms.

71. The OECD Directorate for Science Technology and Industry (DSTI) has recently prepared a comprehensive review of regulatory issues in the maritime shipping services sector (OECD, 2002a). The study provides a useful categorisation to analyse the regulatory environment of the industry, separating regulations intended to achieve public policy objectives, from those relating to commercial operations and practices (see Box 5.1). This is a useful conceptual framework to address potential restrictive effects of regulation as clearly the intended objectives are fundamentally different and the way to review the necessity and effectiveness of the relevant measures also needs to be different.

[55] Bulk shipping services are outside the scope of this paper.

Box 5.1. The regulatory environment in the maritime shipping industry

Regulations related to the rights and obligations of states and to safety and environmental protection:

- The Law of the Sea - rights and obligations of flag states;
- National security measures;
- International safety and environmental regulations;
- National environmental and safety regulations;
- Flag state and port state inspections;
- International labour regulations.

Regulations related to commercial operations and practices:

- Shipping specific economic policy regulations;
- Ship registration conditions;
- Cargo reservation/cargo sharing provisions;
- Cabotage laws;
- Cargo liability regimes;
- Competition legislation.

Source: Adapted from OECD, 2002a.

72. The first set of measures relates to security, safety and environmental protection and therefore points to a strong rationale based on reducing the risk of serious incidents involving vessels. This regulation is underpinned by the international community, principally working through the International Maritime Organisation. Recent events, such as the September 11 attacks or the 1999 incident involving the ship *Erika,* have highlighted the importance of establishing strong regulation in these areas. Important rationales also relate to commercial operation and practices. Chief among these is competition policy to ensure that the benefits of liberalisation are transferred to consumers (see below). Other measures, such as uniform cargo liability regimes, are also important to ensure the orderly management of maritime shipping service.

73. The case appears to be less strong for measures aiming at favouring national participation in the shipping services sector, such as cargo reservation schemes, which can unduly restrict competition and create market distortions. These require that part of the cargo carried in trade with other states must be transported only by ships carrying the national flag or ships interpreted as national by other criteria. Cargo reservations can be imposed unilaterally or on the basis of bilateral or international agreements. However, it is widely recognised that cargo reservations have continued to lose relevance in recent years as more and more countries have phased them out. In addition, the increased transfer of ships to open registers to reap the benefits of more efficient cost conditions has further diluted the significance of these measures. Nevertheless, a number of countries still have these measures in places (see also World Bank, 2002; and WTO, 2001b).

74. While these "traditional" access issues have been losing relevance in recent years, they have increasingly been replaced by a stronger focus on the scope of admissible business operations. Competition-related business practices in liner shipping services take the form of a variety of cooperative agreements among maritime carriers, deeply rooted in the history of the sector. As a general feature, it appears that the number of conferences (agreements to apply uniform or common rates and other conditions on particular routes) has decreased in recent years, in parallel with the development of new forms of cooperation, such as consortia and alliances (agreements to operate joint or combined services).

Another more recent form of cooperation are stabilisation or discussion agreements (usually between conference and non-conference members attempting to control rates and regulate capacity).

75. Cooperation agreements in liner shipping services are exempted from anti-trust rules in most countries. This has given rise to significant debate in recent years. On the one hand cooperation agreements can generate benefits to consumers notably through improved network coordination and, on the other, price-fixing arrangements can exercise a significant influence on liner freight rates. In practice, the extent to which rates are increased by private anticompetitive practices is likely to differ across routes. Developing country routes are likely to be more affected since low overall traffic volumes limit the number of competitors that can be commercially sustained. These concerns are intensified by the fact that many developing countries lack an adequate national competition policy framework to deal with private practices by shipping operators (World Bank, 2002).

76. Another report recently prepared by DSTI has attempted to shed light on the costs and benefits of common pricing under anti-trust exemptions (OECD, 2002b). The analysis was based on information collected through a survey on market shares, freight rates, financial performance and regulatory trends. The review, while acknowledging the importance of operational arrangements to generate greater efficiencies and higher productivity, did not find convincing evidence that the practice of discussing and fixing rates among competing carriers offers more benefits than costs to shippers and consumers. It thus recommended that limited anti-trust exemptions *not* be allowed to cover price fixing and rate discussions. It also found that capacity agreements need to be carefully scrutinised to ensure that they do not distort market conditions and prevailing prices.

Seaport services

77. Seaports play a vital role as gateways for international trade and commerce in most nations. As noted earlier, shipping remains by far the most significant mode for international transport of commodities. As an important determinant of maritime transport costs, port efficiency is crucial to successfully integrate a country into the global trading system. The last decades have seen profound changes in the organisation of seaports, with increasing private sector participation, including foreign operators, and greater competition between and within ports. These policies can contribute to bring about needed capital, technology and know-how, and improve port services efficiency and performance. This is particularly the case for emerging economies and developing countries in light of limited finance for modernisation and expansion of facilities and services.

78. Similar to other network utilities, most port infrastructure is likely to have natural monopoly characteristics (large sunk costs and increasing returns to scale). But unlike other utilities, ports provide a wide variety of services rather than a few specific ones, most of which are conducive to competition and have experienced increasing levels of liberalisation in recent years. The movement of freight traffic through a port typically involves a range of activities related to berthing (pilotage, towing, and tug assistance) and to cargo handling. Vessels also require a range of services while in ports, including bunkering, garbage collection, and repairs and maintenance. Other services related to cargo include customs clearance, storage and warehousing and, increasingly, other value-added activities such as packaging and distribution. Many of these services are increasingly provided in so-called “distriparks” or logistics zones which accommodate companies within or in the proximity of harbours.

79. A variety of ownership and operational structures have emerged with regard to port management, the provision of infrastructure and the supply of services — depending on the degree of private sector participation. Developing and emerging economies have been gradually moving from the public service model to the landlord model (where the public sector owns the infrastructure and the private sector provides services on a long-term basis through e.g. concessions), which is becoming widespread

worldwide. Only a few countries have transferred land, infrastructure, and management and regulatory functions to the private sector (World Bank, 2004d). In parallel, port competition has intensified in all its forms, inter-port (between two or more ports), intra-port (between two or more terminal operators within the same port) and intra-terminal (companies competing within the same terminal). Even in small ports, where the market cannot sustain multiple providers, competition *for* the market has become widespread through the exclusive right to provide services.

