

# The potential for hub ports *on the Pacific coast* of South America

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The external trade of a country is closely linked with its geographical location, with the transport services that cover the distance to markets, and the ports through which that trade passes. Recent advances in maritime transport, the growing international economic integration, and the privatization of ports in the countries on the Pacific coast of South America have given rise to expectations that ports could be developed that concentrate both domestic cargo and that of neighbouring countries for its subsequent redistribution: what are known as “hub ports”. The main conclusion of the present study is that the potential for hub ports on the Pacific coast of South America is very limited. In the past, countries tried to prevent the foreign trade of their neighbours from using their ports to gain some kind of commercial benefit. Now, however, the situation has been reversed, and ports compete with each other for the trade of neighbouring countries. In itself, this competition is positive, but the problem is that in many cases it has been raised to a political level which has turned simple competition between ports into international competition between hypothetical future “hub ports”. In view of the low degree of probability that the establishment of such ports on the west coast of South America will be a success, it might be more advisable to seek greater regional coordination of transport policies and of investments in port and land transport infrastructure, in order to promote integration between the countries of the Atlantic and Pacific coasts of South America.

# I

## Introduction

Hub ports (“puertos pivotes” in Spanish) are seaports that concentrate domestic and foreign cargo with different points of origin and/or destination for its subsequent redistribution.<sup>1</sup> They thus generate business for the local economy by transporting cargo that does not come from the actual hinterland of the port in question.

The question of whether or not there is potential for the emergence of such hub ports on the west coast of South America is important both for the economic integration of the South American countries and for their integration with other regions. For example, transport services between South America and the Asian Pacific Rim countries are crucial for the South American countries’ participation in the Asia-Pacific Economic Cooperation forum (APEC), and port links are fundamental elements for connecting the bioceanic corridors with maritime transport services.

In more general terms, in recent years there have been many studies which analyse the relation between geographical aspects and the development of countries in the light of such variables as distance and transport. Radelet and Sachs (1998), for example, seek to identify the determinants of transport costs and then go on to investigate the relation between those costs and growth rates. The results show a clear negative relation between the two variables. In view of the importance of the maritime mode in international transport, improving its efficiency and reducing its cost should form part of any development policy.

In recent years, the maritime transport industry has undergone a marked process of concentration, including alliances and mergers between shipping companies, and there has been an increase in the transshipment of containerized cargo in ports.<sup>2</sup> At the same time, the Latin

American countries are opening up their economies and their international trade is growing faster than their product, giving rise to a big increase in the need for international transport services.

Both these tendencies –the advances in the maritime transport industry and the greater economic openness of the countries– have helped to create expectations that ports could sell their services to neighbouring countries. Traditionally, ports served almost exclusively the foreign trade of the countries where they were located, but there are now possibilities for them to provide services for cargo from other origins destined for third countries. Such expectations have arisen with respect to ports in the four South American countries with Pacific coastlines: Chile, Colombia, Ecuador and Peru.

These four countries also share the characteristic that their ports are being privatized and that they are seeking investors to improve port infrastructure and productivity. At first sight, it would therefore seem reasonable that the governments should seek investors not only to improve the services for their own cargo, but also to generate extra business through the export of port services.

In itself, the idea of offering port services for other countries’ trade reflects a positive change of attitude. Thus, up to the early 1990s the idea was to avoid this happening, because exporters considered that the goods of neighbouring countries should not pass through their ports because they competed with domestic products, while farmers feared the entry of pests and diseases. Furthermore, the maritime authorities, which came under the respective navies, were against opening up their ports to countries with which they had border conflicts.

Today, however, in the context of greater regional political and economic integration and the progress made in privatizing ports, such opposition has lost its strength. Ports are competing for cargo and trying to attract pri-

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<sup>1</sup>This definition is quite independent of the degree of industrialization of the port or its volume of traffic. We have tried to avoid using the term “megaport” because there is no generally accepted definition of this concept, and moreover its use is not necessary. The concentration of cargo may involve one or more modes of transport. If only maritime transport is involved, we speak of “transshipment”. If cargo arrives from another country by land and leaves the port by sea, we use the term “transit”.

<sup>2</sup>This transshipment involves two port movements: a container arrives on one ship, is stored temporarily in the port, and then leaves on another ship. It is used above all to take advantage of the econo-

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mies of scale offered by bigger ships and to increase the frequency of services to a given destination. Transshipment traffic has greatly increased in recent years thanks to technological advances, the use of bigger ships, and increased use of containers.

vate investors, and their geographical location on the Pacific rim has opened up expectations of potentially big business reflected in the press in headlines such as “Megaports in South America: Conquering the Pacific” (*El Mercurio*, 1998, p. D1).

## II

### South America’s trade and its transport by sea

What is the relation between the geographical location of a country and investments in ports? Broadly, there are two possible interdependences:

- i) The port would be a means of modifying trade flows: improvement of the ports could help to offset geographical disadvantages and promote the country’s external trade; in this case, the country would invest in its ports as part of its trade policy.
- ii) The trade flows and geographical location would be an opportunity for generating income through the supply of port services: the ports could take advantage of their privileged geographical location and offer their services for the foreign trade of their own and neighbouring countries; in this case, the country would invest in its ports in order to export port services.

Both these motives could play an important role in the potential development of hub ports in South America. The aim would be to reduce transport costs for the foreign trade of the country in question while at the same time attracting additional cargo from neighbouring countries, which would help the port to generate economies of scale and hence ultimately also reduce the costs of the country’s own foreign trade.

#### 1. The port as a facilitator of foreign trade

Trade flows are influenced by the geographical location and distances between countries, as well as the presence or absence of transport services covering those distances. Countries which are close to each other have more bilateral trade than countries which are further apart. This is partly explained by historical, political, cultural and linguistic reasons, but also by transport costs and the time goods take to arrive. According to a regression made by Gallup and Sachs (1999), each 1,000 kilometres of dis-

The present article will analyse whether there really is a potential for hub ports on the west coast of South America and whether the ports on that coast have comparative advantages for moving the trade between South America and the Asia-Pacific countries.

tance between a country and its main markets raises the transport costs by one percentage point of the value of the goods.

In 1998, 99.75% of the total volume of the foreign trade of Argentina, Brazil, Chile, Peru and Uruguay with Asia, North America and Europe was transported by sea, and only 0.25% by air. The situation is somewhat different when the trade is analysed by value, however: since the goods of highest value and lowest weight tend to be transported by air, the share of sea transport in intercontinental trade goes down to 80.15% of the total value, while the share of air transport goes up to 19.85%.

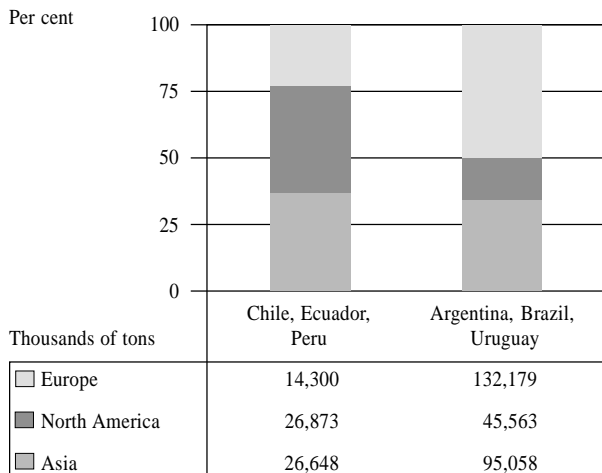
Within the trade of the South American countries which is transported by sea, it may be noted that Chile, Ecuador and Peru, which are on the west coast, have relatively less trade with Europe than Argentina, Brazil and Uruguay, which are on the east coast (figure 1).

It may be seen from the figure that, together, the latter three countries have 4.5 times more intercontinental trade by sea than Chile, Ecuador and Peru. Within this trade, the east (Atlantic) coast countries’ trade with Europe was almost three times greater than their trade with North America, whereas the Pacific coast countries’ trade with North America was almost double their trade with Europe. Although in terms of total volume the three Atlantic coast countries had 3.5 times more trade with Asia, in relative terms the Pacific countries’ trade by sea with Asia was equally important for them.

Are these trade flows by sea the result of the distances and shipping and port services involved? Later on, we will examine the comparative advantages of ports on the two coasts for trade with the various continents. For the moment, however, we may note that the relative weight of the intercontinental trade of the countries in question corresponds approximately to the distances between the South American coasts and the other conti-

FIGURE 1  
**Three South American countries on the Pacific coast and three on the Atlantic: Volume of their intercontinental trade by sea,<sup>a</sup> 1998**

(Percentages and thousands of tons)



Source: International transport database of the ECLAC Transport Unit.

<sup>a</sup> Includes imports and exports. Trade with Africa accounts for less than one per cent of total trade. Data for Ecuador include trade by air. North America comprises only the United States and Canada. Asia includes the Asian countries and also Australia and New Zealand.

nents. The MERCOSUR countries (Argentina, Brazil and Uruguay) are closer to Europe than Chile, Ecuador and Peru. In order to reach Europe, ships from the latter countries must go through the Panama Canal, which involves extra costs and delay. Both coasts of South America are approximately the same distance from Asian ports.

