

Ports and Transport¹

Tariff and non-tariff barriers are no longer the major hurdles to international trade that they once were for Latin America. In light of the trade liberalization of the late 1980s and 1990s, the countries of the region today must turn their attention to transport costs if they want to better integrate into the global economy. This chapter will show the importance of transport costs and discuss how economic policies at the national level can reduce them.

Distance, of course, is the main factor behind transport costs. But distance is not everything. Among the many other variables that affect transport costs, the efficiency of ports is the most important, and the one that can be most directly affected by government. Port efficiency is so critical that an improvement in the international rankings from the 75th to the 25th percentile could represent a reduction in transport costs for a country equivalent to shortening its distance with its trading partners by 9,000 kilometers.

The question, then, is what explains the huge gaps in port efficiency between locations like Hong Kong, Singapore or Belgium, on the one hand, and some of the Latin American or African countries, on the other? To some extent, differences in the physical infrastructure of ports are behind those gaps. But that is only part of the answer. Many of the least efficient ports are the result of an inadequate regulatory and institutional environment that impedes competition, fosters organized crime and slows the introduction of modern techniques of cargo handling and port management.

This chapter shows the progress that some Latin American countries have made in correcting these problems. Although many different models of port management have been adopted, experience indicates that the recipes for success usually share some common ingredi-

ents. These include private involvement in port management, flexible labor restrictions, and the curtailing of monopoly power either through regulation or competition.

The Growing Importance of Transport Costs

There has been a major shift in national policies around the world regarding international trade over the past two decades. Tariffs have been reduced in virtually every country and non-tariff barriers have been severely curtailed. In Latin America, average tariffs declined from almost 26 percent at the beginning of the 1980s to 10 percent by the end of the 1990s. Most analysts welcome these outward-looking policies, as it is widely accepted that trade is good for growth.²

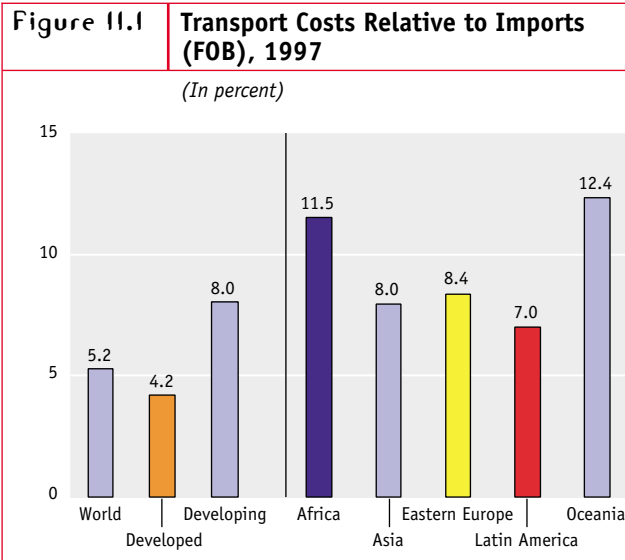
These reductions in artificial trade barriers imply that the relative importance of transport costs has increased.³ Worldwide, transport costs represent around 5 percent of trade value (see Figure 11.1). This figure—which if anything may seem low—is mainly driven by developed countries, which account for more than 70 percent of world imports, and whose proximity to one another is reflected in relatively low freight costs (4.2 percent).

If freight costs are disaggregated by region, some turn out to be substantially higher than the worldwide

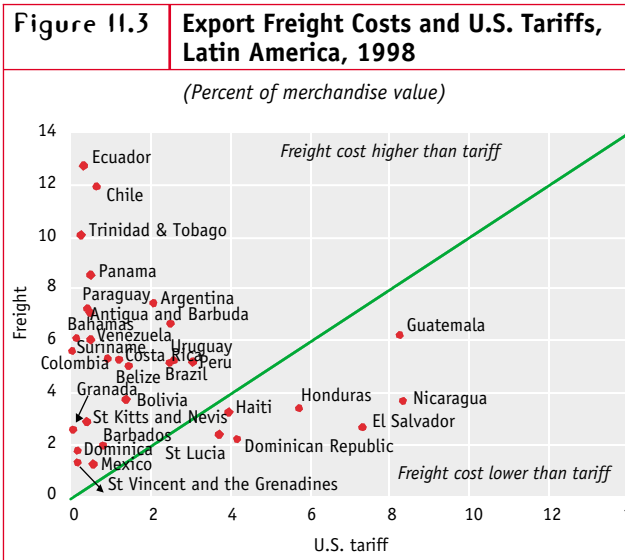
¹ See Micco and Pérez (2001) for a more detailed version of this chapter.

² For recent empirical assessments, see Frankel and Romer (1999), Ades and Glaeser (1999) and Dollar and Kraay (2001). For a skeptical view of the importance of trade policies, see Rodríguez and Rodrik (1999).

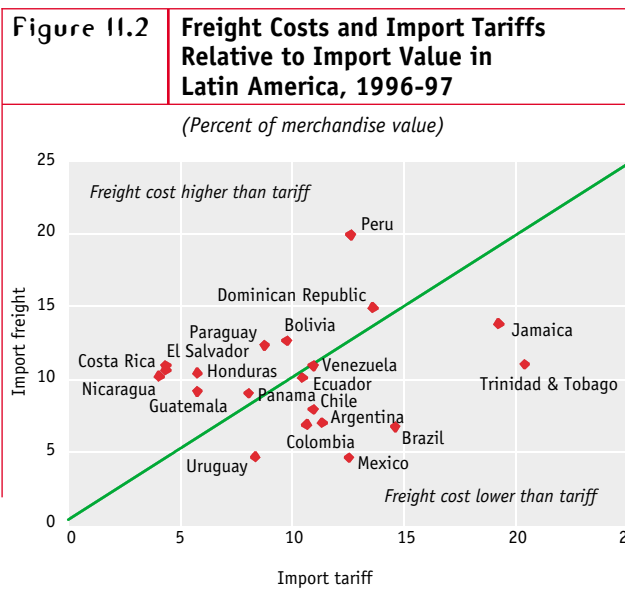
³ See Amjadi and Yeats (1995) and Radelet and Sachs (1998).