80. Yet, while the gains can be significant in terms of costs and time reduction, achieving successful liberalisation is no easy task. For starters, attracting long-term private investors requires a credible and consistent overall policy regime. Countries with high economic uncertainty and political instability face significantly more difficulties in this regard. Furthermore, it is necessary to accompany private port participation with an appropriate regulatory framework to address market failures and ensure social objectives. Another key issue is the establishment of capable and independent port regulatory agencies and competition authorities (see Box 5.2). Experience also shows that there is no universally appropriate model for reform. Every reform programme must take account of each port's features, including its size and hence opportunities to introduce intra-port competition, as well as the economic characteristics of the variety of services that it encompasses.

Box 5.2. Port regulation

The shift in the role of the public sector from direct control over state-owned and operated ports to indirect guidance through appropriate regulation requires the development of new skills, institutional capabilities and practices. Private operators are naturally motivated by profit maximisation objectives and thus may not necessarily provide facilities or services that are of economic, environmental or social value. This creates the need for regulatory oversight and institution building to ensure that the public interest is upheld. Key areas include:

Regulating prices

The pricing regime is typically a cornerstone of the regulatory system. It determines the return investors can expect and whether efficiency gains are passed on to port users, particularly in cases where there can be no or limited competition in the market. Governments typically rely on two alternative mechanisms, cost-plus (or rate of return regulation) and price caps. Under cost-plus regulation, governments guarantee to port operators cost recovery and a mark-up to reward investment. These regimes have the advantage of attracting investors who know they will recover their operating and investment costs but the downside of providing little incentives to minimise costs (because investors are not rewarded for reducing them). Price-caps on the other hand introduce incentives for operators by allowing them to keep a portion of the cost savings they realise. However, a disadvantage of price-caps is the risk of under capitalisation that may lead to quality concerns. Hybrid schemes have also been developed in many countries. The choice of the optimal regulatory mechanism needs to take account of the regulatory agency's technical capacity as well as the specific characteristics of the port and service concerned.

Regulating to ensure safety and environmental protection

Governments' regulation extends beyond prices to ensure the safety and quality of operators. An oil spill within a port's harbour can damage the coastal environment and devastate local fishing and tourism sectors for several years. Port operations involve the use of heavy machinery and handling of dangerous cargo that can result in serious and sometimes fatal injury to port workers or third persons present in the port. Proper systems and safeguards are thus required to induce private port service providers to operate safely and with minimal environmental impact.

Effective regulatory institutions and competition policy

The establishment of appropriate regulatory agencies is essential to the reform process. Particularly in cases of no or limited competition between port operators, regulatory agencies and competition authorities need to ensure that the interests of port users and the public are defended against potential

abuses from private providers operating in a non-competitive environment. The crucial tasks performed by these institutions — setting tariffs and overseeing safety and environmental protection — require significant expertise in appraising the structure and performance of markets. Another key issue relates to regulating unfair or anti-competitive practices ex post through appropriate anti-trust rules and enforcing mechanisms, particularly in light of rising global concentration of the industry. Performing these tasks effectively also requires that regulatory agencies and competition authorities be largely independent of undue influence by the regulated industry or political intervention. At the same time, independence needs to be reconciled with measures to ensure that the regulator is accountable for its actions and that affected parties are able to obtain redress if a regulator acts arbitrarily or incompetently.

Consumers' involvement

Consumers, both individuals and businesses, are not typically heavily involved in the port regulatory process, even though their input can be critical to efficient service where the regulator has only limited means of acquiring information. Final consumers are often the best monitors of service quality. Ways to obtain consumer feedback include establishing user advisory boards or having user representatives on port authority boards.

Source: World Bank, 2001.

Air cargo services

81. Air freight transportation plays an increasingly important role in the global economy. Although it accounts for around 2% of all cargo moved worldwide in terms of tonnage, it represents over one third of the value of world trade in merchandise (Hubner and Sauvé, 2001). Air cargo transport is a key determinant in meeting demand for perishable goods, as well as garment and electronic equipment which are highly dependent on accurately timed imports of inputs and exports of semi-finished or finished products — as part of global sourcing and manufacturing networks. It also often offers the only viable means of freight transport to remote, peripheral regions and landlocked countries, particularly in the developing world in light of more limited land transport infrastructure.

82. Air freight transport is broadly divided into air carriers (which carry freight between airport points), freight forwarders (which design and market cargo services, collect freight and consolidate shipments for carriers, and deliver the goods to consignees), and integrated express carriers (which, as one entity, provide the different components of door-to-door services). Air carriers can be dedicated freighters or combine passenger and cargo operators (by using dedicated cargo aircraft and the belly-holds in passenger aircraft to move cargo, or only the latter). All cargo and combined cargo account each for around 50% of the total freight market (Hubner and Sauvé, 2001). Airport facilities and services, from runway operating services to cargo handling, storage and warehousing, are also essential for the quality, cost and efficiency of services.

83. Trade in air freight services has been heavily restricted by governments around the world since the Chicago Conference of 1944. Market access is largely determined by a complex system of some 3500 bilateral agreements which generally apply to both passenger and cargo (including dedicated freighters) carriers. These agreements typically determine the traffic rights of airlines operating on bilateral routes, as well as the airlines allowed to operate such routes, the tariffs, and the number and frequency of flights. The traffic rights are defined by so-called freedoms of the air of which there are eight. The *third* and *fourth* (from the home country to another country and back) and, to a lesser extent, *fifth* (between two countries by an airline of a third country with origin/destination in its home country) freedoms are the more frequent rights granted in bilateral agreements. The most liberal rights, *seventh* (between two countries by an airline of a third country with no connection with its home country) and *eight* (cabotage) freedoms are very rarely granted.

