

## Chapter 4

### Regulation of ports in Mexico

*Mexico has 117 ports and terminals that handled 288 million tonnes of goods in 2013. Four ports are considered to be national hubs: Manzanillo, Lazaro Cardenas, Altamira and Veracruz. The SCT has the legal attributions to granting concessions, permits and authorisations for building, establishing, administrating, operating and exploiting works and goods in ports, maritime terminals and port installations. Challenges include: to develop an integrated logistics strategy for the main four Mexican ports to increase the volume of containers that could be carried on railroads; to increase port efficiency by: establish a dedicated areas free of border controls for coastal shipping; to introduce a specific regime to facilitate transshipment; to open customs and other inspection agencies more often 24 hours per day; to develop policies to simplify port gate operations; and to consider opening up the maritime cabotage market.*

## Overview of ports in Mexico

### *Market organisation*

Mexico has 117 ports and terminals that handled 289 million tonnes of goods in 2013—102 ports and 15 terminals outside ports. And 74 of these facilities are either under the administration of subnational governments or by the private sector, while 32 are administrated by the federal government. From those 74 facilities administrated by an API, in 32 of them, the concessionaire is a legal firm owned by the federal government as the largest stakeholder; in 36 APIs the control is exerted by a regional government, 3 by the National Fund of Tourism and one by private capital, see Table 4.1.

According to Article VII of the Law of Ports (*Ley de Puertos, LP*) in 1993, the federal government may create state-owned limited companies to which the concessions could be assigned. There is no legal mandate stating whether or when these concessions would be transferred to private entities.

Table 4.1. **Ports of Mexico and their administrative structure**

No.	Federal APIs	State APIs	FONATUR	Private
1	Altamira	Baja California Sur	Huatulco	Acapulco
2	Coatzacoalcos	Campeche	Zihuatanejo	
3	Chiapas	Quintana Roo	Los Cabos	
4	Dos Bocas	Tabasco		
5	Ensenada	Tamaulipas		
6	Guaymas			
7	Manzanillo			
8	Mazatlán			
9	Lázaro Cárdenas			
10	Progreso			
11	Vallarta			
12	Salina Cruz			
13	Tampico			
14	Tuxpan			
15	Topolobampo			
16	Veracruz			

Source: OECD elaboration.

The most important ports are administered by 16 APIs, 9 of which are on the Pacific Coast and 7 on the Gulf Coast (see Table 4.1). Of these 16 ports, 4 are considered to be national hubs: Manzanillo and Lazaro Cardenas on the Pacific Coast and Altamira and Veracruz on the Gulf Coast. These four national ports are the largest in terms of tonnage if petroleum is excluded (see Table 4.2). A large share of the cargo in Mexico is handled by a few ports inside the country, which indicates a more concentrated activity compared to similar sized countries, despite the large number of ports and terminals in Mexico. A precise measure of concentration would require a market definition approach but in such case, the probable result would be on the same direction. This concentration is particularly visible in containerised cargo and oil products. Approximately, 95% of the

total container volume of 4.9 million TEUs is handled in four hub ports (Table 4.3). Comparable concentration tendencies are apparent in the oil terminals where the four top oil ports and terminals account for 74% of the volume. Considering that their maritime forelands and terrestrial hinterlands are hardly overlapping, these ports can be considered to have a quasi-controlling position with respect to oil. For container traffic a concentration tendency is more limited as Manzanillo, Lázaro Cárdenas, and Veracruz all compete to serve the very large market of Mexico City. Monterrey, the second major market, is however, dependent on Altamira. Competition between terminals inside the port is particularly important, considering the fairly concentrated nature of the ports in Mexico. As seen in Table 4.2, in case oil is included, the largest port in Mexico is Cayo Arcas, an off-shore oil terminal owned by Petróleos Mexicanos (PEMEX), a Mexican state-owned company.

Table 4.2. Overview of main federal ports in Mexico

Name of port	State location	Coast location	Type	Nearest ports
Altamira	Tamaulipas (North of Mexico)	Gulf of Mexico	Hub Port	Tampico
Coatzacoalcos	Veracruz	Gulf of Mexico	Regional Port	Veracruz, Dos Bocas
Dos Bocas	Tabasco (Southeast of Mexico)	Gulf of Mexico	Regional Port	Coatzacoalcos
Ensenada	Baja California (Northeast of Mexico)	Pacific Coast	Regional Port	Guaymas
Guaymas	Sonora (Northeast of Mexico)	California Gulf	Regional Port	Topolobampo, Ensenada
Lázaro Cárdenas	Michoacán	Pacific Coast	Hub Port	Manzanillo
Manzanillo	Colima	Pacific Coast	Hub Port	Lázaro Cárdenas, Puerto Vallarta
Mazatlán	Sinaloa	Pacific Coast	Regional Port	Puerto Vallarta, Topolobampo
Progreso	Yucatán (Southeast of Mexico)	Gulf of Mexico	Regional Port	Dos Bocas
Puerto Chiapas	Chiapas (South of Mexico)	Pacific Coast	Regional Port	Salinas Cruz
Puerto Vallarta	Jalisco	Pacific Coast	Regional Port	Manzanillo, Mazatlán
Salina Cruz	Oaxaca (South of Mexico)	Pacific Coast	Regional Port	Puerto Chiapas
Tampico	Tamaulipas (Northeast of Mexico)	Gulf of Mexico	Regional Port	Altamira, Tuxpan
Topolobampo	Sinaloa (Northeast of Mexico)	California Gulf	Regional Port	Guaymas, Mazatlán
Tuxpan	Veracruz	Gulf of Mexico	Regional Port	Tampico, Veracruz
Veracruz	Veracruz	Gulf of Mexico	Hub Port	Tuxpan, Dos Bocas

Source: Ministry of Communications and Transport (SCT).

A large share of the cargo in Mexico is handled by a few ports inside the country, which indicates a more concentrated activity compared to similar sized countries, despite the large number of ports and terminals in Mexico.

Table 4.3. The top 10 ports in Mexico in 2015

Port	Tonnes (incl. oil)	% of total	Port	Tonnes (excl. oil)	% of total
Coatzacoalcos	30 250 853	10.44%	Manzanillo	25 243 881	15.16%
Cayo Arcas	29 838 800	10.30%	Lázaro Cárdenas	23 681 785	14.22%
Manzanillo	27 998 504	9.67%	Veracruz	21 423 898	12.87%
Lázaro Cárdenas	26 430 356	9.12%	Altamira	18 038 940	10.83%
Veracruz	23 157 615	7.99%	Isla de Cedros	15 283 901	9.18%
Dos Bocas	22 290 449	7.69%	Punta Venado	12 996 494	7.80%
Altamira	18 038 940	6.23%	Guerrero Negro	7 720 025	4.64%
Isla de Cedros	15 283 901	5.28%	Coatzacoalcos	6 007 921	3.61%
Salina Cruz	13 814 960	4.77%	Guaymas	5 274 962	3.17%
Tuxpan	13 288 420	4.59%	Topolobampo	3 799 567	2.28%

*Source:* OECD elaboration based on data from the Ministry of Communications and Transport (SCT). The data included in the table came from the *Informe Estadístico Mensual: Movimiento de Carga, Buques y Pasajeros*. At the moment of this draft, statistics have been published until August 2016. This table has been updated up to December 2015 for two reasons: comparability with other figures in the chapter and to grasp the dynamics of a whole year in the Ports System. The following link shows the latest set of available statistics:

[www.sct.gob.mx/fileadmin/CGPMM/U\\_DGP/estadisticas/2015/Mensuales/12\\_diciembre\\_2015.pdf](http://www.sct.gob.mx/fileadmin/CGPMM/U_DGP/estadisticas/2015/Mensuales/12_diciembre_2015.pdf)

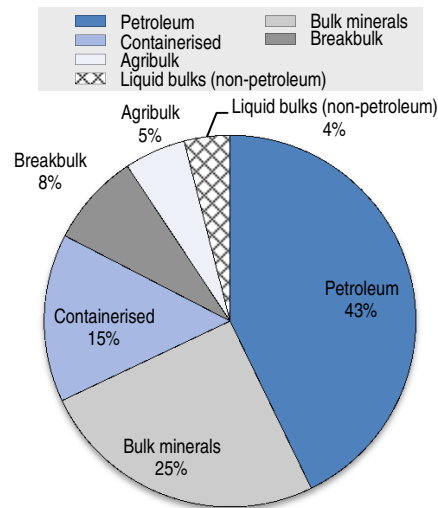
Table 4.4. The top 10 container and oil ports in Mexico

Port	Container (TEUs)	% of total	Port	Oil volume (tonnes)	% of total
Manzanillo	2 136 157	43.3%	Cayo Arcas	47 944 077	39.1%
Lazaro Cardenas	1 051 183	21.5%	Coatzacoalcos	18 625 413	15.2%
Veracruz	866 966	17.7%	Salina Cruz	12 929 555	10.5%
Altamira	597 760	12.2%	Tuxpan	10 959 279	8.9%
Ensenada	131 054	2.7%	Dos Bocas	7 660 759	6.2%
Progreso	64 928	1.3%	Tampico	5 520 165	4.5%
Mazatlan	28 094	0.6%	Rosarito	2 547 415	2.1%
Guaymas	8 370	0.2%	Topolobampo	2 205 767	1.8%
Puerto Morelos	7 271	0.1%	Guaymas	2 191 372	1.8%
Puerto Chiapas	762	0.0%	Lazaro Cardenas	1 987 705	1.6%

*Source:* OECD elaborations based on data from the Ministry of Communications and Transport.

