# B INFRASTRUCTURE IN TRADE AND ECONOMIC DEVELOPMENT

This Section discusses how key infrastructure and infrastructural services support trade and how the quality and cost of infrastructure and related services impact on trade. It includes a discussion of transport infrastructure (roads, railways, airports, seaports etc.) and the services provided by the transport and logistics sector, and telecommunications networks and the services provided over such networks. These are the sectors involved in physical infrastructure that are crucial for moving goods and services from exporting to importing countries. Payments for goods and services flow in the opposite direction from importers to exporters. Financial services are therefore also part of the infrastructural services that support trade. Finally, a number of business services play an important role in intermediating between or matching exporters and importers. They provide logistics services that reduce the transaction costs of international trade and are, therefore, also trade-supporting infrastructural services.
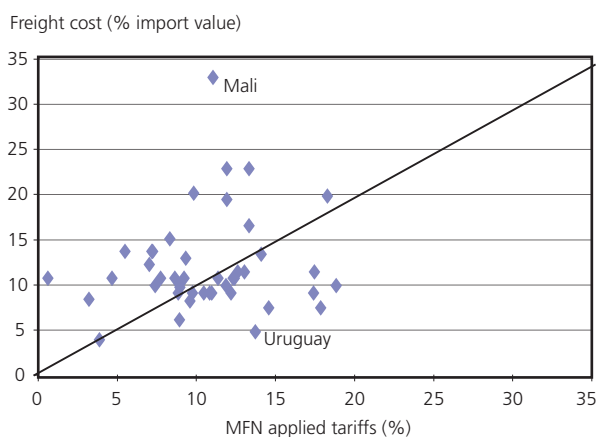
Having established that infrastructure and related services play a crucial role in the flow of international trade, the Section continues with a discussion of how to make infrastructural services more efficient and effective. Infrastructural services are, to a varying degree, subject to market imperfections that require government regulation, but technological changes over the past decade or so have changed the competitive environment of these services, particularly in telecommunications. Making infrastructural services more efficient, therefore, may involve government policy measures and possibly regulatory reforms. These are complementary to trade policies because gains from trade often depend on the quality of infrastructure and related services. Physical infrastructure can at least partly be considered a public good and government intervention is necessary for obtaining efficiency.

These infrastructural services support trade whether or not they themselves are traded. Increasingly, however, they are tradable and traded, and opening up to trade in these services is one channel through which quality can be improved and costs reduced. The Section finally discusses the interface between domestic and international regulation when infrastructural services are traded, focusing on how to improve effectiveness and efficiency. One subsection is dedicated to each of the four infrastructural services sectors.

## 1. TRANSPORT SERVICES

The effective rate of protection provided by transport costs is in many cases higher than that provided by tariffs. A recent study of the World Bank (2001) shows that for 168 out of 216 US trading partners, transport costs barriers outweighed tariff barriers. For the majority of Sub-Saharan African countries, transport cost incidence for exports (the share of international shipping costs in the value of trade) is five times higher than tariff cost incidence (the trade weighted *ad valorem* duty actually paid). Chart IIB.1 shows that in many countries in Latin America, the Caribbean and Africa, an importer pays relatively more for transport cost than for tariffs (these countries are represented by the observations above the 45-degree line in the chart).

Chart IIB.1
**The relative importance of transport costs and tariffs as a barrier to trade**

Freight cost (% import value)



*Note:* Data refer to US, New Zealand and selected developing countries in Latin America, the Caribbean and Africa. Latest available year.
*Source:* UNCTAD, Review of Maritime Transport (2002 and 2003a); WTO - IDB; Hummels (1999a).

Moreover, transport costs vary across regions and products. Table IIB.1 shows that freight costs in developing countries are on average 70 per cent higher than in developed countries. Freight costs are highest in Africa, where they are twice the world average.

At the industry level, freight costs are highest among industries producing goods with a low value-to-weight ratio. In general, agricultural and mining products are more expensively shipped than manufacturing products (Table IIB.2).

Various factors determine different transport costs across countries. Distance from major markets and other geographical characteristics are only two of these factors. For example, it is estimated that doubling distance increases overall freight rates by between 20 to 30 per cent[46], and that landlocked countries face, on average, 50 per cent higher transport costs than otherwise equivalent coastal economies (Limão and Venables, 2001). Other important factors affecting transport costs are the extent of a country's trade imbalances[47], the type of products that a country exports or imports, the degree of containerization of transport, the traffic on specific routes, the quality of transport infrastructure, and the efficiency of related transport services.

Table IIB.1
**Freight costs by region, 2001**
(Percentage of import value)

| | |
|---|---|
| **World** | **6.1** |
| Developed countries | 5.1 |
| Developing countries | 8.7 |
|   Africa | 12.7 |
|   Latin America | 8.6 |
|   Asia | 8.4 |
|   Pacific | 11.7 |

*Source:* UNCTAD, Review of Maritime Transport (2003a).

Table IIB.2
**Transport cost as a source of comparative advantage**
(Trade-weighted freight rates in per cent of imports, 1994)

| | United States | New Zealand | Argentina | Brazil | Chile | Paraguay | Uruguay |
|---|---|---|---|---|---|---|---|
| **All products** | **3.8** | **8.3** | **7.5** | **7.3** | **8.8** | **13.3** | **4.6** |
| Food and live animals | 8.2 | 14.5 | 9.9 | 10.4 | 12.7 | 12.0 | 3.6 |
| Beverages & tobacco | 6.9 | 9.4 | 11.3 | 9.0 | 8.4 | 10.4 | 4.8 |
| Crude materials | 8.2 | 16.3 | 15.2 | 7.7 | 12.0 | 10.2 | 3.7 |
| Mineral fuels, lubricants | 6.6 | 9.9 | 14.7 | 10.7 | 11.8 | 20.9 | 4.7 |
| Animal and veg. oils, fat | 7.1 | 10.6 | 10.8 | 5.4 | 9.3 | 12.5 | 2.6 |
| Chemicals & rel. prod. | 4.5 | 9.0 | 7.6 | 6.8 | 10.2 | 10.4 | 3.0 |
| Manufactures (by material) | 5.3 | 10.0 | 9.4 | 8.5 | 10.9 | 11.2 | 4.7 |
| Machinery & transport equip. | 2.0 | 6.3 | 5.6 | 5.1 | 6.3 | 13.8 | 4.1 |
| Misc manufactures | 4.7 | 6.6 | 9.3 | 8.1 | 9.1 | 15.2 | 5.8 |
| All other goods | 1.0 | 0.6 | 4.5 | 0.8 | 7.6 | 6.8 | 2.5 |

*Note:* Given the limited availability of data, transport costs are reported for 1994 to allow a comparison across countries.
*Source:* Hummels (1999a) based on US Census, Statistics New Zealand and ALADI Secretariat.

High transport costs will be an obstacle to trade and impede the realization of gains from trade liberalization. Differences across countries in transport costs, including relative costs between different modes of transport, are a source of absolute and comparative advantage and affect the volume and composition of trade. For example, a country with relatively lower air transport costs may have a comparative advantage in time-sensitive goods.

As an indication of the relative importance of the various modes of transport for trade, Table IIB.3 below shows the share of trade carried by land, water and air transportation for the United States and Japan. Geographical characteristics obviously explain the zero figures for trade by land for Japan. Similarly trade by land for the United States only refers to US trade with Canada and Mexico. However, these data still provide useful information. A comparison between the shares in value and weight suggests that products characterized by high value/weight ratios are mainly transported by air, whereas those characterized by low value/weight ratios are mainly shipped by water.

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[46]   For example, Hummels (1999a) estimates a distance elasticity equal to 0.27.

[47]   For example, if a country's exports *vis-à-vis* a trading partner greatly exceed its imports, many carriers will be forced to carry empty containers on their return trip. Therefore, the whole cost of the return trip will fall on the exporter. In contrast, if volumes of bilateral exports and imports are similar, containers may be in part used in the return trip too. Therefore, total freight costs can be partially shared between trading partners.

**United States' merchandise trade by transport mode, 2001**
(Percentage shares based on values and weight)

| Mode | United States | | | | Japan | | | |
|---|---|---|---|---|---|---|---|---|
| | Imports | | Exports | | Imports | | Exports | |
| | value | weight | value | weight | value | weight | value | weight |
| Water | 45.5 | 78.7 | 27.2 | 75.1 | 70.7 | 99.8 | 74.8 | 99.2 |
| Air | 23.4 | 0.3 | 34.4 | 0.6 | 29.3 | 0.2 | 29.3 | 0.8 |
| Land | 26.2 | 20.8 | 29.5 | 23.9 | 0.0 | 0.0 | 0.0 | 0.0 |
| Miscellaneous | 5.0 | 0.2 | 8.9 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0 |

*Note:* Land transport includes rail, truck and pipeline transport.

*Source:* US Department of Transportation, Bureau of Transportation Statistics, May 2002; Japan Tariff Association, the summary report on Japan's trade, December 2002.

The rest of this subsection focuses on transport infrastructure and related services for sea, land and air transport. It looks at the role that transportation services play in trade and international integration. Then it discusses the market structure of the transportation industry. Finally, it assesses the options available to the policy maker to render transport services more effective.

## (a) Effectiveness of transport infrastructure differs greatly across countries

Poor transport infrastructure or inefficient transport services are reflected in higher direct transport costs and longer time of delivery. An improvement in a country's infrastructure can make a big difference to the costs of trading. A study by Limão and Venables (2001) shows that if a country's infrastructure improved such that the country moved from being at the mid-point (median) among 64 countries to being among the top 25 per cent of those countries, this would reduce transport costs by an amount equivalent to 481 kilometres of overland travel and 3,989 kilometres of travel by sea. It would also increase trade volumes by 68 per cent, which is equivalent to being 2,005 kilometres closer to other countries. Similarly, inefficient transport services are associated with higher overall transport costs.

### (i) Sea transport

World seaborne trade amounted to 5.9 billion tons of loaded goods in 2002, up by 0.8 per cent from the previous year. In 2002, the share of seaborne exports of developing countries was equal to 49.4 per cent, while that of developed countries was 40.4 per cent.[48] Sea transport represents for many countries the most important mode of transport for trade. For example, for Brazil, Chile, Colombia and Peru over 95 per cent of exports in volume terms (nearly 75 per cent in value terms) is seaborne.

Table IIB.4 reports average costs of the six major liner companies for the major liner trade routes.[49] The direct comparison of liner freight rates for these six companies in 2000 and 2002 seems to suggest that sea transport costs have declined. It is worth noticing, however, that the analysis of historical data on total sea transport costs shows a different picture. Liner price indices for German trade, for example, show a significant increase in ocean freight rates over the period from 1970 to 2000. Causes of this surprising trend are higher port charges and increases in the speed of vessels (Hummels, 1999b). Table IIB.4 also shows that sea freight rates differ greatly across routes. Large price differentials suggest that some countries have a significant disadvantage in terms of competitiveness and their ability to capture the gains from trade. Finally, sea freight rates are not symmetric – the average sea freight rate to haul from Asia to the United States is more than double that to ship from the United States to Asia. While rates for westbound shipments have experienced the largest fall since 2000, sea freight rates remain the highest for cargoes loaded in Asia.

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[48] Developed countries' share in seaborne imports was 60.3 per cent, while that of developing countries was 31.4 per cent.

[49] Lack of publicly available data precludes a comparison of sea transport costs at the country level.

Several factors can explain sea freight rate differentials across countries between westbound and eastbound routes and across regions. Among these are trade imbalances, the product composition of exports, the extent to which containers are used for transport[50], the average distance of importing countries, terminal handling charges and port efficiency. Focusing on port efficiency, a recent study estimates that being among the 25 per cent least efficient ports is equivalent to being 5000 miles farther away from the nearest major market compared to being among the 25 per cent most efficient ports. This is equivalent to a reduction in shipping costs by more than 12 per cent (Clark et al, 2004). Chart IIB.2 shows that port handling charges[51] are lower in more efficient ports.[52]

Determinants of port efficiency are quality of port infrastructure and the market structure of port services. On the one hand, better infrastructure facilitates port operations, such as maritime cargo handling, storage, fuelling and watering, and emergency repair facilities. It reduces the time required to perform these operations and ameliorates the quality of the services provided. For example, investments of more than one billion dollars since 1996 to improve the existing system of locks in the Panama Canal have cut overall transit time by a fifth since 2000. Now ships that reserve in advance and pay a premium can get through the canal in 16 hours compared to a minimum of two days before.

On the other hand, better regulation, more domestic competition and international liberalization of the transportation service industry increases allocative efficiency (i.e. pricing close to costs) and internal efficiency (i.e. reduction of operational costs), thus reducing transport costs. These observations are confirmed by empirical evidence. A recent study finds that public restrictive trade policies, such as cargo reservation schemes (that require that part of the cargo carried in trade be transported only by national ships), and other restrictions imposed on potential foreign suppliers of a service, as well as private non-competitive practices (such as price-fixing carrier agreements and cooperative working agreements) significantly increase liner transport prices (Fink et al., 2002).

**Table IIB.4**
**Sea freight rates on the three major liner trade routes, 2000-2002**
($ per TEU and percentage change)

|  | 2000 | 2002 | Change (2000-02) |
|---|---|---|---|
| **Trans-Pacific** |  |  |  |
| US-Asia | 852 | 768 | -9.9 |
| Asia-US | 2013 | 1502 | -25.4 |
| **Europe-Asia** |  |  |  |
| Europe-Asia | 741 | 663 | -10.5 |
| Asia-Europe | 1620 | 1172 | -27.7 |
| **Trans-Atlantic** |  |  |  |
| US-Europe | 976 | 832 | -14.8 |
| Europe-US | 1204 | 1182 | -1.8 |

*Note:* Average of the six trades' major liner companies. Annual data are averages across quarterly data. TEUs denotes twenty-foot equivalent units, a standard-sized container.

*Source:* UNCTAD, Review of Maritime Transport (2002, 2003a).

**Chart IIB.2**
**Port handling charges and efficiency**

Handling charges[a]



*Port efficiency Index*
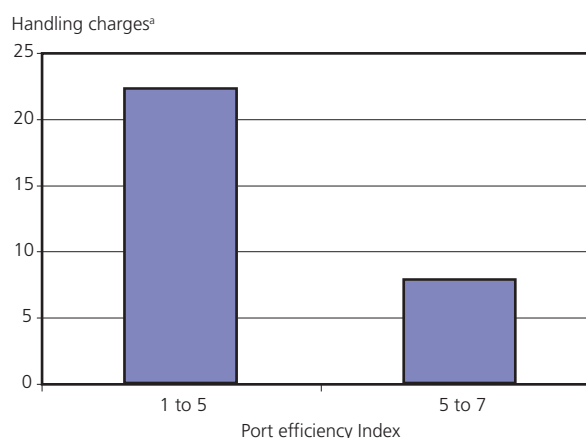
[a] $ per TEU/GDP deflator.