Can trade be promoted through investments in port infrastructure? The answer is affirmative, provided that such investment reduces costs and/or raises productivity. Such improvements reduce the “economic distance”: i.e., they reduce the negative impact of the geographical distances involved. The recent (and ongoing) port privatization and modernization operations and maritime transport liberalization measures taken by the South American countries can be expected to give rise to a general increase in intercontinental trade.

Can trade be promoted if a specific region makes investments in its port infrastructure? In principle, the answer would be yes, but probably not in the specific case of South America, where all the ports serve trade with all continents, so that there do not seem to be any reasons to expect changes in direction of the main maritime trade flows to the various continents. The situation might be different if the road transport infrastructure were

changed, for example in order to facilitate the access of Chilean goods to Argentine ports, which would probably lead to an increase in Chile’s trade with Europe.

To sum up, trade flows and international transport services influence each other mutually. Both are partly the result of the geographical location of the countries and the distances to the main markets. The impact of trade flows on the volume of port traffic is stronger, however, than the influence that greater port efficiency could have on the volume of trade.

## 2. Geographical location as a factor for the establishment of hub ports

Do the ports on the Pacific coast of South America have sufficient comparative advantages to become hub ports? What are the possibilities of concentrating cargo in Chile, Colombia, Ecuador and Peru for its subsequent redistribution?

In its *Review of Maritime Transport* (UNCTAD, 1999, p. 93), UNCTAD notes that in South America there are a number of ports which are impatient to become hub ports, and on the west coast several Chilean ports will compete with Callao (Peru) or Guayaquil (Ecuador). According to *El Mercurio* (1998), “Chile and Peru are vying to establish megaports on their coasts which could link up with biooceanic corridors to become the leading port of the region for trade with Asia”. Many articles in the specialized press highlight the “intense competition” between the ports along the west coast of South America (see, for example, *Schednet News*, 1999).

In Ecuador, Manta is being mentioned as an “international transfer port”. The review CAMAE (1999), for example, describes its “geographical advantages” and “technical advantages”, claims that “international megafirms need to have a port of this category on the South American coast”, and highlights its potential for “serving as a port for unloading containers arriving in large ships from abroad and then distributing them to other ports in smaller vessels” and “Minimizing costs and maximizing the transport of cargo between different ports of Asia, Europe and the United States and South America”.

In mid-1998 the United States Trade Development Agency (TDA) authorized the expenditure of US\$ 362,000 on a prefeasibility study in this respect. According to CAMAE (1999), “the project was considered to be viable, so that the TDA included it among the 125 projects eligible for investment in South America and registered the Transfer Port project under code TRAN-39: “Ecuador - Expansion of the Port of Manta” and the “recommended

capital expenditure programme for the Port of Manta amounts to US\$ 135,996,240".

In Peru, the port of Callao is that which has the highest hopes of becoming a hub port. According to a brochure designed to promote private investments, "Peru's strategic location in South America makes its seaports highly attractive as potential outlets for seaborne trade between Latin America and Asia. Furthermore, the foreign trade of Peru and other emerging economies of Latin America is expected to keep on growing, thus further increasing the demand for port services" (Comisión de Promoción de Concesiones Privadas, 1998). Another brochure, in this case published by the National Ports Corporation (Empresa Nacional de Puertos - ENAPU), states that "Peru's ports enjoy a privileged geographical location on the Pacific Rim which enables them to act as ports that link up with the countries of the Atlantic coast and interior of South America through a vast network of railroads, highways and navigable rivers suitable for intermodal transport" (ENAPU, undated). The specialized press, too, mentions that Callao is well located for taking transshipment cargo to and from the whole of the west coast of South America (Lloyds List, 1999).

Private investments amounting to some US\$ 300 million are expected to be made under the concessions for the port of Callao. In 1999 a US\$ 240 million soft loan from the Japanese government for its modernization was rejected. The granting of a concession for a container terminal, which was planned for 1998 or 1999, was postponed until the year 2000. One of the reasons for the postponement was the existence of doubts as to whether the port should not be divided into several terminals in order to increase in-port competition and avoid a monopoly. On the other hand, if Callao wanted to become a hub port it might be better not to divide it but rather to try to put it in the most competitive position possible compared with other ports.

In Chile, the port best known for its aspirations to become a hub port is Mejillones, north of Antofagasta. Indeed, in the local press it is usually called a "megaport". As far back as 1996, in a working paper of the regional government of Antofagasta entitled "Megaport of Mejillones" (Schellmann, 1996), it was claimed that the bay of Mejillones has "unrivalled natural advantages" and that "the megaport of Mejillones is a strategic point

where the hinterland of the great production areas of the Gran Chaco joins up with the Asia-Pacific Basin". According to *El Diario* (1999), a Chilean government representative said that "Mejillones is winning the battle to become a megaport of the South Pacific".

With regard to the amounts of investment involved, when the Mejillones project was begun it was estimated that the total investment would be some US\$ 600 million and it was planned to grant the concession in late 1998. After various postponements, however, in late 1999 the concession was awarded to a consortium of Chilean firms which undertook to invest a total of around US\$ 100 million by the year 2002. This consortium is currently seeking finance from commercial banks and multilateral financial institutions. This first phase of the project is mainly limited to the construction of installations for handling copper exports, although the documentation soliciting loans to finance the project continues to stress the long-term potential for attracting cargo from neighbouring countries and for the transshipment of containers.

Other Chilean ports with expectations of attracting more transshipment or transit traffic are, in particular, Arica, Iquique, Valparaíso, San Antonio and Talcahuano/San Vicente, although none of them are usually described as "megaports". According to the newspaper *Estrategia* (1998), the Mayor of Iquique "announced that the Ministry of Public Works had approved the deepening of the Northern port from 16 to 17 metres draft for a new berth that will take vessels with a capacity of 7,000 containers. 'The new vessels operating now have got bigger, and Iquique does not want to be left out of the world market. It is not only the megaport being built at Mejillones that has the right to receive such ships', he added". According to the Web page for the Iquique Free Zone (2000), that Zone is "in a strategic geographical position" and is "South America's principal place of business, where markets of the Pacific Basin and the Southern Cone of the American Continent connect".

In short, there are expectations of the possible establishment of hub ports in all the South American countries on the Pacific coast, based on the growth of trade, regional and world economic integration, the privatization of ports, and the perceived advantages of a strategic geographical location.

### III

## Transshipment centres in the world

In terms of volume, most maritime cargo is transported as liquid bulk (above all petroleum) and dry bulk (grains, coal, iron ore). In terms of the value of goods and freight charges, containerized cargo is more important.

Analysis of potential hub ports generally centers on their possibilities of concentrating containerized cargo transported by sea. This cargo is transported by regular liner services. Bulk cargo, in contrast, is generally transported in chartered vessels and is less suitable for transshipment operations.

#### 1. A business decision

The selection of the mode of transport for a foreign trade operation generally depends on a mainly commercial decision: the goods must arrive at their destination as soon as possible and at the lowest cost and risk.

##### a) *Journey time*

Rapid delivery is increasingly important. The average value of each ton of merchandise is going up all the time, and this also raises the capital costs. Just-in-time delivery is becoming more and more common. The incidence of a transshipment operation on the total journey time depends on various factors: on the one hand, the transshipment operation in itself involves extra costs and time, and may also mean a diversion from the direct route in order to reach the transshipment centre. On the other hand, however, the goods may be loaded on a faster ship at that centre.

##### b) *Frequency*

A journey which is rapid in itself is not much use to an exporter if his cargo has to wait many days or even weeks for a direct transport service. One of the main advantages of passing through hub ports is that they concentrate cargo and make possible more frequent departures to the different destinations.

##### c) *Cost*

The extra cost of a transshipment operation may be partly offset by the advantage of being able to use bigger ships with lower operating costs. On the route between the United States and Asia, for example, it is estimated that

the use of the biggest ships (called "post-panamax" because they are too big to go through the Panama Canal) gives shippers a cost advantage of US\$ 27 per container compared with "panamax" ships, which are the largest ones that can use the Canal (Drewry Shipping Consultants, 1996; Hoffmann, 1999). The ships currently serving the South American Pacific ports are only about half the size of panamax ships.

Quite apart from the possibility of consolidating cargo of different origin, the volume of trade between ports on a given route could itself justify the use of bigger ships on intermediate stages. For example, if we assume that there are 50 containers of bilateral trade from each of 12 ports (i.e., 11 stages), then on the last stage the ship would only be carrying 550 containers (the trade with the remaining 11 ports), whereas on the sixth stage (between ports 6 and 7) it would be transporting 1,800 containers. The general formula is:

$$\text{Number of containers on the ship} = k(n-k)$$

where  $n$  = total number of ports on the route and  
 $k$  = number of the stage.

This example reflects quite realistically the case of trade between the west coast of South America and Europe or North America. There are various services which call in at 10 to 15 ports per voyage, and the number of containers unloaded in each port rarely exceeds 600.

##### d) *Risk*

Every transshipment operation involves the risk of loss or damage of the goods and delays due to errors or strikes. Insurance premiums therefore tend to be higher if transshipment services are used.

##### e) *Volume*

The journey frequencies and size of the ships used are naturally closely linked with the volume of the transactions that must be covered. If this volume is not large enough even to fill smaller ships running at a frequency of at least one departure per month, there will simply be no direct service at all, and it will be necessary to use feeder services that link the port with a hub port.