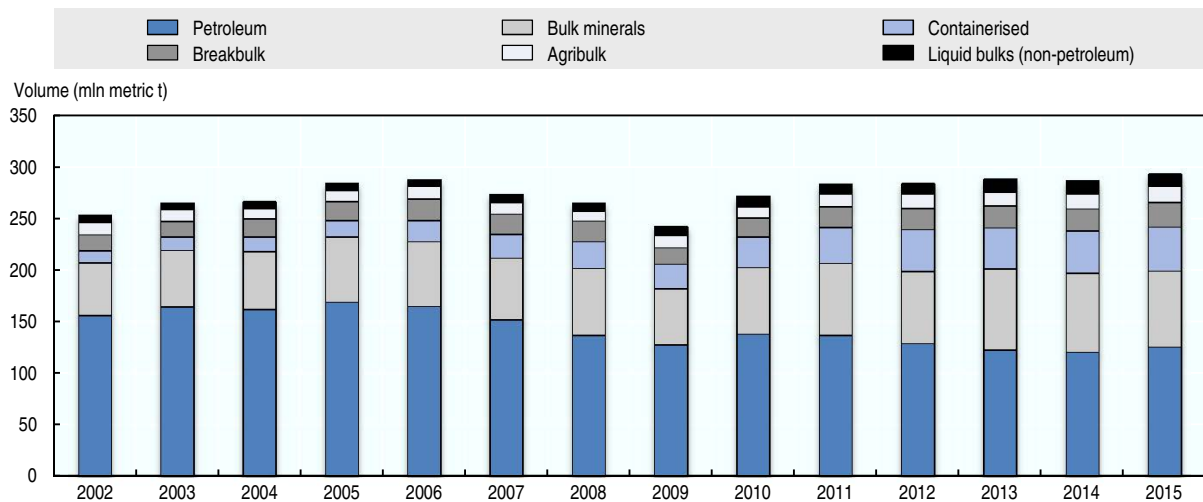
The cargo mix of Mexican ports is dominated by petroleum (43% of the total tonnage), followed by bulk minerals (27%) and containerised cargo which represented 14% of the total tonnage of Mexican ports in 2013 (Figure 4.1). The last decade has seen, however, significant changes in the cargo categories: the share of petroleum in the total port cargo has declined from 61.5% in 2002 to 42.5% in 2013, whereas the shares of both, bulk minerals and containerised cargo have increased in the same period. Cargo in minerals increased 7 points from 20.3% to 27.2% and containers from 4.7% to 13.9%. The other cargo types remained relatively stable (Figure 4.2).

Figure 4.1. Cargo mix of Mexican ports 2015



Source: Elaboration of the OECD Secretariat based on data from the Ministry of Communications and Transport.

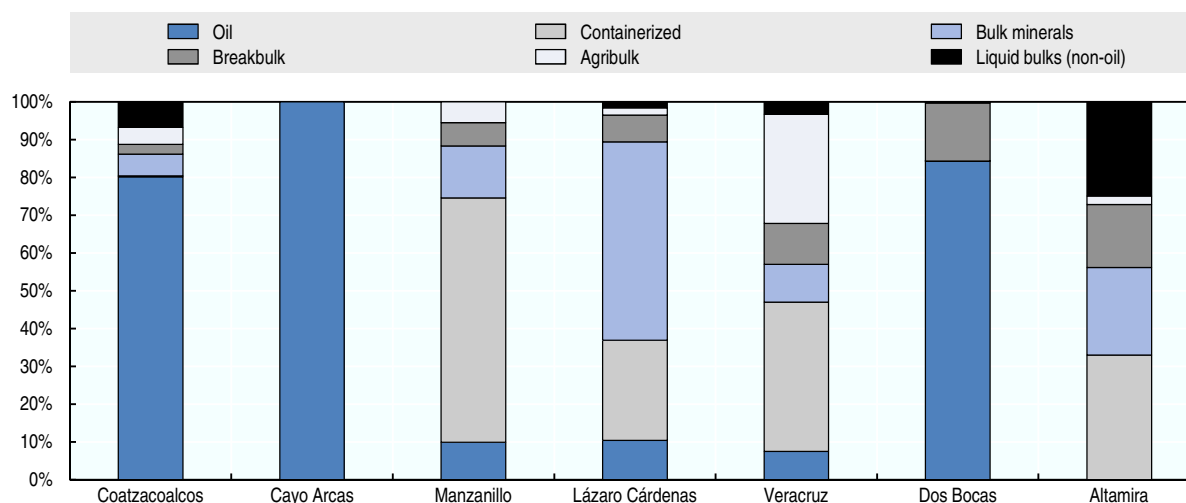
Figure 4.2. Cargo mix of Mexican ports 2002-2015



Source: Elaboration of the OECD Secretariat based on data from the Ministry of Communications and Transport.

There are few ports in Mexico that resemble this average cargo mix (Figure 4.3), due to port specialisation. Some of the largest ports in Mexico are specialised in oil (Cayo Arcas, Coatzacoalcos, Dos Bocas)). The main four non-oil specialised hub ports have different profiles with respect to their cargo mix, with pre-dominance of container traffic, representing between 26% of tonnage in Lázaro Cárdenas to 65% in Manzanillo. The exception is Lázaro Cardenas, where minerals form the largest cargo type, taking up 52.5% of total tonnage. The cargo type for which most of the competition takes place is in the container sector. As the section on Port Competition (below) indicates, the four main container ports have hinterlands that overlap to some extent, in particular Mexico City.

Figure 4.3. Cargo mix of seven largest ports in Mexico (2015)



Source: Elaboration of the OECD Secretariat based on data from the Ministry of Communications and Transport.

Coastal shipping represented around 25% in 2015 of the total volume transported by maritime transport in Mexico; this is down from 30% in 1996. Imports and exports from domestic coastal shipping are – per definition – in balance; for international shipping in 2015, exports dominate with 119 million tonnes handled, compared to 98 million tonnes for imports from international shipping.

According to statistics of the SCT regarding supply services in regular maritime transportation between Mexico and the world in 2009, there were arrivals from 82 shipping companies in national ports in 2009. These companies had operations in 11 ports in the Gulf of Mexico, in which Veracruz port stands out as it had the presence of 37 shippers. On the Pacific coast there were arrivals of 30 shipping lines in ten ports, in which Manzanillo port stands out with 22 ship liners. As shown in Table 4.5, the most important ports in terms of the number of shipping lines are Veracruz, Altamira, Cayo Arcas, Dos Bocas and Pajaritos all from the Gulf of Mexico coast and Manzanillo in sixth place with 22 of the Pacific coast. Regarding daily services, in 2009 the port with more services on average was Pajaritos with 6.7, followed by Dos Bocas (5.7), Cayo Arcas (5.6) and Veracruz (4.2) in the Gulf side and Manzanillo on the pacific side with 4.0. It is worth mentioning that Dos Bocas and Cayo Arcas are two of the most important petroleum ports in the country.

As shown in Table 4.6, in 2009 the highest number of shipping lines was concentrated in the routes between Mexico and North America with 64 lines, which also had the highest daily average of services with 11.2, but the second lowest number of destinies with 43, just above Oceania with 18 destinies. It stands out that the largest number of destinies goes to Asia with 194 through 25 shipping lines that make 3.2 services every day on average. Central and South America and Europe also had an important number of destinies with 113 and 106 respectively, with 44 and 25 shipping lines. In summary, lines that transport to North American destinies would face more competitive pressure because of the largest number of lines. On the contrary, Oceania and Africa would face lower competitive pressures from the point of view of the number of participants in the market.

Table 4.5. Shipping lines by port in Mexico in 2009

Gulf of Mexico			Pacific		
Port	Shipping line	Average daily service	Port	Shipping line	Average daily service
Tampico	19	2	Ensenada	12	1.8
Altamira	31	3.8	La Paz	2	0.5
Tuxpan	11	1.7	Guaymas	2	1.3
Veracruz	37	4.2	Topolobambo	2	1.3
Coatzacoalcos	5	0.8	Mazatlán	5	0.8
Dos Bocas	25	5.7	Manzanillo	22	4.0
Cayo Arcas	27	5.6	Lázaro Cárdenas	10	1.6
Pajaritos	25	6.7	Acapulco	1	0.3
Cd. del Carmen	2	0.5	Salina Cruz	8	3
Progreso	6	1.9	Puerto Madero	2	0.4
Puerto Morelos	3	0.6			
<b>Total</b>	<b>191</b>		<b>Total</b>	<b>66</b>	

Source: Ministry of Communications and Transport (SCT).