84. Nevertheless, over the years the general regulatory framework of air transport services has become increasingly more liberal. At the domestic level, deregulation of the industry in some countries has allowed for the entry of new carriers and opened domestic routes to competition. Liberalisation of international air transport has also taken place through more open bilateral agreements. In particular, the emergence of "open skies" agreements in the second half of the 1990s has relaxed restrictions on both passenger and cargo services between signatory countries. These agreements typically allow airlines to fly on all routes between two countries without (ex ante) controls on capacity or fares, and grant unrestricted *fifth* freedom rights. Another development is the inclusion of air service agreements in regional initiatives not only among developed countries (e.g. the EU) but also between developing counties (e.g. the Andean Pact). Meanwhile, airports and ancillary services have experienced growing private sector participation and progressive exposure of domestic monopolies to market forces.

85. Furthermore, in most countries unilateral and bilateral policies are generally more liberal for air freight services than for passenger services. Bilateral agreements at times include differing market access provisions for passenger and cargo operations, particularly by countries with a strong interest in developing their cargo infrastructure. This is implemented by maintaining capacity control over passenger services, and liberalising entry and capacity in the cargo subsector, either confined to given routes or more general by covering several departure or arrival points between two countries. In addition, non-scheduled charter and express airlines generally operate in a more liberal regulatory environment than scheduled services. At the same time, the separation of passenger and cargo rules may lead to a mixed outcome, since, as seen earlier, combined passenger/cargo flights represent an important share of all cargo carriage (Hubner and Sauvé, 2001).

86. The process of liberalisation of air transport services needs to occur without neglecting essential safety and security aspects of aviation. Appropriate rules need to be in place to avoid the emergence of any kind of "flags of convenience", including in the air cargo segment. Market opening also raises competition policy concerns. In particular, in recent years the industry has seen the emergence of a large number of airlines alliances and code sharing agreements among airlines of different countries, including in the cargo subsector. While these initiatives may contribute to expand the reach of existing networks, their actual impact in terms of dominant market position on certain routes, prices and market entry barriers may deserve the attention of competition policy authorities. Additionally, in light of the importance of ground handling at airports, whatever the market structure, efficient supply and access to all carriers to related services is critical for fair competition in the industry (OECD, 1999).

Transport services and the GATS

87. Multilateral negotiations on transport services under the GATS have so far led to limited bound liberalisation. In maritime transport, negotiations were extended following the Uruguay Round (as in telecommunication and financial services) but could not be completed successfully. This resulted in a suspension of the most-favoured-nation (MFN) obligation for the sector and in existing commitments limited to those that some 51 Members were willing to make unilaterally and in subsequent accession negotiations. Progress on air transport services has also been modest. Air traffic rights are expressly excluded from the GATS, largely because the bilateral air transport services regime is fundamentally inconsistent with the MFN principle. The exclusion, though, must be reviewed at least every five years with a view to consider expansion of the application of the Agreement. Existing commitments are limited and apply only to ancillary services, i.e. aircraft repair and maintenance (38 commitments), selling and marketing (26), and computer reservation services (32).

88. New offers on transport services as part of the DDA negotiations do not seem to bode well for further bound liberalisation any time soon. As of August 2005, only 24 Members had offered new or improved commitments in maritime services, whereas for air transport 13 Members had offered new or

improved commitments in repair and maintenance, 7 in selling and marketing, and 6 in computer reservation services. Yet, as seen earlier, significant unilateral reforms have taken place since the end of previous negotiations. This is particularly the case for maritime services, as countries increasingly realise that restrictions on shipping and port services impose a significant cost on the whole economy. So there seems to be scope to achieve more progress on maritime transport at the multilateral level in current negotiations, building on the initial draft model schedule that was used during the negotiations following the Uruguay Round. Candidate measures for bound liberalisation include cargo reservation policies, foreign equity limitations, preferential taxation, restrictions on cargo handling and related services, and terms of access to port services.

89. In air transport services, a multilateral framework for aviation applying the MFN principle to the industry would require major changes in the way it is currently structured and may not be a realistic goal in the short term. Nevertheless, there are a number of desirable initiatives that could be taken by WTO Members in current negotiations. First, consideration could be given to expand commitments on the ancillary services already covered by the Agreement. This remains an important objective since these services are essential to the efficient functioning of air carriers, including in the air cargo segment. With respect to the review of the exclusion, a way forward could be to negotiate an amendment to the Annex on Air Transportation to include other ground logistics services, such as cargo handling, storage and warehousing, in so far as these services are open to competition. More ambitious is the possibility to include air cargo, though as seen earlier these services are already relatively more liberal than air passenger services. Whatever course is taken, it is crucial that these policy options are pursued without neglecting air safety and security.

90. These developments have been reflected in current negotiations through a recent call for a "holistic" checklist to the liberalisation of logistics services (see Box 5.3 below). The proposal was first introduced by Hong Kong, China in 2001 and was subsequently completed and co-sponsored by a number of developed and developing countries in 2004.[56] It proposes a flexible approach for logistics services that does not suggest a new classification but encourages Members to undertake commitments in the relevant services under different headings of the existing GATS classification (also called W/120). This includes some air transport elements that are currently outside the scope of the GATS. The proposal also stages the importance of scheduling commitments in the different subsectors according to whether they are core (where substantial liberalisation would be required for viable logistics services), related (where Members are strongly encouraged to make offers) and non-core logistics services (where liberalisation would be desirable).

91. Furthermore, the proposal suggests the possibility of entering additional commitments in a number of areas, including on transport regulatory measures — in relation to licensing requirements and procedures, technical standards, and anti-competitive practices — and on ensuring adequate access to these services. In light of the characteristics of the industry, such commitments could help ensure effective market access and that the gains from liberalisation accrue to consumers and are not captured by private firms. It also contains suggested additional commitments on trade facilitation — including in relation to more efficient procedures and formalities, customs clearance and electronic processing — which are being taken up in the broader discussion on trade facilitation.

[56] Australia; Hong Kong, China; Lichtenstein; Mauritius; Nicaragua; New Zealand; and the Separate Customs Territory of Taiwan, Pengu, Kinmen and Matsu.