Source: UNCTAD (1999), based on IMF Data.



Source: IDB calculations based on U.S. Census Bureau, Department of Commerce.



Source: World Bank (2000) and IMF (2000).

average. Although Latin America appears to have low transport costs relative to other developing regions (7 percent compared to 8 percent for Asia and 11.5 percent for Africa), the Latin American figure is weighted by Mexico’s proximity to its main trading partner, the United States, and its resulting low freight costs. When Mexico is excluded, the region’s average transport costs rise to 8.3 percent, more similar to that of other developing regions.

The effective rate of protection provided today by transport costs is often higher than the rate provided

by import tariffs. Import freights paid by Peru are almost twice as large as the average import tariff of 12 percent. In several Central American countries—including Costa Rica, El Salvador and Nicaragua—freight costs account for more than double the average import tariff of less than 5 percent (see Figure 11.2). For many Latin American countries, the main obstacle to gaining access to the U.S. market is no longer the tariff, but the transport cost. Two extreme cases are Chile and Ecuador: import tariffs represent less than 1 percent of the value of their exports to the United States, while transport costs are 12 percent or more of that value (see Figure 11.3). Consequently, any international integration strategy must take into account the effect of transport costs and their determinants.

Do transport costs affect trade and economic development? The literature that applies the gravity approach to the study of international bilateral trade shows that geographical distance, which is used as proxy for transport costs, is negatively related with trade and income levels.⁴ Limao and Venables (2000) show that raising transport costs by 10 percent reduces trade volumes by more than 20 percent. Using the same approach, Redding and Venables (2000) claim that transport costs explain more than 70 percent of cross-country variation in per capita income and more than 50 percent of the variation in manufacturing wages. Thus, in their view,

⁴ See Bergstrand (1985).

transport costs are the most important determinant of income gaps between countries worldwide. In a different analysis, Radelet and Sachs (1998) find that doubling shipping costs (for example, from an 8 percent to 16 percent CIF band) is associated with a reduction in GDP growth of slightly more than half of one percentage point.

What Factors Explain Maritime Transport Costs?

Transport costs may be an important barrier to trade and could have an important effect on income. But why do some countries have higher transport costs than others? Is it only a matter of distance? Can government policies affect these costs? This section addresses these questions by using a qualitative and quantitative description of the determinants of transport costs.⁵ The analysis focuses on international maritime transport costs (more specifically, *liner* maritime transport costs), given their relative importance and the availability of data.

The services provided by shipping companies make them by nature a transnational industry that serves more than one country. In general, these companies have access to international capital markets and are able to hire workers from all over the world.⁶ Therefore, we would not expect differences in capital or labor costs to be the main factors in explaining differences in transport costs across countries.

The obvious and most studied determinant of transport costs is geography, particularly distance. The greater the distance between two markets, the higher the expected transport cost for their trade. According to our own estimates based on liner maritime charges paid by U.S. imports from all around the globe, a doubling in distance increases transport costs by 20 percent (see Appendix Table 11.1). Using shipping company quotes for transporting a standard container from Baltimore to selected worldwide destinations, it was found that an extra 1,000 kilometers raises transport costs by \$380 (or 8 percent for a median shipment). Breaking the journey into an overland and a sea component, an extra 1,000 kilometers by sea raises costs by only \$190, while the same distance by land raises costs by \$1,380—4 percent and 30 percent of a median shipment, respec-

tively. In addition, if a country is landlocked, transport costs rise by \$2,170, almost 50 percent higher than the average cost. In other words, being landlocked is equivalent to being located 10,000 kilometers farther away from markets.

Trade composition can also help explain differences in transport costs across countries. Because of the insurance component of transport costs, products with a higher unit value have higher charges per unit of weight. On average, insurance fees are around 2 percent of the traded value, and they represent around 15 percent of total maritime charges. Therefore, high value-added exporting countries should have higher charges per unit weight due to this insurance component. On the other hand, some products require special transport features and therefore have different freight rates.

Directional imbalances in trade between countries imply that carriers are forced to haul empty containers back. As a result, either imports or exports become more expensive. Fuchsluger (2000) examines this phenomenon in bilateral trade between the United States and the Caribbean. In 1998, 72 percent of containers sent from the Caribbean to the United States were empty. This excess of supply in the northbound route implied that a U.S. exporter paid 83 percent more than a U.S. importer for the same type of merchandise between Miami and Port of Spain (Trinidad and Tobago).

Maritime transport is a typical example of an industry that faces increasing returns to scale. The classical economist Alfred Marshall put it clearly long ago: "... a ship's carrying power varies as the cube of her dimensions, while the resistance offered by the water increases only a little faster than the square of her dimensions." Besides increasing returns at the vessel level, there are economies of scale at the seaport level. At the Port of Buenos Aires, the cost of using the access channel is \$70 per container for a 200 twenty-foot equivalent unit (TEU) vessel, but only \$14 per container for a 1,000 TEU vessel. In general, even though most of these economies of scale are at the vessel level, in practice they are related to the total volume of trade between two re-

⁵ This section is based on LSU-National Ports and Waterways Institute (1998), McConville (1999) Fuchsluger (2000), Limao and Venables (2000), and Fink, Mattoo and Neagu (2000).