*Note:* TEU is a standard container measure that refers to twenty-foot equivalent unit. Countries included are: Australia, Belgium, Brazil, Canada, Chile, China, France, Germany, Italy, Japan, Malaysia, Netherlands, Philippines, Singapore, Spain, Thailand, United Kingdom and the United States.

*Source:* WEF (1999); Micco and Perez (2001).

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50   Container port traffic is distributed unevenly across regions. It represents 45 per cent of total traffic in South East Asia, 23 per cent in Europe, 16 per cent in North America, 6 per cent in Middle East, 4 per cent in Central and South America and 3 per cent in Africa.

51   Port handling charges are divided by per capita GDP at purchasing power parity, in order to control for factors other than port efficiency that may affect productivity at the country level.

52   The port efficiency index used for the Chart in the studies by Clark et al. (2004) and Micco and Perez (2001) is the one reported in Global Competitiveness Report (WEF, various years). It is based on surveys conducted of representative firms in each country. The question asked is: "Port facilities and inland waterways are extensive and efficient (1 if "strongly disagree", 7 if "strongly agree").

## (ii)    Land transport

Land transport includes road transport, rail transport and pipelines. In the United States the share of total trade transported by land is 34 per cent. Of this, freight transport by road is the principal mode of land freight transport, accounting for 60 per cent of total trade (in value terms) by land.

Data on the costs of inland transport are extremely difficult to obtain, except for some specific case studies. Table IIB.5 provides some examples of land transport costs for selected routes in Africa. The Table shows large differentials in road transport costs across routes. An additional kilometre on the route from Douala to N'djamena, for example, is three times more expensive than on the route from Maputo to Johannesburg. Other studies also find large cost differentials across routes. For example, the cost of shipping from Durban to Lusaka, 1,600 kilometres away, is 2,500 dollars, whereas the cost of shipping from Durban to Maseru (Lesotho), only 347 kilometres away, is 7,500 dollars (Limão and Venables, 2001). The quality of a country's own road infrastructure, and road infrastructure in transit countries, is likely to be an important determinant of inland transport costs. The third column of Table IIB.5 reports an index of the quality of land transport infrastructure based on the quality of roads in the origin and destination countries. The data show a negative correlation between inland transport costs and the quality of infrastructure.

**Table IIB.5**
**Estimated unit road transport costs for container and selected routes**

| Route | Distance (km) | Cost ($ per km) | Road quality index |
|---|---|---|---|
| Dar-es-Salaam-Kigali | 1650 | 3.0 | 2.1 |
| Dar-es-Salaam-Bujumbura | 1750 | 3.0 | 2.0 |
| Douala-D'Jamena | 1900 | 4.2 | 0.5 |
| Lomé-Ouagadougou | 1000 | 2.6 | 2.5 |
| Lomé-Niamey | 1234 | 2.6 | 2.1 |
| Mombasa-Kampala | 1440 | 2.3 | 1.0 |
| Maputo-Johannesburg | 561 | 1.4 | 3.4 |

*Note:* Refers to containers of maximum 28 tons in 40'. The index of quality of roads is calculated as an average of km of paved roads per 100 sq km in the origin and destination countries.
*Source:* UNCTAD, Review of Maritime Transport (2003a).

**Table IIB.6**
**Quality of infrastructure for land transportation**
(Km per 100 sq km of the territory)

| | Roads | Paved roads | Rail lines |
|---|---|---|---|
| High-income OECD countries | 41.7 | 36.7 | 2.5 |
| Middle-income countries | 12.3 | 6.5 | 0.7 |
| Low-income countries | 17.7 | 2.9 | 0.7 |
| World | 20.7 | 9.0 | 0.9 |

*Source:* WTO calculations on World Bank, WDI (2003) data.

Table IIB.6 shows the kilometres of roads (total of paved and dirt roads), paved roads and rail lines per 100 square-kilometres for high, middle and low income countries.[53] The gap in terms of quality of infrastructure between poor and rich countries is large. Data on the availability of paved roads show that rich countries have, on average, more than 13 times as many kilometres of paved roads per 100 square-kilometres than poor countries. For example, while Belgium has nearly 350 kilometres of paved roads per 100 square-kilometres, El Salvador only has about 9.5. The disadvantage in terms of reduced efficiency, lack of competitiveness and forgone gains from trade of countries with poor road infrastructures is substantial. Box IIB.1 provides an example of how the poor quality of transportation infrastructure affects efficiency of production and prices in the case of beer production in Cameroon.

A comparison between transport costs by land and by sea shows that transport by land is more expensive than by sea. Using data on the cost of transporting a standard container from Baltimore to selected destinations, Limão and Venables (2001) estimate that land transport is about seven times more costly than sea transport. An extra 1,000 kilometres by sea adds on average 190 dollars whereas by land it adds on average 1,380 dollars to the transport cost. As a consequence, at a given distance, being landlocked increases transport costs and represents a disadvantage for trade. Despite the higher costs, there is evidence that land transport is gaining market share relative to sea transport and that the cost of overland transport has declined relative to ocean transport (Hummels, 1999b). As discussed below, the growing importance of timeliness for trade is one factor explaining this trend.

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[53]    The definition of high income OECD, middle income and low income countries, used in this Section, follows the World Bank definition applied in the WDI 2003.

**Box IIB.1:   Poor road infrastructure: who pays the cost?
                The case of beer distribution in Cameroon**

Cameroonian transport infrastructure is very poor. In 1995, there were 2.6 kilometres of road per 1,000 people. Of these, less than a tenth are paved, and most are badly cracked or potholed which rainstorms make much worse. Road repairs are undertaken occasionally by amateur workers or street boys who fill holes with sand. In these conditions, a trip of 500 kilometres can take up to 4 days and a rainstorm may render roads impassable.

Guinness has a local subsidiary in Cameroon, the fifth biggest market by volume for the company. The company performance is good. Returns to capital are about 16 per cent and sales of the main brands have gone up by 14 per cent over the past five years.

However, bad infrastructure is estimated to add an average of 15 per cent to the production costs of beer in Cameroon. Bad infrastructure makes "just-in-time delivery" impossible. Factories and wholesalers need to keep large stocks and this increases costs. Guinness Cameroon keeps a 40-day inventory in the factory, while some European factories keep only a few hours of inventories. At the start of the rainy season, a wholesaler might need up to five months of inventory, as the rain renders the road impossible to travel.

Who loses? The big losers are ordinary Cameroonians, who pay higher prices or are paid lower wages. A Guinness that costs 350 CFA in Douala may cost up to 30 per cent more in an eastern village that can be reached only on foot.

*Source:* The Economist, 19 December 2002.

*(iii)      Air Transport*

The importance of air transport for trade has been increasing over time. The share of US imports shipped by air increased from 7 per cent in 1965 to 23 per cent in 2001 in value terms. In terms of ton-miles, air cargo grew at an annual average rate of 10 per cent between 1970 and 1996, while ocean shipping grew at an average rate of 2.6 per cent over the same period (World Bank, 2001). Air transport is also very important for developing countries, accounting for nearly 30 per cent of their exports by value (World Bank, 2003a). More than 20 per cent of African exports to the United States are shipped by air. The products exported from Africa to the United States by air are mainly precious stones, scientific instruments, clocks and watches (Amjadi and Yeats, 1995).

Air transportation is particularly important for time-sensitive products such as agricultural products and intermediate inputs traded within international production networks. In 1995, the most important air cargo commodities in US trade, by weight, were machinery parts (10 per cent of trade), electronics (13 per cent), high-tech instruments (4.6 per cent) and cut flowers and fish (each representing 4 per cent of trade) (OECD, 1999). Low air transport costs relative to ocean transport costs, for example, may contribute to creating comparative advantage in time-sensitive goods.

Data on air cargo costs are difficult to obtain. Some specific information shows significant differences in international freight rates across countries. For example, a synthesis indicator developed by the Japanese Ministry of Transport indicates that overall air cargo freight charges in China are approximately 70 per cent cheaper than in Japan, and in Germany and the United States they are about 25 and 45 per cent less expensive respectively than in Japan (OECD, 1999). African air transport costs appear to be higher than other countries. Amjadi and Yeats (1995) estimate that air transport costs represent in some cases up to 50 per cent of the value of African exports to the United States.

**Table IIB.7**
**Quality of airport infrastructure**

|  | Average number of first class airports[a] | |
|---|---|---|
|  | per country | per 100,000 sq km |
| High-income OECD countries | 14 | 1.1 |
| Medium-income countries | 5 | 0.6 |
| Low-income countries | 2 | 0.4 |

[a] Airports with paved runways over 3047 m.

*Source:* WTO calculations based on CIA (2003) and on World Bank, WDI (2003b) data.

The quality of air infrastructure varies greatly across countries. Table IIB.7 reports the average number of airports within country categories that have paved runways over 3,047 metres in length. High income OECD countries have seven times as many airports on average with paved runways over 3,047 metres long than low income countries. When figures are standardized to control for different country sizes, high income countries still have, on average, four times as many airports as low income countries. Large differentials across countries, in terms of quality of airport infrastructure, also appear when looking at the total number of airports. For example, the United States has over 5,131 times more airports than Benin, but is only 86 times larger in terms of land mass and 44 times larger in terms of population.

## (iv)     Integrated transport and logistic services

Total logistics costs (packaging, storage, transport, inventories, administration and management) are estimated on average at 20 per cent of total production costs in OECD countries. Transport usually accounts for a quarter of total logistics costs, storage for a fifth and inventories for a sixth. Integrated transport and communication links are essential for cost-efficient transport networks. Border delays, transport coordination problems and direct charges that may be required by transit countries constitute an important part of trade costs. After controlling for the distance between countries, empirical analysis suggests a positive border effect on trade – that is, adjacent countries trade more than two otherwise identical countries for reasons other than distance.

Efficient logistics is an important determinant of a country's competitiveness. The international transport system may suffer from insufficient cross-country coordination of the network, such as non-integrated time schedules, customs delays, incompatible standards or an insufficient flow of information about delays. Logistics services help to solve these problems. For example, they assist clients to save costs by concentrating cargo flows, reducing the ratio of empty voyages and favouring the sharing of information across transport operators. Box IIB.2 illustrates the role of information communication technology in this context.

Efficient logistics do not just reduce costs of transport and transit time, but also decrease the costs of production. If logistics services are inefficient, firms are likely to maintain higher inventories at each stage of the production chain, requiring additional working capital (bigger warehouses to store larger inventories). Gaush and Kogan (2001) estimated that developing countries could reduce the unit cost of production by as much as 20 per cent by reducing inventory holdings by half. At the sectoral level, logistics is most important for the electronic, pharmaceutical, fashion clothes and automotive sectors, where timeliness is important.[54]

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[54] For example, to serve a Ford factory producing 1500 minivans a day in Toronto, the logistics contractor organises 800 deliveries a day from 300 different part makers. Loads have to arrive in 12 different places along the assembly lines, and parts must be loaded in the right sequencing. In order to perform this task, the firm employs 200 unskilled workers and ten computer experts (The Economist, 5 December 2002).

**Box IIB.2:  How information communication technology (ICT) has transformed
the transport sector**

The transport system is more and more characterized by a multimodal transport structure integrated by logistics companies. ICT rather than the development of coordinated international networks has brought this about by improving the efficiency of the transport system and market access.  As a consequence, the digital divide between developed and developing countries has become a further source of diminished market access and competitiveness for developing countries.

ICT and the transport sector share some common characteristics. They both enhance accessibility and facilitate the linking of remote activities, and they both have a network structure. There is, therefore, a certain potential for substitutability between tele-activity and physical travel. The possibility of transferring files through the Internet, for example, has reduced the need to send hard copies of a document.

Technological advancement of ICT has been largely complementary to the transport sector. The application of telecommunication and information technology to the transport sector has transformed the latter. First, logistics companies have emerged next to pre-existing road haulage companies, rail-freight firms, shipping companies and air-cargo firms. The freight industry, traditionally very fragmented, has become more integrated and a multimodal transport system organized by logistics companies has developed. Technological advancements in ICT are a major factor in this transformation. The use of radio frequency identification tags, the Internet and transponders on product packages allows factories and warehouses to keep track of where a product is at any time. Sharing information among terminal operators, shippers and customs brokers can help manufacturers and logistics contractors to manage the supply chain and fulfil the need of "just-in-time" delivery and material requirements planning.

Second, freight companies have extended their services. The restructuring of the production, distribution and transportation system through the entry of logistics firms has created demand for some new activities to be performed at the place of shipment. As a consequence, for example, freight forwarders no longer simply buy capacity on ships and cargo planes and put together loads from different companies and load them, but also increasingly do packaging and labelling, i.e. start organizing the supply of parts and the preparation of kits for assembly.

*Source:* Cohen et al., 2002; The Economist, 5 December 2002.

Integrating transport systems across countries and liberalizing consultancy services in order to develop efficient transport chains may contribute to a large reduction in transport costs and improved market access. In this context, the GATS has a major role to play. The issues involved range from the establishment of block train connections, the introduction of swap bodies and the improvement of container logistics to the efficient flow of production components between international sites.

## (b)    Transport costs affect the volume and the composition of trade

This subsection discusses the relationship between transport costs and trade. The discussion focuses on two dimensions of transport costs: direct transport costs and time to market. A final subsection focuses on the quality of infrastructure. The impact of transport costs on the volume and pattern of trade is analysed.

### (i)    Direct transport costs and trade

Direct transport costs impede trade in much the same way as tariffs. Empirical evidence shows that freight charges are a crucial determinant of a country's ability to participate in the global economy and ultimately of its export competitiveness. It has been estimated that a 10 per cent increase in transport costs may reduce trade

volumes by more than 20 per cent (Limão and Venables, 2001) and that the decline in transport costs accounts for 8 per cent of average world trade growth in the post-World War II period (Baier and Bergstrand, 2001).[55]

However, most of the existing literature on the relationship between transport costs and trade only captures part of the overall impact of transport costs on trade. The reason is two-fold. First, the index generally used for estimation (the c.i.f./f.o.b. ratio) is a very imperfect measure of transport costs. It underestimates the recent fall in transport freight rates due to technological advancements and the reduction in air transport costs (see Box IIB.3 for further details). Second, the role that transport costs play in trade growth is more complex than that captured by an analysis conducted using an overall index of transport costs. The dynamics of trade growth and changes in the composition of trade are also determined by variations in the relative prices of various modes of transport, the fall in the relative price of long-distance hauls and the increased speed of transport. Understanding the causes and welfare consequences of trade growth require that transport costs be carefully measured, and the relative variation in sea, land, and air transport be taken into account.

## (ii)    Shipping times and trade

The proliferation of intra-firm trade, international outsourcing, and an increasing focus by firms on managing their supply chains efficiently have highlighted new dimensions of transport costs. One of these aspects is time to market. In this respect transport costs are different from tariffs. Distance matters as a determinant of trade – even after controlling for transport costs – as it captures the cost of time.

There is a trade-off between time and cost in the demand for transport services. Lengthy shipping times impose costs that impede trade. Therefore, importers are willing to pay in order to avoid these costs. This explains why a large and growing fraction of trade occurs by air, even though it is more expensive than sea transport. It has been estimated that each day spent in shipping time adds 0.5 per cent to the cost of a good, approximately 30 times greater than the cost associated with pure inventory holding (Hummels, 2000).