Box 5.3. Checklist on logistics services

Core freight logistics services

Services auxiliary to all modes of transport (corresponding W/120: 11.H)

a. Cargo handling services
b. Storage and warehousing services
c. Transport agency services
d. Other auxiliary services

Related freight logistics services

(1) Freight transport services

Maritime transport services (corresponding W/120: 11.A)
Internal waterways transport services (corresponding W/120: 11.B)
Air transport services (corresponding W/120: 11.C)
b. Air freight transport (currently excluded from the GATS)
c. Rental of aircraft with crew (currently excluded from the GATS)
Rail transport services (corresponding W/120: 11.E)
b. Freight transport
Road transport services (corresponding W/120: 11.F)
b. Freight transport
c. Rental of commercial vehicles with operator and without operator

(2) Other related logistics services

Technical testing and analysis services (corresponding W/120: 1.F.e)
Courier services (corresponding W/120: 2.B)
Commission agents' services (corresponding W/120: 4.A)
Wholesale trade services (corresponding W/120: 4.B)
Retailing services (corresponding W/120: 4.C)
Other supporting services not covered by 11. H.

Non-core freight logistics services

Computer and related services
Packaging services
Management consulting and related services

Source: WTO, 2004.

92. Meaningful multilateral liberalisation of transport and logistics services under the GATS could bring about considerable gains. Since there are significant scale economies in transport, open markets could allow regional hub and spoke transport systems, which in turn could make more frequent calls of ships economic and thus reduce transport time significantly. Another reason is that the relevant services links must often be provided through commercial presence and many poor countries are not attractive to foreign investors even in open regimes. By creating a more transparent and predictable legal framework, a multilateral agreement could improve the investment climate and help attracting FDI to enhance the quality of transport infrastructure. The negotiating process could also be used to advance liberalisation of transport services, particularly in subsectors where powerful interest groups resist reforms.

Other policy areas

93. Negotiations on *trade facilitation* aim at providing a framework for simplification and harmonisation of international trade procedures. The Doha Round negotiations are, however, limited to GATT 1994 Article V (freedom of transit) Article VIII (fees and formalities connected with importation and exportation) and Article X (publication and administration of trade regulations). This study has argued that freedom of transit can be crucial for exports of time-sensitive products for land-locked countries, although gains of course depend on the quality of infrastructure and related services in the country or countries of transit as demonstrated in the Kyrgyz case study. As for fees and formalities connected with importation and exportation, it has been shown that these can be significant and constitute a barrier to market entry as well as reducing trade volumes.

94. However, it has also been argued that costs related to fees and procedures covered by Article VIII represent one out of many complementary links in a supply chain. In countries where time costs related to Article V and/or VIII constitute the weakest links in the chain, gains from trade facilitation can be substantial. In such cases trade facilitation can remove barriers to entry and induce a leap forward in terms of exports of time-sensitive goods. Furthermore, trade facilitation can in that case trigger a demand-driven expansion of logistics services in the private sector. Conversely, if logistics services as defined in Box 5.3 above represent the weakest link in the chain, trade facilitation alone is not sufficient to reduce lead time or time variability. In that case trade facilitation will reveal bottlenecks in the logistics chain and these will limit the effect of trade facilitation.[57]

95. Earlier OECD work has documented benefits and costs of trade facilitation in developing countries as well as discussed policy options and implementation issues. This work has emphasised that more efficient and modern customs services tend to stimulate trade as well as enhancing customs revenue. Therefore the expenses related to trade facilitation, including investment in information technology, are quickly paid back when reforms are successfully implemented. However, success depend on a holistic approach where legislation, institutional framework, training and information technology are all included in the reform package. Work has emphasised the costs of *not* undertaking trade facilitation in a situation when trade becomes more complex and demands on customs' timely and efficient response increase.[58] The current study strengthens this argument by showing that exports of time-sensitive products decline as the time to market *relative to competitors* increase. In other words, doing nothing while others reform would leave firms the non-reforming country at a competitive disadvantage. Both earlier OECD work and the current study strongly suggest that trade facilitation and policies related to logistics services should constitute a coherent policy framework for each individual developing country and as far as possible also in the single undertaking of the DDA.

96. The second policy area briefly discussed here is *special industrial zones*. These are often associated with export processing enclaves where investors enjoy tax holidays and few regulatory restrictions. This is not what is advocated here. The argument is rather that poor countries with weak infrastructure and shallow services markets cannot easily mobilise the resources necessary for investment in adequate infrastructure for the country as a whole. Furthermore, a critical mass of customers for key service providers will often be lacking. Fully serviced industrial zones could bridge this gap and serve as a first step towards integration of local firms into international markets. When well designed and managed, such zones could attract a diversified supplier base of essential logistic and infrastructure services. The

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57 Recent modelling exercises analysing the gains from trade facilitation do not capture such complementarities and in some cases they underestimate the gains from trade facilitation and in other cases they overestimate the gains, depending on which are the weakest links in the supply chain. See Engman (2005) for a discussion of these studies.

58 See See OECD (2003a; 2003b; 2004; 2005a) and Engman (2005) for further discussion.

special economic zones in South East Asia and China have for instance contributed to creating a critical mass of skills and services inputs for the electronics sector (Kimura and Ando, 2005). Lessons can also be learnt from the role that trading houses in Hong Kong has played for the emergence of China as one of the world's largest traders. During the period 1988-1998 as much as 53% of China's exports were re-exported through Hong Kong where the Hong Kong trading houses added value through sorting, packaging, testing and marketing. The Hong Kong trading houses also played an important role in providing information on Chinese producers to potential customers abroad and thus had a crucial role in matching suppliers and customers. The mark-ups on Hong Kong re-exports averaged 24%, which also illustrates how valuable these services are (Feenstra et al., 2002). The Dominican Republic case study in contrast shows how special economic zones can facilitate exports in time-sensitive goods without generating much spillovers to the rest of the economy. Special economic zones appear to have the desired effects when they are special in terms of infrastructure and supporting services rather than in terms of export-related subsidies and privileges that discourage backward linkages to the rest of the economy. Finally, special economic zones are more likely to be successful when located close to a node in transport networks (e.g. port or airport).