Table 4.6. Ship arrivals in national ports on regular services in 2009

Ship liner services	Total of shipping lines	Daily average services	Total monthly average	Destinies
Mexico-North America	64	11.2	335	43
Mexico-Central, South America and the Caribbean	44	5.4	163	113
Mexico-Africa	13	1.5	45	58
Mexico-Asia	25	3.2	97	194
Mexico-Europe	25	2.6	79	106
Mexico-Oceania	10	1.4	41	18

Source: Ministry of Communications and Transport (SCT).

### Port organisation

Ports in Mexico are relatively specialised, which means that a limited number of ports dominate the traffic of different cargo categories, as illustrated in Table 4.4 for containerised cargo and oil. Ports compete with each other if they have overlapping hinterlands and forelands. For three of the four main container ports in Mexico the main port hinterland is the metropolitan area of Mexico City (Table 4.7). Considering that Veracruz is on the Gulf Coast, unlike Manzanillo and Lazaro Cardenas, it has a completely different maritime foreland that is difficult to replicate for the two other ports. Rail concessions were structured and designed to ensure competition between the ports in the rail container and intermodal markets; this objective however, should be assessed in order to know to what degree the objective has been achieved.

Table 4.7. Mexico City as container port hinterland in 2007

Port	Flows to/from Mexico City (in mln TEUs)	% of TEUs destined to Mexico City
Manzanillo	0.72	51%
Veracruz	0.54	74%
Lazaro Cardenas	0.19	71%
Altamira	0.10	25%

Source: Elaborations based on Peyrelongue and Martinez (2011) and data from Ministry of Communications and Transport.

The geographic limitation on inter-port competition would be compensated to some extent by intra-port competition. The main ports in Mexico all have concession agreements and contracts with private terminal operators that handle services for the different cargo categories. This would provide competitive pressures, especially for terminals with similar cargo types such as containers. For instance, several of the largest global terminal operators are active in the main Mexican ports and compete with each other for cargo, especially in the container sector (see Table 4.8).

Table 4.8. Global terminal operators in Mexican ports

Global terminal operator	Port	Terminal	Cargo type
Hutchison Port Holdings (HPH)	Manzanillo	Terminal Internacional de Manzanillo (TIMSA)	Containers
	Lazaro Cardenas	Lazaro Cardenas Terminal Portuaria de Contenedores (LCT)	Containers
	Veracruz	Internacional de Contenedores Asociados de Veracruz (ICAVE)	Containers
	Ensenada	Ensenada International Terminal (EIT)	Cont. & bulk
APM Terminals	Lazaro Cardenas		Containers
SSA	Lazaro Cardenas		RoRo
	Manzanillo		Containers
	Veracruz		Multipurpose
	Acapulco		Cars
ICTSI	Manzanillo	Contecon Manzanillo	Containers

Source: Elaborations of the OECD Secretariat based on data from terminal operators.

One of the areas where port competition is played out is in port hinterland connections. As Table 4.8 shows, many of the global terminal operators are present in the ports that compete with each other, in particular Lazaro Cardenas and Manzanillo, indicating the competition between the terminals of HPH, APMT, SSA and ICTSI. It is reasonable to assume that the knowledge transfer from global terminal operators such as HPH and SSA, benefits terminals in both ports (Lazaro Cardenas and Manzanillo), so one would expect that the main differences between the ports will not be so much with respect to terminal operations. However, these ports differ in their connections to freight rail. Although all major ports in Mexico are connected to rail lines, the way that freight rail is organised in Mexico implies that major ports have a different rail company taking care of the cargo service. For instance, Ferromex is the rail company that serves the port of Manzanillo to Mexico City, KCSM for is the firm connecting the port of Lazaro Cardenas and Mexico City (ITF, 2014), see Table 4.9.



Table 4.9. Port-railway connections in Mexico

Firm	Kilometres of lines	Ports covered	Border cities covered <sup>2</sup>	Inland cities covered
Kansas City Southern de México (KCSM)	4 283	Lázaro Cárdenas (Pacific)	Matamoros (United States)	Mexico City
		Veracruz (Gulf of Mexico)	Nuevo Laredo (United States)	Hermosillo
Ferrocarril Mexicano (Ferromex) <sup>1</sup>	8 643	Matamoros (Gulf of Mexico)	Mexicali (United States)	Guadalajara
		Guaymas (Pacific)		Irapuato
		Manzanillo (Pacific)		Silao
				Puebla
				Monterrey
				Torreón
				Chihuahua
				Puebla
				Mexico City
				Querétaro
Línea Coahuila Durango	974	Altamira (Gulf of Mexico)	Piedras Negras (United States)	Irapuato
		Guaymas		Tepic
		Topolobampo	Mexicali (United States)	Guadalajara
		Mazatlán	Nogales (United States)	Chihuahua
		Tampico (Gulf of Mexico)	Ojinaga (United States)	Los Mochis
		Manzanillo	El Paso (United States)	Culiacán
		Coatzacoalcos (Gulf of Mexico)	Ciudad Juárez (United States)	Hermosillo
		Veracruz (Gulf of Mexico)		Saltillo
				Monterrey
				Torreón
Ferrocarril y Terminal del Valle de México	297			Aguascalientes
				Colima
Compañía de Ferrocarriles Chiapas-Mayab	1 550	Villahermosa (Gulf of Mexico)		Sabinas
		Coatzacoalcos (Gulf of Mexico)		Barroterán
		Progreso (Gulf of Mexico)		Ciudad Frontera
		Puerto Madero (Pacific)		Escalón
		Salina Cruz (Pacific)		Torreón
Ferrocarril del Istmo de Tehuantepec	219	Salina Cruz (Pacific)		Felipe Pescador
				Durango
Administradora de la vía corta Tijuana- Tecate	71		Tijuana (United States)	Tecate

1. Including the lines of Ferrosur, due to its merge.

2. Parenthesis on the “Border cities covered” column states the country that the city has a border with.

Source: Ministry of Communications and Transport of Mexico.

### *Hinterland connections*

The lack of capacity of hinterland connections is a widely-recognised issue and infrastructure expansion is well underway in several ports and critical links. Ports are clearly identified as critical nodes in the logistic infrastructure of the country and, as it is often the case, road connections appear more developed than rail. Several sections of the road, however, need to be upgraded and as cargo volume increases, it is likely that road congestion will become an issue. While there seems to be substantial efforts carried out by the government to improve the quality of the infrastructure, some issues appear which require further attention: in particular, the favouring of the growth of intermodal nodes, the prioritisation of infrastructure needs, and the involvement of the private sector in the financing of road and rail infrastructure.

An important consequence of the current structure of Mexican hinterland transport is that major ports act as gateway to specific areas or corridors in the country, with limited competition being allowed by the current network structure, Mexico City being the exception as it is served by various ports. While in the United States or in Europe, ports on major ranges compete for cargo as the hinterland is competitive, the more limited development of transport infrastructure in Mexico implies that the captive hinterland of some of the ports is substantial. While the road network connects major nodes, distances and the quality of infrastructure in the end leaves transport service providers with only a few alternatives.

The national development plan has the objective of providing an infrastructure investment strategy so as to resolve some of the bottlenecks in the country. Table 4.10 displays the assessment of the government on the current access to major ports of the country, as described in the national transport programme (*Programa Sectorial de Transportes y Comunicaciones 2013-2018*). With the exception of Veracruz, Lazaro Cardenas and Guaymas, all other ports have infrastructural issues that need to be resolved. Even in those cases where infrastructure is indicated as in good state, the rapid growth of transport volumes will create new bottlenecks. One of the main policy challenges remains prioritisation.

On the Gulf of Mexico, the ports of Altamira and Tampico appear to have sufficient connections, although the access by rail could be improved. Veracruz seems to have effective connectivity in terms of rail and road and adequate intermodal capabilities, although the railway access to the port by the two competing railway companies could be improved. Other ports, however, such as Progreso are poorly connected. The port of Dos Bocas, although mostly focusing on liquid bulk cargo, does not have adequate hinterland connections. Coatzacoalcos is one of the few cases where rail connectivity appears better than road accessibility. The port, however, is not one of the main gateways to the major production areas in the country.

On the Pacific side only Lazaro Cardenas and Guaymas appear to have good connectivity on multiple modes. Mazatlan and Ensenada lack both road and rail connections, while the ports of Topolobampo and Puerto Chiapas have good connections by road and are niche ports in terms of hinterland and cargo. The port of Salina Cruz, on the other side of the Tehuantepec isthmus as Coatzacoalcos, has a similar good connection by rail and poor road connectivity.

Infrastructural needs are being addressed with a large number of projects, both related to the port infrastructure (Altamira and Veracruz), road (new road Mazatlan-Durango, Salina Cruz and Coatzacoalcos, Tuxpan), rail (new tunnel in Manzanillo, Lazaro Cardenas) or logistics (new logistics zone in Progreso).