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**Box IIB.3: Alternative measures of transport costs**

Transport costs include freight charges and insurance on shipments (customarily added to freight charges data), holding costs for goods in transit, the opportunity cost of time spent moving goods across borders, vehicle renewal costs and other general charges.

Direct measures of transport costs exist, but their availability is limited. For instance, the US Department of Commerce provides disaggregated freight rates for ocean, air and land transportation for imports to the United States from everywhere in the world. Similar data exist for New Zealand and a few Latin American countries, although product level data are less disaggregated and they do not distinguish by mode of transport. Transport companies also report freight rates. However, the availability of these data is partly limited by their private nature. For example, Panalpina provides the cost of shipping a 40-foot container from Baltimore to 64 destination countries, including information on the city of docking and the final city of destination (thus allowing an estimation of sea versus land costs), but these data are not publicly available.

Indexes of *ad valorem* shipping liner rates have been collected by the Royal Netherlands Shipowners Association (reported in the Review of Maritime Transport) since 1961, but they are limited to only a certain number of commodities and routes. An index on liner shipping costs is also calculated by the German Ministry of Transport, but it only includes liners loading and unloading in Germany and the Netherlands. A third index is calculated by the Norwegian Shipping News. The index covers several important routes worldwide, but only comprises tramp shipping costs.

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[55]    Baier and Bergstrand (2001) also find that income growth and tariff liberalization explain about 67 per cent and 25 per cent respectively of world trade growth. In contrast, they do not find a significant impact of income convergence on world trade growth.

As regards air transport, World Air Transport Statistics reports worldwide air freight revenue and ton-kilometres over the period 1955-1997. The International Civil Aviation Organisation has surveyed air cargo transport rates (price per kilometre between two cities) worldwide for the period 1973 to 1993. In the case of land freight rates, US Transborder Surface Freight supplies data on overland imports from Canada, by city of origin and destination and transport mode (rail or truck).

Since the availability of direct measures of transport costs is limited in coverage or by its private nature, economists generally measure transportation costs using various proxies. These include *ad valorem* iceberg costs, distance and geography-related proxies and c.i.f./f.o.b. ratios. The simplest measure of transport costs is the one that assumes *ad valorem* iceberg types of costs, where transport costs are a fraction, generally between 10 and 20 per cent, of the value of trade. The shortcomings of this measure are that it does not depend on the specific countries of origin and destination, it does not depend on the transport mode or industry, and it is based on the strong (empirically unfounded) hypothesis that transport costs are a linear function of the value of the goods shipped.

Another measure of transport costs often used in economic literature is based on distance and geography. This measure assumes that transport costs increase with distance, and decrease with adjacency. This could be related to less time spent at customs, whether a trade facilitating measure is in place, whether information flows more easily between neighbouring countries, the degree of integration of the transportation network and whether trade partners share a common language. Although this measure depends on the country of origin and destination, it does not overcome all limitations applying to iceberg costs. It fails to capture variations in transport costs by mode of transport or type of commodity shipped. It is also a timeless measure and fails to capture variations of transport costs over time. Adding a variable indicating whether the country is landlocked or an island may partially correct for differing transport modes. Adding a variable on country specific infrastructure may capture variations over time.

The measure of transport costs most often used by economists to estimate the impact of transport costs on international trade is based on the comparison between "free-on-board" (f.o.b.) and "cost-insurance-freight" (c.i.f.) values of trade. The f.o.b. price measures the cost of an imported item at the point of shipment by the exporter as it is loaded onto a carrier for transport. The c.i.f. price measures the cost of the imported item at the point of entry into the importing country, inclusive of the costs of transport, insurance, handling, and shipment costs, but not including customs charges. The higher the value of the ratio, the higher the share of transport cost in the value of traded goods.

Although widely used this measure is quite imprecise. First, c.i.f./f.o.b. ratios are not available for all countries – for example, Europe and Japan are not included. Second, there are a series of technical problems that are simply solved through data imputation. For example, loading or unloading costs are included in the c.i.f. values depending on the country. This renders the quality of the data very poor. Third, disaggregated data are usually not available. An exception is US Census data. This provides data on US imports at the HS 10 level by exporter country, mode of transport and entry port valued at f.o.b. and c.i.f. base. Fourth, the c.i.f./f.o.b. ratio is subject to variations due to compositional changes in the types of goods traded, the set of partners with which a country trades over time, and in the choice of the mode of transport. For example, worldwide trade in high-value-to-weight manufactures (cheaply shipped) has grown much faster than trade in low-value-to-weight primary products (expensively shipped). This will affect the c.i.f./f.o.b. ratio measure of costs even if the unit cost of shipping remains unchanged. A related issue is that the ratio probably does not capture the significant decline in transport costs that has taken place over the years (Hummels, 1999b). If technological innovations reduce the price of fast means of transport relative to slow means, or if time becomes more important in trade (in the context of expanding production network), it is likely that demand will shift toward fast vessels and air transport (relatively more expensive than slower means of transport at each point in time). The c.i.f./f.o.b. ratio fails to capture these absolute and relative price variations, thus underestimating the decline in transport costs.

*Source:* Combes and Lafourcade (2003), Hummels (1999b), Anderson and Wincoop (2003).

What is the impact of shipping time on trade? The time required to transfer a good through space is an additional barrier to trade. Using the standard gravity equation of trade (including GDP, distance, common language and adjacency), augmented by a variable measuring the shipping time between ports, Hummels (2000) estimates that doubling shipping time decreases the volume of trade by approximately one quarter to one third. Similarly, the results obtained by the estimation of a gravity equation model augmented by a variable measuring the median number of days required for customs clearance[56] show that lengthy times in completing administrative procedures for border crossing have a significant negative impact on trade. An increase in the median number of days required for customs clearance from five to seven reduces trade by more than 40 per cent. Passing from a most efficient country in terms of time required for customs clearance, such as Estonia or Lithuania where customs clearance procedures only require one day (Table IIB.8), to a least efficient country such as Ethiopia, where customs clearance requires an average of 30 days, would *ceteris paribus* nearly eliminate trade (Nordås and Piermartini, 2004).

Table IIB.8
**Days required at border for customs clearance**
(Median number)

| Most efficient countries | | Least efficient countries | |
|---|---|---|---|
| Estonia | 1 | Ethiopia | 30 |
| Lithuania | 1 | Cameroon | 20 |
| Croatia | 2 | Nigeria | 18 |
| Czech Rep. | 2 | Malawi | 17 |
| Georgia | 2 | Ecuador | 15 |
| Italy | 2 | Haiti | 15 |
| Singapore | 2 | Kenya | 14 |
| Slovakia | 2 | Tanzania | 14 |
| Slovenia | 2 | Uganda | 14 |
| Sweden | 2 | Venezuela | 11 |

*Source:* Micco and Perez (2001).

Where shipping time is important for trade, some additional considerations should be borne in mind. First, the time required to ship a good between two ports may determine a country's comparative advantage. Lengthy shipping times impose a cost. This cost is magnified for some goods, such as fresh products, cut flowers, newspapers, Christmas decorations and high-fashion textiles, as well as for countries that trade intermediate goods and specialize in a specific stage of production. Shipping time is a determinant of comparative advantage as some sectors are more time-sensitive than others. Countries whose air shipping costs are lower than sea shipping costs have a comparative advantage in exporting time-sensitive products. By the same token, these countries have a comparative advantage in adopting a production structure characterized by vertical specialization.

Second, technological changes that decrease shipping times constitute a reduction in trade barriers and will therefore enhance trade. Hummels (2000) has estimated that the development of fast transport (air shipping and faster ocean vessels) was equivalent to reducing tariffs from 20 per cent to 5.5 per cent between 1950 and 1998, thus explaining part of world trade growth over the post-World War II period.

Third, the importance of shipping time for trade suggests that the decline in shipping prices and the relative decline of air shipping prices help to explain the growth of world trade. To the extent that time is an important barrier to trade for all goods, the decline in the price of air transport relative to sea transport boosts trade, because sea transport can be substituted by faster air transport.

Fourth, the relative decline in air transport costs can explain variations in the composition of world trade. Trade in more time-sensitive goods has grown more rapidly than trade in other goods. To the extent that just-in-time delivery is very important for trade within production networks, the relative decline in air transport can be responsible for the increase in the share of vertical specialization in trade. In fact, trade growth within production networks explains roughly half of world trade growth between 1970 and 1990 (Hummels, 2000).

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[56] Data are based on surveys conducted by the World Bank on importers of each country. The specific question asked is "if you import, how long does it typically take from the time your goods arrive at their port of entry until the time you can claim them from customs?".

Finally, the quality of infrastructure and related transport services are an important determinant of trade through their effect on the time required to move goods between trading partners. Shipping times are not only determined by the time spent travelling (of which the speed of the means of transport used is the most important determinant), but also by the time spent in port loading, unloading and carrying out administrative procedures for customs clearance. Delays in transit represent costs and affect trade, comparative advantage, investment choices and ultimately GDP. Although research on these issues is at a preliminary stage, the case of Intel's investment in Costa Rica is a useful example. Intel decided to invest $300 million in Costa Rica in a microchip facility only after the Government of Costa Rica had guaranteed rapid customs clearance free of bureaucratic and administrative blockages (Redding and Venables, 2002).

### (iii)    Quality of transport infrastructure and trade

The quality of transport infrastructure affects trade in two ways. First, poor quality of infrastructure increases total transport costs as it increases direct transport costs and the time of delivery. Box IIB.4 illustrates an example of the crucial impact of the quality of infrastructure and related transport services on trade, although the case addresses internal trade in a poor country. The example also shows how transport costs and lack of infrastructure erode the potential income of local producers. The negative impact of a lack of infrastructure on domestic income is generally recognized – improving infrastructure in the service sector has been estimated to be worth $154 billion or 4 per cent of world GDP (Wilson et al. 2003).

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**Box IIB.4:   Transport cost, market access and rural income in the Democratic Republic of Congo**

Small-scale farmers in the Kinshasa region trade their surplus output in Kinshasa. The region is characterized by long distances between villages, and roads are often of poor quality. Traders travel from Kinshasa to the villages and purchase farm products which they bring back to the Kinshasa market. Minten and Kyle (2000) study how the distance between producers and market, and quality of infrastructure, affects the prices received by the farmer and the transport margin. Traders can choose between travelling by road or on the river for villages located close to the river. The direct transport costs are considerably lower on the river, but it takes much more time. The journey takes, on average, 20 days on the river as compared to four days on the road, in both cases over a distance of about 300 km. A very small share of the total produce is transported on the river, indicating that time to market is important. On average, transport costs account for as much as 30 per cent of wholesale price for goods transported by road and about 20 per cent for goods transported by river. The farmers receive about 40 per cent of the wholesale price, on average, for goods transported by road. An analysis of the relationship between transport costs and income at each link in the supply chain finds that the farmer's share of the wholesale price declines by 3.4 percentage points per 100 km, while the share of transport costs increases by 3.1 percentage point per 100 km of road transport on good roads (paved roads), but by as much as 6.2 percentage points on bad roads (dirt roads). This implies that a farmer living 500 km from Kinshasa, where 400 km is on paved roads and 100 km is on dirt roads, would enjoy a 15 per cent increase in the producer price if the dirt road was paved.

*Source:* Minten and Kyle (2000).

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Second, public infrastructure, including transportation infrastructure, has been proved to affect trade through its effect on a country's comparative advantage. If a sector, say textiles, is more sensitive than others to the quality of infrastructure, then the provision of good infrastructure will promote a country's comparative advantage in textiles. Yeaple and Golub (2002) quantify the extent to which government infrastructure explains the large international differences in total factor productivity (TFP) existing at the sectoral level. The provision of road infrastructure consistently appears to be a significant factor in a sector's productivity growth and in a country's production specialization. Road infrastructure appears to be particularly important for productivity growth in the transportation equipment sector, and for specializing in the production of textiles and apparel.

One recent study estimated a standard gravity model augmented with a variable measuring the quality of infrastructure of the importing and exporting country. The study showed that better infrastructure for sea, land and air transport are associated with higher volumes of trade. The quality of ports seems to have the largest impact on trade.[57] Increasing port efficiency has a significant positive impact on trade. Efficient ports explain bilateral trade patterns better than preferential margins. As regards air transport infrastructure, doubling the number of paved airports per square kilometres of territory in a country boosts imports by 14 per cent. Trading with an exporting country with twice as many airports increases bilateral trade by a further 15 per cent. Good quality of land infrastructure also has a positive effect on trade. Doubling the kilometres of paved roads per 100 square-kilometres is estimated to increase trade by 13 per cent. Imports from a country with twice as many kilometres of paved roads per 100 square kilometres than another increases trade by 12 per cent (Nordås and Piermartini, 2004).

## (c)      Liberalization of transport services and complementary domestic policies

Anticompetitive behaviour and restrictive regulations increase transport costs, thus raising actual trade barriers between countries and ultimately increasing costs of traded goods and market shares. Practices that restrict competition and restrictive regulations are present in both the maritime and international air transport sectors.

The market structure for international maritime transport includes tramp shipping (transport services performed irregularly and provided on a demand basis) and liner shipping (regular lines which publish in advance their calls in different harbours). It is generally believed that the former is fairly competitive while the latter has been traditionally characterized by private cooperative agreements and government restrictions. For example, some countries still have in place cargo reservation schemes which require that part of the transported cargo be shipped only on national carriers.  Shipping companies commonly join carrier agreements and consent to common practices regarding tariff rates, conditions of services, traffic distribution and/or vessel capacity utilization. Historically, port and auxiliary services, such as cargo handling, fuelling, watering and navigation aids have been characterized by monopoly.

Cargo reservation schemes and limitations on port services often protect inefficient shipping lines and port operators. Cooperation agreements among maritime carriers on technical standards and price fixing are other competition-restricting practices.[58] A recent study (Fink et al., 2002) estimates that liberalizing port services may reduce prices by an average of 9 per cent, and the break-up of cooperative working agreements and price-fixing agreements could lower prices by 25 per cent. Another study (Clark et al., 2004) argues that the relative inefficiency of South American ports can be explained by their excessive regulation, as the practice of mandatory service for incoming ships is beneficial at low levels, but harmful when it is too high. The case of Brazil illustrated in Box IIB.5 gives an example of how excessive regulation reduces port efficiency. Chart IIB.3 shows that there is a negative correlation between barriers to services trade and port efficiency.[59]

In 1974 the UNCTAD Liner Code of Conduct was adopted in order to counteract the anti-competitive practices generated by cooperation agreements among maritime carriers. The Liner Code requires that cargo is transported by the importing, exporting and a third country on the basis of a 40:40:20 ratio. The Code entered into force in 1983 in over 70 countries. However, it has never been applied on a large scale and today covers only a small share of trade, being applied mainly on routes between West Africa and Europe.

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[57]   Data availability limits the number of observations for port infrastructure.