6. Summary and conclusions

97. To summarise the study, it has shown that time is an important competitive factor and hence also a trade barrier in its own right. It not only affects the volume of trade, it more importantly also affects the ability of enterprises to enter export markets at all. Many developing countries have time for exports and imports that exceeds the level that enables local entrepreneurs to enter international production networks or to become regular suppliers to lean retailers. For entrepreneurs in these countries time for imports and exports constitute a substantial disincentive to invest in quality and upgrade their products, since they cannot be sure that their product will arrive on the market in time to reap the price premium that new and differentiated products command. Removing unnecessary barriers to timely delivery is therefore of utmost importance for these countries. Trade facilitation has been pointed out as the lowest-hanging fruit in this respect. It has also been argued that logistics services play an important role in matching entrepreneurs in poor countries with foreign customers, whether these are retailers or downstream manufacturers. In particular, as the traditional wholesalers are increasingly being bypassed in modern supply chains, developing countries need to ensure that their entrepreneurs have access to modern intermediaries that can help match local suppliers with foreign buyers and with ensuring that products meet quality as well as time reliability requirements. Liberalising logistics services such as services auxiliary to all modes of transport services, other related logistics services and non-core freight logistics services is another policy option where adjustment costs and regulatory capacity requirements are moderate, while gains can be substantial. This is particularly the case in developing countries where access to imported services can stimulate exports of time-sensitive goods, and where the probability to enter export markets is sufficiently high. Trade facilitation and logistics services are, however, complementary and the impact of liberalisation in one depends on liberalisation in the other. Liberalisation of transport and port services has been identified as a higher-hanging fruit where the policy environment is more challenging and regulatory issues more demanding. Yet, the gains from liberalisation can be substantial.

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STATISTICAL ANNEX

Table A.1. Table on the Logistical Costs of Moving One TEU to/from Almaty (US$)

Corridor	Destination	Mode	Distance (Km)	Freight Costs (US$)	Time (days)	Cost/Km (cents)
Northern	Moscow	Road	4 391	3 350	10	0.76
		Rail	4 050	1 100	17	0.27
Western	Baku	Road	4 090	5 300	13	1.30
		Rail	3 934	1 800	18	0.46
Southern	Tehran	Road	3 120	4 650	16	1.49
		Rail	3 250	1 200	16	0.37
Eastern	Urumqi	Road	1 330	2 150	5	1.90
		Rail	1 338	1 016	8	0.76

Source: The World Bank 2005a

Table A.2. Countries included in the empirical analysis.

(x indicates exports > $ 1 mill. 2004)

	Australia		United Kingdom		Japan	
	Total	Int	Total	Int	Total	Int
Afghanistan			x			
Albania			x			
Algeria			x	x	x	
Angola			x	x	x	x
Antigua and Barbuda			x	x		
Argentina	x	x	x	x	x	x
Armenia						
Aruba			x			
Australia			x	x	x	x
Austria	x	x	x	x	x	x
Azerbaijan			x	x	x	
Bahamas The	x	x	x	x		
Bahrain	x	x	x	x	x	x
Bangladesh	x	x	x	x	x	x
Barbados			x	x		
Belarus			x	x	x	x
Belgium-Luxembourg	x	x	x	x	x	x
Belize			x		x	
Benin			x	x		
Bermuda	x		x	x		
Bhutan						
Bolivia	x		x	x	x	
Bosnia and Herzegovina			x	x	x	
Botswana			x		x	
Brazil	x	x	x	x	x	x
Bulgaria	x	x	x	x	x	x

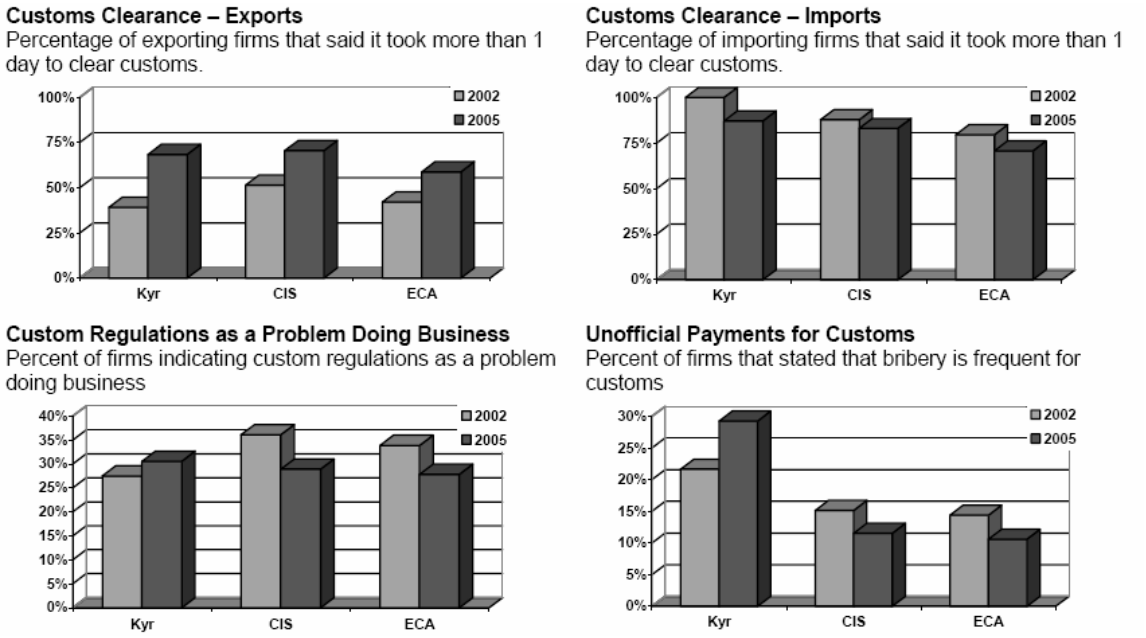
	Australia		United Kingdom		Japan	
	Total	Int	Total	Int	Total	Int
Burkina Faso					x	
Burundi						
Cambodia	x		x		x	
Cameroon			x	x	x	x
Canada	x	x	x	x	x	x
Cape Verde			x	x		
Central African Republic					x	
Chad			x			
Chile	x	x	x	x	x	x
China	x	x	x	x	x	x
Colombia	x	x	x	x	x	x
Comoros						
Congo Dem. Rep.			x	x	x	x
Congo Rep.			x	x	x	x
Costa Rica	x	x	x	x	x	x
Cote d'Ivoire	x		x	x	x	
Croatia	x	x	x	x	x	x
Cyprus	x		x	x	x	
Czech Republic	x	x	x	x	x	x
Denmark	x	x	x	x	x	x
Djibouti						
Dominica			x		x	
Dominican Republic	x	x	x	x	x	x
East Timor	x					
Ecuador	x	x	x	x	x	x
Egypt Arab Rep.	x	x	x	x	x	x
El Salvador			x		x	
Equatorial Guinea			x	x	x	
Eritrea						
Estonia	x	x	x	x	x	x
Ethiopia(excludes Eritrea)	x		x		x	
Fiji	x	x	x		x	
Finland	x	x	x	x	x	x
France	x	x	x	x	x	x
French Polynesia	x				x	
Gabon			x	x	x	
Gambia The			x			
Georgia	x		x	x	x	x
Germany	x	x	x	x	x	x
Ghana	x	x	x	x	x	
Greece	x	x	x	x	x	x
Grenada						
Guatemala	x		x		x	
Guinea			x		x	
Guinea-Bissau						
Guyana			x	x	x	
Haiti			x			
Honduras	x		x	x	x	