The traffic balances also depend on the volume of goods transported. If cargo is only available in one di-

rection, it is less profitable to establish a direct service, and it is more expedient to try to concentrate the cargo at places where the maritime transport flows can be balanced in both directions.

#### f) *The case of South America*

As a real example of the relation between journey lengths and frequencies, it may be noted that five different weekly services to Northern Europe depart from the MIT port on the Caribbean coast of Panama, whereas there are only three similar direct services from the west coast of South America, between one and three times per month. These services pass through the Panama Canal, and one of them calls in at MIT. On average, the journey between MIT and the Northern European ports on the five weekly services takes one day less than the Panama-Europe leg of the services from San Antonio and Callao. Altogether, the five weekly services departing from MIT also connect with a larger number of different ports in Europe.

Consequently, if for example a Peruvian exporter does not want to wait for the departure of one of the three direct services, he may be able to find another service that will take his goods to Panama, where they can take advantage of the next departure of one of the five weekly services to Europe.

Because of the increase in the number of mergers and alliances between shipping companies, such combinations of services are increasingly frequent. In the trade with Asia there are already a number of established services which link up North-South services from South America with East-West services in Panama or Los Angeles. There are even services which carry out transshipment at the Panamanian MIT port, on the Caribbean coast. In that case, the containers pass through the Canal twice.

Generally speaking, the connections between the west coast of South America and Asia are more suitable for the use of transshipment services, because the stage on which big ships can be used is much longer than in the services to Europe or North America.

In short, ports consolidate cargo so that it will reach its destination more cheaply and quickly. The decisions in this respect are eminently commercial and hardly involve political considerations.

## 2. Current transshipment centres

The biggest container ports are currently in Asia, the United States and Europe. There, the transshipment ports are located primarily at points where the main sea routes intersect. Tables 1 to 4 show the volume of container traffic in different regions of the world and the volume

TABLE 1  
**The five main container ports in the world: port traffic in containers, 1998**  
(in TEU)

Port	Port traffic
Singapore	15,000,000
Hong Kong	14,582,000
Long Beach/Los Angeles (United States)	7,478,218
Kaohsiung (Taiwan)	6,271,053
Rotterdam	6,010,000

Source: Cargo Systems, 1999.

TABLE 2  
**The five main container ports in Latin America and the Caribbean: Port traffic in containers, 1998**  
(in TEU)

Port	Port traffic
Buenos Aires (Argentina)	1,138,000
Cristóbal (Panama)	1,117,035
Santos (Brazil)	859,500
Kingston (Jamaica)	670,858
Puerto Cabello (Venezuela)	486,774

Source: ECLAC, 1999.

TABLE 3  
**The five main container ports on the west coast of South America: port traffic in containers, 1998**  
(in TEU)

Port	Port traffic
San Antonio (Chile)	415,001
Guayaquil (Ecuador)	407,434
Callao (Peru)	378,013
Valparaíso (Chile)	255,687
Buenaventura (Colombia)	143,420

Source: ECLAC, 1999.

TABLE 4  
**Main transshipment areas of the world: Port transshipment movements, 1998**  
(In TEU)

Area	Port movements
Southeast Asia	13,356,000
Far East	8,374,000
Northern Europe	6,312,000
Southern Europe	5,940,000
Middle East	3,077,000
Central America and the Caribbean	1,994,000
North America	1,623,000
Africa	1,215,000
South Asia	1,200,000
South America	230,000
Oceania	112,000

Source: Drewry Shipping Consultants, 1999.

of transshipment operations by regions, both measured by TEUs.<sup>3</sup>

At the world level, there were 185 million port movements during 1998, including movements of empty containers and transshipment operations. Of this total, 23% corresponded to transshipment movements (Drewry Shipping Consultants, 1999); the percentages by the main transshipment ports are given in table 5. The small amount of transshipment traffic currently registered in South America (table 6) is concentrated above all in Cartagena (Colombia) and Puerto Cabello (Venezuela).

To sum up, both the total volumes of cargo transported in South America and the percentage of transshipment within those totals are very small compared with other regions of the world. South America accounts for only 3.4% of world movements of containers in ports, and only 3.6% of this is transshipment traffic. Indeed, the South American region accounts for only 0.5% of the total transshipment operations in the world.

### 3. Requisites for a hub port

#### a) Land links

Many hub ports concentrate cargo by land, as for example in the case of those in Northern Europe and the United States. Hong Kong also receives most of its cargo by land. In order to be able to concentrate cargo in this way the port must naturally have links with other forms of transport, especially railways, which are important for obtaining high volumes of cargo. If the port is in an industrial area which offers other services for the cargo, this could be an additional advantage.

#### b) Maritime links

The world's main transshipment centre (where the cargo arrives and leaves by sea) is Singapore. In recent times there has been a tendency to establish ports which have almost no traffic of local origin and are devoted to transshipment traffic. The main ports in the region which serve as transshipment centres have also continued to grow because they have international maritime services and cargo from smaller ports must be transferred to them to connect with those services. The main basis for the viability of those centres is their geographical location.

In ports where intercontinental routes cross or connect, transshipment operations take place between ships serving two different routes. Examples of this are

TABLE 5

#### Main transshipment ports: Transshipment as a percentage of port container traffic, 1998<sup>a</sup>

Port	Transshipment (%)
Malta	93
Damietta (Egypt)	90
Algeciras (Spain)	84
Singapore	82
Gioia Tauro (Italy)	80
Kingston (Jamaica)	75
Colombo (Sri Lanka)	70
MIT (Panama)	70
Dubai	50
Kaohsiung (Taiwan)	43
Rotterdam (Netherlands)	40
Bremerhaven (Germany)	30
Hamburg (Germany)	30
Felixstowe (United Kingdom)	28
Antwerp (Belgium)	25
Pusan (Korea)	21
Hong Kong	18
Kobe (Japan)	15

Source: Data from Drewry Shipping Consultants and direct information from the ports.

<sup>a</sup> The data are for 1998 or the last available year.

TABLE 6

#### South American ports: Transshipment as a percentage of port container traffic, 1999

Port	Transshipment (%)
Cartagena (Colombia)	50
Puerto Cabello (Venezuela)	38
Callao (Peru)	6
Buenos Aires, Puerto Nuevo (Argentina)	3
San Antonio (Chile)	3
Guayaquil (Ecuador)	2
Santos (Brazil)	2
Rio de Janeiro (Brazil)	2

Source: Prepared by the author on the basis of various sources.

Algeciras (Africa-Europe route and North America-Europe-Asia route), Jamaica and Panama (South America-North America-Europe route and Europe-North America-Asia route) and Singapore (Europe-Asia-North America route and Australia-Europe route). Transshipment operations are also carried out at Gioia Tauro, Malta and Dubai between different parallel services linking North America, Europe and Asia. These ports operate with or without cargo from their local hinterland.

Some ports connect up a local market with an international route that passes through the region. Examples of this are Colombo (Indian subcontinent), Gioia Tauro and Malta (the Mediterranean), Jamaica and Panama

<sup>3</sup> TEU = twenty foot equivalent unit: equivalent to a 20 foot container.



(Caribbean, Central America, west coast of South America), Miami (Caribbean) and Singapore (southeast Asia). These ports operate with or without cargo from their local hinterland.

There is a tendency to concentrate cargo from neighbouring islands and countries at ports located at the end of international routes. Examples of this are Gothenburg (connects with Scandinavian ports), Port of Spain (connects with other Caribbean ports), San Antonio (connects with ports in southern Chile), and Buenos Aires (connects with various river ports in the area). These are usually main regional ports whose cargo comes mainly from the local hinterland, and they are not usually called "hub ports" because the transshipment traffic tends to represent only a small percentage of their total port traffic.

Obviously, transshipment operations can be carried out for different purposes at each hub port. Exporters and importers in regions of the traditional north-south traffic generally have at their disposal direct services to the main markets in Europe, North America and Asia, but also an increasing number of services involving at least one transshipment operation. Examples of this are Australia (with transshipment at Singapore), India (with

transshipment in Sri Lanka), East Africa (with transshipment in the Middle East), West Africa (with transshipment at Algerciras), and South America (with transshipment in Jamaica, Panama, or North American ports).

Zohil and Prijon (1999) have analysed (for the Mediterranean area) the relation between the volume of port traffic generated by the port area itself, geographical location, and the volume of transshipment traffic. They conclude that the volumes of transshipment traffic of a port are a linear function of the volume of port traffic and an inverse linear function of the distance from the main line of transit. In other words, ships tend to prefer ports for which they have local cargo and take advantage of their presence there to engage in transshipment operations. The shorter the detour from the main route that the stopover involves, the more likely that port is to be chosen as a transshipment centre.

To sum up, in order to become a hub port a port must have ample land transport links, be located in a place where maritime routes connect or cross, or have big volumes of locally generated cargo. None of these conditions exist in the ports on the west coast of South America to the extent that they do in the hub ports already operating in the world.

## IV

### Maritime services in South America

What are the features of the regular lines offering maritime transport services in South America? How do the services on the west coast compare with those on the east coast? What sort of distances does a direct service by a charter vessel have to cover? These questions need to be analysed in order to determine if it is possible to concentrate cargo from South American countries and where, and whether the ports on the Pacific side have comparative advantages compared with those on the Atlantic.