[58]   A cooperation agreement, however, can also include some provisions that may actually increase efficiency, like for example, slot sharing provisions.

[59]   The index of restrictiveness used in the chart is calculated on the basis of the number and severity of restrictions that hinder foreign firms from entering and operating in an economy. As it applies to foreign firms, it is referred to as a foreign index. A domestic index of restrictions that apply to domestic firms also exists (produced by the Australian Productivity Commission). A plot of a port efficiency index on a domestic index of restrictiveness of maritime services also shows a negative correlation.

Historically, the air travel industry has been dominated by inter-governmental deals which dictate which airline can fly where, how many seats each airline can offer and in some cases what fares airlines can charge. So far, for example, air traffic across the Atlantic has been regulated by bilateral agreements between the United States and individual European countries.[60] While bilateral airline agreements may increase network efficiency, they may impede competition by precluding entry to efficient outside carriers, thus resulting in higher costs. For example, one study shows that airfares for city-pair routes on which more than two airlines operate are on average 10.7 per cent less expensive (World Bank, 2003b).

Deregulation of air transport services would lead to substantial gains from enhanced competition. One study estimates that restrictions imposed by

Port efficiency index



*Source:* Productivity Commission of Australia, http://www.pc.gov.au/research/ and Micco and Perez (2001).

domestic regulatory regimes increases prices in international discount air passenger fares by a percentage ranging between 3 to 22 per cent (Doove et al., 2001). Some country experiences show the benefits of deregulation. For example, domestic deregulation in Europe and the United States led to the emergence of new low-cost carriers, new routes, more passenger traffic, lower fares and some innovation, such as Internet-based booking techniques initiated by low cost start-ups. The domestic air transport industry was liberalized in the United States in 1978. Over the next 20 years, air travel (measured as revenue passenger kilometre) rose by 150 per cent. Empirical studies find that as a consequence of air traffic liberalization, consumers benefited by $20 billion a year, fares were 20 per cent lower than they would have been and 80 per cent of passengers enjoyed lower fares on their routes (cited in The Economist, 4 October 2003).

International liberalization of trade in transport services and the opening of investment in infrastructure to private capital, including foreign capital, can play an important role in improving the quality and reducing the costs of transport services. It can increase competition and provide the necessary funds for investing in infrastructure. However, appropriate competition policy, domestic regulation and good governance are complementary to international liberalization. First, liberalization in services without proper competition and regulation may transform a public monopoly into a private monopoly without improving efficiency in the service sector.[61] Indeed, a simulation of the impact of full trade liberalization in the maritime industry on welfare in Latin America, South Asia and Africa has shown that the effect depends critically on the degree of competition in the shipping industry. The more competitive the industry, the larger the gains occurring to consumers (Francois and Wooton, 2001).

Second, effective regulation is crucial, for example, to ensure adequate access to services of low-income groups or people located in very remote areas. Liberalization of the transport system may transform the structure of the service supply from a comprehensive network with many links to a hub-and-spoke network. A hub-and-spoke structure may lower prices on well-connected hub routes, but could actually raise freight rates on thin spoke routes, thus increasing income inequality within a country by marginalizing the periphery from the core of the economy.

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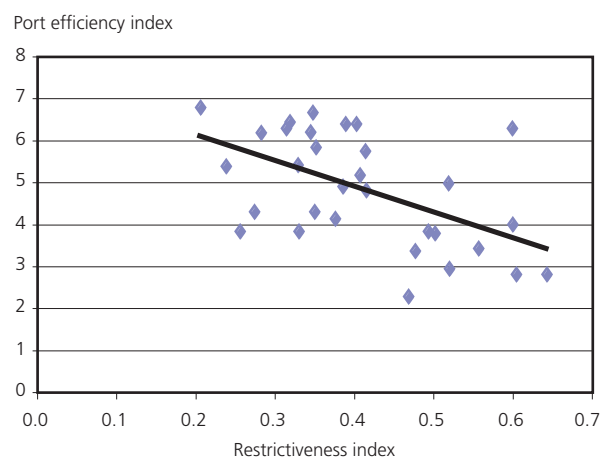
[60]   In October 2003, the European Union and United States commenced talks on liberalizing transatlantic air traffic.

[61]   It is often argued that the high fixed costs of transport infrastructure, such as the cost of building rail tracks, and sea and air ports renders the industry a natural monopoly. A natural monopoly occurs when average costs of production decline over the entire range of demand. In this case, the firm that covers the whole demand can sell at a lower price and crowd out competition. Since one firm is viable but two or more are not under these circumstances, cartels and private monopoly might replace public monopoly when the transport sector is liberalized. As a counter example, Box IIB.5 shows that a regime of public ownership can coexist with private and competitive ownership of transport services.

To conclude, a well-conceived liberalization of trade in transport services may lead to large gains. However, little has been achieved at the multilateral level in terms of transport service liberalization to date both in maritime transportation and air transport. Only 47 WTO Members have included maritime transport commitments in their GATS[62] schedules, with considerable variation in terms of coverage and depth of commitments. Few among developing countries have assumed any obligation. For example, only seven African countries have included maritime transport commitments in their schedules. Moreover, commitments cover only the three pillars of maritime transport – blue water services, auxiliary services and access to and use of port services.

As regards air transport, GATS rules at present cover only aircraft repair and maintenance, the selling and marketing of air transport services and computer reservation system services. Services affecting air traffic rights are excluded from GATS. Thirty-four WTO Members (counting the EU as one country) have assumed MFN obligations for repair and maintenance, 23 for selling and marketing of air transport services, and 28 for computer reservation system services.

## Box IIB.5: Liberalization of port services: the case of Argentina and Brazil

The process of liberalization and privatization of port services was initiated in the 1980s in Latin America. Initially, the involvement of private firms was confined to the provision of specific port services, such as towing, pilotage and stevedoring. Starting from the 1990s in many Latin American countries, firms were allowed to operate ports and undertake investments to improve the quality of the services they offered. Analysis of Latin American countries' experiences in liberalizing and privatizing port services shows that deregulation and participation of the private sector, including foreign capital, in public ports has led to higher productivity and lower cargo handling costs. It also shows that what is crucial for successful liberalization and privatization is the coherence between these policies and other economic policies, such as the promotion of competition between ports, investments in infrastructure and the flexibility of the labour market.

Let us compare the case of Argentina and Brazil.

### Argentina

Argentina started privatizing some seaport services in the 1970s. This phase of privatization did not have much success in terms of productivity. Public investments in infrastructures remained low, the system was over-regulated and port institutions were inadequate. In the 1990s, private firms were allowed to operate public ports and to build new ports or invest in their infrastructure. In the case of the port of Buenos Aires, its six terminals were given in concessions to five different private firms, while the Port Authority retained the ownership of infrastructure (landlord port model).

As a result of the reforms, cargo handling increased by 50 per cent between 1990 and 1995, labour productivity surged by 275 per cent and Argentinean ports became the cheapest ports in Latin America. In 1997, Puerto Nuevo's cargo handling surpassed that of Santos (Brazil), the biggest port in South America. Foreign firms participated in the construction of new ports, as in the case of a terminal in Zarate.

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[62]   The General Agreement on Trade in Services (GATS) establishes a multilateral set of rules and principles that govern trade in services, including international transportation services.

*Brazil*

In 1990s, Brazil initiated a reform that involved the participation of the private sector in cargo handling services and the liberalization of port tariffs. The results of the privatization were not as successful as in Argentina. For example, in 1998, the average cost of handling a twenty-foot container in Buenos Aires was 130 dollars, while in Brazil it was 350 dollars.

Brazil suffered strong resistance from labour unions to allow flexibility in the number of employees. As a consequence, in 1999 in Santos 50 workers were required to handle a ship's cargo, while only 14 were needed in Buenos Aires.

Nevertheless, privatization did deliver some gains. In the two terminals in Santos operated by private firms, for example, waiting time was drastically reduced from several days to less than a day in 1999, and container handling charges fell from 550 dollars per TEU in 1996 to 328 dollars per TEU in 1998.

Two important lessons can be drawn from the experience of Argentina and Brazil in liberalizing and privatizing port services. First, the gains that can be achieved through liberalization and privatization depend on whether adequate competition is guaranteed to prevent firms from engaging in anti-competitive behaviour. This can be achieved with effective regulation (anti-trust laws), but as the experience of Argentina shows, it can also be achieved by fostering inter- and intra- (between terminals) port competition through investing in new terminals or improving land transport infrastructure.

Second, gains from liberalization and privatization are greater when the right economic environment is created instead of heavily regulating enterprises. For example, in Brazil insufficient flexibility in the labour market delayed adjustment in capital-labour ratios required by technological changes in maritime transport.

*Source:* Micco and Perez (2001).

## 2.    TELECOMMUNICATIONS

Effective telecommunications provide a low-cost channel for searching, gathering and exchanging information which, in turn, is a key input in all economic activities. Hardly any business today can operate without telecommunications. For many industries the telephone is the primary point of selling, and the Internet is an increasingly important channel for marketing, and for sales for some industries. Telecommunications networks provide the supporting infrastructure for such information flows and for Internet access. During the past few decades, technological progress in the telecommunications sector has been remarkable and there has been a rapid diffusion of technology as well. It is now possible for countries that have lagged in economic and technological development to switch to the most recent technologies at relatively low costs of adoption. In Africa, for example, 95 per cent of mobile lines were GSM in 2001, well above the world average of 70 per cent. The Republic of Korea has the highest rate of broadband penetration in the world, with almost twice as many lines per 100 inhabitants as Canada, the country with the second highest rate.[63] Finally, it appears that the digital gap is narrower and narrowing faster than the income gap between rich and poor countries. Thus, while GDP per capita grew at almost the same pace in low-income and high-income countries during the period 1995-2001, the number of mobile phones per 100 inhabitants grew almost twice as fast in low-income countries.[64]

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[63]    In June 2002, the Republic of Korea topped the ranking of OECD countries according to broadband access per 100 inhabitants with a score of 19.1, almost twice the score of Canada which came second with 10.2 (OECD, 2003f).

[64]    GDP per capita grew by about 2 per cent per annum in both low and high-income countries, while the number of mobile phones per 100 inhabitants grew by 63 and 32 per cent per annum respectively. The figures are calculated from World Development Indicators 2003.

Telecommunications consist of services that can be wire-based (e.g. fixed-line telephony), wireless (e.g. mobile and satellite services), resale-based (i.e. over leased transport capacity) and a myriad of combinations thereof. The Internet has come to embody a technology in its own right, providing low-cost access to data as well as voice communication. Telecommunications are a network industry and as such the value of the network for each customer increases with the size of the network. Because of this and because of economies of scale, the industry was considered a natural monopoly in the past. Recent technological developments have, however, reduced the importance of economies of scale and made vertical disintegration and competition possible. As a consequence, most countries have carried out regulatory reforms, often including privatization of state monopolies and the introduction of competition in some or all market segments. Regulatory reforms in the sector have contributed to further innovations, diffusion of technology and a substantial reduction in the cost of telecommunication services. This does not mean, however, that telecommunications have become a perfectly competitive industry with no need for government regulation. Rather, there has been a rethinking of regulation in order to ensure incentives for cost effectiveness and innovation and for investment and competition in a rapidly changing market.

This subsection first presents the structure and the performance of the telecommunications sector in terms of supply and cost of services. It continues with an analysis of the relationship between telecommunication sector performance and trade performance. Finally, regulatory challenges related to greater openness in the telecommunication sector are addressed, focusing in particular on LDCs, where the potential gains from reform may be the largest.

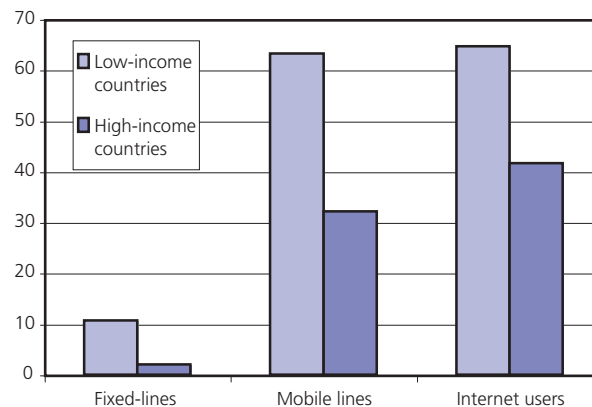## (a)     The digital gap is wide, but narrowing

The industry consists of fixed-line telephony, mobile telephony, the Internet and a number of related services. In most countries fixed-line telephony has the largest market share, but mobile communication revenue reached 33 per cent of total telecommunication revenues in the OECD area in 2001, and accounted for more than half of total revenues in some developed as well as developing countries. For example, the share of mobile revenue in total revenue was 58 per cent in Japan, 60 per cent in the Republic of Korea and Zimbabwe, 69 per cent in Swaziland and as much as 89 per cent in Latvia in 2001.[65] In developing countries with low fixed line density there are typically more mobile lines than fixed lines. In as many as 20 developing countries included in the ITU database there were more than twice as many mobile as fixed lines in 2001.

Fixed-line communication requires a substantial investment in infrastructure and was usually provided by a state-owned monopoly in the past. The initial investment requirement in mobile networks is modest in comparison and the mobile market was therefore easier to enter and more amenable to competition than fixed-line services. The market structure is changing, even in the fixed-line segment of the market. By the end of 2002, all OECD countries except Turkey had abolished the state monopoly and the trend is similar in developing countries. Nevertheless, new entrants' share of fixed access lines is still modest in most countries. Fixed-line services can also meet competition from new sources such as cable television providers, electricity providers and rail transport companies who offer telephony over their networks. In some OECD countries (Belgium, the United States and Canada), nearly all households are close to a cable television network. Also voice-over-internet protocol (VOIP) has emerged as a competitor to fixed-line telephony, although its quality is still inferior to state-of-the-art fixed-line services. Some OECD countries define this service as a value-added network service not subject to the kind of regulation applied to basic telecommunications, while others do not make this distinction. Some operators, particularly in Asia and Latin America, have elected to offer VOIP themselves. An increasing number of national regulators are caught in the dilemma of trying to determine how best to deal with VOIP.

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[65]     Source: ITU (2003).

Chart IIB.4 shows the growth of the number of fixed lines, mobile lines and Internet hosts over the period 1995-2001 for low-income and high-income countries respectively. The figure suggests a narrowing digital gap between high-income countries and low-income countries. In both groups of countries the price of local calls has fallen during the 1990s, but it has declined more in low-income countries. In 2000, the average price of a three-minute local call in low-income countries was less than half that in high-income countries ($0.05 versus $0.11). The cost of international calls varies widely among countries. The most expensive services are generally found in low-income countries while the cheapest services are found in Scandinavia. The data suggest that local calls more commonly remain cross-subsidized by international

*Source:* World Bank, WDI (2003b).

calls in low-income countries than in high-income countries. Most developed countries had rebalanced rates by the mid- to late 1990s to reflect better costs and market conditions during the reform process. Rebalancing has become an essential component of telecommunications reform in developing countries as well, both in response to price competition from mobile services, call-back services and the Internet, and to lay the groundwork for introducing new market entrants in fixed telephony.