⁶ Shipping companies prefer to sail their ships under open-registry flags. In fact, according to UNCTAD (1999), Panama, Liberia, Cyprus and the Bahamas account for more than 40 percent of the world fleet.

gions. Maritime routes with low trade volume are covered by small vessels, and vice versa. Similar features can be observed in air and land transport.

In addition, the development of containerized transport in recent years has been an important technological change in the transport sector. Containers have allowed large cost reductions in cargo handling, increasing cargo trans-shipment and therefore national and international cabotage. In turn, this increase in cabotage has induced the creation of hub ports that allow countries or regions to take advantage of increasing returns to scale.

Commercial routes more liable to competition and less subject to monopoly power will tend to have lower mark-ups. Monopoly power can be sustained either through restrictive trade policies imposed by government or by private anti-competitive practices (cartels). The former includes a variety of cargo reservation schemes, such as the UN Liner Code. Private anti-competitive practices include the practice of fixing rates of maritime conferences.⁷ The econometric analysis in Appendix Table 11.1 reports evidence that agreements between liner companies serving the United States seem to have at most a mild effect, adding an estimated 6.7 percent to liner maritime transport costs in 1998. This may be because, as some studies have shown, the power of maritime conferences has declined in recent years, forcing shipping companies to merge as a way of retaining their monopoly power.

Similar restrictions and anti-competitive practices can induce inefficiencies or monopoly power in ports. For example, workers in many countries are required to have special licenses for providing stevedoring services, and in general these restrictions imply high fees and low productivity.

Finally, and most relevant for its policy implications, the quality of onshore infrastructure is an important determinant of either land or maritime transport costs. It accounts for no less than 40 percent of predicted transport costs for coastal countries, and up to 60 percent for landlocked ones. If a country with relatively poor infrastructure—such as Ecuador or Brazil, ranked 75th internationally—were able to upgrade to the 25th percentile (the level of France or Sweden), it would reduce transport costs by between 30 and 50 percent.⁸ Although this is hypothetical, it underscores the relative importance of onshore physical infrastructure and its operation. The estimates in Appendix Table 11.1 for trans-

port costs of merchandise entering the U.S. market confirm these findings. Based on these estimates, an improvement in port efficiency from the 75th to the 25th percentiles in the world rankings reduces shipping costs by the equivalent of 9,000 kilometers.

Maritime Transport Costs and Port Efficiency

The previous section stressed the importance of port efficiency. But what exactly does that mean, and what are the factors behind it? Port efficiency is related to activities that depend on port infrastructure, such as towing and tug assistance or cargo handling, as well as to activities related to customs requirements. As stated by Raven (2000), “the (in)efficiency, even timing, of many port operations is strongly influenced (if not dictated) by customs.” However, legal restrictions and procedural flaws can also impair the services more closely related to port infrastructure. As mentioned earlier, for example, seaport costs are artificially increased in the many countries where workers are required to have a special license for providing stevedoring services. Some ports still receive cargo without specifying the presentation of a Standard Shipping Note, which is inconceivable in modern port practice. In many ports, it is virtually impossible to obtain a written and accurate account of the main port procedures, and sometimes port regulations are not clear about the acceptance of responsibilities (for cargo in the warehouse or on the quay, for instance). All of this generates unreasonably long delays, increases the risks of damage and pilferage of products (in turn raising insurance premiums), and, as a consequence, considerably increases costs associated with port activities.

Port efficiency varies widely from country to country and, especially, from region to region. Some Asian countries, like Singapore and Hong Kong, have the most efficient ports in the world, while several African nations (Ethiopia, Nigeria, Malawi) and South American ones (Colombia, Venezuela, Ecuador) have the most inefficient ports. Table 11.1 presents estimates of port

⁷ Maritime conferences enjoy an exemption from competition rules in major traders such as the United States and the European Union.

⁸ See Limao and Venable (2000).

Table 11.1 Port Efficiency Variables by Region

	Port efficiency (7=best, 1=worst)	Customs clearance (days)	Container handling charges in ports (US\$/TEU)
North America	6.35	3.5	261.7
Europe (except East)	5.29	4	166.7
Middle East	4.93	na	na
East Asia and the Pacific	4.66	5.57	150.5
East and South Africa	4.63	12	na
North Africa	3.72	5.5	na
Former Soviet Union	3.37	5.42	na
Eastern Europe	3.28	2.38	na
Latin America	2.9	7.08	251.4
South Asia	2.79	-	na
West Africa	na	11.7	na

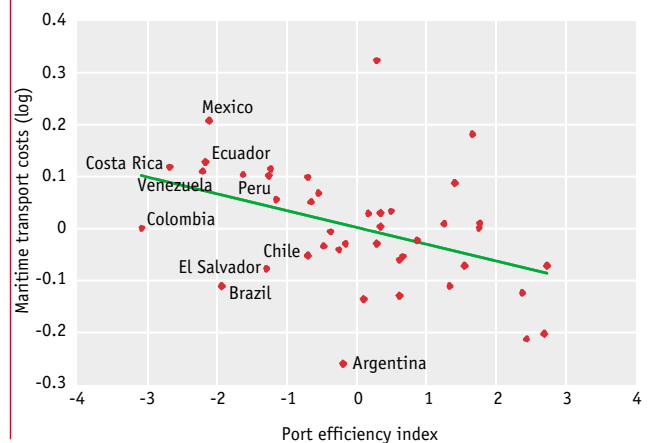
Notes: Efficiency variables per region are not directly comparable to each other because the availability of countries is not the same. Thus, this should be considered a complementary rather than substitute measure.