#### 1. Regular liner services

##### a) *Comparison between the east and west coasts of South America*

If we compare the regular liner services covering South American ports on the Pacific and Atlantic coasts (table 7), as well as the options open to South American exporters and importers, the following observations may be made.

There are almost twice as many ports with liner service on the east coast as on the west coast of South America, and 56% more regular services depart from east coast ports than from the main ports on the west coast. There are also more companies offering such services, which are also more frequent.

Ships sailing from the east coast arrive more quickly on the east coast of the United States, Europe and South-east Asia (Singapore). The journey time to the continent of Asia (Hong Kong) is approximately the same in both cases. Ships sailing from the west coast arrive more quickly in Japan and the west coast of the United States, however. Indeed, there are no regular direct services between Los Angeles and the MERCOSUR countries, although there are regular services that transship cargo at Puerto Cabello (Venezuela).

Greater economies of scale are obtained on the east coast, which handles almost twice as many containers. Each of the regular services transports about 35% more

TABLE 7

**South America: Regular liner services from ports on the  
Pacific (west) and Atlantic (east) coasts of South America<sup>a</sup>**

	<b>West coast:</b> Chile, Colombia <sup>b</sup> , Ecuador, Peru	<b>East coast:</b> Argentina, Brazil, Uruguay
<b>Ports:</b> Number of ports with regular services as at 1 January 2000 <sup>c</sup>	<b>Total</b> 13: Chile 7, Colombia 1, Ecuador 2, Peru 3	<b>Total</b> 25: Argentina 5, Brazil 19, Uruguay 1
<b>Main ports:</b> Number of regular services as at 1 January 2000 <sup>c</sup>	San Antonio (Chile) 20 Callao (Peru) 20	Buenos Aires (Argentina) 25 Santos (Brazil) 27
<b>Services:</b> Total number of departures per month on each coast, as at 1 January 2000 <sup>c</sup>	<b>Total:</b> 356 To Asia: 74 To North America: 221 To Europe: 61	Total: 556 To Asia: 98 To North America: 196 To Europe: 273
<b>Volume moved per service:</b> Estimated average number of TEUs moved by each service per year <sup>d</sup>	All services: 9195 To Asia: 8708 To North America: 8093 To Europe: 13,125	All services: 12,500 To Asia: 10,906 To North America: 18,121 To Europe: 9302
<b>Journey time:</b> Minimum duration of voyage from the main South American ports as at 1 January 2000	San Antonio - Singapore: 36 days San Antonio - Hong Kong: 33 days San Antonio - Yokohama: 26 days San Antonio - New York: 19 days San Antonio - Hamburg: 31 days Callao - Singapore: 34 days Callao - Hong Kong: 25 days Callao - Yokohama: 21 days Callao - New York: 14 days Callao - Hamburg: 25 days	Buenos Aires - Singapore: 25 days Buenos Aires - Hong Kong: 29 days Buenos Aires - Yokohama: 35 days Buenos Aires - New York: 16 days Buenos Aires - Hamburg: 19 days Santos - Singapore: 21 days Santos - Hong Kong: 25 days Santos - Yokohama: 31 days Santos - New York: 14 days Santos - Hamburg: 15 days
<b>Frequencies:</b> Number of days between departures on each direct service. Weighted average for each port as at 1 January 2000 (for example: a weekly service would give the number 7.0).	San Antonio - Asia: 10.2 San Antonio - N. America: 11.0 San Antonio - Europe: 13.8 Callao - Asia: 10.2 Callao - N. America: 11.0 Callao - Europe: 13.8	Santos - Asia: 9.6 Santos - N. America: 9.4 Santos - Europe: 9.3 Buenos Aires - Asia: 8.4 Buenos Aires - N. America: 9.7 Buenos Aires - Europe: 9.2
<b>Shipping companies:</b> Number of shipping companies offering liner services as at 1 January 2000 <sup>c</sup>	To Asia: 8 To North America: 20 To Europe: 12	To Asia: 14 To North America: 30 To Europe: 23
<b>Size of ships:</b> maximum size of ships as at 1 January 2000	2200 TEU, with ship's own cranes	3428 TEU, without cranes on ship (used on the Asia service)
<b>Trade in containers:</b> Total number of shipping movements, imports and exports, in 1998 (in thousands of TEU). Includes non-regular services.	<b>Total:</b> 1131 Asia: 209 North America: 607 Europe: 315	<b>Total:</b> 2200 Asia: 349 North America: 1051 Europe: 800
<b>Balances:</b> Export/import balance of shipping movements in TEU in 1998	<b>Total:</b> almost in balance = 1.11 Asia: surplus = 2.48 North America: deficit = 0.79 Europe: surplus = 1.30	<b>Total:</b> almost in balance = 0.96 Asia: surplus = 2.23 North America: deficit = 0.68 Europe: almost in balance = 1.07

*Source:* Prepared by the author on the basis of American Shipper (2000); Datamar Consultores Asociados (2000) and World Sea Trade Service (1998).

<sup>a</sup> This table does not take account of the ports on the north coast of South America (Cayenne, Colombia, Guyana, Suriname and Venezuela). TEU = twenty-foot equivalent unit (a unit equal to a 20-foot container). Figures for San Antonio include services from Valparaíso. Many services are the result of cooperation among several shipping companies.

<sup>b</sup> Buenaventura.

<sup>c</sup> Only direct services; these may include stopovers in other ports, but without transshipment.

<sup>d</sup> Approximation, based on services offered in January 2000 and containers moved during 1998.

containers, and the vessels used are larger. There are services that use ships which do not have cranes of their own. This saves costs, as it is not necessary to transport dead weight and idle capital on the voyage. As most of the ports on the west coast do not yet have specialized cranes for handling containers, however, the services covering that coast have to have their own cranes.

Both coasts have a surplus of containers in their trade with Asia and a deficit in their trade with North America. Overall, however, South America's trade in containers is more or less balanced.

b) *Comparison of the services from the east and west coasts of South America to other regions*

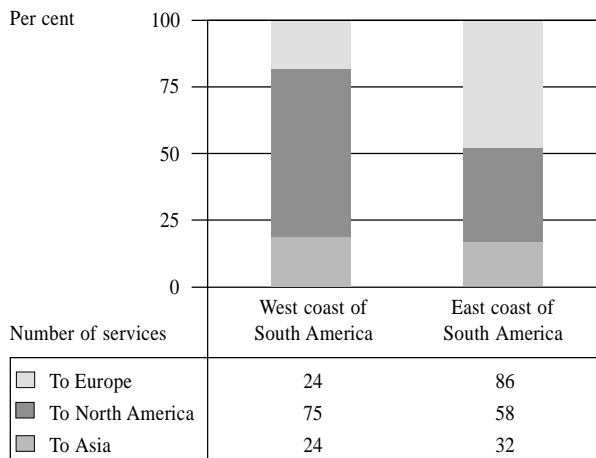
A more detailed analysis of the different trade regions reveals that the relative weight of sea transport services to Asia is approximately the same for both coasts. The main difference is the predominance of services to North America on the west coast and of services to Europe on the east coast. Every day 4.5 times more ships leave for Europe from east coast ports than from those on the west coast. The Atlantic side also has 32% more departures to Asia, while there are 13% more departures for North America from the west coast. The final result is similar in terms of the total number of services. Figure 2 shows the simple sum of services from all the ports on each coast of South America to the three destination regions. Services which go from a South American port to two destination regions (for example, first Miami and then Hamburg) are included in both regions. The simple coefficient of correlation between the number of services (figure 2) and the number of port departures (table 7) is +99%.

In addition to this quantitative comparison, it is also necessary to take into account the frequency of the services. There are weekly services to Asia and North America from ports in all the countries in question. In the case of services to Europe, however, the maximum frequency of those from Chile and Peru is only once every ten days, whereas there are lines from Argentina and Brazil which leave every five days.

In the case of the route to Europe, the ports on the east coast have a clear advantage over those on the west coast. Exporters and importers who have access to ports on both coasts should therefore prefer those on the Atlantic.

For services to the west coast of North America, the Pacific ports have an advantage, as there are no regular direct services between the east coast of South America and western North America. It should be borne in mind,

FIGURE 2  
**West and east coasts of South America:  
 Liner services by destination region, January 2000**  
 (Percentages and number of services)



Source: Prepared by the author on the basis of *American Shipper* (2000).

however, that in order to reach any given destination inside the United States or Canada it is not necessary to enter by the east or west coast in particular, because in North America, unlike South America, there are intermodal connections providing efficient transport from any port in those two countries.

With regard to services to Asia, for most destinations it would be better to use the services sailing from Argentina, Brazil or Uruguay, provided the intermodal land connections within South America permit this.

In short, the services offered by the ports of both coasts basically reflect the needs of local trade. The larger volumes available on the east coast result in more services, bigger ships and higher journey frequencies. The greater relative importance of services to Europe from the east coast and to North America from the west coast basically reflect the needs of the corresponding foreign trade with those regions (see figure 1 above).

c) *Regular services from the Pacific coast of South America*

There are currently no regular international services from the main west coast ports of South America which involve transshipment of containers within South America. There are direct services, and also the possibility of using services involving transshipment in Central America or North America.