Even though the digital gap is narrowing, it remains substantial, particularly when comparing the least connected to the best connected individual countries. Table IIB.9 shows the top and bottom 10 countries ranked according to the number of fixed and mobile lines per 1000 inhabitants, and the ratio of mobile lines to fixed lines.

Table IIB.9
**Number of fixed and mobile lines per 1000 inhabitants and total number of Internet hosts**

| Fixed-lines | | Mobile lines | | Mobile/fixed-lines | | Internet hosts | |
|---|---|---|---|---|---|---|---|
| **Top 10 countries** | | | | | | | |
| Bermuda | 869 | Luxembourg | 921 | Congo, Dem. Rep. | 7.5 | United States | 110 000 000 |
| Luxembourg | 780 | Hong Kong, China | 859 | Gabon | 6.9 | Japan | 7 000 000 |
| Switzerland | 746 | Italy | 839 | Congo, Rep. | 6.8 | Canada | 2 900 000 |
| Sweden | 739 | Norway | 825 | Cambodia | 6.7 | Netherlands | 2 600 000 |
| Norway | 720 | Iceland | 820 | Uganda | 5.1 | Germany | 2 400 000 |
| Denmark | 719 | Israel | 808 | Morocco | 4.0 | Australia | 2 300 000 |
| Canada | 676 | Austria | 807 | Paraguay | 4.0 | United Kingdom | 2 200 000 |
| United States | 667 | Sweden | 790 | Philippines | 3.5 | Chinese, Taipei | 1 700 000 |
| Iceland | 664 | Finland | 778 | Cameroon | 3.1 | Brazil | 1 600 000 |
| Germany | 634 | Portugal | 774 | Rwanda | 3.0 | Mexico | 900 000 |
| **Bottom 10 countries** | | | | | | | |
| Congo, Dem. Rep. | 0.4 | Niger | 0.2 | Tajikistan | 0.01 | Haiti | 0 |
| Chad | 1.4 | Tajikistan | 0.3 | Cuba | 0.01 | Iraq | 0 |
| Afghanistan | 1.5 | Myanmar | 0.3 | Tonga | 0.02 | Sudan | 0 |
| Niger | 1.9 | Ethiopia | 0.4 | Uzbekistan | 0.04 | Burundi | 1 |
| Liberia | 2.2 | Liberia | 0.6 | Armenia | 0.05 | Chad | 1 |
| Central African Republic | 2.4 | Cuba | 0.7 | Myanmar | 0.05 | Myanmar | 2 |
| Cambodia | 2.5 | Nepal | 0.8 | Belarus | 0.05 | Bangladesh | 3 |
| Rwanda | 2.7 | Vanuatu | 1.7 | Vanuatu | 0.05 | Marshall Islands | 3 |
| Uganda | 2.8 | Papua New Guinea | 2.0 | Algeria | 0.05 | Saint Kitts and Nevis | 3 |
| Burundi | 2.9 | Tonga | 2.4 | Nepal | 0.06 | St. Vincent and the Gr. | 3 |

*Source:* ITU (2003).

It is notable that many of the countries with the lowest fixed-line penetration rate have a high mobile to fixed line ratio, indicating that mobile telephones to some extent serve as a substitute for fixed lines. This assumption is supported by a recent study by Fink et al. (2003), which finds that mobile telephone penetration grows faster in countries with a lower fixed-line penetration. Mobile services have often been provided by two or more competing firms from the start in developing as well as developed countries, and the performance of this market segment underscores the importance of competition. Finally, note that tiny island nations have a larger total number of Internet hosts than a populous country such as Bangladesh.

## (b) Good telecommunications promotes cross-border trade in services and just-in-time delivery of goods

A few years ago, before the Internet bubble burst, it was widely believed that the Internet would imply the death of distance and market access would only be limited by policy-induced trade barriers. This vision has not materialized, and online selling has had a slower start than expected. However, e-commerce as broadly defined has become essential to businesses around the world.[66] Thus, the Internet provides a rich source of information and a channel for advertising, marketing and searching. It also appears that e-commerce is important for international trade in certain geographical areas and in some industries, particularly in services industries. The number of Internet subscribers per 100 habitants is often taken as a proxy for the demand side of e-commerce, while the number of secure servers per 100,000 inhabitants is taken as a proxy for the supply side of e-commerce. Among the OECD countries, Iceland is the country with by far the highest score on both counts, indicating that e-commerce is an attractive substitute to conventional trade in remote and sparsely populated countries.

Cross-border trade in services (GATS Mode 1) largely depends on telecommunications as the channel for transactions. A study of the impact of the Internet on US trade in services found that trading partners' Internet penetration had a significant impact on US imports of business, professional and technical services. But no significant relationship between Internet penetration and US exports of services was found (Freund and Weinhold, 2002). A possible explanation is that it is often the customer (importer) who determines the mode of supply and communication. Thus, given the high rate of Internet penetration in the United States it is likely that US importers prefer the Internet as the channel of exchange of information and services, and therefore tend to choose suppliers that are able to provide services over the Internet. Such suppliers are most likely found in countries that also have a relatively high Internet penetration rate.

A recent study finds a strong and positive correlation between the density of fixed and mobile telephone lines and trade relative to GDP. Moreover, the study also found that the supply response to a reduction in tariffs is larger the higher the penetration rate of telecommunications (Box IIB.6 and Jansen and Nordås, 2004). However, anecdotal evidence suggests that new technology can sometimes also create barriers between those connected and those not connected in low-income countries. For example, traders in Ghana regularly travel to visit suppliers of agricultural products in order to purchase their produce. Some of the traders have recently acquired mobile phones and started to contact suppliers beforehand to check what they have on offer. In some cases they have stopped visiting those suppliers who could not be contacted over the telephone. The use of mobile phones vastly improved efficiency and reduced travel time, but some networks of traders and suppliers became limited to those who were connected to telecommunication lines (Overå, 2004).[67]

In the same way as sectors differ according to transport intensity (Section IIB.1) they also differ as far as the use of information and communication technology is concerned. The most information-intensive sectors are those producing goods with short product cycles, experiencing rapid fluctuations in consumer tastes, enjoying rapid technology development and sectors where international vertical fragmentation is common. Consumer electronics, for example, is characterized by all these features, while fashion clothing is an example of goods for which tastes change rapidly, and the automotive sector is an example of a sector where international

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[66]    The WTO Work Program on Electronic Commerce defined electronic commerce as "the production, distribution, marketing, sale or delivery of goods and services by electronic means" (WT/L/274, adopted 25 September 1998).

[67]    Similar phenomena can be observed as infrastructure and related services have improved in other areas. Improved roads, for example, induce the adoption of larger trucks, which bypass villages whose roads cannot carry them. Improved harbour facilities have increased the average size of ships which in turn bypass harbours with inadequate facilities.

vertical fragmentation is important. Good telecommunications services contribute to comparative advantage in these sectors and hence influence the pattern of international specialization and merchandise trade. Having seen that the quality and cost of telecommunication play an important role in both the volume of trade and the pattern of international specialization, the question arises as to how telecommunication services can be improved through trade and better regulation.

## (c)    Liberalization is necessary to improve quality and effectiveness, but getting regulation right is a challenge

In many low-income countries, the incumbent state telecommunication monopoly has been unable to raise the funds necessary for upgrading the services and extending the network to the level considered necessary in the information society that developing countries invariably have become a part of. World Bank studies of eight Sub-Saharan African countries, for example, find that prior to reform the growth in telephone density was very low, the number of faults per line was high, the service provider had low and in some cases even negative equity and large arrears on customer payment, the largest debtor typically being the government.[68] Privatization, partial or full, has therefore come to be seen as a necessity in many low-income countries. Privatization, in turn, usually involves direct foreign investment since domestic investors with experience in this sector are often scarce for obvious reasons. Domestic liberalization, therefore, often goes hand in hand with international liberalization, particularly under GATS Mode 3, which covers foreign direct investment.

Privatization alone is, however, no panacea for a better functioning market. Several studies have found that the impact of reform in terms of higher telephone penetration, higher productivity in the telephone companies and lower costs to customers depends on a packet of reforms including privatization of the state-owned monopoly, introduction of competition and the establishment of an independent regulator. Wallsten (1999) analysed the impact of reforms in 30 African and Latin American countries and found that competition increased the number of mainlines per capita and the number of payphones, it increased connection capacity and the costs of local telephone calls declined. Such effects were not found for privatization alone. A later study by Fink et al. (2003), including 86 developing countries, found that both privatization and competition had a positive impact on telephone penetration and productivity in the telecommunications sector. Furthermore, they found that the two reforms reinforced each other, such that the impact on performance was larger when competition was introduced at the same time as privatization. These findings suggest that allowing the privatized incumbent temporary exclusive rights has few if any benefits in the short run and may adversely affect market performance even after competition is introduced. The long-term effect is due to large up-front and sunk costs that often give the first entrant lasting advantages. Finally, the study found that the establishment of an independent regulator reinforced the gains from competition and privatization. Countries that introduced the full package of reforms did systematically better than those that confined themselves to partial reforms.

Mobile services are up to a point competing with fixed-line services. Mobile competition can therefore serve as a surrogate for fixed-line competition and thus a possible first step towards competition. Regulating a privatized fixed-line industry in a way that ensures or mimics competition beyond the competitive pressure from mobile entrants has proved more challenging.

The history of regulation of the telecommunications sector can be seen as defining the boundary of a natural monopoly under changing technological circumstances. In the early days of telecommunications, the complete end-to-end service was considered a natural monopoly and prices were regulated to serve several objectives. The most common approach was to set prices such that total revenue covered costs, but the prices of individual services were determined by social objectives, such as universal services at equitable prices. This involved cross-subsidizing and constituted another rationale for not allowing competition. The first legal limitation of the boundary of the monopoly in the United States was to set the limit at the end of the wire at the customer's premises, thus unbundling customers' telecommunication equipment. Subsequent limitations of the monopoly came after new technology (e.g. micro-wave, local access networks and time-sharing computers) opened the opportunity for niche producers, who subsequently extended their

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[68]    See Gebreab (2002), Haggarty et al. (2002) and Clark et al. (2003).

services and challenged the monopoly. The second significant regulatory redefinition of the boundary of the monopoly in the United States came in 1984, when long-distance services were opened for competition and the regulated monopoly limited to regional networks.[69] Further, a line was drawn between unregulated data processing services (enhanced or value added services) and regulated basic telecommunication services. There is, however, no universal consensus on where to draw that line.

New entrants in the telecommunication services sector raise the question of how to ensure interconnection between networks and between networks and services. This is an area where there is ample scope for uncompetitive behaviour on the part of the incumbent. Most countries, therefore, regulate interconnection conditions and fees, ensuring that entrants have the right to access networks on a non-discriminatory basis, that the interconnection fees are cost-based, and that the entrant does not have to pay for a bundle of services, some of which he does not need. These principles are also included in the Reference Paper on regulatory principles formulated under the basic telecommunications negotiations under the auspices of the GATS.[70] One area where the need for regulation has become widely acknowledged is the local loop connecting individual customers to the nearest local switching centre. The local loop is often controlled by a single supplier, usually the incumbent fixed line supplier. Duplicating the local loop is probably costly from a welfare point of view, but it is a highly strategic asset since all services provided over the network have to pass this loop to reach the customer. Ensuring access to the local loop on a non-discriminatory basis is therefore crucial for competition.

Where market power is considerable, price regulation may still be necessary. The most common forms are rate-of-return regulation and price cap regulation. Rate-of-return regulation imposes a target rate of return for the regulated telecommunication firm and specifies the actions to be taken if the realized rate of return deviates from the target. Typically, there is a margin where no actions need to be taken while a rate of return below this range would allow the telecoms firm to increase prices and a rate of return above the range would require the firm to lower prices or share the excess return with customers. Price cap regulation places a limit on the prices that a firm can charge on its services. Regulated companies are typically allowed to raise prices in step with the consumer price index less an estimated productivity gains factor (the so-called x-factor). The x-factor, which is the difference in productivity growth between the telecoms sector and the average for the economy as a whole, is the crucial element in price cap regulation.

It follows that efficient regulation of both interconnection and end-user prices requires information on costs of individual services, which is intrinsically difficult for regulators to obtain. This is because telecommunications providers offer multiple services using capital that is fixed and common across a variety of applications, and there may be economies of scale and scope that render the cost of a bundle of services different from the cost of the sum of services when provided individually. Information on costs is often considered of strategic importance and thus not readily available. The solution to this challenge has been for the regulatory body to estimate cost functions for each service based on information on the scope and scale of services provided and the amount and price of inputs used. Again this is a demanding task that requires specialized skills often in short supply in developing countries. A practical solution applied in many countries is to set a cap on the average price of a bundle of services. This allows the regulated companies some flexibility in price setting, but unfortunately also the possibility of setting prices in a way that deters the entry of competitors. For interconnection rates, a practical solution has been for regulators to draw upon benchmarking or to encourage commercial negotiations as a first resort, intervening only when the parties cannot arrive at a mutually satisfactory rate.

As already indicated, competition is crucial for a desirable outcome of reforms in the telecommunication sector, and trade liberalization is one measure to this effect. An analysis of the relation between service supply and the extent to which foreign entry is restricted finds that the more restricted is foreign entry, the lower

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[69] This was the split of AT&T into a long-distance provider operating in a competitive market and seven regional regulated monopolies (the Baby Bells) that were excluded from the long-distance market in 1984.

[70] The Reference Paper takes on a legally binding character in GATS when inscribed by a WTO Member as part of the additional commitments in its Schedule of Specific Commitments on trade in services. See also Tuthill (1997) and Geradin and Kerf (2004) for further discussions.

the mobile telephone density.[71] It is also worth noting that the more open market-based mobile services have produced a narrower international digital gap than the state-controlled fixed-line services. As a result, in several countries, including some of the poorest countries in the world, households and businesses have better access to mobile services than to fixed line services.

In conclusion, telecommunications are found to have a positive impact on the volume of trade and, in addition, they affect the pattern of international specialization. The availability of fixed and mobile telephone lines is negatively correlated with the restrictions on competition and trade in telecommunications services imposed by governments. For example, restrictions on foreign investment and cross-border trade are strongly and negatively correlated with the number of mobile telephone lines. These findings suggest that liberalization of the telecommunications sector complements trade liberalization in other sectors in addition to improving the performance of the economy in its own right.

## 3.    FINANCE

The financial sector plays a pivotal role in the efficient allocation of resources across time and space and in facilitating macroeconomic stability (Section IIA). Financial services also play a crucial role in the process of transferring the ownership of a product across borders and hedging the risk of international trade flows. Financial services are thus part and parcel of international trade transactions and the pricing and quality of such services are key components of the transaction costs incurred by traders.