Source: World Economic Forum (1999), World Bank surveys, Cámara Marítima y Portuaria de Chile (1999), and LSU-National Ports and Waterways Institute (1998).

efficiency by geographic region. The first column is a subjective index based on surveys reported by the World Economic Forum in *The Global Competitiveness Report* for 1999. North America and Europe have the best rankings, followed by the Middle East, East Asia and the Pacific. Latin America and South Asia, in turn, are perceived as having the least efficient ports. The second column indicates the typical delay in days to clear customs.⁹ Latin America is second only to Africa in terms of major customs problems, with a median delay in clearing customs of seven days. In this group, Ecuador (15 days) and Venezuela (11 days) are the worst offenders.

As should be expected, port efficiency is reflected in handling costs and therefore in maritime transport costs (see Figure 11.4). While efficient ports in East Asia have lower charges, Latin American ports have the most expensive handling services (third column of Table 11.1). This relationship is clearer when we take into account wage differentials across countries and even when we isolate the influence of physical infrastructure quality on port efficiency (Figure 11.5) Where ports are most efficient, like Singapore and Belgium, the (relative) cost of handling services is lower. At the other extreme, handling costs are high in countries like Ecuador and Brazil, where ports are least efficient.

Therefore, port efficiency is not just a matter of more or better physical infrastructure. To support this important point, Appendix Table 11.2 presents econo-

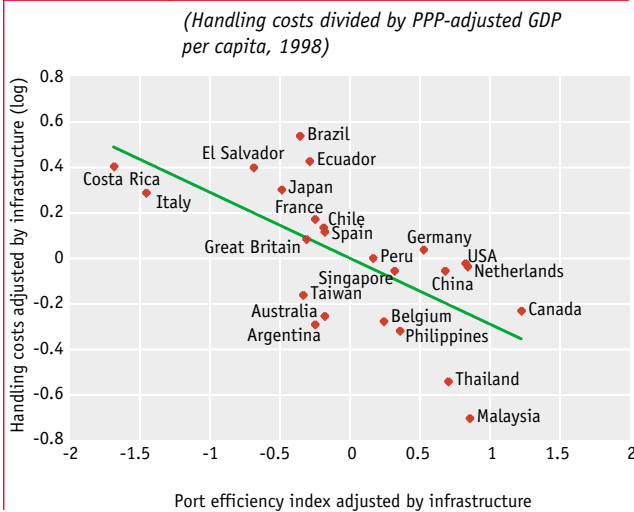
Figure 11.4 Maritime Transport Costs and Port Efficiency

Note: Adjusts for distance, trade volume, containerization, conferences, product type, etc. Does not include Canada.

Source: Appendix Table 11.1.

metric evidence showing that, in addition to port infrastructure, port efficiency is influenced by the quality of the regulatory and institutional environment in which ports operate. As a proxy of the degree of regulation, the variable “mandatory port services” is used to measure the extent to which port services are mandatory

⁹ As reported in business environment surveys by the Inter-American Development Bank and the World Bank.

Figure 11.5 Handling Costs and Port Efficiency

Source: IDB calculations.

for incoming ships. (See Appendix 11.1 for data definitions.) The results suggest that while some level of regulation is necessary for port efficiency, excessive regulations can be damaging. Argentina has a moderate level of regulation of its seaports, while Brazil imposes too many requirements. In the same vein, the variable “cargo handling restrictions” captures the severity of the restrictions imposed on foreign suppliers of cargo handling services, which tends to discourage competition. The measure of “organized crime” also turns out to be highly significant and suggests that much port inefficiency is due to the quality of the institutional environment. In terms of our sample, a reduction in organized crime from the 75th to the 25th percentile would imply an improvement in port efficiency from the 50th to the 25th percentile.

Towards a Latin American Model of Port Management?¹⁰

Because the regulatory and institutional environment is so important for port efficiency, many countries have welcomed the private sector in port management (see Box 11.1). This has been a global trend affecting both developed and developing economies. In the latter, private investment commitments in 112 projects amounted to more than \$9 billion between 1990 and 1999. In Latin America alone, the private sector has become in-

Box 11.1 Organizational Models for Ports

Maritime transport literature characterizes ports according to the ownership of their infrastructure and superstructure. Accordingly, there are three types of ports: service ports, tool ports and landlord ports. Under the service port model—commonly used for public ports in Latin America in the 1960s—the Port Authority is in charge of management of infrastructure and superstructure, as well as overall operation of the port. The Port of Singapore is a publicly owned port of the service type, but there can also be private service ports, such as that of Hong Kong. The tool port can be best described as one in which the Port Authority owns the infrastructure and superstructure, and its services are licensed to private firms. Most public ports in Latin America functioned under this scheme during the 1980s, and many Central American countries continue to do so. (Panama is an exception.) Finally, under the landlord port system, the infrastructure belongs to and is managed by the Port Authority, which grants concessions to private firms for port superstructure and to provide all port services. The concessionaire can undertake the investments deemed necessary to best provide services.

involved in 64 projects worth \$3.9 billion. Although the main purpose of these initiatives has been to improve seaport efficiency, privatization has also been motivated by the need to reduce the fiscal burden of port losses. Even though it is too soon to pass final judgment, the Latin American experience seems to show that private involvement increases port efficiency when supported by labor reform, and when seaport monopoly power is either adequately regulated or reduced by competition.¹¹

Private involvement in public seaports has been the result of new market conditions and global trends in maritime transportation. The new export-led growth paradigm adopted by many countries has put pressure on port authorities to improve seaport efficiency, while

¹⁰ This section is based on Baird (1999), Cámara Marítima y Portuaria de Chile (1999), Estache and Carbajo (1996), Foxley and Mardones (2000), Gaviria (1998), Hoffman (2000, 1999a), Nombela and Trujillo (1999), and Vilorio (2000).