Table 4.10. Connectivity of the port system to rail and road networks in Mexico (2012)

Name of port	Coast location	Direct access to highway	Connectivity to rail	Intermodal terminal
Altamira	Gulf of Mexico	In good shape	Difficult or deficient connexion	In good shape
Coatzacoalcos	Gulf of Mexico	Non existent	In good shape	In good shape
Dos Bocas	Gulf of Mexico	Non existent	Non existent	Non existent
Ensenada	Pacific Coast	Difficult or deficient connexion	Non existent	Non existent
Guaymas	California Gulf	In good shape	In good shape	In good shape
Lázaro Cárdenas	Pacific Coast	In good shape	In good shape	In good shape
Manzanillo	Pacific Coast	Difficult or deficient connexion	Difficult or deficient connexion	In good shape
Mazatlán	Pacific Coast	Non existent	Difficult or deficient connexion	Non existent
Progreso	Gulf of Mexico	Non existent	Non existent	Non existent
Puerto Chiapas	Pacific Coast	In good shape	Difficult or deficient connexion	Non existent
Salina Cruz	Pacific Coast	Non existent	In good shape	In good shape
Tampico	Gulf of Mexico	Difficult or deficient connexion	Difficult or deficient connexion	In good shape
Topolobamo	California Gulf	In good shape	Difficult or deficient connexion	Non existent
Tuxpan	Gulf of Mexico	Difficult or deficient connexion	Non existent	Non existent
Veracruz	Gulf of Mexico	In good shape	In good shape	In good shape

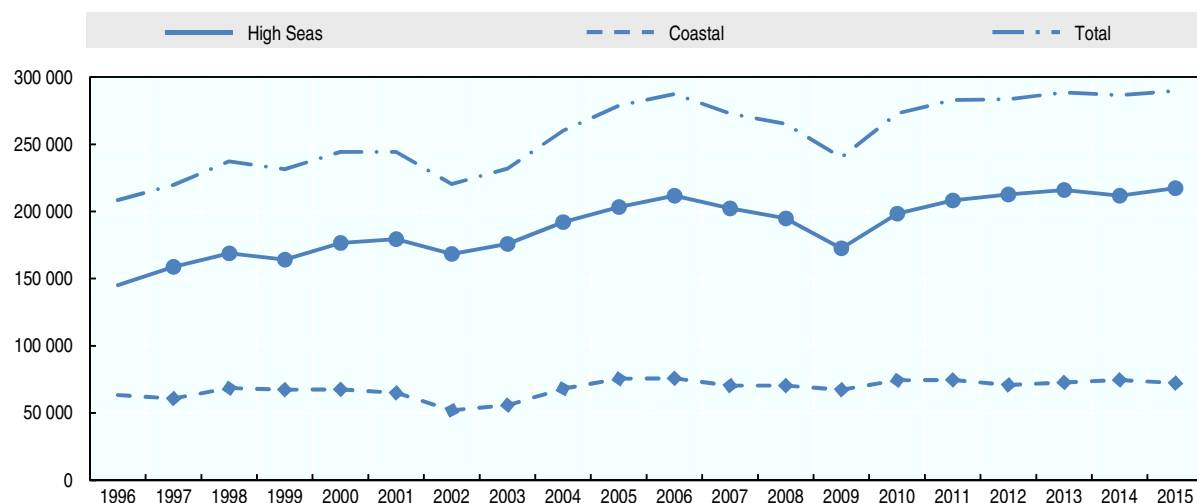
Source: OECD elaboration based on the Sector Program Communications and Transport, SCT (*Programa Sectorial de Comunicaciones y Transportes*, SCT) 2013-18, p. 41, 2012.

### ***Economic performance***

Maritime transport accounted for around 30% of the total freight volume in Mexico over 1995-2013. In 1996 maritime freight represented approximately 208 million tonnes; in 2015 it was 290 million tonnes, which represented an increase of 39% in the whole period and an annual average increase rate of 1.65%. In relative terms, the proportion of the maritime transportation increased from 30.7% of the total transport of freight to 31.9%, which meant an increase of 3.9% points over the 20-year period.

As shown in Figure 4.4, high seas transportation increased from 145.1 million tonnes in 1996 to 217.4 million in 2015: a total increase of 49.8% at an annual rate of 2.04%. Coastal trade performance was more modest, going from 63.5 million tonnes to 72.3 million in the same period with a global increase of 13.9% and an annual rate of 0.65%. In fact, coastal trade has presented a decreasing pattern since 1996 in relative terms: it accounted in 1996 for 30.4% of the total freight and in 2015 the share was 25%.

Figure 4.4. Maritime transportation in tonnes in Mexico (thousands)

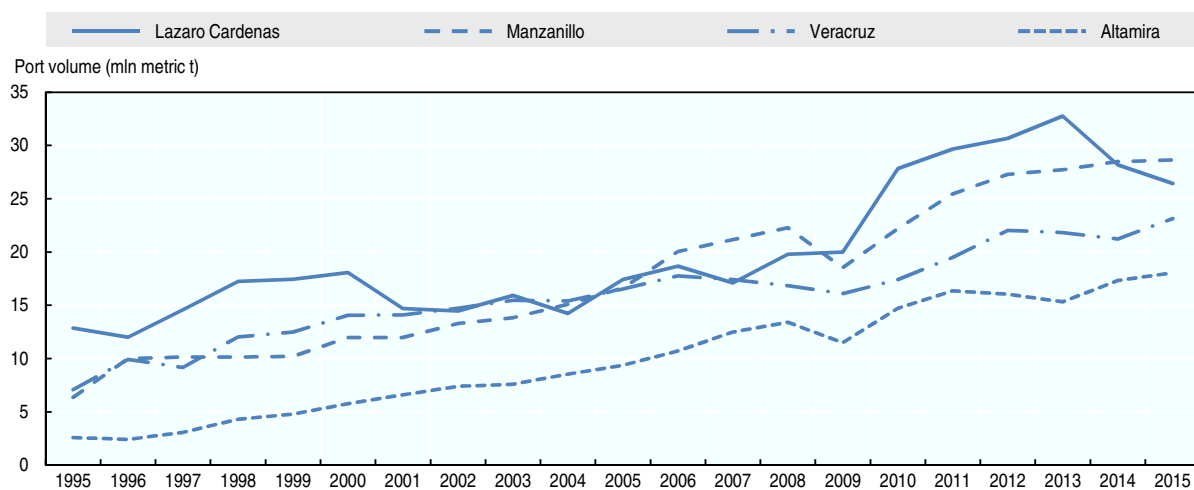


Source: Banco de Información Económica, INEGI.

A comparison of the increase of the economic value added of maritime transportation in real terms versus freight transported from 1996 to 2013, shows that value added in maritime transport had an annual average increase of 3.2%, 1.3 percentage points higher than the pace of total freight, and 0.9 points more than maritime transport volumes. Maritime transport accounted for 6.39 million passengers in 1996 and 13.68 million in 2015, an increase of 114% in the whole period and an average yearly increase of 3.88%.

Maritime transport flows showed a predominance of exports at the end of 2015, representing approximately 120 million tonnes, whereas imports represent around 98 million tonnes. Imports via shipping have increased at an average annual rate of 6.8% over 1996-2013 and the exports at an average rate of 0.7%. During this period export flows were fairly volatile, with growth dips in 1999, 2002 and 2009—imports have also shown similar trends but with less overall impact. In the case of coastal trade, imports and exports have shown almost the same pattern.

Figure 4.5. Growth paths main ports 1995-2013

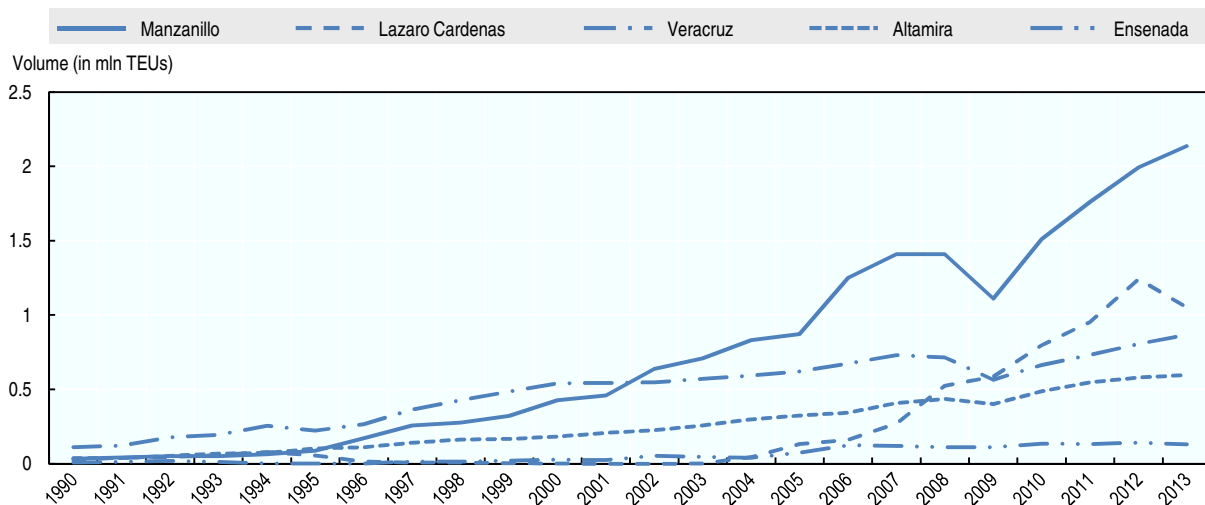


Source: Elaborations of the OECD Secretariat based on data from the Ministry of Communications and Transport.