As regards regular services connecting the Pacific coast with Asia, there are direct services which include

the main ports in Chile, Peru, Ecuador and Colombia and cross the Pacific from Buenaventura, Callao or San Antonio (for example, those provided by the shipping lines CSAV, Nedlloyd, NYK, P&O Nedlloyd and Rickmers). There are also indirect services which involve transshipment in, for example, the MIT port in Panama or Los Angeles (provided by the shipping lines APL, CCNI, COSCO, Ecuadorian Line, Hapag Lloyd and Maersk).

Analysis of the regular services covering the South Pacific coast indicate that all the main shipping lines include Callao and San Antonio. Some use San Antonio instead of Valparaíso, but there are no services which include Callao but do not include either San Antonio or Valparaíso. Table 8 shows the number of regular services per port.

#### d) *The future outlook*

The shipping lines are tending to establish their main routes in an east-west direction, with transshipment services linking them up with north-south routes. The tendency towards more services involving transshipment is also reflected in the statistics which indicate that port traffic is growing faster than actual maritime movements: each movement of a container between the exporting and importing country constitutes only one maritime movement, but it may involve two, four or even more port movements, depending on the number of transshipment operations during the voyage.

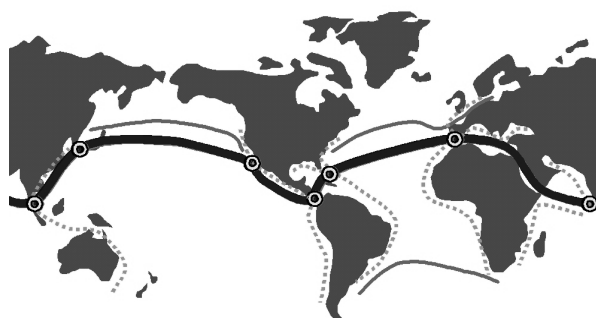
Figure 3 illustrates a possible future pattern of regular liner services. We will surely not arrive at the extreme of having only indirect services from the west coast of South America, but there is a definite trend in this direction. In the case of various regular services on the Pacific coast of South America, the pattern shown in figure 3 is already almost a reality, with the main hub ports being Long Beach in the United States, the MIT port in Panama, and Kingston in Jamaica.

TABLE 8  
**Pacific coast of South America:  
Regular direct services, by ports**

Port	Number of services		
	Asia	North America	Europe
Buenaventura (Colombia)	3	8	2
Guayaquil (Ecuador)	3	10	3
Callao (Peru)	4	14	4
Iquique (Chile)	4	8	1
Antofagasta (Chile)	2	4	2
Valparaíso and San Antonio (Chile)	4	14	4
Talcahuano and San Vicente (Chile)	2	4	1

Source: Prepared by the author on the basis of *American Shipper* (2000).

FIGURE 3  
**World: Possible future pattern of direct and indirect services<sup>a</sup>**



Source: *Containerisation International* (1999).

<sup>a</sup> The thick line shows east-west services around the world in ships of up to 15,000 TEU, assuming widening of the Panama Canal. Alternatively, there could be to-and-fro services sailing to and from the two coasts of the United States. The three thin solid lines show direct services between Asia and North America, North America and Europe, and South America and South Africa. The broken lines show feeder services connecting up with the main east-west service.

## 2. Distances for charter services

Not all trade is transported by regular shipping lines. Much of it—especially in the case of dry and liquid bulk cargo—is transported in ships which are chartered for specific voyages and do not follow established routes to cover a schedule of port visits but basically seek the shortest distance to their destination.

Comparisons of the distances involved should not be limited only to crossing the Pacific, but should also include the alternative of sailing via the Cape of Good Hope in South Africa. Furthermore, they should include not only the most easterly Asian ports, but also the biggest ports in that region, namely Hong Kong and Singapore (table 9).

Some of these comparisons may give surprising results:

- From any Brazilian port or Buenos Aires, the distance to Singapore is shorter than from any port on the west coast of South America.
- Rio de Janeiro is the same distance from Hong Kong as Antofagasta, which is on the same latitude.
- In order to reach Los Angeles from Buenos Aires, the voyage is shorter through the Straits of Magellan than through the Panama Canal.
- Valparaíso appears to be closer to Singapore than Callao, but the straight-line route would pass very close to the Antarctic and would probably not be viable for most voyages.

TABLE 9

	Distances by sea						
	Panama	Singapore	Hong Kong	Yokohama	Los Angeles	New York	Hamburg
Los Angeles	2 912	7 867	6 380	4 839	0	4 930 via Panama	8 012 via Panama
Panama (Colón)	0	10 504	9 194	7 725	2 956	1 972	5 005
Buenaventura	395	10 375	9 317	7 681	3 047	2 369 via Panama	5 440 via Panama
Guayaquil	892	10 726	9 505	7 987	3 228	2 872 via Panama	5 947 via Panama
Callao	1 387	10 676	10 018	8 558	3 654	3 367 via Panama	6 442 via Panama
Antofagasta	2 178	10 524	10 532	9 154	4 433	4 158 via Panama	7 233 via Panama
Valparaíso/ San Antonio	2 858	9 945	10 532	9 280	4 806	4 638 via Panama	7 713 via Panama
Recife	3 217	8 934 via S. Africa	10 220 via S. Africa	10 942 via Panama	6 173 via Panama	3 698	4 450
Rio de Janeiro	4 289	8 863 via S. Africa	10 149 via S. Africa	11 517 via Straits of Magellan	7 245 via Panama	4 780	5 535
Santos	4 565	9 035 via S. Africa	10 321 via S. Africa	11 335 via Straits of Magellan	7 521 via Panama	4 955	5 710
Buenos Aires	5 390	9 301 via S. Africa	10 587 via S. Africa	10 647 via Straits of Magellan	7 243 via Straits of Magellan	5 910	6 665

Source: *Fairplay Ports Guide*, 1998.

- New York is closer to Callao and Valparaíso than Los Angeles. Economically, however, the distance is greater than the number of miles would indicate, because in order to reach New York it is necessary to pass through the Panama Canal.
- Colombia, Ecuador, Peru and even Chile are closer to Europe than to Asia.
- Carrying out a transshipment operation at Los Angeles when sending goods between Asia and the west coast of South America involves practically no increase in the total distance. Thus, travelling from Guayaquil to Singapore via Los Angeles involves a detour of only 3.5%, Callao-Hong Kong via Los Angeles increases the distance by less than 1%, and Valparaíso-Yokohama via Los Angeles involves a detour of less than 4%.

We thus see that, in terms of distances by sea, the Pacific coast of South America does not offer any comparative advantage for South America's trade with Asia, but in comparison with the Atlantic coast it does offer such an advantage for trade with North America.

### 3. Reserved cargo

Although the traditional cargo reservation practices which hindered maritime trade throughout the region up to the 1980s no longer exist, a number of bilateral accords are still in force which prevent international shipping companies from serving intra-regional trade and domestic cabotage.

Thus, the international shipping lines connecting Chile with Europe, North America and Asia call in at the main ports on the Pacific coast of South America, such as Callao, Guayaquil and Buenaventura, but a number of them cannot transport cargo between San Antonio (Chile) and Guayaquil (Ecuador) or between San Antonio and Buenaventura (Colombia). For example, Mitsui OSK does not even mention that its ships call at Guayaquil and Buenaventura in the announcements of its services published in Chile, because if a Chilean client wanted to use Mitsui OSK's services on that route he would be prohibited from doing so.

The same thing occurs inside countries too. In Chile, ships not flying the Chilean flag cannot transport cargo

from Valparaíso to Antofagasta or Iquique even if they have unused space available –which they usually do. The opposition to the opening up of cabotage comes mainly from the trade unions representing the workers of shipping companies and also road transport firms. Both groups are aware of the danger of losing jobs if domestic sea transport is opened up to lines that do not fly the Chilean flag and therefore do not have to employ Chilean crew either.

This reservation of cargo is also an obstacle to port development, since every container that leaves the port by land transport instead of by sea increases urban traffic congestion and reduces the number of port movements.

In short, the concentration of cargo at hub ports is made more difficult if international shipping companies are excluded from these services, which are also made more expensive by insisting on the use of a carrier of a specific nationality.

#### 4. Freight rates

Maritime freight rates, which fluctuate daily, depend on many factors, such as the type of product carried, the trade balances, the distance, the use of containers and the size thereof, the value of the goods, port productivity, and economies of scale. Table 10 shows the marine freight and insurance costs of the imports by sea of five South American countries, as recorded by the customs authorities. The disparities between the countries are largely explained by the different products imported. Thus, for example, Brazil imports large amounts of cereals from Argentina, which involve lower transport costs per ton than, for example, Argentina's imports of vehicles from Asia.

A more detailed econometric analysis which takes account of the different products, the distance, the value of the goods and the volumes involved shows that within a given group of products –fertilizers or vehicles, for example– every 1% increase in the volume means a re-

duction of 0.1-0.2% in the transport costs per ton, due to the use of bigger ships and more specialized port equipment. Since Brazil has larger import volumes, it is only natural that it should pay less for their transport.

Freight quotations obtained from shipping companies confirm that in early 2000 freight rates for the export of containers from the MERCOSUR countries were lower than the rates for Chile, Ecuador or Peru. The sales staff of the different companies all agreed that this is because on the east coast of South America there is more competition, bigger ships are used, and the cost per ship in each port is lower if it can be spread over a larger number of containers. According to Sgut (1999) “freight rates to the Far East and Australasia are 30% lower from the Atlantic coast than from the Pacific”. It should be noted, however, that the freight charged for each trade transaction depends on many different factors, and the fluctuations on the two coasts are not always similar.