Financial services are themselves subject to international trade and it has been found that trade improves the quality and reduces the cost of financial services. The presence of foreign banks, for example, can exert competitive pressure on local banks leading to a significant decline in their overhead costs following the entry of foreign banks. In addition, foreign banks often bring new products and may stimulate improvements in domestic supervision and regulation (Levine, 2001).  However, foreign as well as domestic private banks are profit-maximizing institutions and are likely to exploit market power as well as loopholes in the regulatory environment, if any, when regulation is weak. Therefore, when trade liberalization results in a more complex and diversified financial sector, it is often necessary to strengthen the regulatory and supervisory framework in order to safeguard against financial instability and ensure competitive markets.

This Section first presents the structure and the performance of the financial services sector in terms of supply and cost of services. It continues with an analysis of the relationship between financial sector performance and trade performance. Finally, regulatory challenges related to greater openness in the financial sector are addressed, focusing in particular on emerging markets. This is because countries at an intermediate level of economic and financial development experience higher trade and income volatility in the face of financial sector openness than both LDCs and developed countries.[72]

## (a)    Performance of the financial services sector differs widely among countries

The financial service industry consists of five broad categories of services: banks, insurance, securities, asset management and financial information. In the past, these five categories of services corresponded to categories of financial institutions. For example, banks' major business has traditionally been to take deposits and award loans. However, in recent years capital markets and non-bank financial institutions have taken a larger share of this business, while an increasing proportion of banks' revenues has come from such fee-based services as underwriting, trading, brokerage, rating, and advising on mergers and acquisitions.

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[71]    The mobile telephone density was regressed on GDP per capita and a trade restrictiveness index developed by the Australian Productivity Institute. Trade restrictiveness was significant at a one per cent level and the regression explained 82 per cent of the variation (staff estimates).

[72]    See Aghion et al. (2004) for a recent analysis.

Both access to financial services and costs of financial services vary enormously among countries. The financial sector performance gap is illustrated by Table IIB.10 which shows the top ten countries ranked according to credit to private sector provided by financial institutions relative to GDP, the top ten ranked according to the overhead cost of financial institutions relative to their total assets and finally the ranking according to banks' net interest margin. The Table also shows the bottom ten countries ranked by the same criteria.[73]

Table IIB.10
**Financial indicators, selected countries, 2001**

| Credit to private sector % of GDP | | Overhead cost % of total assets | | Net Interest Margin | |
|---|---|---|---|---|---|
| **Top 10 countries** | | | | | |
| Switzerland | 161 | Cuba | 0.6 | Luxembourg | 1.0 |
| Hong Kong, China | 157 | Ireland | 0.6 | Ireland | 1.4 |
| United States | 145 | Bahamas, The | 0.9 | Thailand | 1.7 |
| Denmark | 138 | Kuwait | 1.1 | New Zealand | 1.8 |
| Portugal | 138 | China | 1.1 | Egypt, Arab Rep. | 2.0 |
| Malaysia | 138 | Chinese, Taipei | 1.3 | China | 2.1 |
| Netherlands | 138 | Luxembourg | 1.3 | Netherlands | 2.1 |
| Korea, Rep. of | 133 | Netherlands | 1.4 | Belgium | 2.1 |
| United Kingdom | 132 | Mauritius | 1.4 | Portugal | 2.1 |
| Singapore | 122 | New Zealand | 1.5 | Switzerland | 2.2 |
| **Bottom 10 countries** | | | | | |
| Angola | 2.0 | Congo, Rep. | 13.3 | Congo, Rep. | 18.7 |
| Chad | 3.7 | Paraguay | 11.8 | Turkey | 16.5 |
| Kyrgyz Republic | 3.7 | Argentina | 10.5 | Venezuela | 15.3 |
| Central African Republic | 4.5 | Venezuela | 10.5 | Nicaragua | 14.8 |
| Niger | 4.6 | Colombia | 10.5 | Zimbabwe | 14.6 |
| Congo, Rep. | 4.7 | Malawi | 9.9 | Malawi | 14.0 |
| El Salvador | 4.8 | Kyrgyz Republic | 9.8 | Zambia | 13.1 |
| Guinea-Bissau | 5.8 | Zambia | 9.8 | Georgia | 12.8 |
| Romania | 6.3 | Cambodia | 9.7 | Uganda | 12.7 |
| Lao PDR | 7.9 | Sierra Leone | 9.5 | Paraguay | 11.7 |

*Source:* Financial structure database, IMF.

The ten countries with the highest ratio of private sector credit to GDP are mainly high-income countries, although Malaysia also falls into this group. At the other end of the scale are a number of least-developed countries where credit to the private sector is almost non-existent. It should be noted, however, that a high ratio of private sector credit may be a problem in countries where risk assessment is weak or credit allocation is made according to other criteria than assessment of the return and risk of the projects being financed. The high ratio in Malaysia, for example, can partly be explained by high bank exposure to financial and property markets. The picture is more mixed when it comes to overhead costs where some developing countries such as Cuba and Mauritius are doing well. Cuba does, however, have a highly centralized financial sector where credit allocation is largely undertaken administratively, which explains its low overhead costs. The same has applied to China, while Mauritius has an efficient and modern financial sector (IMF and World Bank, 2003). The huge difference in interest margins between the top and bottom 10 in the table is an indication of the differences in finance-related transaction costs that firms face in different parts of the world. It is, however, an imperfect indicator because differences in net interest margins may not always reflect differences in real interest rates that firms pay on their borrowing, including on export credit.[74] The three performance indicators of financial services reported in the Table are correlated. High overhead costs are reflected in high interest margins and high costs and interest margins are reflected in low credit volumes.[75]

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[73]    The list of the bottom 10 has the worst performer on top of the list.

[74]    Differences in inflation rates and subsidies, for example, may be important determinants of differences in the real interest costs paid by companies.

[75]    The correlation coefficients are 0.83 for overhead and interest margins, -0.60 for credit to private sector and interest margins and -0.57 for credit to private sector and overhead cost. There is also a negative correlation between the market share of the three largest banks and credit to the private sector of -0.44.

One reason why credit to the private sector is particularly low in LDCs is that poor institutions, including poor enforcement of contracts and weak rule of law are commonly found in poor countries (Section IID). Poor institutions translate into weak investor rights, weak property rights, and thus high risk in lending and corresponding borrowing constraints on would-be entrepreneurs. Finally, the financial sector itself is part of the institutional framework in a country. In LDCs, banks often lack the capacity to assess risk and they consequently concentrate on credit to large firms or government paper.[76] As a result there may be fewer entrepreneurs while existing entrepreneurs upgrade their machinery and introduce new technology less often than they would if credit was available to all viable projects. This, in turn, prevents them from responding to new market opportunities following trade liberalization.

## (b)    Financial services support merchandise trade and influence comparative advantage

Empirical research has found that integration of financial markets and trade in goods and services tend to go together. The IMF (2002) finds that financial openness and openness to international trade are highly correlated both in developed and developing countries.[77] This finding is supported by Tornell et al. (2004) who also observe that trade liberalization typically comes before financial liberalization.[78] A reason for this is the complementarity between trade and trade financing and between trade and hedging the risk of trade flows. As already noted, the cost of financial services is part of the transactions costs of international trade and one would expect a negative relation between such costs and the volume of trade. A negative relationship is indeed found in a recent study. Furthermore, the study indicates that the disadvantage of not having access to credit is an even more significant impediment to international trade. Hence, a positive relation is found between credit to the private sector and trade, both measured as shares of GDP (see Box IIB.6 for details).

Finally, financial sector development is found to affect a country's comparative advantage. Industries differ as far as their dependency on external financing is concerned. First, any industry with high growth prospects will experience relatively high investment demand compared to current cash flows and therefore be dependent on external financing. Second, in some industries there is an inherent mismatch between investment and cash flow, even in the long run, due to underlying technological characteristics. Examples of industries with high growth potential in the short run are new industries based on recent innovations (e.g. mobile phones), while examples of industries with an inherent dependence on external finance are R&D-intensive industries such as pharmaceuticals, electronics and many categories within the chemicals industry aggregate. Empirical research indeed finds that countries with a high level of financial development have a higher growth rate in new industries and a higher share of industries dependent on external finance in total industrial output.[79]

Bearing in mind the importance of financial development for the volume and composition of trade and for economic development in general, it is natural to ask how the performance of the financial sector can be improved and how trade in financial services may contribute. The next subsections will look at this.

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[76]    See Beck and Levine (2003) for a recent review of the evidence on the relations between institutions and financial markets.

[77]    Financial openness is defined as the sum of external assets and liabilities of foreign direct investment and portfolio investment divided by GDP.

[78]    The Tornell et al. (2004) study actually argues that trade liberalization leads to financial liberalization in a sample of 66 high and medium contract enforceability countries (as measured by the rule of law index discussed in Section II.D) during the period 1980-99.

[79]    See Fisman and Love (2004) for a recent study.

**Box IIB.6: Openness to trade and infrastructural services**

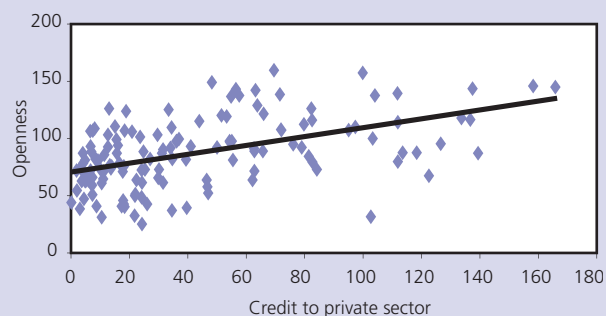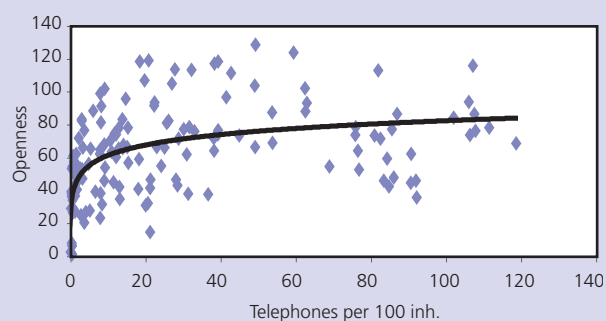Chart 1
**Openness and credit to private sector**
(Percentage of GDP)

Access to financial services and telecom-munications reduces the cost of engaging in international trade and thereby increases a country's openness towards the rest of the world as measured by (exports + imports)/ GDP. Chart 1 depicts the estimated relationship between credit to the private sector and open-ness, while Chart 2 depicts the relationship between mobile plus fixed telephone lines per 1,000 inhabitants and openness. Both regres-sions control for market size, own and trading partners' tariffs, dummy variables are used for islands and landlocked countries respectively, and the distance from the equator is included as a proxy for distance to major markets.

Chart 2
**Openness and telephone density**

The inserted trend lines show the estimated positive correlation between trade flows and access to credit. In the first figure the estimated coefficient is 0.45 and it is significant at a one per cent level. The regression explains 37 per cent of the variation. In the second figure the trend-line is log-linear, the coefficient on telephone density is significant at a one per cent level and the regression explains 35 per cent of the variation (Jansen and Nordås, 2004).

## (c)    Trade in financial services improves the financial system's effectiveness

The most important mode of trade in financial services, particularly in the banking sector, is through commercial presence (GATS Mode 3). In a sample of 80 developed and developing countries covering the first half of the 1990s, about a third on average of the total number of banks in the domestic banking system were foreign-owned and about a quarter on average of total bank assets were foreign. The share of foreign banks ranked from 0 to 100 per cent. Nepal and Swaziland had only foreign-owned banks while many other small countries, developing countries and countries in transition also had a high share of foreign banks. Foreign banks have played a particularly important role in the economies in transition in Central and Eastern Europe. More than half of the banks in the region were foreign-owned, and foreign-owned banks accounted for about two thirds of total bank assets in 2000. Foreign-owned banks lent more to the private sector than local banks, they were more profitable, and focused their activities more on large companies than domestic banks. However, local and foreign banks' performance has tended to converge over time in the transitional economies. Foreign banks have expanded and broadened their activities and are facing more of the same conditions as local banks, while local banks' performance has improved following both competition from foreign banks and liberalization of the domestic financial sector. There are, however, large differences among the transitional countries. Only the Czech Republic has obtained a financial sector similar to that of the euro area as measured by bank assets relative to GDP, while this ratio is still low and appears to have stagnated in Bulgaria, Lithuania, FYR of Macedonia and Romania.[80]

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[80]    See Naaborg et al. (2003) for details.

A recent study (Classens et al., 2001) finds that foreign banks tend to have higher interest margins, higher profitability and pay more taxes than local banks in developing countries while the opposite is true in developed countries. The explanation for this is that foreign banks are typically not subject to credit allocation and other regulations that domestic banks may face in developing countries, while the advantage of local knowledge benefits local banks in developed countries.[81] Second, it is found that a larger share of foreign banks is associated with reduction in the profitability and interest margins of domestic banks, a result that is consistent with findings in other studies, suggesting that foreign entry improves the functioning and reduces the cost of domestic banking (Levine, 2001). Third, the study found that the number of foreign banks entering the local market is more important than their market share, indicating that the competitive pressure from foreign banks is felt immediately after opening the market. Finally, it was found that the impact on domestic banks' profits may reduce their charter values and make them more vulnerable. This may destabilize the financial sector in the case where domestic regulation and supervision are insufficient. Thus, entry of foreign banks in local markets appears to improve efficiency, but also has a downside risk in the case of weak regulatory capacity.

## (d)      Openness requires appropriate regulation and international cooperation on supervision and surveillance

Trade liberalization under the auspices of GATS relates to transactions on the current account of the balance of payments only, but capital transfers often underlie the provision of services. An understanding of the benefits and risks of trade in financial services therefore requires an appreciation of the relationship between current account and capital account transactions. An example taken from Kono and Schuknecht (2000) illustrates this relationship: "if a domestic bank provides a loan to a domestic client using domestic capital, this creates neither financial services trade nor an international capital flow. If a domestic bank lends capital from abroad to the same client, this is a case of capital flows without financial services trade. A loan arranged by a foreign institution involving only domestic capital is an incidence of financial services trade without international capital flows. Only loans through a foreign bank involving international capital represent international capital flows and trade in financial services" (p.141).[82]

Transactions through commercial presence are perceived to lend themselves more easily to regulation, supervision and surveillance than cross-border trade. Furthermore, lending from local subsidiaries or branches is often more long-term than cross border trade in financial services. Cross-border trade in financial services usually implies exposure to short-term international capital flows unless trade is restricted to trade in financial information and brokerage. Meaningful liberalization therefore requires the lifting of certain capital controls as well, although full openness to international capital flows is still not necessary. Financial services trade, international capital flows and not least recent technological developments, particularly in information technology, have all contributed to more internationally integrated financial markets, and a changing environment facing regulators, and thus changes in regulation as well.

Both national and international financial markets have become increasingly complex with a growing number of financial instruments. Among financial sector institutions, the banking sector is usually subject to the strictest regulation and supervision. However, banks have recently engaged in securitizing and selling off large amounts of loans, shifting some of the lending risk out of the banking system to less regulated markets. As the various types of financial service providers have started to compete in the same markets, there is a need to develop regulation and supervision systems that focus on functions rather than institutions in order to avoid regulatory arbitrage in domestic markets. By the same token, regulatory differences among countries create arbitrage at the international level, and this calls for international cooperation.