The largest Mexican ports showed average growth annual rates during 2002-2013 ranged from 3.53% in Veracruz, 4.75% in Lázaro Cárdenas, 6.07% in Manzanillo and the highest rate in Altamira, with 7.10%. Excluding Lázaro Cárdenas (3.67%), long-term growth rates were higher, considering the period 1995-2015: Veracruz (6.11%), Manzanillo (7.80%) and Altamira (10.19%) (Figure 4.5).

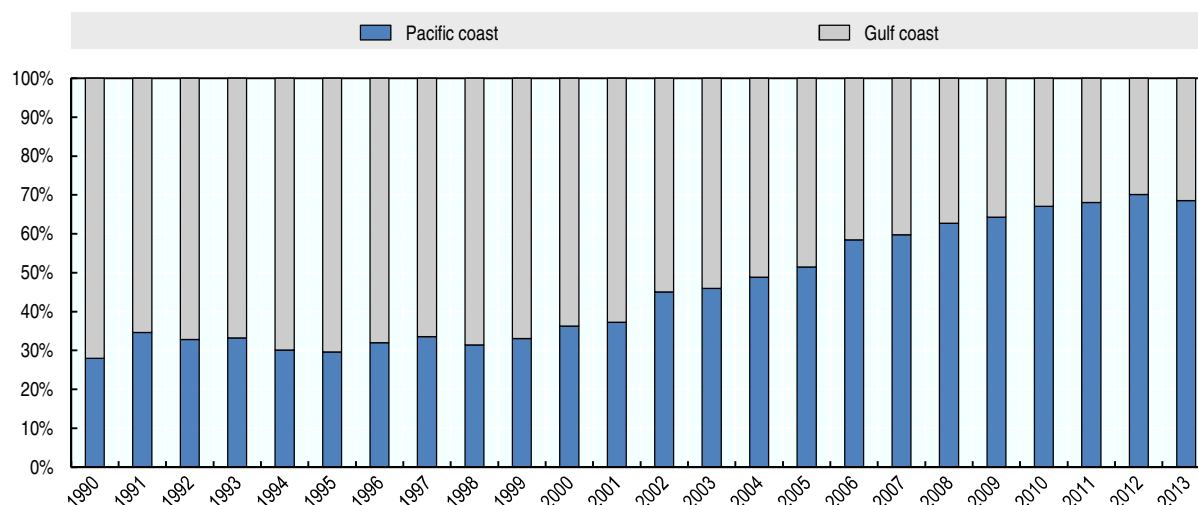
The main driver of port growth in Mexico is containerisation. The top-five container ports in 1990 handled 0.21 million Twenty-foot Equivalent Unit (TEUs) and 4.88 million TEUs in 2013. Although container growth increased in the 1990s, higher growth rates in container handling happened from 2000, with average annual growth rates of 13.1% in Manzanillo, 13% in Ensenada and 9.6% in Altamira (Figure 4.6). Container traffic in Lazaro Cardenas was almost inexistent in 2000, but it had grown until 1 million TEUs in 2013. In comparison, growth rates over the same period in Veracruz were relatively slow (3.7%), but this port had seen huge container growth in the 1990s. In Figure 4.6, it can be observed that the growth rates of Lázaro Cárdenas and Manzanillo rose rapidly since the 2000s, outpacing the rates of Veracruz and Altamira. This may be related to increasing trade relations of Mexico with emerging Asian markets, which caused a higher demand of Pacific Coast shipping points. Another reason is the emergence of Manzanillo and Lázaro Cárdenas as transshipment hubs: in 2013, 44% of the containers handled in Manzanillo and 41% in Lázaro Cárdenas were transshipment. Considering the rapid increases of container ship size, and the constraints of the current Panama Canal, increases in trade flows with Asia have benefitted the Pacific ports. The share of Pacific ports in total Mexican container handling rose from 28% in 1990 to 69% in 2013 (Figure 4.7). There have been container port concentration tendencies at the Gulf coast, where ports like Tuxpan and Coatzacoalcos have dropped out the container business, flows which have been absorbed by Veracruz (Martner, 2002).

Figure 4.6. Growth paths main container ports in Mexico 1990-2013



Source: Elaboration of the OECD Secretariat based on data from the Ministry of Communications and Transport.

Figure 4.7. Distribution of container handling by type of ports in Mexico 1990-2013

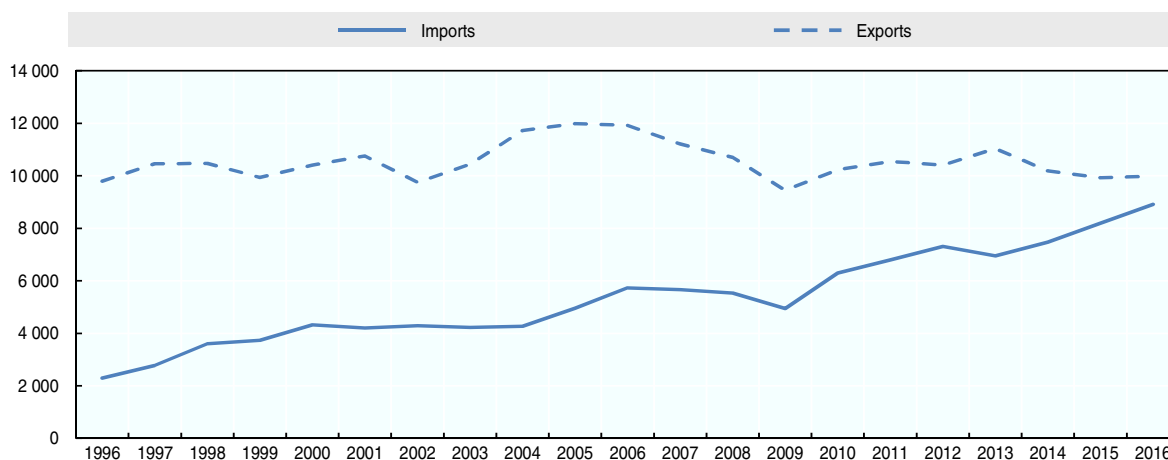


Source: Elaboration of the OECD Secretariat based on data from the Ministry of Communications and Transport.

Determinants of the port growth rates—and port competitiveness in a wider sense—are mainly the performance in maritime forelands and operations within the port, and hinterland connectivity. The performance on these aspects will be assessed in the next section using the following key performance metrics: maritime connectivity, ship turnaround time, port efficiency, cargo release time, and facilities and access.

As it can be observed in Figure 4.8, the volume of exports of high seas has seen a growth far superior than the imports. During 2016 (up to July, the last available figure), the imports average volume has accounted for 8 910 thousands of tonnes, while the exports figure has been 9 976 thousands of tonnes. The growth dynamic has seen a dramatic shift, since in 1996 the imports level were 2 294 thousands of tonnes while the exports levels were 9 800. This translates into an average annual growth from 1996 to 2015 for the imports of 6.93%, while the exports rate has a rate of only 0.07%.

Figure 4.8. High ports commerce in Mexico



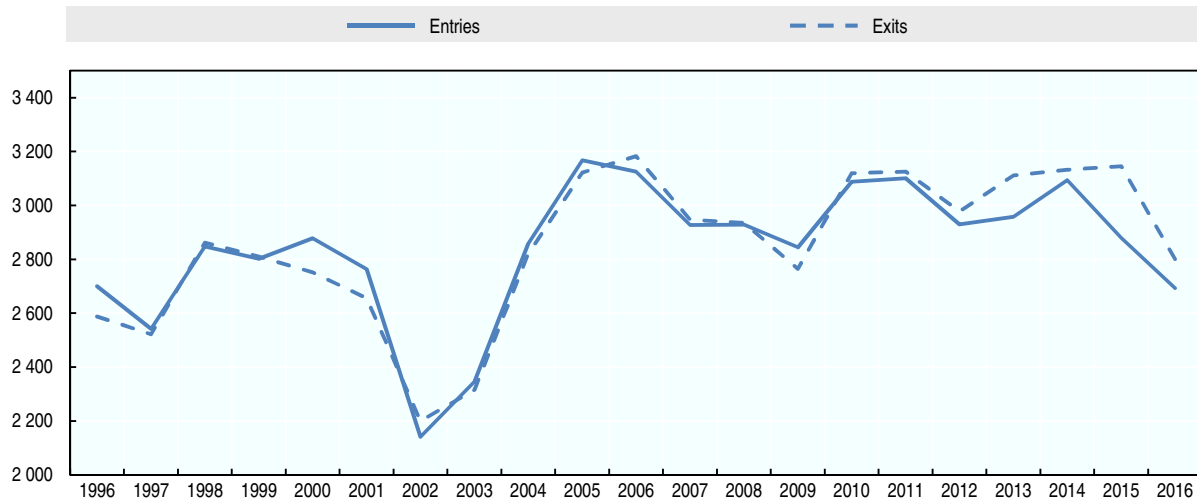
Notes: The figure shows yearly averages of the monthly data presented by INEGI. For the year 2016, the average was constructed with information from January to July. Units: thousands of tonnes.