In January 2000 the land freight between Buenos Aires and Valparaíso was US\$ 1,650 per 20-foot container. According to non-official information from three shipping companies and a cargo forwarding agent, in the same month the sea transport freight for FAK (Freight All Kinds) cargo from Asia, North America or Europe to South American ports was between US\$ 1,400 and US\$ 2,000, the rates to Atlantic ports being lower than those to ports on the Pacific. When the land freight rates are compared with the maritime ones, not much cargo can be expected to be sent from a capital on one side of South America for export from a port on the other side.

The interdependence of the freight rates in different markets may be seen if we examine the rates in force between Asia and the west coast of South America. According to the data given in table 7 above, there is a surplus in the container trade in favour of South America, so the export freight rates might be expected to be higher than those for imports, since there is a shortage of empty containers in South America. However, in January 2000 the rates for imports from Singapore were approximately 40% higher than those for exports from South America to Singapore. The reason for this is the heavy imbalance in the trade between the United States and Asia, which gives rise to an overall surplus of empty containers on the west coast of the Americas.

To sum up, the freight rates for South America's foreign trade by sea are in line with what might be expected from the volumes, balances and products involved in the South American countries' trade with other regions. Sea freight rates are much lower than the rates for land transport, and the freight rates for the Atlantic coast are currently lower than those for the Pacific.

TABLE 10

**South America (five countries):  
Freight and insurance costs of imports  
transported by sea or river, 1998**

Country	Difference between CIF and FOB values	
	% of FOB value	Dollars per ton
Argentina	6.5	56
Brazil	6.2	27
Chile	8.4	47
Peru	9.2	40
Uruguay	8.3	51

Source: ECLAC, 2000.

# V

## Ports and port traffic

### 1. Economies of scale

Port traffic costs are lower when the latest technology and best superstructure can be used. With increasingly high fixed costs and lower variable costs, an increase in volume leads to a reduction in the cost per container. This attracts additional cargo, and this in turn causes a reduction in unit costs, thus giving rise to a virtuous circle.

If we compare the Atlantic and Pacific coasts of South America, we see that the Atlantic coast has greater possibilities of obtaining economies of scale. In terms of tons of cargo moved, including cabotage (figure 4), the ports on the east coast transport five times more cargo than those on the west coast.

The port with the biggest volume of traffic in South America is Tubarão (Brazil), which mainly handles iron ore, while the port with the biggest volume on the Pacific is Balao (Ecuador), which mainly receives oil tankers. Of the 25 ports with the biggest volume of traffic in South America, 20 are on the Atlantic and only 5 on the Pacific (table 11).

In short, for liquid and solid bulk cargo the Atlantic ports have a comparative advantage because they move large volumes of cargo from their own hinterland and their unit costs tend to go down as a result of economies of scale.

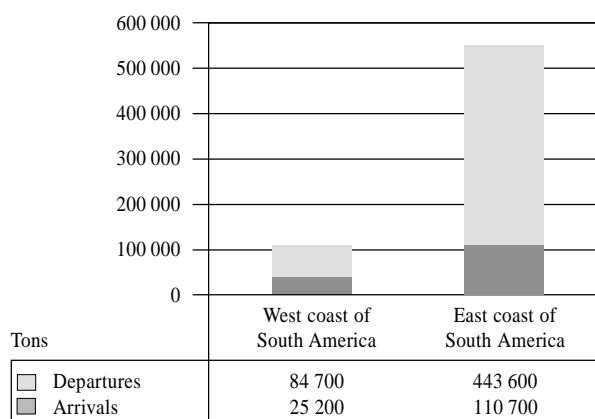
### 2. The danger of private monopolies

In South America, there has been a process of privatization of publicly-owned ports in recent years. Many specialized ports have always been privately owned, and new private ports are also being built.

This tendency towards greater participation by the private sector has created some fears that private monopolies may be established. Indeed, one of the main challenges in privatization is the need to keep a very close watch on these processes and avoid monopolistic abuses by the private sector after the State has ceased to operate the ports. Even if the ports are not privatized, however, there would still be the danger of public monopolies.

It is more difficult to avoid monopolies in the Pacific coast ports than in those on the Atlantic. Importers and exporters of many cities in Argentina and Brazil have easy access to several ports, whereas on the Pacific side there is usually access only to a single obvious port

FIGURE 4  
South America: Forecast of port movements  
in the year 2000  
(Tons)



Source: UNCTAD, 1999.

TABLE 11  
South America: The 25 main ports on  
the Atlantic and South Pacific, 1998<sup>a</sup>  
(Millions of metric tons)

Port	Volume
Tubarão (Brazil)	69.6
Itaqui (Brazil)	50.3
São Sebastião (Brazil)	42.4
Santos (Brazil)	24.9
Aratu (Brazil)	19.1
Paranagua (Brazil)	19.1
Buenos Aires (Argentina)	18.8
San Lorenzo (Argentina)	18.6
Angra dos Reis (Brazil)	18.4
Praia Mole (Brazil)	15.4
Bahía Blanca (Argentina)	14.8
Balao (Ecuador)	14.1
Rio de Janeiro (Brazil)	11.3
Belem (Brazil)	12.6
Ponta Ubu (Brazil)	11.7
São Francisco (Brazil)	11.2
Rio Grande (Brazil)	11.5
Rosario (Argentina)	11.4
Callao (Peru)	10.2
Caleta Olivia (Argentina)	8.6
Buenaventura (Colombia)	7.3
San Antonio (Chile)	7.4
Caleta Cord. (Argentina)	7.3
San Vicente (Chile)	7.0
Quequén (Argentina)	6.5

Source: ECLAC, 2000.

<sup>a</sup> This list does not include ports in Colombia and Venezuela on the north coast of South America.

(Buenaventura, Guayaquil or Callao, for example). The inter-port competition is greatest between the ports of Argentina, Brazil and Uruguay: there, exporters and importers have access to railways, good highways and even river transport, so that they have more options to choose between different ports. In Colombia, inter-port competition is weaker on the Pacific side, where Buenaventura is the dominant port, than on the Caribbean, where Cartagena, Barranquilla and a number of smaller ports compete strongly for local and transshipment cargo.

In Chile, the situation is not so difficult as in the other three countries on the west coast, as there is strong competition between San Antonio and Valparaíso. There is also competition between the public ports of the former EMPORCHI (Empresa Portuaria de Chile, dissolved in 1999) and the 100% private ports that exist, for example, in the Concepción area, and between established ports and those that are currently being built (between Antofagasta and Mejillones, for example).

The need to regulate ports after their privatization makes it more difficult for them to become hub ports. The main transshipment centres in Latin America and the Caribbean –the MIT port in Panama, Kingston in Jamaica, and Freeport in the Bahamas– keep the rates they charge their clients confidential, thus making the supervisory work of the State regulators more difficult.

If a port is divided up into several terminals which compete with each other, this creates intra-port competition and thus avoids private monopolies. On the other hand, however, the division of a port like Callao which handles relatively low volumes of goods would leave each operator with very little trade, and this could discourage major investments.

Port charges are different for local cargo and transshipment cargo: the latter is charged much less than cargo leaving the port by land transport. This partly reflects the lower costs, and also the greater elasticity of demand for transshipment services.

To sum up, freedom to set port charges that are in line with the needs of the market is much more important –in fact, it is indispensable– for transshipment centres than for ports that only handle local cargo. Such freedom is more difficult (though not impossible) to ensure in privatized public ports if the State is afraid that monopolistic abuses may arise, as in the case of the main ports of the Pacific coast in Colombia, Ecuador and Peru.

### 3. Physical and geographical aspects

Because of the form of the tectonic platform of South America and its relative shift to the west, the Pacific coast is steeply sloping and has very few bays. Building a breakwater on it costs much more than on other coasts, and this too limits the potential of many ports for growing into hub ports. One of the exceptions to this limitation would appear to be the port planned at Mejillones, in northern Chile.

Several of the main ports on the west coast are also limited in their future growth by the fact that they are located inside cities. One of the reasons why San Antonio has grown more than its main competitor, Valparaíso, is that it has better land links with Santiago and more room for expansion.

Finally, along the whole Pacific coast the growth of ports may be limited by the danger of earthquakes and tidal waves. Antofagasta and San Antonio, for example, have suffered serious damage in recent decades. Quays, breakwaters and buildings all cost more to build in earthquake-prone areas than in other regions. Furthermore, the cost of capital for investors is always higher if it has to include a premium to cover the risk of tidal waves.

We thus see that tectonic aspects, urban congestion and lack of space for expansion are factors that limit many western South American ports' possibilities of becoming hub ports.