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[81]   This is of course also the case in developing countries, but this advantage is more than offset by other factors.

[82]   The quotation omits references to a table in the original text. Since developed countries have by and large opened their capital account to international capital flows, the discussion here is mainly relevant to developing countries, in particular emerging markets.

Although the regulatory measures and institutions change over time, the rationale for regulation and the core principles of regulation largely remain the same. These are market imperfections, such as asymmetric information that may lead to problems of moral hazard and adverse selection. Put simply, moral hazard arises when individuals take less care to avoid losses or damages because others share the losses, but not the gains, from risky projects. Adverse selection refers to the case where, for example, an insurance policy mainly attracts those with a high risk of experiencing the event that is covered by the insurance. These problems are mitigated by regulation of financial institutions' exposure to risk. Direct regulation of risks has proved increasingly difficult as banks and other intermediaries are more and more in a position to outwit the rules. In response, the regulatory focus has shifted from capital-adequacy rules towards assessments of internal risk-management systems, increased banking supervision and effective market discipline (BIS, 1999a; BIS, 1999b). Successful implementation of such an approach critically hinges on the available expertise in financial intermediaries and regulatory institutions. It also requires functioning markets for debt and equity leading to the disclosure of relevant information. This last aspect can be problematic, especially in developing countries. Liberalizing financial services may help in allowing for increased competition among banks and the development of credit-rating agencies that improve transparency and know-how in the sector.

In developed countries challenges remain regarding the management of risk. It is increasingly recognized that financial sector crises do not always result from discrete institutional failures and financial contagion. Risk can also build up over time and systemic risk can arise from common exposure to macroeconomic conditions. Furthermore, the incentives for caution actually decrease in the run-up to a crisis. When the markets are booming, managers have every incentive to compete for market share even if they perceive the boom to be unsustainable. Regulatory systems in many countries are well equipped to deal with the failure of individual institutions and to analyse risk across institutions and markets at a certain point in time. However, the ability to analyse the development of risk over time and from broader macroeconomic factors, including external shocks, appears to be less well developed.[83]

An additional rationale for government regulation, supervision and surveillance is the economic and social consequences of institutional failures in the financial sector. Financial crises often trigger recessions, and sometimes even depressions, and in some cases it has taken several years to restore the pre-crisis income levels. Many governments have introduced deposit insurance and lender of last resort policies in order to prevent systemic financial crises arising from individual bankruptcies. It is acknowledged, however, that these measures can potentially contribute to moral hazard, and thus an additional rationale for the regulation of exposure to risk.

A brief look at historical developments illustrates the linkage between national regulation, international integration of financial markets and regulatory arbitrage. The period 1950 to 1970 was a period with strict regulation of the financial sector in many countries. Interest rates, credit volumes, market entry and the range of services offered by banks were typically regulated – and the markets were stable. However, during the 1960s the offshore banking sector emerged, mainly as a response to strict regulation in the United States (Errico and Musalem, 1999). Banking services emerged in offshore financial centres (OFC) and became a vehicle for financial institutions to shift their heavily regulated activities to these less regulated (or close to unregulated) locations and the market share of the OFCs grew rapidly.

The 1980s and 1990s was a period of liberalization and deregulation of financial markets in a number of developed and emerging markets, partly in response to changing market conditions and partly due to the emerging regulatory arbitrage. The period of liberalization was also one of greater international financial volatility and a number of countries including the United States, Norway, Sweden, Mexico and other Latin American and Asian countries experienced financial crises. The reasons for these crises varied from case to case, but it appears that insufficient surveillance, supervision or regulation in the face of changing market conditions played a role in most of the episodes, while offshore banking played a role in some (IMF, 2000). International cooperation between national regulatory bodies, the IMF, the World Bank and the Basel Committee on Banking Supervision has been intensified following financial sector turmoil. One of the most

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[83]     Borio (2003).

important developments in this regard was the creation in 1999 of the Financial Stability Forum (FSF) by G-7 ministers and central bank governors. The FSF is composed of senior representatives from national financial authorities, international financial institutions, international regulatory and supervisory groupings, committees of central bank experts and the European Central Bank. Its main objective is to promote international financial stability through the exchange of information and cooperation on supervision and surveillance, including bringing OFCs under such supervision and surveillance.[84]

The role of offshore banking declined in the major developed markets following liberalization, as offshore and onshore activities became less distinguishable. In emerging markets, by contrast, offshore banking has increased in importance. It appears that demand for credit and financial intermediation have run ahead of domestic supply, which has often been heavily regulated, creating space for offshore suppliers. It is therefore worth taking a closer look at the offshore sector.

Offshore banking is defined as the provision of financial services by banks and other agents to non-residents. However, the term is usually related to OFCs, where the bulk of financial sector transactions on both sides of the balance sheet are with companies and individuals that are non-residents, and transactions are in currencies other than that of the country where the OFC is located. An OFC, in turn, is defined as a financial system with external assets and liabilities out of proportion to the current account transactions of the domestic economy. Typically, OFCs have low tax rates, no interest rate or exchange rate restrictions, and deposits are not subject to reserve requirements (Errico and Musalem, 1999). Offshore banking mainly consists of inter-bank markets where onshore banks establish branches, subsidiaries, shell branches and parallel-owned banks.[85] The inter-bank nature of the market encourages uploading and downloading of funds between onshore and offshore activities unless effective capital controls are in place. But even in the case of capital controls, onshore parents are still legally responsible for the offshore branches and subsidiaries and are therefore exposed to the risks they take on.

Some key statistics illustrate the relative importance of offshore banking. By mid-2003 external loans by banks located in OFCs – excluding the US International Banking Facilities (IBF) and Japanese Offshore Markets (JOM) – accounted for 27 per cent of total external loans by banks, down from 31 per cent in 1995. External loans by banks located in OFCs (again excluding the IBF and JOM) corresponded to 9 per cent of world GDP in 2002. Thus, it is clear that offshore banking is not a marginal activity on the fringe of the international financial market but, rather, a major sector that needs to be taken into account when analysing financial sector trade liberalization and its impact on financial sector and trade performance, and also on other macroeconomic variables.[86]

This Section has emphasized the role of financial services in international trade and economic development, the relation between financial openness and trade openness and the regulatory challenges following international integration of financial markets and regulatory arbitrage. It has also pointed out the need for international cooperation regarding supervision and surveillance of banks in the event of greater financial market integration, a need that has been addressed through several initiatives including the Financial Stability Forum.

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[84]  The FSF initiated a number of activities such as the Financial Sector Assessment Program (FSAP) jointly with the IMF and World Bank, cross-border E-banking with the Basel Committee on Banking Supervision, Foreign Direct Investment in the Financial Sector with the Committee on Global Financial System, and Offshore Financial Centre Assessment with the IMF. It also issued a Compendium of Standards identifying 12 standards that in the FSF's opinion deserve priority implementation. See http://www.fsforum.org/home/home.html for details.

[85]  A branch is part of the onshore bank in terms of being part of the same legal entity, while a subsidiary is an independent legal entity incorporated in the OFC. Parallel-owned banks are separate corporate and legal entities with the same owners.

[86]  So far, seven countries have made commitments on offshore banking under the GATS. These are Bahrain; Chinese Taipei; Macao, China; Malaysia; Singapore; Thailand and Uruguay. Malaysia and Chinese Taipei restrict offshore banks to servicing non-resident customers in foreign currencies and there is thus little interaction between the local and the offshore financial system. Thailand restricts the number of "international banking facilities" in the country. Singapore, on the other hand, allows offshore banks to lend in Singaporean dollars to residents, but limits the amount. St Kitts & Nevis has also made commitments, but only on registration of offshore companies and trusts, not including banking and insurance.

## 4. BUSINESS SERVICES

Business services consist of a broad range of services, including computing and data processing, professional services, marketing services, technical services, leasing and renting, labour recruitment and operational services. For almost every function performed in a modern business, there exist specialized companies providing the function in the form of a business service. As a result, an increasing number of manufacturing and service firms choose to purchase or outsource business services from external suppliers rather than producing the services themselves. The growing outsourcing business, in turn, contributes to diversification in the business services sector, with new types of services emerging all the time.

## (a) Business services are among the most dynamic in the economy

In the OECD area, business services have been among the fastest growing sectors in terms of employment and value added since around 1980. In the European Union, business services contributed to about the same share of GDP as manufacturing in 2000, while in the United States business services had a higher share in GDP than manufacturing in 2001.[87] In South Africa, a middle income country, the business services sector has also recorded healthy growth both in absolute terms and as a share of GDP over the past decade. The business services sector increased its share of GDP from 7.9 per cent in 1990 to 9.5 per cent in 2002. This is far below the European Union and the United States, but the business services sector is nevertheless one of the most dynamic in the South African economy. In Brazil, another emerging market, the business services sector has been among the most dynamic in the economy over the past few years. During the period from 1998 to 2000, the sector increased its share in total value added from 7.5 to 8.7 per cent, while employment in the sector increased by 20 percent. Employment in the business services sector was only slightly below manufacturing sector employment in 1999 (4.6 million and 4.9 million employees respectively). The fastest growing business services sector was computer services, where employment increased by 40 per cent during the period.[88] Finally, in the Czech Republic business services also grew faster than the rest of the economy during the 1990s, increasing its share of total GDP from 11.8 per cent to 12.6 per cent from 1990 to 2002.

Business services mainly provide knowledge-intensive inputs to other industries, and are important channels for technology diffusion and a source of productivity growth in other industries. It is particularly important for diffusion of process and management innovations. An indicator of the prominence business services have gained in recent years is its share in total intermediate demand in the manufacturing sector, which has increased from 5 per cent in 1972 to 20 per cent in 1998 in the Netherlands and from 3 per cent in 1968 to 14 per cent in 1997 in the United Kingdom.[89] According to the US input-output table for 1999, business services accounted for only 7.5 per cent of total intermediate inputs in the manufacturing sector. There is, however, large variation within the manufacturing sector. The highest shares were found in the tobacco, printing and pharmaceutical industries at 30 per cent, 27 per cent and 25 per cent respectively. At the other end of the spectrum was the motor vehicle industry, with less than 3 per cent. This is perhaps surprising, given that the motor vehicle industry has been among the pioneers in terms of new management and industrial organization practises. But a closer look at the data reveals that the American car industry has shifted its core functions from manufacturing of cars to R&D, design and marketing of cars, while as much as 88 per cent of total gross output consists of intermediate inputs, shifting the car industry's core activities from manufacturing to services.

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[87] Business services are defined by category K in the ISIC revision 3 sector classification, including real estate and business services. In the European Union this category accounted for about 21 per cent of GDP in 2000, while in the United States it accounted for about 18 per cent of GDP in 2001. (Source: Commission of the European Communities, 2002a and BEA, 2003).

[88] The source of data on Brazil is the Instituto Brasileiro de Geografia e Estatística (2003).

[89] See Commission of the European Communities (2002b). The shares refer to knowledge-based services without giving the exact sector classification.

An example of the importance of services inputs in production in a middle-income developing country is shown in Chart IIB.5, which depicts the development of the share of services in intermediate inputs during the period 1990-2002 in the South African economy.[90] As in the United States and the European Union, the services (tertiary) sector uses services inputs most intensively. The highly export-oriented primary sector, consisting of agriculture and mining, comes second, indicating the important role that business services play in international trade. The primary sector has increased its imports of intermediate services from 3.6 per cent in 1990 to 6.5 per cent of total service intermediates in 2002.[91] The share of expenditure on services in total intermediate inputs increased sharply from 1990 to 2001, after which it dropped slightly. In manufacturing (the secondary sector), however, the services share of expenditure has been flat during the entire decade. Nevertheless, the level is approximately the same as in many European countries and much higher than in the United States.

The market for business services is much thinner in low-income developing countries, due to the lack of a sufficient pool of skills and a small market size that cannot sustain a highly diversified business services sector. The problem is circular – the degree of specialization depends on the size of the market and the size of the market depends on the extent of specialization. International trade in business services can help businesses in developing countries to escape this trap.

Chart IIB.5
**Share of services in intermediate purchases of major sectors in South Africa, 1990-2002**
(Percentage)
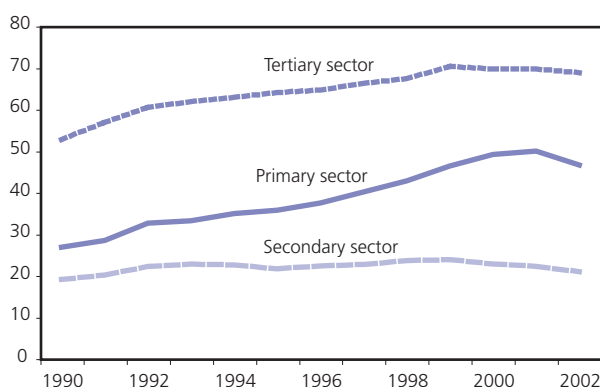


Source: TIPS (2003).

## (b)   Business services lower entry barriers and transfer technology

Purchasing business services from specialized outside suppliers often saves costs but, first and foremost, it allows even small and medium-sized companies in manufacturing and service industries to utilize specialist services in non-core, but strategically important functions. For example, a small shipyard could produce design and engineering in-house, but then one or two persons would have to design and engineer the vessels from hull to interior, and these two persons could not possibly be experts on all parts of the operations. They would typically continue to produce the same design and concept for as long as possible. By purchasing these services from a specialized engineering firm, the shipyard would have access to a team of architects and engineers, expert in specialized areas and commanding state-of-the-art-technology. The interaction between the shipyard and the design and engineering service supplier enables the former to adopt new technologies and designs more rapidly, and to enter into higher-margin markets for specialized vessels.[92] By the same token, in consumer goods industries, packaging, brand development and marketing are often key strategic functions that determine the market price, and thus the profitability of the producer. These services are increasingly outsourced to specialized service providers, and the availability of such services is particularly important for small and medium-sized companies (OECD, 2000b).

The business service sector creates jobs directly and also contributes to job creation in other sectors by lowering the barriers to entry for entrepreneurs with business ideas and product inventions. Such entrepreneurs usually do not have the necessary expertise in accounting and business regulation to comply with laws and regulation in domestic, let alone foreign markets and they do not often have the capacity to carry out market research.

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[90]   The data are for total services, but one should expect that since these are intermediate inputs in the production process, they are largely business services.

[91]   A likely explanation for increased imports of business services is that some of the major South African mining companies have moved their headquarters to London, and headquarter services to local affiliates are therefore registered as trade in business services.

[92]   See Nordås (2004) for a discussion and case study.