¹¹ Private involvement in managing and financing ports to date has been largely limited to captive facilities. These facilities, typically for bulk cargo, are often vertically integrated into production processes and not actively promoted for use by third parties.

containerization and other technological changes in maritime transport have forced seaports to modernize their installations and operational methods. New investments and administrative and labor reforms have been required for ports to successfully compete for cargo handling. More often than not, however, governments have been unable to financially commit to this challenge, so private sector involvement has become critical. Still, changes have been gradual and followed different paths. At the beginning of the 1980s some countries allowed private participation for seaport services such as towing, pilotage and stevedoring.¹² Since 1981, private stevedore firms have been allowed to perform all transfer services in Chilean state-owned ports, a system known as the multi-operator model. Meanwhile, Colombia allowed private operation of terminals and berths alongside major port districts.¹³ As a first step toward privatization in the United Kingdom, the National Dock Labor scheme was abolished, liberalizing the labor market. In Asia, concessions for container operations in the port of Kelang (Malaysia) and the Manila International Container Terminal were awarded in 1986 and 1988, respectively. Most of these initial experiences had a positive impact on port efficiency.

During the 1990s, private participation in public ports became more pronounced and led the way to concession contracts that allowed private firms to operate ports and make investments to improve the quality of services. Pioneering this process in Latin America were Panama and Colombia. The former granted its first concession at Manzanillo International Terminal in 1993, which started operations by 1995, and the latter offered its first port concession in 1993. Mexico was also an early reformer. The Ports Law enacted in 1993 allowed private firms to provide all port services. The major container terminals have since adopted the single-operator scheme.

Most public ports in Latin America are currently implementing the landlord port model. Under this system, the infrastructure of the port belongs to the port authority and the superstructure (including services such as pilotage and towage) is given in concession to a private firm. However, the reasons why countries have turned to this model have varied, as have the ways in which they have carried out the process. Argentina and Brazil, with little transcontinental commerce but with a large fiscal burden, were mainly driven by the fiscal impact of concessions. Colombia and Venezuela were

mostly concerned with opening their economies and improving port efficiency.

Regulation regimes also differed: countries with little intra or inter-port competition implemented more restrictive regulations in order to curtail monopoly practices. The ports of the Andean Community, which are far away from each other and have poor road connections, became more regulated. On the other hand, given the proximity of MERCOSUR ports to one another, there was less regulation in order to ensure competitive price levels. A good example is the competition for cargo between the ports of southern Brazil and those of Buenos Aires and Montevideo. Competition between them has been enhanced by improved highway infrastructure that allows for more rapid connections with the interior of those countries.

Reforms have not reached all countries, however. Central American ports such as those in El Salvador, Guatemala, Honduras and Nicaragua are still service ports where modernization and labor reforms are yet to come. In Costa Rica, ports have already licensed stevedoring services, but investment and prices at the ports are still controlled by the government. The exception in the Central American region has been Panama.

Initiatives by most countries in the region in the 1990s to reform the maritime sector have led experts to define a new "Latin American model" that comprises the following features:¹⁴

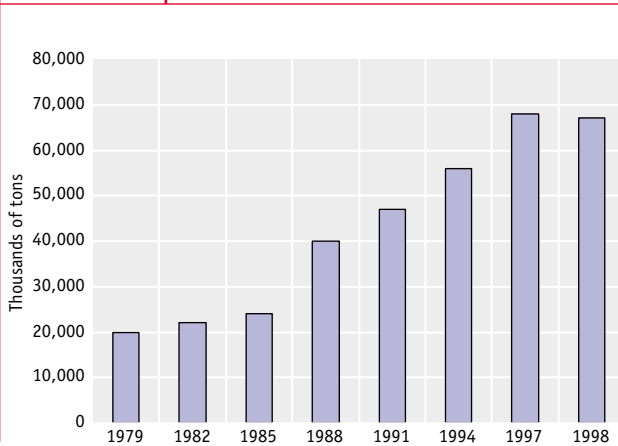
- Public ports are of the landlord type and mostly serve import cargo, while a high percentage of bulk goes through privately owned and operated terminals. For example, in 1998, 86 percent of Chilean liquid bulk went through such ports.
- Opportunities are available for private firms and foreign investors to establish new ports. An example is the new private terminal in Zárate, Argentina.
- Concessions have been granted for 12 to 30 years in order to promote private investment in modernization of port infrastructure and superstructure.

Though not enough time has elapsed to pass final judgment on the reforms, several results are clear. In most cases, labor productivity has increased and handling cargo costs have decreased. Efforts have been made

¹² In the United Kingdom, Thatcherism went further and privatized the ports and the Port Authority.

¹³ These private berths would handle mainly liquid and solid bulk.

¹⁴ See Hoffman (2000, 1999a).

Figure 11.6 Throughput of Chilean Ports

Source: Cámara Marítima y Portuaria de Chile (1999).

to promote competition between proximate ports, but land transport infrastructure still poses a serious obstacle to such competition.

National experiences have been diverse, and each one brings a lesson. The Chilean case shows that better management can significantly improve efficiency even without any additional investment. The Brazilian experience stresses the key role of labor reform. Argentina shows that competition is a good substitute for regulation, while Panama highlights the increasing importance of cabotage in international trade.