## VI

### The hinterland

#### 1. The impact of the Andes

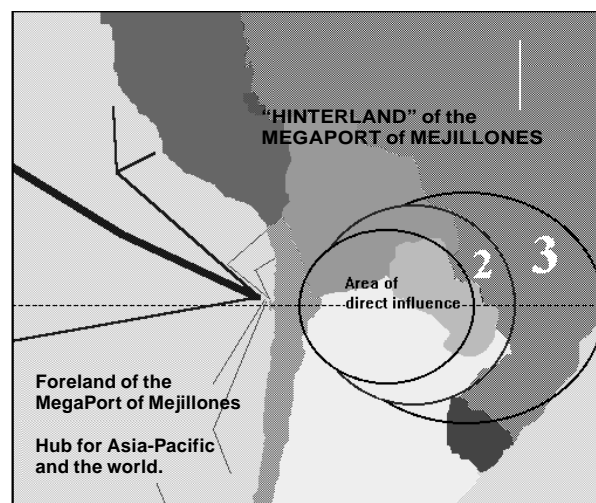
Above all in Chile and Peru, but also to some extent in Ecuador and Colombia, the mountain range of the Andes seriously impedes the possibility of attracting cargo from neighbouring South American countries. Transporting cargo for long distances by road –railways are not very important in the international trade of South America –and having to cross mountain passes 3,000 to 4,000 metres high would only be worth it if, on reaching the Pacific, the cost of this land transport was offset by other savings.

The proponents of new projects do not always seem to bear this in mind, as may be seen, for example, from the expectations expressed with respect to the hinterland of Mejillones (figure 5).

In a brief study on potential port privatization operations in Latin America (Hoffmann, 1997), it was considered that the impact of the Andes on trade between Chile and Argentina is equivalent to an additional distance of some 4,700 kilometres. In other words, although Chile and Argentina are neighbours, which in most parts of the world would mean greater bilateral trade, these two countries have a level of such trade that would normally correspond to countries separated by several thousand kilometres. This does not mean that crossing the Andes in a truck is as costly as travelling all those kilometres, but it does mean that, together, the impact of the closure of tunnels and passes in winter, the uncertainty about when they will be closed, the limited number of passes, the need to adjust motors for the great height, and the additional expenditure of energy has a negative effect on trade equal to a very long distance over level ground.

Improvements in the land transport infrastructure naturally help to reduce the negative impact of the Andes. Indeed, the current situation is not so extreme that no cargo from neighbouring countries passes through the ports of Colombia, Ecuador, Peru or Chile. Thus, fruit from western Argentina for the United States market already passes through Valparaíso and San Antonio. In 1999, 1.7% of San Antonio's total volume of cargo was to or from Argentina, while 0.6% was to or from other South American countries. The mineral products of northern Argentina and Bolivia can pass through Antofagasta

FIGURE 5  
Chile: Expectations regarding the hinterland of a hub port at Mejillones



**Direct area of influence:** Businesses would clearly choose the megaport of Mejillones.

**Area 2:** The megaport of Mejillones would offer clear advantages.

**Area 3:** This area would pose a challenge for the megaport of Mejillones.

Source: Schellmann, 1996.

or Mejillones, and much Bolivian trade already passes through Arica. The Iquique Free Zone has successfully specialized in imports from Asia and the United States for Bolivia and the MERCOSUR countries. Various other Chilean and Peruvian ports are also moving cargo for Bolivia and even Paraguay. Future growth in mining production in northern Argentina and western Bolivia could result in bigger volumes of cargo for the ports of northern Chile and southern Peru.

One of the obstacles that persists among various member countries of the Andean Community is the restriction of land transport services to hauliers of the individual countries in question, which makes it necessary to transfer cargo from one truck to another at the frontier.

Increasing the trade flows of neighbouring countries which pass through Chilean or Peruvian ports depends above all on improving the land transport infrastructure.

When projecting the impact of such improvements, however, it must be borne in mind that land transport connections are also being improved in Argentina and Brazil. In MERCOSUR, the railways have been privatized, the Paraná waterway is being dredged, and the road infrastructure in general is being improved with private and public investments. At the end of 1999, rail transport of a container between the Argentine cities of Mendoza and Buenos Aires cost US\$ 500, whereas transporting a container by road between Mendoza and Valparaíso cost between US\$ 500 and US\$ 800, depending on the weight (Cámara Marítima de Chile A.G., 1999). In other words, although Mendoza is three times as far from Buenos Aires as it is from Valparaíso, the transport to Buenos Aires costs less.

Sgut (1999) considers that projects for bioceanic corridors turn up on the desks of Ministers of Transport and subsequently of the heads of State themselves, and for political reasons these authorities are not in a position to reject any initiative of this kind outright, even if it is not economically feasible.

To sum up, South America is geographically divided by the second highest mountain range in the world, and this represents a disadvantage for ports on the west coast of that region which aspire to attract cargo from neighbouring countries.

## VII

### Concentration of cargo: a good idea, but where?

#### 1. By land or by sea

The cargo for a hub port can come from its hinterland, by land transport, or it can arrive by sea for transshipment in the port. We have seen that the possibilities for concentrating cargo by land on the west coast of South America are only limited. On a very long coastline, with cities close to the sea and a hinterland restricted by the Andes, it is difficult to follow the example of Rotterdam, Los Angeles and Hong Kong, or even of São Paulo or Buenos Aires on the east coast of South America.

At present, the main east-west corridor in South America is that connecting Valparaíso, Santiago, Mendoza and Buenos Aires. It is based on the bilateral trade between Argentina and Chile and has to cover a shorter distance than other corridors further north. For the areas of agricultural and mining production in west-

#### 2. Economic growth and local cargo

The ports on the Pacific coast of South America have some growth potential, based above all on domestic cargo and that of the nearby hinterland. Whether this cargo arrives at its destination by direct services or with a transshipment operation in a foreign country is of little importance for the port itself or for foreign trade.

In the long term, Latin America's economic growth is expected to be above the world average. In the shorter term, however, the prospects do not seem so promising, especially for Ecuador and Colombia. At all events, all the countries need efficient ports for their own trade.

The port operators who are potential investors in the ports being offered under concessions along the coast have also confirmed their interest in local cargo, sometimes called "captive cargo", in which they hope to do good business. The transshipment of containers, however, seems to them to be a risky and volatile business. Nor can they base their multi-million dollar investments on uncertain expectations of bulk cargo coming from neighbouring countries, which may or may not materialize once the land transport connections have been improved.

At present, much of the port traffic on the west coast of South America is due to the domestic trade of each country, and this will probably continue to be so in the future.

ern Argentina, it may be advantageous to use Chilean ports, especially for trade with the United States. However, there seems little reason to expect these transit flows through Chilean ports to change much in the future compared with their present levels.

The limitations on the concentration of cargo by land do not affect concentration by sea in transshipment centres. The trends observed in maritime transport mean that the percentage of containers transshipped at least once during their voyage is increasing. The question is whether this transshipment is to take place on the coast of South America or outside the region.

In short, it is unlikely that ports on the west coast of South America will be able to concentrate large volumes of cargo transported by land. Containerized cargo leaving by sea may pass through transshipment centres, but these may not necessarily be located in South America.

## 2. Outside South America

In a study commissioned for the Mejillones port project in northern Chile, it was estimated that there could be as much as 8 million tons of containerized cargo for transshipment at that port, near Antofagasta. Even if that figure is feasible, however, the location does not seem to be appropriate. At the moment, a large transshipment centre on the west coast of South America would not appear to be viable.

On voyages to Europe and the east coast of North America, transshipment in Panama, Jamaica or at Freeport (Bahamas) involves hardly any detour from the main north-south route. These ports have bigger volumes of cargo of their own and are located on the intersections of various east-west and north-south routes.

For voyages to Asia, transshipment in Panama or Los Angeles involves a detour of between zero and five per cent (see table 9 above). Los Angeles/Long Beach is one of the three main container ports in the world. The largest types of ships sail daily from it for Asia, and ships from South America can pick up or discharge cargo to and from North America there.

Among world orders for gantry cranes, there are almost none from ports on the west coast of South America. As at the beginning of 1999, Latin America and the Caribbean together accounted for 12% of world orders for such cranes (a total of 161). This percentage is higher than the figure that would correspond to the region in the light of its port traffic in containers and reflects the modernization processes that were under way in this respect in that year in Central America, the Caribbean and MERCOSUR. On the Pacific coast, only Buenaventura had orders for gantry cranes pending. If suitable investment and expansion programmes were carried out in terms of dredging, provision of cranes and more space for containers at the main ports along the coast, they could probably attract regular services with bigger ships that would eventually not need their own cranes. This would reduce the transport costs for the foreign trade of all the South American countries on the Pacific coast, regardless of whether or not the cargo in question was transshipped in countries outside the region.

The MIT port, on the Caribbean side of Panama, is one of the ports whose transshipment traffic has grown most in recent years, and it is expected to keep on growing. An increase of the volume of such traffic is also expected at Balboa, on the Pacific side, where operations were recently begun with the aim of attracting such traffic, and there are also other projects for the construction of new ports which will compete with Balboa on

that side of the country. A concession has also just been granted for the operation of the railway that connects ports on the two sides of Panama, thus making possible transshipment operations between the two oceans. All these advances, together with the great advantage of having the Panama Canal, suggest that the role of Panamanian ports as transshipment centres will continue to grow in importance. These ports are better placed than the South American ports to connect regional markets such as Central America, the Caribbean subregion and the west coast of South America with the main east-west routes.