Furthermore, the entrepreneur will typically not have the resources to employ expertise in these areas. Therefore, the existence of a market for services where entrepreneurs can purchase the necessary accountancy services, legal advice, marketing, and possibly also rent production equipment, would lower entry barriers substantially. This kind of outsourcing has the effect of turning some fixed costs into variable costs. The external purchase of specialized business services by small and medium sized companies often helps them access new production, process and organizational technology and to comply with customers' quality requirements and standards required by legislation.[93]

## (c)    Business services can match suppliers and customers across borders

The business services sector has both a direct and indirect impact on international trade. The direct impact is the rapidly growing international trade in business services. The indirect effect stems from business services providers acting as intermediaries between potential exporters and foreign customers. These providers lower transaction costs and improve productivity and competitiveness in customer companies. In the case of ports, for example, Table IIB.6 above shows that it takes, on average, three weeks to clear goods in the worst performing African ports. In such a situation, it would be impossible – even for the most innovative and capable local firms – to enter export markets where delivery time is an important competitive factor. In an increasing number of markets timeliness is important.[94] However, as Box IIB.5 shows, opening up port services to private services companies, local and foreign, brought down clearing times substantially, so reducing an obstacle preventing local producers from entering export markets. In countries where local service providers are lacking, such services can be imported, thereby opening trade possibilities for other sectors.

Business services contribute to lowering trade costs by improving supply chain management. For example, marketing services can help to match producers in one country with customers in another, while technical and management services help producers in countries with shortages of skills to improve productivity and become more competitive. Returning to the shipyard example, it is often the case that developing countries have a comparative advantage in shipbuilding. Access to technical services through imports could help them benefit more from this comparative advantage through technology transfer that would enable them to produce more technologically advanced vessels, which also yield higher prices.

An engineering and design services firm in the shipbuilding industry in Norway, for example, develops design and work drawings at its main office in Norway and transmits them electronically to shipyards all over the world. The company also has local offices close to all its major customers' shipyards including in China, Iceland and Poland, where it employs local staff and sends staff from the main office for shorter or longer periods. Their local employees in their overseas offices can also spend time at the main office in Norway working on projects and undergoing on-the-job training. All this helps the shipyards to compete in the market for highly-specialized vessels.

This example illustrates the complementarity between cross-border supply, foreign direct investment and movement of natural persons in the business services sector. Testing services is another business service that could reduce an important entry barrier for many potential exporters in developing countries. Meeting quality standards, whether legal or self-imposed by business, can often be a problem. And even if the standards are met, it can be a problem to document that this is actually the case. Access to foreign testing services could potentially improve the situation and open new markets for developing country producers.

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[93]    In a perfect capital market financing upfront investment for a project with an expected positive return should not be a problem, but in most countries, particularly developing countries, capital markets are not perfect.

[94]    See Hummels (2000) and Evans and Harrigan (2003) for a discussion.

## (d) Business services are also a dynamic traded sector

Business services not only facilitate trade in other sectors, but can also be a dynamic trading sector in its own right. Trade in business services takes place in all four modes included in the GATS and Mode 3 (foreign direct investment) appears to be the most important. According to UNCTAD (2003b), the inward stock of foreign direct investment in the sector increased nine-fold during the period 1990-2001 worldwide – about five-fold in developed countries and almost one hundred-fold in developing countries. Moreover, the share of business services in the stock of total inward investment increased from 6 per cent to 17 per cent globally, and from less than 2 per cent to almost 25 per cent in developing countries during the same period. Also, the stock of outward investment by developing countries in business services increased substantially. These investments are largely motivated by supporting trade and other operations by multinational firms or immigrants, and this appears to be the case both for developed and developing country outward investment. For example, about a third of the foreign affiliates of Japanese manufacturing multinational corporations are in the services sector (UNCTAD, 2003b).

The world's largest exporter of business services is the United States. The country publishes data on trade in services distinguishing between sales through foreign affiliates and other modes. Table IIB.11 presents the data on US exports of business services during the period 1997-2002.

Table IIB.11
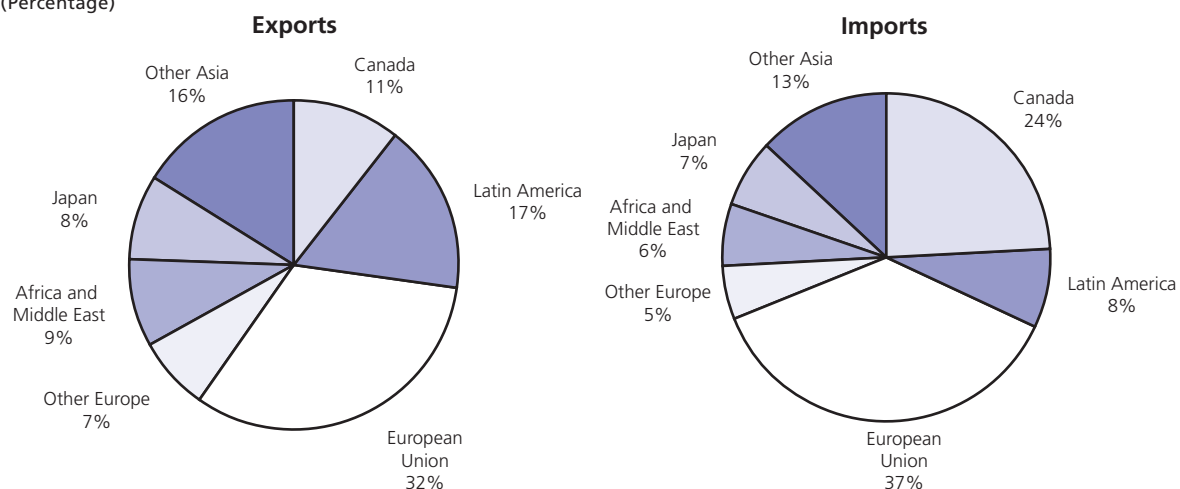**United States: Business services exports by sub-sector, 1997-2002**
(Billion dollars)

|  | 1997 | 2000 | 2002 |
|---|---|---|---|
| **Business, professional,** **and technical services** | **44.0** | **55.2** | **65.4** |
| **Unaffiliated** | **21.5** | **25.3** | **28.8** |
| **Affiliated** | **22.4** | **29.9** | **36.6** |
| Computer and information services | 5.1 | 6.8 | 6.9 |
| Unaffiliated | 3.5 | 5.6 | 5.4 |
| Affiliated | 1.6 | 1.2 | 1.5 |
| Management and consulting services | n.a. | n.a. | 3.7 |
| Unaffiliated | 1.6 | 1.7 | 1.7 |
| Affiliated | n.a. | n.a. | 2.0 |
| Research and development and testing services | n.a. | n.a. | 6.3 |
| Unaffiliated | 0.9 | 0.9 | 1.1 |
| Affiliated | n.a. | n.a. | 5.2 |
| Operational leasing | 3.6 | 5.2 | 5.9 |
| Unaffiliated | 2.0 | 3.1 | 3.6 |
| Affiliated | 1.5 | 2.1 | 2.3 |
| Other business, professional, and technical services | 32.8 | 40.6 | 42.5 |
| Unaffiliated | 13.5 | 14.0 | 17.0 |
| Affiliated | 19.3 | 26.6 | 25.5 |

*Source:* BEA (2003).

Total exports of business services increased at an average annual rate of about 8 per cent and the share of affiliated sales (i.e. sales by US multinationals abroad) increased for the business services sector as a whole. This conceals, however, some interesting differences among business services industries. In computer services, the entire export growth has come from non-affiliate sales, and non-affiliate sales are also more important than affiliate sales in the operational leasing industry, the fastest-growing category.[95] Chart IIB.6 shows the regional distribution of US non-affiliate trade in business services.

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[95] US imports of business services increased by about 10 per cent per year during the period 1997-2002, and non-affiliate sales accounted for 28 per cent of the total in 2002. For imports, affiliate sales dominate non-affiliate sales in all sub-sectors.

Chart IIB.6
**United States' unaffiliated trade in business services by region, 2002**
(Percentage)

**Exports**

Other Asia 16%
Canada 11%
Japan 8%
Latin America 17%
Africa and Middle East 9%
Other Europe 7%
European Union 32%

**Imports**

Other Asia 13%
Canada 24%
Japan 7%
Africa and Middle East 6%
Other Europe 5%
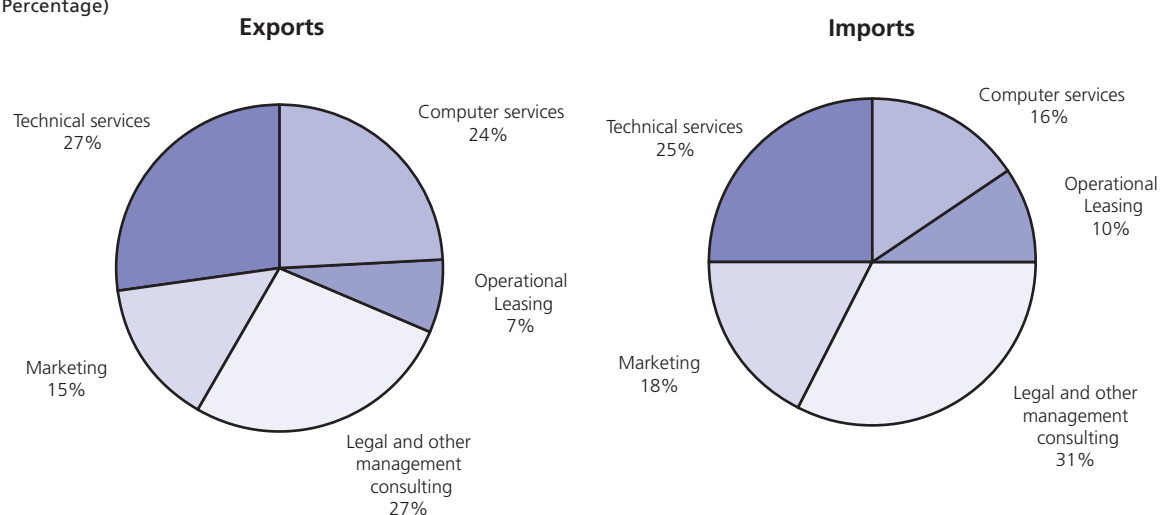Latin America 8%
European Union 37%

*Source:* BEA (2003).

Although OECD countries dominate both as destinations for exports and sources of imports, the Middle East and Africa receive more than twice the share of services exports from the United States as they do for goods exports and they account for a higher share of US imports as well.

Turning to the European Union, exports of business services increased by almost 14 per cent per year in nominal terms during the period 1998-2001, while imports grew even more rapidly – at a rate of 16 per cent during the same period. These figures only represent cross-border trade. Chart IIB.7 shows exports and imports of business services for the European Union in 2001.[96] The composition of exports and imports is fairly similar to that of the United States, although computer services account for a larger share in the European Union's trade in business services.[97]

Chart IIB.7
**European Union's trade in business services by sector, 2001**
(Percentage)

**Exports**

Technical services 27%
Computer services 24%
Operational Leasing 7%
Marketing 15%
Legal and other management consulting 27%

**Imports**

Technical services 25%
Computer services 16%
Operational Leasing 10%
Marketing 18%
Legal and other management consulting 31%

*Source:* OECD services database (2003g).

[96]  Total trade in business services amounted to about euro 80 billion, evenly split between exports and imports.

[97]  Because of differences in classification, US and European Union data are not perfectly comparable.

Among the OECD countries, Central European countries have experienced the most rapid export growth in computer services. Exports increased from $5 million in 1995 to $122 million in 2001 in the Czech Republic, and high growth rates were also experienced in Poland and the Slovak Republic. A number of developing countries, led by India, have emerged as important exporters of business services, particularly those that can be transmitted electronically to the foreign customer. According to UNCTAD (2003b), India accounts for about 80 per cent of international IT-enabled business process outsourcing (Box II.7).[98] As pointed out in Section IIB.2, adequate telecommunications are necessary in order to enter this growing export market.

## Box IIB.7: "Offshoring" of business services

Offshoring is defined as the relocation of jobs from the domestic economy to a lower-cost foreign country. According to McKinsey (2003), offshoring is growing by more than 30 per cent per year. The business services being offshored are back-end processing, call centres, accounting, software maintenance and development, product design, telemarketing, procurement and research and consultancy services. The United States accounts for about 70 per cent of offshoring and the major host countries are Canada, India, Ireland and Israel, while Australia, South Africa and the Philippines are emerging as major hosts to such services as well. Developments in the telecommunications market, with better services at lower costs, have made offshoring possible, while substantial differences in wages paid to workers with comparable skills have made offshoring profitable. A software developer costs about $60 an hour in the United States, but only $6 in India. By offshoring to India, a US firm can save about 50 per cent in the cost base for a particular service. The estimated value of exports due to offshoring to India in 2001 was $7.7 billion, while offshoring to Israel and the Philippines had a value of $3 billion and $0.3 billion respectively. The number of US jobs offshored is estimated to be about 400,000. It is also estimated that for each dollar value of outsourcing, there is a net gain of 14 cents to the US economy due to increased competitiveness and productivity. So far, offshoring has mainly been a phenomenon among English-speaking countries, as a common language appears to be crucial for these services.

To conclude this Section, even if a developing country does not have a comparative advantage in business services, it can still benefit from trade. First, trade in business services creates jobs in the importing country. Second, trade in business services may provide a "missing link" between domestic producers and foreign customers in other industries and thus stimulate exports in other sectors. Furthermore, it appears that the barriers to entry in export markets are lower in the business services sector than in many other services sectors, and therefore trade flows are likely to respond swiftly to trade liberalization The costs of such liberalization are probably minimal, and the regulatory capacity less critical than for financial services and telecommunications. This is because unlike transport, finance and telecommunications, there are no obvious market imperfections in the business services sector. However, the precarious state of infrastructure in some least-developed countries may limit, but not eliminate, the gains from trade in business services.

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[98]   It appears, however, that this is an under-researched area as the data included in the UNCTAD report are mainly taken from newspaper articles.

## 5.    SUMMARY AND CONCLUSIONS

Infrastructure and related services interact with trade in goods and services in a complex way. First, the cost and quality of infrastructural services are important determinants of the volume and value of international trade through the impact they have on cross-border transactions costs. Second, because sectors differ in terms of how intensively they use infrastructural services, the quality and cost of such services also affect patterns of comparative advantage and international specialization. Reliable and cost effective infrastructure services are, for example, more important for trade within international production networks in advanced industries than for trade in non-perishable commodities. Third, trade in infrastructural services may improve the quality and cost effectiveness of such services, and when that is the case trade in infrastructural services will stimulate trade in other sectors through the transactions cost channel. Infrastructural services, with the exception of business services, are subject to market imperfections such as network externalities, significant scale economies and coordination failure. Financial services are also subject to moral hazard and adverse selection. The underlying infrastructure often has the character of a public good. Because of these market imperfections, government regulation is often necessary and so is government intervention in the provision of underlying infrastructure. In some cases market imperfections have international dimensions. This applies in particular to the interface between national and international transport and communications systems, where common or compatible standards are necessary. It also applies to areas where international regulatory arbitrage can undermine domestic regulation. The fourth area of interaction between infrastructure services and trade involves regulation. Regulation is a very information-intensive activity and good telecommunications improve the ability of regulators to cooperate at the international level.