	Australia		United Kingdom		Japan	
	Total	Int	Total	Int	Total	Int
Hong Kong China	x	x	x	x	x	x
Hungary	x	x	x	x	x	x
Iceland	x	x	x	x	x	x
India	x	x	x	x	x	x
Indonesia	x	x	x	x	x	x
Iran Islamic Rep.	x	x	x	x	x	x
Iraq	x		x		x	
Ireland	x	x	x	x	x	x
Israel	x	x	x	x	x	x
Italy	x	x	x	x	x	x
Jamaica	x		x	x	x	
Japan	x	x	x	x		
Jordan	x	x	x	x	x	x
Kazakhstan	x	x	x	x	x	x
Kenya	x		x	x	x	
Kiribati					x	
Korea Rep.	x	x	x	x	x	x
Kuwait	x	x	x	x	x	x
Kyrgyz Republic			x			
Lao PDR			x		x	x
Latvia	x		x	x	x	x
Lebanon	x	x	x	x	x	
Lesotho			x			
Liberia			x			
Libya			x	x	x	
Lithuania	x	x	x	x	x	x
Luxembourg	x	x	x	x	x	x
Macao					x	x
Macedonia FYR	x		x	x	x	
Madagascar			x		x	
Malawi			x		x	
Malaysia	x	x	x	x	x	x
Maldives			x		x	
Mali			x			
Malta	x	x	x	x	x	x
Marshall Islands			x		x	
Mauritania			x	x	x	
Mauritius	x	x	x	x	x	x
Mexico	x	x	x	x	x	x
Micronesia Fed. Sts.					x	
Moldova			x			
Mongolia			x		x	x
Morocco	x	x	x	x	x	x
Mozambique			x	x	x	
Namibia	x		x		x	x
Nepal	x		x	x	x	x
Netherlands	x	x	x	x	x	x
Netherlands Antilles	x				x	

	Australia		United Kingdom		Japan	
	Total	Int	Total	Int	Total	Int
New Caledonia	x				x	x
New Zealand	x	x	x	x	x	x
Nicaragua	x		x		x	
Niger			x		x	
Nigeria			x	x	x	
Norway	x	x	x	x	x	x
Oman	x		x	x	x	
Pakistan	x	x	x	x	x	x
Palau					x	
Panama			x		x	x
Papua New Guinea	x	x	x	x	x	x
Paraguay			x		x	
Peru	x	x	x	x	x	x
Philippines	x	x	x	x	x	x
Poland	x	x	x	x	x	x
Portugal	x	x	x	x	x	x
Puerto Rico						
Qatar	x	x	x	x	x	x
Romania	x	x	x	x	x	x
Russian Federation	x	x	x	x	x	x
Rwanda			x			
Samoa					x	
Sao Tome and Principe					x	
Saudi Arabia	x	x	x	x	x	x
Senegal			x	x	x	
Seychelles			x	x	x	
Sierra Leone			x			
Singapore	x	x	x	x	x	x
Slovak Republic	x	x	x	x	x	x
Slovenia	x	x	x	x	x	x
Solomon Islands	x	x			x	
Somalia					x	
South Africa	x	x	x	x	x	x
Spain	x	x	x	x	x	x
Sri Lanka	x	x	x	x	x	x
St. Kitts and Nevis			x			
St. Lucia			x			
St. Vincent and the Grenadines			x		x	
Sudan			x		x	
Suriname					x	
Swaziland	x	x	x		x	x
Sweden	x	x	x	x	x	x
Switzerland	x	x	x	x	x	x
Syrian Arab Republic	x		x	x		
Taiwan China	x	x	x	x	x	x
Tajikistan						x
Tanzania	x		x	x	x	x
Thailand	x	x	x	x	x	x