Source: Bank of Economic Information, INEGI.

The cabotage market is smaller in terms of tonnes moved in ports, as in October of 2015 the volume of entries was 2 693 thousands of tonnes and 2 801 for exits. This market has been rather static in comparison with the High Ports market (see Figure 4.9). The annual average growth rate from 1996 to 2015 of both the entries (0.34%), and the exits (1.03%).

Figure 4.9. **Cabotage commerce**

Thousands of tonnes



Note: The graphs are yearly averages of the monthly data presented by INEGI. For the year 2016, the average was constructed with information from January to July.

Source: Bank of Economic Information, INEGI.

### **Regulatory framework**

The General Coordination of Ports and Merchant Navy (CGPMN), dependent of the SCT, has by law, the authority on regulation and administration of Ports and Merchant Navy. Created in 1993, the LP and its by-law (*Reglamento*) are the main source of port regulation. For merchant navy the general principles are in the Law of Navigation and Maritime Commerce (*Ley de Navegación y Comercio Marítimo*, LNCM) and its by-law.

As established in the LP, every activity related to the port administration, operation and services is under supervision of the federal government, who also has the obligation to establish and make ports operational.<sup>1</sup> Other relevant legal faculties of the SCT regarding port policies include the promotion and conduction of policies and programmes for the development of the national port system; the promotion of the private industry and subnational governments to exploit the ports, its terminals and installations; the authorisation of deep sea navigation terminals of private use. In matters of construction and operation, the SCT has the legal attributions to: granting concessions, permits and authorisations; build, establishing, administrating, operating and exploiting works and goods in ports, maritime terminals and port installations.<sup>2</sup>

The LP defines ports and terminals given its navigation, installations and services nature. Depending on its navigation, ports may be *deep sea navigation*, which refers to ports handling vessels that cater for people or goods within national and international ports; whereas *cabotage* refers to vessels only moving within national ports. The installation and services classification divides ports into commercial, industrial, fishing, and touristic categories.

#### **Box 4.1. Legal attributions of the Ministry of Communications and Transport of Mexico on merchant navy**

1. The planning and conducting the policies and programmes for the development of transport by water and Merchant Navy.
2. Intervene in the International Treaty negotiations in maritime issues.
3. Organise, promote and regulate the formation and capacitation of the Navy Merchant personnel.
4. Integrate the statistical information of the merchant fleet, transport and water related accidents.
5. Champion and registering vessels and Mexican naval craft and developing National Maritime Public Registry.
6. Granting navigation permits and authorisations for lending services in general waterways, as well as competency certificates.
7. Granting concessions for the construction, operation and exploitation of waterways.
8. Regulate and oversee that waterways comply with the general conditions of safety and maritime signalling
9. Regulate and oversee the security of the navigation and human life at sea.
10. Organize, regulate and if applicable give service of assistance for the navigation, maritime radio communication and maritime transit control.
11. Establish and organize a vigilance, security and distress body for the navigation of interior waters.
12. Regulate and oversee that the pilotage service is being given in a secure and efficient way.
13. Conducting inspections and certifying Mexican vessels, the compliance of International Treaties, national legislation, by-laws, official Mexican normative in matters of navigation safety, and prevention of marine contamination due to vessels.
14. Conducting inspections on foreign vessels with regard to International Treaties.
15. Granting and supervising authorisations of inspections to physical persons to verify and certificate the compliance of international treaties and national legislation.
16. Establishing basis for regulating tariffs in the provision of maritime services in national territory
17. Request for the intervention of the Ministry of Economy when there may be existence of international trade practices that break the national legislation in foreign trade.
18. Conducting investigation and relevant actions as well as designating experts in matters of maritime regulation and issue opinions on maritime, river and lake accidents.
19. Helping within its faculties the labour authority for the compliance of the maritime conflicts resolution on labour nature.
20. Requesting the intervention of the Competition Commission when there may be practices breaking the Federal Economic Competition Law.
21. Imposing sanctions for breaking the Merchant Navy and Maritime Commerce Law and International Treaties.

*Source:* OECD elaboration with information from the Law of Navigation and Maritime Commerce.



The SCT may establish basis for tariff regulation when competition issues may arise.<sup>3</sup> This tariff regulation can be applied for services such as port infrastructure, general freight and container handle services, storage services, pilotage, amongst others. The LP also establishes the definition and faculties of the API. According to Article 38, when the entire administration, planning, programming and development activities of the port administration are entitled to a private business they can become an API, having autonomy on its operational and financial management. This legal figure may manage – with the proper concession specifications – more than one terminal, installation and, or port within the same state.

On Merchant Navy issues, the federal government, through the SCT has the faculties indicated in Box 4.1.

As stated in Box 4.1 the maritime regulator is in charge of inspections and certifying that Mexican vessels and navy artefacts comply with the national legislation and international treaties. On doing so, the Law also states that the inspection procedures have to be made by personnel authorised by the SCT. The SCT has a non-transferable obligation of supervising the inspection services for vessels.

On terms of Foreign Investment related to the maritime industry, the Law of Foreign Investment (*Ley de Inversión Extranjera*, LIE) states that foreign investment can participate up to 49% of shares in the following port services: Pilotage, towing, mooring, bunkering, electric power supply, refuse collection, services for handling goods. Those limits according to the article cannot be circumvented through trusts, agreements or any other mechanism. However, a share larger than 49% of foreign investment is possible in other port services than the ones mentioned above, provided that this is authorised by the Foreign Investment Commission.

## Maritime issues

As it was mentioned before, the main regulation of ports comes from the LP and its by-law. According to Article 21 of this Law, only Mexican companies can hold concessions for the API administration. The law also considers concessions outside the API administration over assets of public domain, including the construction, operation and exploit of terminals, shores and port facilities and permits to provide port services – as in the case of APIs these concessions will be granted only to Mexican citizens and firms. Meanwhile, Article 20 of the LP states that inside the ports the APIs can also transfer rights or grant specific services contracts to other firms or agents in order to supply port services. Cruises terminal concessionaires can sign contracts with third parties if the concessionaires have the authorisation of the SCT.

### *Maritime connectivity*

Maritime connectivity of ports and their place in global port networks can be quantified with three different measures: *degree centrality*, *betweenness centrality* and *clustering coefficients*. The first two indicators indicate gateway characteristics whereas the cluster coefficient reveals hub characteristics. Degree centrality expresses the number of adjacent neighbours of a node; it is the simplest and most commonly accepted measure of centrality. It often correlates with total traffic (more connections imply more traffic). Betweenness centrality expresses the number of shortest paths going through each node. The clustering coefficient estimates whether the adjacent neighbours of a node are connected to each other (i.e. “my friends are also friends”), thus forming triangles

(triplets); the coefficient is the ratio between the number of observed triplets and the maximum possible number of triplets connecting a given node. The ratio goes from 0 (no triplets observed) to 1 (all neighbours connected).

When it comes to hub-functions in a transport system, in theory the "pure hub" will have a clustering coefficient near zero because it serves as a pivotal platform redistributing flows to/from satellite platforms (spokes) which are only connected to the hub (star-shaped network). Conversely, values close to 1 depict a denser pattern with more many transversal (and thus less hierarchical) links.

In a maritime network, transshipment hubs should have low clustering coefficients as opposed to other configurations where links are more evenly distributed among ports (e.g. absence of hubs such as in the Baltic Sea or in the United States). The different port hub-measures are related, but also complementary to each other. Very central nodes (high betweenness centrality) often act as hubs (low clustering coefficient) and it is common to observe a high correlation between degree centrality and betweenness centrality due to the physical constraint of coastlines for circulation. In some cases such as relay and remote hubs, some nodes can have higher betweenness centrality than degree centrality, i.e. they are very central globally but have only a few links locally. This is because they act as "bridge" between sub-components of the network, such as Anchorage in the global network of air freight being a bridge between Asia and North America.

We have calculated these three different measures for a set of 2 177 world ports and their connections in 2011, assessing both absolute values and ranking amongst world ports. Results for Mexican ports are summarised in Table 4.11.

Table 4.11. **Connectivity of ports in Mexico and their place in global port networks**

Port	CC score	CC rang	BC score	BC rang	DC score	DC rang
Altamira	0.284	186	7 731	217	127	123
Coatzacoalcos	0.299	234	2 686	471	71	339
Veracruz	0.315	281	3 337	417	95	221
Manzanillo	0.315	282	9 896	172	101	188
Lazaro Cardenas	0.324	312	9 862	174	77	307
Cayo Arcas	0.351	409	1 876	536	44	572
Tuxpan	0.445	741	787	726	41	630
Salina Cruz	0.458	781	145	1 088	16	1146
Tampico	0.507	969	267	973	27	844
Guaymas	0.600	1 227	2	1 592	6	1 626
Topolobampo	0.603	1 254	143	1 092	13	1 265
Mazatlan	0.639	1 320	22	1 390	9	1 438
Progreso	0.665	1 354	301	944	26	863
LAC Benchmarks						
Santos	0.187	27	54 779	22	216	29
Buenos Aires	0.322	304	19 245	90	96	212
San Antonio	0.323	310	5 145	297	75	318
Buenaventura	0.308	264	8 926	197	72	331
Puerto Limon	0.471	834	2 175	504	63	403

Note: CC: Cluster coefficient; BC: betweenness centrality; DC: degree centrality.