In short, in view of the tendencies observed in maritime transport and a future situation like that shown in figure 3, it may be expected that there will be an increase in the proportion of container movements by sea that involve one or more transshipment operations. However, these operations will take place at ports which have a bigger volume of traffic and are located closer to the main east-west trade routes, such as Los Angeles, the MIT port in Panama, Kingston (Jamaica) or Freeport (Bahamas).

## 3. On the west coast of South America

The viability of transshipment operations at some ports on the west coast of South America should not be ruled out altogether: as may be seen from table 6, for example, 6% of the movement of containers at Callao already consists of transshipment operations.

If cabotage services were liberalized and the reservation of cargo for national carriers between various countries on that coast were ended, it would be easier for the international lines themselves to establish their own feeder services. At the same time, such liberalization would also make direct services more efficient, because a line could make better use of its idle capacity by collecting cargo along the coast to help fill its ships.

The investments planned for the next few years in the ports of Colombia, Ecuador, Peru and Chile will make it more feasible to use bigger container ships, even possibly without their own cranes. At present, however, the main Chilean shipping company, Compañía Sudamericana de Vapores (CSAV), has on order several 3,100 TEU ships with their own cranes for handling containers, which indicates that it does not consider that the cranes planned in the ports are adequate. These ships are suitable for long trips, with relatively high volumes of cargo. Hub ports on the west coast of South America would require smaller ships with their own cranes, subsequently developing to serve larger ships with lower costs per TEU and a faster turnaround in port, which would necessarily mean using ships without cranes of their own

and carrying out transshipment operations with the port's cranes.

If some day there is greater concentration of containerized cargo on the west coast of South America, Callao would probably be the most suitable port for becoming a transshipment centre. Although this is unlikely, shipping lines could then have an incentive to stop sailing half-empty to Valparaíso and San Antonio. If Peru's economic growth were as fast or faster than that of Chile, Peru's larger population would make it possible (although not probable) in the long term for Callao to have a bigger volume of port traffic than Valparaíso and San Antonio together. In that case, thanks to economies of scale,

port charges could be lower and importers and exporters would have more frequent sailings on regular services at their disposal. As Callao is north of Chile, the detour from the main east-west route would be smaller.

To sum up, the viability of transshipment activities at some ports on the west coast of South America should not be ruled out altogether. The port with the biggest possibilities of carrying out these operations could be Callao. However, San Antonio and Valparaíso have better possibilities for attracting cargo from a broader hinterland, including Argentina, and could thus continue to justify direct services that do not pass through a transshipment centre in Peru.

## VIII

### Summary and conclusions

The decisions to use one mode of transport or another, to pass through one port or another, or to use services with or without transshipment are mainly taken on the basis of business considerations. The public sector must concern itself with the location of hub ports, however, because these require both private and public investments and it is the public sector which defines the conditions for private-sector participation in such ports.

A country's external trade is closely linked with its geographical location, the transport services that cover the distances to markets, and the ports through which that trade passes. This gives rise to "an interesting vein for public-private association, since the private sector should be responsible for management and contribute the resources for financing the necessary investments, while the State should establish a transparent legal framework which permits competition, as well as adopting a long-term approach which seamlessly links the port with its environment and its area of influence" (Lagos, 1997). It is therefore crucial to make an in-depth analysis of the types of transport services that the different trade flows require and the present and potential area of influence of the country's ports.

In all the countries on the Pacific coast of South America there are aspirations to develop hub ports, the idea being to concentrate cargo by land and sea from the country itself and its neighbours. These aspirations have led to extensive public investment programmes in port and land transport infrastructure and have also directly influenced the conditions laid down for port privatization processes.

The main conclusion of the present study is that the potential for hub ports on the Pacific coast of South America is very limited. This conclusion is based on an analysis of the trade of the South American countries; an examination of the situation of hub ports that exist in other regions of the world; an analysis of regular sea transport lines and the journey distances and freight rates involved and, finally, a study of the volumes of port traffic and the possibilities of attracting cargo from a broader hinterland. The results of these analyses are as follows:

i) After Australia, South America is the region with the least transshipment traffic. At present, the total movement of containers and the percentage of transshipment traffic within that total are lower than in other regions. South America has a share of only 0.5% in world transshipment traffic.

ii) The fundamental factors for a hub port are its location and the volume of cargo from its hinterland. In order to become a hub port, a port must have ample land transport connections, be located in an area where maritime routes connect or cross, or have high volumes of cargo generated in the area around the port. None of these conditions exist on the west coast of South America to the extent that they exist in the case of other hub ports already operating in the world.

iii) In the South American countries, the regular sea transport services primarily reflect the needs of each country's own trade. Because of the larger volumes of trade through the Atlantic ports of South America, the ports on that coast have more services, with bigger ships

and more frequent sailings, than on the Pacific coast. The greater relative importance of services to Europe from the east coast and to North America from the west coast corresponds to the external trade with those regions.

iv) The shipping services from Argentina, Brazil and Uruguay have advantages over the services sailing from ports on the west coast of South America. The countries on the east coast of South America have twice as many ports, with 56% more regular services that have more frequent departures and use bigger ships, and each regular service moves 35% more containers. The ports on the Atlantic coast move five times more cargo than those on the Pacific, and the sea freight rates are lower. These advantages are the result of the bigger volumes of trade of the MERCOSUR countries and should in no way be interpreted as a criticism of the ports or the port and maritime policies of any South American country. At all events, however, these differences mean that an exporter who has equally easy access to ports on both coasts will find various advantages if he opts for a port on the east coast.

v) Their geographical location gives the Pacific countries an advantage over those on the Atlantic in trade with North America. This is because of the sea distances involved and also the fact that most of the services linking the Pacific coast of South America with Europe and Asia automatically call in at North American ports. A detour via Los Angeles during a voyage from Chile, Colombia, Ecuador or Peru to Japan, Hong Kong or Singapore only involves a 1% to 5% increase in the distance travelled.

vi) Their geographical location is a disadvantage for the Pacific countries in trade with Europe, however. The distances from ports on the same latitude are much shorter in the case of the eastern coast of South America, and moreover the ships do not have to pass through the Panama Canal.

vii) Overall, their geographical location does not give the countries on the Pacific any advantage in trade with Asia. Yokohama (Japan) is closer to the Pacific countries, Hong Kong is the same distance from both coasts of South America, and Singapore is closer to Argentina, Brazil and Uruguay. Maritime services from Santos or Buenos Aires to Asia pass by South Africa and Sri Lanka. Services sailing from the west coast do, however, have the advantage of being able to connect in Los Angeles with services between North America and Asia, thus allowing them to take advantage of the bigger ships and more frequent sailings on that route. In other words, the only advantage of the ports of Chile, Ecuador and Peru in trade with Asia is the possibility of connecting with a transshipment centre outside South America.

viii) The hinterland of the Pacific ports is restricted by the Andes mountains, whose negative impact on bilateral trade is equivalent to an extra distance of several thousand kilometres of flat terrain. Transporting a container from Mendoza in western Argentina to Buenos Aires costs less than transporting it by road to San Antonio (Chile), although Buenos Aires is three times further. At the present time the main Pacific ports register very low percentages of transit traffic, and these trade flows are not expected to change much in the future.

ix) There will be no hub ports in western South America. Even if there were an adequate land transport infrastructure, on the maritime side there are not sufficient reasons to justify a bigger concentration of cargo transported by land in the Pacific ports. Although in general the use of containers and the percentage of transshipment operations is increasing, the transshipment centres for cargo from the western South American countries are outside the region, in the Bahamas, the United States, Jamaica and Panama.

These conclusions must seem pessimistic, and may be a disappointment to those who believe or believed in new possibilities of generating income and employment through the sale of port services to neighbouring countries. In no case, however, are we suggesting that investments should not be made in transport infrastructure or that ports should not continue to be modernized and privatized. On the contrary, the disadvantages described in this article should be seen as an incentive to make renewed efforts to improve transport services.

The idea of offering transport services for neighbouring countries' trade in itself reflects a very positive change of attitude. Up to a few years ago, countries sought to prevent the products of other countries from gaining in competitiveness through the use of their ports. However, it is not possible to forcibly influence the decisions of shipping companies or other suppliers of transport services to concentrate cargo in a particular place. The physical and administrative obstacles that prevent transport companies from finding the most cost-effective solutions for their clients can and must be reduced. Improvements in land transport infrastructure, the liberalization of cabotage, whether by land or sea, and the reduction of delays at border passes would directly benefit those wishing to import from or export to other regions.

Such advances would also benefit trade among the South American countries. Over half of the volume (in tons) of South American imports comes from within Latin America and the Caribbean (ECLAC, 2000). Furthermore, in recent years this intra-regional trade has grown more than interregional commerce. Investments in bioceanic

corridors designed to connect countries with hub ports that concentrate intercontinental cargo would appear to be less promising than investments in intra-regional trade corridors connecting the main economic centres of the region with each other.

In the past, countries competed in external trade by trying to prevent neighbouring countries from gaining benefits by using their ports. Today, however, countries are seeking to compete for the possibility of handling their neighbours' exports or imports. In itself, this competition is positive, but in many cases it has been raised

to a political level which has turned simple competition between ports into an international struggle between hypothetical future hub ports. In view of the limited likelihood that the establishment of such ports will be a success on the west coast, perhaps it would be better to seek greater regional coordination of transport policies and infrastructure investments in order to promote integration between the countries on the Atlantic and Pacific coasts of South America.

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