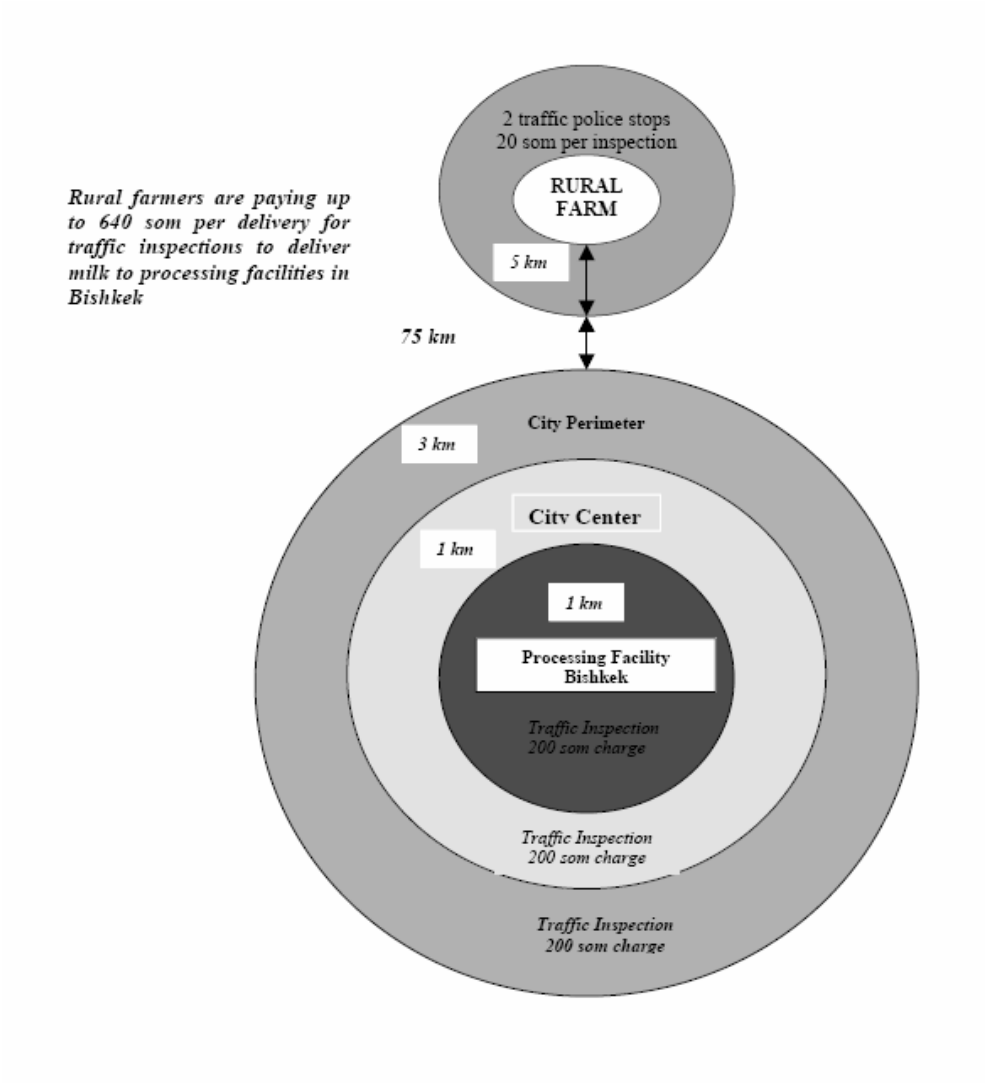
	Australia		United Kingdom		Japan	
	Total	**Int**	**Total**	**Int**	**Total**	**Int**
Togo	x				x	
Tonga					x	
Trinidad and Tobago	x	x	x	x	x	
Tunisia	x		x	x	x	x
Turkey	x	x	x	x	x	x
Turkmenistan			x			
Uganda	x		x		x	
Ukraine	x	x	x	x	x	x
United Arab Emirates	x	x	x	x	x	x
United Kingdom	x	x			x	x
United States	x	x	x	x	x	x
Uruguay	x	x	x	x	x	x
Uzbekistan			x	x	x	x
Vanuatu	x	x			x	x
Venezuela	x		x	x	x	x
Vietnam	x	x	x	x	x	x
West Bank and Gaza						
Yemen	x		x		x	
Yugoslavia	x		x	x	x	
Zambia	x		x	x	x	x
Zimbabwe	x		x	x	x	x

Chart A.1. Selected indicators from the BEEP Survey (2002-2005) on transit facilitation issues as perceived in the Kyrgyz Republic



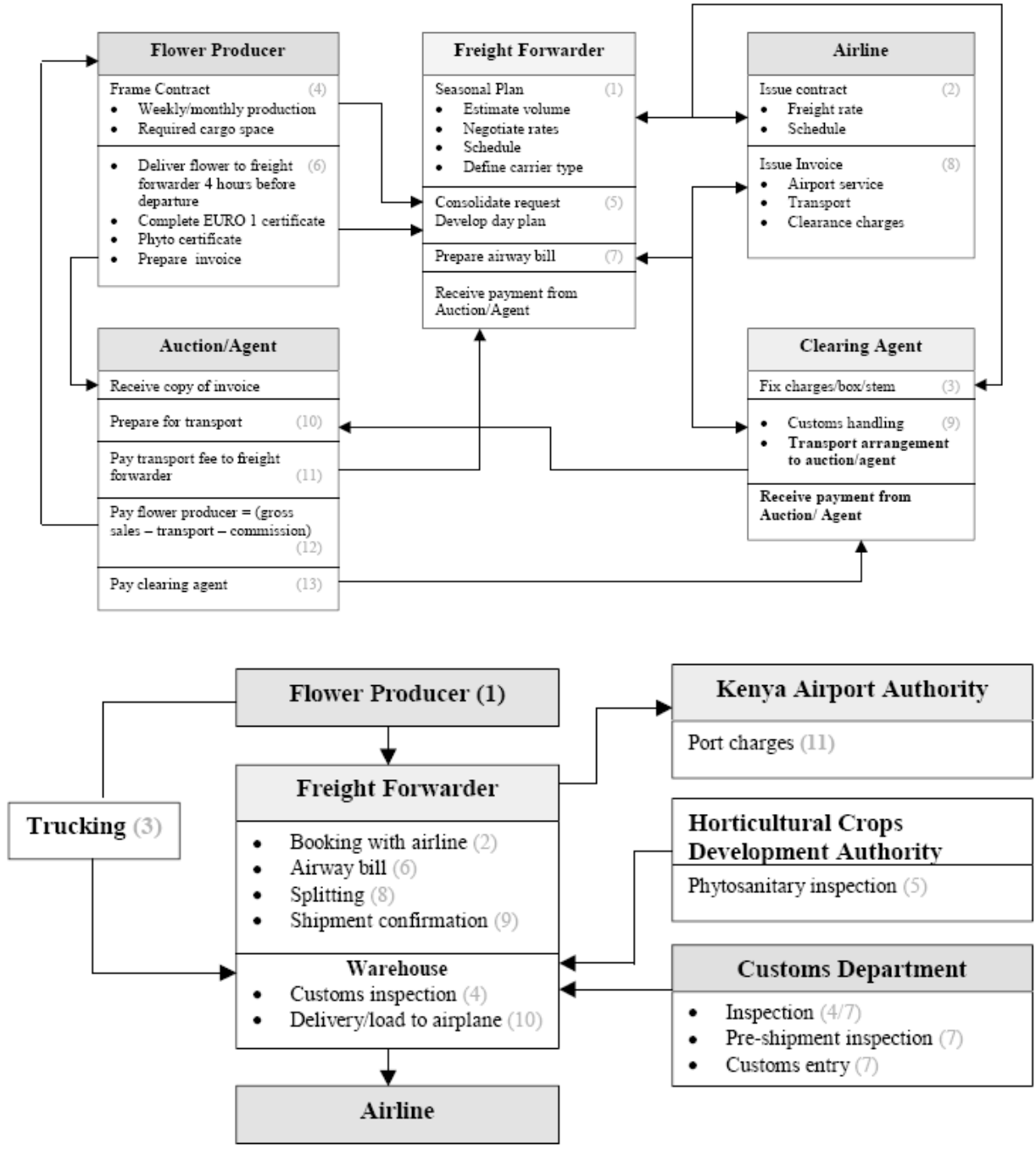
Source: The Would Bank, Kyrgyz Republic BEEPS at-a-glance, 2005d

Chart A.2. Kyrgyz Republic: Random Traffic Police Inspections during Delivery of Milk from Rural Farm to Bishkek Processing Facility



Source: The World Bank, 2004a.