Source: Calculations and elaborations of the OECD Secretariat based on data from Lloyd's Marine Intelligence Unit (LMIU).

The overall picture that emerges from this assessment is the confirmation that the four ports in Mexico that are considered as national hub ports by the SCT, namely Manzanillo, Veracruz, Lazaro Cardenas and Altamira, do indeed score highest on gateway and hub characteristics. It is remarkable the strong hub characteristics of Altamira, the smallest of the four ports. Coatzacoalcos also obtains high scores with respect to hub characteristics. The scores of the main four ports are more and less in line with their peer ports in the LAC region with the exception of the port of Santos in Brazil that has substantially more hub and gateway characteristics than any of the Mexican ports. Not included in this assessment are main transshipment hubs in Central America and the Caribbean, such as Kingston (Jamaica), Colon and Balboa (Panama) that score higher on hub characteristics. Mexican ports hardly have any transshipment traffic due to cabotage legislations, which allows foreign ocean-going vessels only to carry empty containers between Mexican ports, not full containers, which evidently limits the possibilities for transshipment and coastal shipping

### ***Ship turnaround time***

The ship turnaround times in ports in Mexico are generally in line with those in United States and Canada; however, some Central American countries have ports with lower ship turnaround times. This can be concluded from ITF/OECD work on ship turnaround times, based on detailed calculations of vessel movements (Ducruet et al., 2014; ITF/OECD, 2015).<sup>4</sup> The main Mexican ports score generally well on ship turnaround times in their container terminals, that ranged from 0.6 days in Altamira to 1.2 days in Manzanillo in 2011. Those represents better scores than those of the main LAC benchmarks, such as Santos, Buenos Aires, San Antonia and Buenaventura (Table 4.12). The score of Altamira has to be nuanced considering that the average container ship called there has much lower capacity, so it is reasonable that its ship turnaround time is lower. With respect to the bulk terminals, the assessment is more mixed and varied. The best score in this respect was 2 days turnaround times in Topolobampo in 2011, up to 4.9 days in Veracruz, which represent both lower and higher scores than those of the main LAC benchmarks. The turnaround time for oil terminals ranges from 1.5 days in Coatzacoalcos to 4.5 days in Cayo Arcas, but this difference could possibly be explained by large differences in the ship sizes calling the two ports. Newly released data on 2014 shows that container ship turnaround times in Altamira and Manzanillo remained stable, that the score of Lazaro Cardenas improved to 0.5 days and that the score of Veracruz went up to 0.8 days.

A related performance metric is berth productivity as measured by the Journal of Commerce (JOC) JOC Group. It is the average container movements per ship, per hour on container ships. In the 2013 ranking, there was one Mexican port in the top 10 for the Americas, namely Lazaro Cardenas, ranked 4th with 82 container movements per ship per hour. The first place in that ranking is the port of Balboa (Panama). However, it has to be mentioned that the average scores in the Americas are lagging those of Europe and particularly those of Asia; Tianjin, the top port in Asia reaches a score of 130. In terms of terminals, there is one Mexican terminal in the top 10 for the Americas, the *Lazaro Cardenas Terminal Portuaria de Contenedores*, ranked 9th (JOC Group, 2014). Other container terminals in Mexico have ship productivity rates that are comparable with this last terminal, e.g. HPH reported a rate of 100 moves per ship per hour for its terminal in Veracruz. Data from SCT (in particular the General Coordination of Ports and Merchant Marine) roughly confirm the data indicated above, indicating a score of 94 container moves per ship per hour in the port of Lazaro Cardenas in 2013, increasing to a score of

111 over January-September 2014 for Lazaro Cardenas, with a score of 82 for the port of Veracruz.

Table 4.12. Average ship turnaround times in days in Mexican ports (2011)

Port	Containers	Bulk carriers	Crude oil tankers
Altamira	0.6	2.3	-
Lazaro Cardenas	0.7	3.5	-
Veracruz	0.7	4.9	-
Manzanillo	1.2	3.0	-
Coatzacoalcos	-	4.1	1.5
Cayo Arcas	-	-	4.5
Tampico	-	4.0	-
Topolobampo	-	2.0	-
LAC Benchmarks			
Santos (Brazil)	1.0	3.2	
Buenos Aires (Argentina)	1.4	-	
San Antonio (Chile)	1.0	3.5	
Buenaventura (Colombia)	1.0	3.7	
Sao Sebastiao (Brazil)			1.9
San Lorenzo (Argentina)		2.4	

Source: Calculations and elaborations of the OECD Secretariat based on data from Lloyd's Marine Intelligence Unit (LMIU).

### *Coastal shipping*

Coastal shipping in Mexican waters as a general rule is reserved to Mexican ship-owners with Mexican vessels. If there are no Mexican-flagged vessels available, foreign flagged vessels may engage in cabotage trade under temporary permits<sup>5</sup> granted by the SCT.<sup>6</sup> According to Article 40 of the LNCM, cabotage permits are granted for three-month periods and can be renewed seven times with a maximum of two years. After this period, the vessel would have to be flagged Mexican in order to continue operating in Mexican waters. Flagging and registration for Mexican vessels are allowed only to Mexican citizens or companies. Foreign companies and individuals may incorporate a Mexican shipping company, which would be subject to foreign investment restrictions.

The procedure to award cabotage permits gives priority to Mexican ship-owners and crews. This is a bidding procedure which comprises two stages. In the first stage, only Mexican ship-owners may participate with the priority given to foreign vessels under a bareboat charter, which implies that the whole crew must be Mexican. The second priority is for Mexican ship-owners with foreign vessels under any other charter agreement; under this category priority is given to the vessel having a higher number of Mexican crew members. In the case that no vessels are available under these categories, the second stage of the bidding procedure takes place and foreigners with foreign vessels may participate (Moran, 2013).

The obligation to flag a vessel as Mexican after two years does not apply to what is called "highly specialised" vessels. For these kinds of vessels, the 2006 LNCM does not give a limit to the number of times that the cabotage permit might be renewed. Although the law provides some general provisions on what a highly specialised vessel is considered, more concrete guidelines are given in the revised by-law of LNCM in 2007,

but it has not been issued yet. In this draft, the criteria to determine if a vessel is highly specialised is as follows: the state of technology in the international market; the availability of the technology in the international market and construction and equipment reports with respect of vessels and naval artefacts. In practice, the question whether a vessel is highly specialised is determined on a case-by-case basis (Moran, 2013). However, it is clear that tankers and cargo vessels (as well as supply vessels, tugs and crew boats) are not considered to be unique in any case (Enriquez and Moran, 2009). Another exception to the Mexican cabotage regulations relates to tourism, sports and leisure vessels, which may be carried out by foreign ship-owners or operators with foreign vessels, provided there is reciprocity with the relevant country.

The cabotage permits are widely used. In 2009, it was estimated that nearly 500 permits are granted or renewed every year. The great majority of these permits are granted to vessels operating in the offshore oil fields in the Gulf of Mexico (Enriquez and Moran, 2009). The coastal shipping provided by cabotage permits represents around one third of the total domestic shipping in Mexico, the other two thirds is concentrated by Mexican ships transporting gas for PEMEX—the Mexican state-owned oil company. The need for exemptions of the cabotage rules is clear considering the relatively small Mexican-owned and flagged fleet with approximately 115 ships representing 0.06% of the total world fleet capacity, according to UNCTAD (2014). Mexico ranks 54th of the world in ship ownership—which includes foreign-flagged vessels. Mexico holds a similar position with respect to the number of Mexican seafarers.

On the other hand, Mexican companies with more than 49% foreign participation in their capital stock cannot have vessels engage in cabotage in Mexican waters, whereas foreign companies (irrespective of whether they have Mexican owners or not) may obtain cabotage permits. The Foreign Investment Law stipulates that foreign investment cannot exceed 49% in any cabotage business in Mexico. Additionally, in Mexico, it is not possible to register a vessel that remains registered in another country, unlike practices in some other countries.