Chile

Prior to 1981, the *Empresa Portuaria de Chile* (EMPORCHI) was in charge of 11 major public ports and also had a monopoly on cargo handling. The main aim of EMPORCHI was to improve port efficiency and increase investment, especially in the ports of San Antonio and San Vicente, which by the early 1970s were unable to receive wheat, corn, sugar and many other bulk commodities. As a monopolist, EMPORCHI created a system of cargo handling under which two groups of workers coexisted: stevedores required to have a license to operate, and workers hired directly by EMPORCHI to handle cargo from the ship to the port. Because of high wages for night work, ports did not operate at night, and EMPORCHI shifts did not match those of the stevedores. These conditions led to high costs and port inefficiency.

In 1981, EMPORCHI's monopoly was abolished and a multi-operator system was introduced under which all

cargo handling services were licensed to private firms that could meet quality and security requirements. The personal licenses of stevedores were abolished, eliminating their monopoly power. Although the state compensated 2,700 workers with \$50 million, this scheme proved to be very successful.

In 1979, experts advised the Chilean government to invest \$200 million in seaports to improve port services, an expenditure that was beyond the country's fiscal capabilities at that time. However, cargo handling (including cabotage) of all public ports increased from 22 million tons in 1979 to 66 million in 1998 without any significant investment during this period (see Figure 11.6). Port tariffs remained low and competitive, although Chile did not modernize its ports as did most Latin American countries during the 1990s.

In spite of this initial success, the division of cargo among several stevedore companies limited incentives to invest in modern transfer equipment and did not permit an efficient use of limited backup yard space. This problem was exacerbated by the huge increase in trade during the 1980s and 1990s. The issue was finally addressed in 1997, when the Port Modernization Law was enacted and 11 port authorities were created. The law prohibited port authorities from handling cargo or berthing. Instead, they have to lease the ports to private firms under a single-operator scheme. In addition, port authorities are encouraged to share revenues derived from annual rent and operational revenues with the private firms. The concessions are granted for periods of 15 or 20 years with the possibility of extension to a maximum of 30 years. In 2000, four of the concessions—San Vicente, San Antonio, Valparaíso and Iquique—initiated operations. The lease of these four ports in 1999 represented \$300 million in income for the government. No lease was granted for the Port of Arica, in part because port authorities imposed excessively high infrastructure requirements, which made the project unprofitable and would likely to have led to excessive investment.

The concession process prompted labor unrest at public ports. As a result, the government reached an agreement with workers to create a safety net that if fully used will cost about \$30 million. One consequence of the plan was that 760 of 1,750 workers accepted early retirement.

Three important lessons can be derived from the Chilean experience: (i) improvements in efficiency may

not require additional investments in infrastructure; (ii) even though a multi-operator system may be successful, it may not provide the right incentives for investment; and (iii) concessions may provide an important service by preventing white elephant investments.

Brazil

In a country as diverse as Brazil, any generalization is bold. Still, it seems safe to say that until 1993, when the Port Modernization Law was enacted, most Brazilian ports were highly inefficient, excessively bureaucratic, and constantly under-funded. The results were tariffs three to six times higher than the international average, long waiting times for ships, and deficient service provision. The situation has since improved, but inefficiency is still rampant in some ports.

The government decentralized the port system and started dismantling the public agency Portobras in 1990. Three years later, the Port Modernization Law allowed private participation in cargo handling services and liberalized port tariffs in order to promote competition between neighboring ports. The original plan was to award concessions for 36 public ports, but the process has lagged, putting Brazil at a disadvantage with neighboring Argentina, where the reform has been more aggressive. One reason is that reforms at Brazil's ports have faced constant resistance from labor unions.¹⁵ The Port Modernization Law gave more flexibility to the number of workers per "squadron," but this has not been fully implemented in many ports. Difficulties in reducing the number of employees have constrained the possibility of decreasing port costs. For example, in 1998, the average cost of handling a 20-foot container in Buenos Aires was \$130, while in Santos, Brazil, it was \$350. An important reason is that 50 workers are required for handling the cargo of a ship at Santos, compared to only 14 in Buenos Aires.

However, in two Santos terminals currently operated by private firms, waiting time for ships went from several days in 1997 to less than a day by 1999. Concessions of small ports such as Itaji, Laguna, Cabedelo and Porto Velho were well advanced in 1999—75 percent of all the port infrastructure had been leased to the private sector. The operation of ports by private firms reduced waiting times for ships, and ports have become more competitive within the region. The tariff structure at Santos has been also modified, allowing a

more market-oriented structure that has resulted in reduced tariffs for users of these port terminals. Container handling charges were \$328 per TEU in 1998, down from \$550 in 1996.

The main conclusion of the Brazilian experience is that labor reform in port activity is essential to accomplish port concessions that increase productivity and reduce tariffs.

Argentina

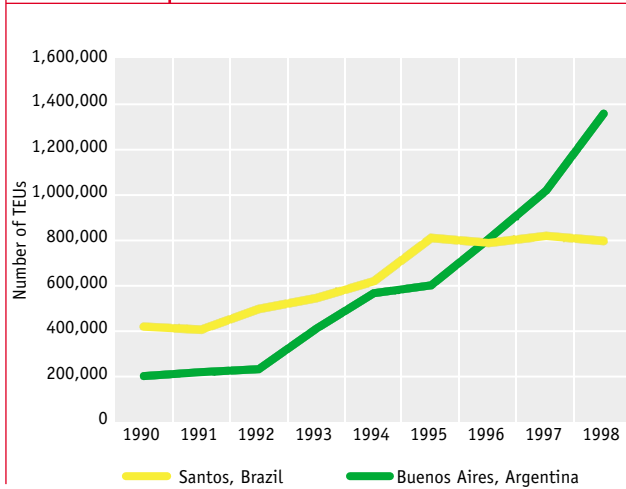
As early as the 1970s, Argentina allowed the private sector to manage stevedoring at the public port of Buenos Aires. This early modernization effort never rendered satisfactory results in terms of productivity because of over-regulation and the overlapping supervisory functions of state entities, strong labor unions that separated stevedoring and loading services, and a lack of investment by the port authority. In addition, other public ports were still operating under the service model, functioning inefficiently and charging very high tariffs for cargo handling.