Chart A.3. Freight Forwarding Process Flow Map for Kenyan & Export Airfreight Clearance Map for Cut Flowers



Source: The World Bank ,2005b, pg. 110.

ANNEX B. TECHNICAL ANNEX

How should the probit coefficients be interpreted?

The probit equation is given as follows:

$$\rho_{ij} = \Phi\left(\alpha_0 + \alpha_1 \ln gdp_i + \alpha_2 \ln reldist_i + \alpha_3 reltime + \sum\nolimits_n \alpha_{in} x_{in}\right) = \Phi(x\alpha)$$

The estimated values of the α_i are presented in the regression result tables 4.1 – 4.2. The impact of a change in for instance time for exports on the probability to export is given by $\Phi'(x\alpha)\alpha_3$ where $\Phi'(x\alpha)$ is the standard normal probability density function evaluated at the point $x_i\alpha$. The important thing to note is that the impact of a change in time varies with the value of x which in turn represents the underlying function in the bracket in the formula. It should also be noted that the impact is largest when the estimated probability is around 0.5.

Regression results

Table B.1. Determinants of probability to export; core equation

	Australia				Japan				United Kingdom			
	Total	**Interm**	**Clothing**	**Electr**	**Total**	**Interm**	**Clothing**	**Electr**	**Total**	**Interm**	**Clothing**	**Electr**
Lngdp	0.83** (0.04)	0.93** (0.04)	0.57** (0.03)	0.73** (0.04)	0.56** (0.05)	0.63** (0.03)	0.57** (0.03)	0.97** (0.06)	0.79** 0.05	0.81** 0.04	0.55** (0.03)	0.67** (0.03)
Lnreldist	-0.77** (0.09)	-0.74** (0.11)	-0.46** (0.09)	-0.27** (0.11)	-1.20** (0.17)	-1.27** (0.12)	-0.62** (0.10)	-0.65** (0.14)	-0.75** (0.19)	-0.91** (0.13)	-0.39** (0.09)	-0.76** (0.09)
Island	0.86** (0.14)	1.27** (0.16)	0.24* (0.13)	1.17** (0.15)	0.28* (0.14)	-0.15 (0.13)	0.82** (0.12)	1.56** (0.23)	0.43** (0.17)	0.60** (0.15)	0.52** (0.12)	0.95** (0.12)
Landlocked	-0.09 (0.10)	-0.27* (0.14)	-0.04 (0.09)	0.33** (0.12)	-0.55** (0.12)	-0.15 (0.10)	0.00 (0.09)	0.86** (0.17)	-0.30* (0.13)	-0.40** (0.11)	-0.15 (0.10)	-0.48** (0.13)
Language	0.29** (0.13)	0.25 (0.16)	0.03 (0.11)	0.30 (0.14)					1.49** (0.22)	0.56** (0.20)	0.17 (0.15)	-0.09 (0.15)
Colony			0.07 (0.45)			-1.93** (0.21)	-1.49** (0.18)	0.11 (0.21)	-0.39* (0.19)	0.08 (0.16)	0.08 (0.13)	0.57** (0.13)
N	1596	1596	1605	1596	1555	1588	1591	1591	1611	1611	1611	1614
Pseudo R^2	0.50	0.58	0.40	0.51	0.36	0.46	0.38	0.62	0.44	0.53	0.39	0.54

1. No country shares a common language with Japan so common language is not included in these regressions.

Table B.2. Countries with predicted probability to export between 0.3 and 0.5

Intermediate exports to Japan			Exports of fashion clothing to UK			Exports of electronics to Japan		
Country	**Days**	**Probability**	**Country**	**Days**	**Probability**	**Country**	**Days**	**Probability**
Albania	37	0.34	Albania	37	0.43	Bangladesh	35	0.41
Armenia	34	0.41	Armenia	34	0.36	Algeria	29	0.48
Azerbaijan	69	0.31	Azerbaijan	69	0.38	Ecuador	20	0.38
Bosnia and Herzegovina	32	0.42	Benin	36	0.39	Guatemala	20	0.33
Bolivia	43	0.33	Bosnia and Herzegovina	32	0.47	Nigeria	41	0.35
Bhutan	39	0.37	Botswana	37	0.43	Romania	27	0.48
Costa Rica	36	0.43	Congo Rep.	50	0.34	Slovenia	20	0.32
Ethiopia	46	0.46	Ethiopia	46	0.50	Ukraine	34	0.34
Fiji	22	0.49	Fiji	22	0.45	Vietnam	35	0.36
Honduras	34	0.36	Georgia	54	0.32			
Iceland	15	0.49	Ghana	47	0.32			
Macedonia	32	0.38	Guinea	43	0.31			
Mongolia	66	0.47	Haiti	58	0.31			
Mozambique	41	0.38	Kenya	45	0.49			
Namibia	32	0.40	Cambodia	43	0.46			
Paraguay	34	0.39	Madagascar	50	0.45			
El Salvador	43	0.42	Macedonia	32	0.38			
Samoa	12	0.31	Mozambique	41	0.48			
			Nicaragua	38	0.49			
			Papua New Guinea	30	0.38			
			Sudan	82	0.47			
			Chad	49	0.31			
			Tajikistan	23	0.39			
			Samoa	12	0.34			
			Congo Dem. Rep.	50	0.43			