In 1990, the first steps were taken to deregulate and decentralize public ports in a more comprehensive fashion. Deregulation consisted of abolishing restrictive working practices at ports and on vessels, and liberalizing rates for pilotage, towage and stevedoring. In addition, foreign ships were allowed to practice cabotage. The government dismantled the Ports Administration and transferred property of the major ports to the provinces, which were given the responsibility of establishing their own port authorities in charge of maintaining the port infrastructure and granting concessions to private firms.¹⁶

The Buenos Aires port was divided into the Dock Sud and Puerto Nuevo. The central government kept the latter and leased its six terminals to five different firms handling different types of cargo. In each terminal, a single stevedoring firm was allowed to operate under a single operator scheme. To date, the achievements of this port have been remarkable: cargo handling increased 50 percent and labor productivity surged by 275 percent over 1990-95. This progress has allowed Puerto

¹⁵ By 1998, the Brazilian Port Union had 66,000 affiliated workers, compared to 690 workers in Argentina.

¹⁶ Smaller ports—some of them long since out of service—were transferred to the provinces, which were allowed to operate or lease them to private firms or shut them down.

Figure 11.7 Container Throughput in Buenos Aires and Santos

Source: Hoffman (1999a).

Nuevo to compete with South America's largest port, Santos in Brazil. As of 1997, Puerto Nuevo's cargo handling had surpassed that of Santos (see Figure 11.7).

Currently, foreign firms can also participate in the construction of new private ports in Argentina, as has been the case of a terminal in Zárate, which is being remodeled for container handling.

The Argentine case shows that even when some port services are supplied by the private sector—as was the case before 1993—excessive regulation can constrain improvements in port efficiency. The country's experience since then shows that competition, whenever possible, is preferable to regulation.

Panama

Panama was one of the first Latin American countries to privatize a public port. The first privatization took place in 1993, when a concession was granted to the Manzanillo International Terminal (MIT). The MIT started operations in 1995 and was so successful that it opened the way for other port operating concessions. The Colón Container Terminal (CCT) and the Port of Cristóbal started

operations in 1997, while the Port of Balboa did so in 2000.

This process also led to dismantling the National Port Authority and establishing the Panama Maritime Authority (PMA) in 1998. The PMA is the landlord authority that awards port operating concessions to private firms and also regulates the maritime industry. The advantage of Panamanian ports such as MIT is their proximity to the Panama Canal, making them ideal hubs. MIT currently handles 70 percent of all containers that go through Panama. MIT's throughput increased from 161,000 TEUs in 1995 to 878,000 TEUs in 1999, and most of the cargo is for trans-shipment. In fact, 70 percent of all containers handled in Panamanian ports are for trans-shipment.

The experience of Panama highlights the increasing importance of cabotage in international trade.

Conclusions

The reduction of tariffs and other artificial trade barriers has increased the relative importance of transport costs as a barrier to trade. Any strategy aimed at integrating a country into the global trading system has to seriously consider transport costs. Besides distance and other variables that no government can change, the most important determinant of maritime transport costs is seaport efficiency. But seaport efficiency is not just a matter of physical infrastructure. The quality of the institutional and regulatory environment in which ports operate may be much more important. Organized crime, in particular, has a deleterious effect on port services. Some evidence suggests that excessive regulation may impede efficiency, and a number of success stories in Latin America show that private involvement in port management leads to efficiency and lower costs whenever it is accompanied by labor reform, and when monopoly power is reduced through either regulation or competition.

Appendix II.1 Data Definitions

- Cargo handling restrictions:* Zero-to-one index that captures restrictions and special requirements imposed on foreign suppliers of cargo handling services. The index takes a value of 0 if no restriction exists, 0.25 for minor restrictions, 0.5 if a joint venture condition is imposed, 0.75 if major national participation in the company is required, and 1 if foreign companies are simply forbidden to provide cargo handling services. Source: Fink, Mattoo and Neagu (2000).
- Containerization:* Percentage of cargo transported by containers. Source: U.S. Import Waterborne Databank (U.S. Department of Transportation).
- Container handling charges:* Correspond to container handling charges in ports (US\$/TEU). For 19 countries, we have information from the Transport Division of the World Bank. For 12 countries, of which eight are in the World Bank sample, we have information (as an index) from the Cámara Marítima y Portuaria de Chile. For four Central American countries, of which only Panama is in the previous samples, we have information from the LSU-National Ports and Waterways Institute. Using ratios, we put all samples in the same unit used by the data from the World Bank.
- Cooperative agreement:* Dummy variable signaling the presence of carrier agreements on maritime routes: cooperative working agreements that do not have a binding rate authority. Source: Fink, Mattoo and Neagu (2000).
- Customs clearance:* Corresponds to time (days, median) to clear customs, based on surveys by the World Bank of importers in each country. The specific question 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?" Source: World Bank's business environment surveys.
- Distance:* Corresponds to the distance between the foreign port i and the U.S. customs district J . Data provided by Fink, Mattoo and Neagu (2000).
- Foreign GDP per capita:* GDP per capita of the exporting countries to the United States. Source: *World Development Indicators 2000* (World Bank).
- Infrastructure index:* Corresponds to the simple average of four indices: main telephone lines per capita, kilometers of paved roads, kilometers of railroads, and the number of paved airports, the last three variables per country surface area. To homogenize these four indices, we divide each by its standard deviation.¹ Source: *World Development Indicators 2000* (World Bank) and *The World Factbook 2000* (Central Intelligence Agency).
- Mandatory port services:* Zero-to-one index that captures the extent to which port services are mandatory for incoming ships. This variable is constructed adding 0.125 for each of the following services if they are mandatory: pilotage, towing, tug assistance, navigation aids, berthing, waste disposal, anchorage and other mandatory services. Source: Fink, Mattoo and Neagu (2000).
- Maritime transport costs:* Calculated as import charges divided by weight. Source: calculated from data of the U.S. Import Waterborne Databank (U.S. Department of Transportation).
- Organized crime:* One-to-seven index ranking based on surveys of representative firms in each country. The specific question is: "Organized crime does not impose significant costs on business and is not a burden" (1=strongly disagree, 7=strongly agree). Source: *The Global Competitiveness Report* (1996-2000).
- Port efficiency:* One-to-seven index ranking port efficiency, based on surveys of representative firms of each country. The specific question is: "Port facilities and inland waterways are extensive and efficient" (1=strongly disagree, 7=strongly agree). Source: *The Global Competitiveness Report* (1996-2000).

¹ Based on Limao and Venable (2000).

Price fixing agreement: Dummy variable signaling the presence of carrier agreements on maritime routes: conferences and other price-fixing agreements. Source: Fink, Mattoo and Neagu (2000).

Total liner volume: Total volume of imports transported per maritime route (where we define routes as “from foreign country to U.S. coast”). Source: constructed from data of the U.S. Import Waterborne Databank (U.S. Department of Transportation).

Unit weight: Value of total U.S. imports divided by total weight, and calculated per maritime route (where we define routes as “from foreign ports to U.S. customs districts”). Source: calculated from data of the U.S. Import Waterborne Databank (U.S. Department of Transportation).

Appendix Table II.1 Determinants of Maritime Transport Costs, 1998: Regression Results

Independent variables	Dependent variable: Charges/Weight					
	OLS estimations			IV estimations		
	1	2	3	4	5	6
Distance (km)	0.18 (9.53)***	0.19 (9.73)***	0.18 (10.41)***	0.18 (8.18)***	0.17 (8.24)***	0.18 (8.75)***
Unit Weight	0.55 (50.36)***	0.55 (49.82)***	0.55 (49.55)***	0.55 (55.40)***	0.55 (49.82)***	0.5 (45.42)***
Policy variables						
Price-fixing rate agreement	0.07 (1.81)*	0.03 (0.68)	0.01 (0.20)	0.07 (1.63)	0.02 (0.57)	0.01 (0.22)
Cooperative agreement	-0.02 (-0.88)	-0.03 (-1.37)	-0.01 (-0.23)	-0.02 (-0.83)	-0.03 (-1.29)	-0.01 (-0.24)
Containerization	-0.04 (-3.23)***	-0.04 (-2.78)***	-0.04 (-3.38)***	-0.04 (-3.50)***	-0.04 (-2.84)***	-0.04 (-3.58)***
Economies of scale						
Total liner volume (Foreign country to U.S. coast)	-0.02 (-3.83)***	-0.03 (-3.12)***	-0.03 (-3.30)***	— —	— —	— —
Total liner volume (Instr.) (Foreign GDP)	— —	— —	— —	-0.03 (-2.07)**	-0.04 (-2.62)***	-0.04 (-1.80)*
Port efficiency						
GDP per capita (proxy for infrastructure)	-0.06 (-5.27)***	— —	— —	-0.06 (-4.83)***	— —	— —
Port efficiency (<i>Global Competitiveness Report</i>)	— —	-0.06 (-4.00)***	— —	— —	-0.05 (-3.53)***	— —
Infrastructure index (proxy for port infrastructure)	— —	— —	-0.06 (-2.00)**	— —	— —	-0.06 (-2.03)**
No. of observations	314,034	308,549	314,034	314,034	308,549	314,034
R² (adjusted)	0.465	0.465	0.463	0.465	0.465	0.463

Notes: t-statistics in parentheses. All estimations include fixed effects for products (4,828 products) and for U.S. district (31 districts).

Regressions allow the observations to be independent across exporting countries, and interdependent within each country.

* Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

Appendix Table 11.2 Determinants of Port Efficiency, 1998: Regression Results

Independent variables	Dependent variable: port efficiency (from <i>The Global Competitiveness Report</i>)		
	1	2	3
Infrastructure	0.33 (2.14)**	0.35 (2.29)**	0.30 (2.41)**
Cargo handling restrictions	1.46 (1.145)	0.34 (0.743)	— —
Cargo handling restrictions (squared)	-1.23 (-0.88)	— —	— —
Mandatory port services	4.31 (2.31)**	3.90 (2.04)**	4.21 (2.33)**
Mandatory port services (squared)	-6.84 (-2.56)**	-5.96 (-2.29)**	-6.20 (-2.41)**
Organized crime (“Organized crime is not a problem”)	0.63 (5.28)***	0.57 (6.82)***	0.57 (6.58)***
Constant	0.97 (1.51)	1.32 (2.85)***	1.38 (2.78)***
No. of observations	42	42	42
R²	0.716	0.712	0.706

Notes: t-statistics in parentheses.

* Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.