The cabotage regulation in Mexico can make coastal shipping an expensive mode of transport. Priority is given to Mexican-flagged ships with Mexican crews. In the case of Mexican crews, it is common that certain fringe benefits are paid, which makes wage costs more expensive than if foreign seafarers could be used. Mexican crews are generally expensive and prohibitive unless there are long-term contracts such as in the case of Pemex (Moran, 2013). However, Pemex is not satisfied with the current state, since it initiated a constitutional review (*amparo*) by the Supreme Court on the cabotage regulation so as to examine whether it contravened the Mexican Constitution. Pemex claimed that giving preference to Mexican ship-owners with chartered foreign vessels may violate constitutional principles, such as equality, legal certainty, freedom of employment and commerce, and best value for money in procurement procedures. The Supreme Court found that preferring Mexican shipping companies over foreign ones does not create a monopoly, even though the bidding procedure intends to promote national maritime activities, protect the national shipbuilding industry and benefit the Mexican economy. The procedure, continues the Mexican court, does not force Pemex to hire Mexican vessels, considering that foreign vessels with cabotage permits can be hired when the Mexican vessels available do not fulfil the technical specifications required by Pemex (Enriquez and Moran, 2009). Even if the cabotage regulation provides some flexibility that make it aligned to the Constitution, one could wonder if it serves the greatest interest of the Mexican consumer.

An additional disadvantage for coastal shipping is that there are no dedicated facilities or “fast lanes” for it in most ports. As a result, the cargo is handled in the same way as international cargo, subject to many inspections and controls, leading to unnecessary costs and time loss (considering that the goods are not leaving or entering the country), which make coastal shipping uncompetitive in comparison with truck transport. The creation of “fast lanes” for short sea shipping is underlying the EU Blue Belt initiative to ease custom formalities in EU ports for coastal shipping between EU ports. The lack of dedicated facilities for coastal shipping in Mexico is a circular issue; dedicated facilities would make sense if there is substantial coastal maritime trade, which is currently not the case. But it is not the case because there are no dedicated facilities. One of the few cabotage initiatives that have recently emerged was developed by the Mexican shipping company TMM between the ports of Manzanillo, Mazatlan, Guaymas and La Paz; ten vessels move empty MSC containers and national cargo between the northeast and the centre of the country. This initiative was facilitated by an agreement with Customs on dedicated areas within container terminals for cabotage activities.

A development law to stimulate coastal shipping is under review. The likely aim of the law is to extend the commodities and routes for coastal shipping. This law would provide a good vehicle to stimulate dedicated areas (“control-free”) in terminals for coastal shipping.

Various countries have engaged in liberalisation of maritime cabotage. Generally, the range of maritime cabotage regimes is wide, ranging from very restrictive in the US and Japan to very liberal in New Zealand and Australia (Brooks, 2009). The regime in the United States, regulated by the Jones Act, requires not only US-flagged vessels and US crews, but also that the vessel is built in the US. Many countries are less restrictive and do not include the “built in” requirement. The regimes of Australia and New Zealand are very liberal and aim at creating a level playing field between international and coastal shipping. The regime in Mexico could be placed somewhere between restrictive and moderately restrictive on this continuum. The framework has the domestic flag and crew criteria but it also provides possibilities to circumvent these; notwithstanding, cabotage trade in practice only exists for bulk cargo. Although cabotage legislation is sensitive and difficult to reform, various countries have over the last decades liberalised their legislation, one of the more recent liberalisations was conducted in China.

Mexico could consider liberalisation of maritime cabotage in various ways. One step could be to resolve the inconsistency that Mexican companies with more than 49% foreign capital cannot acquire cabotage permits, whereas foreign companies can. Another measure could be to relax the priority given to Mexican crews or bring their emoluments and fringe benefits closer to international practice, in order to improve the competitiveness of coastal shipping. A condition that could be added is that foreign vessels operating in cabotage would need to make a commitment to train Mexican seafarers as part of their operations.

On the other hand, the current system of renewable 3-month permits could be replaced by renewable one-year permits so as to reduce the red tape. Mexico could also consider the introduction of an international shipping register, which is a common practice in many countries to attract shipping activity from foreign ship owners. One of the advantages for ship-owners is that it would allow for cabotage trade in Mexico, considering that these ships are registered in Mexico so they would qualify for cabotage trade.

## Efficiency issues

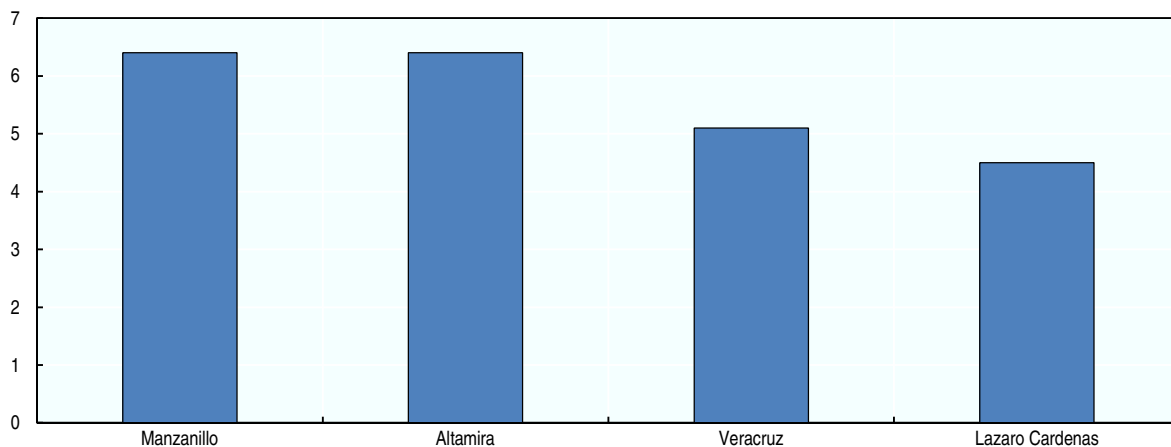
### *Port efficiency*

There are various studies focusing on the efficiency of container terminals in Mexico. The most recent study on the subject, in 2010, indicates that Mexican ports in general have low technical global efficiency with the exception of Manzanillo and Lazaro Cardenas (Delfin-Ortega, Navarro-Chávez, 2013). This study can however be criticised for the limited number of input factors that are taken into account; only quay length and number of employees, but not the number of container cranes and terminal surface as is usual in many port efficiency studies. Older studies indicated that the efficiency of Mexican ports improved after the port reform of 1993 that liberalised the port sector (Estache et al. 2002 and Estache et al. 2004). Merk and Dang (2012) have assessed the efficiency of oil ports and terminals and they conclude that the oil terminal of Cayo Arcas ranked 26th out of 41 ports in terms of efficiency, just after Freeport in Jamaica. No other Latin or Central American Ports were included in this analysis.

### *Yard turnaround times*

The average turnaround time for full containers in the container yards of Mexican ports was 5-6 days in 2009 with some variation in the different ports (Figure 4.10), which is a significant improvement since 2000 when containers stayed on average more than 10 days in container yards (Martner and Martínez, 2011), although it was increased to 7 days recently. International best practice is approximately three days; e.g. this represents the average container dwell time of containers in Hamburg (Germany). The still fairly long turnaround time of containers might be explained by the time it takes to get containers cleared by customs and other inspection bodies. Note in this respect the poor score of Mexican Customs in the World Bank Logistics Performance Index (LPI), which is based on a survey of perceptions of service levels by foreign freight forwarders. Whereas Mexico was overall ranked 50th on the LPI in 2014 with a score of 3.13, it ranks 70th of the world with respect to the quality of customs with a score of 2.69.<sup>7</sup>

Figure 4.10. Turnaround time in container yards in selected ports in Mexico, 2009



Note: Unit: days.

Source: Peyrelongue and Martínez, 2011.

Overall, port performance in Mexico can be considered fairly well. Ship turnaround times are in line with those in the United States and Canada, berth productivity indicators are high in some containers, but the situation with dwell times in container yards might be more of a challenge. A complete assessment of port performance would also have taken into account ship waiting times and truck turnaround times in the different ports, but such information was not made available.

### ***Cargo release time***

Main bottlenecks in ports are linked to the release of cargo due to various controls and administrative procedures. There are various projects in place to reduce administrative burdens, such as paperless port and one single window but these initiatives are not implemented in similar approach across ports and do not encompass all procedures. Reform of the customs law has increased the number of free days in yards from 5 to 7 days. Although it reflects the long time needed for goods clearance, it nevertheless provides no incentive for shippers to get their goods quickly out of the port. The treatment of abandoned containers is regulated in the Customs Law, but the relevant by-law has been in preparation for the last 9 years.

Finally, various port terminals are open 24 hours per day, which is not the case for customs and other inspection agencies. Requests can be submitted to have customs work at night but reportedly, almost all these requests are refused. A more extensive analysis of the issues highlighted here is conducted in the chapter on borders and customs.

### ***Transshipment***

Pacific ports as Manzanillo and Lazaro Cardenas could be well placed to capture a share of the sea-to-sea transshipment activity of Central America and the Caribbean. The advantage of these ports is that they are on the crossroads of several shipping routes such as the East-West flows from Asia to Los Angeles/Long Beach to the Panama Canal and the North-South flows of the West Americas. The Panama Canal expansion, finished in June 2016, could stimulate the rise of transshipment ports in the Pacific, in addition to the large transshipment ports that already exist in Panama (Colon) and the Caribbean (Kingston, Freetown) and Cartagena, Colombia. Advantages of developing transshipment functions could be more direct maritime routes between Mexico and Asia, lower handling costs due to the larger ships, more terminal activity and more demand for maritime services, with the related positive economic spill overs.

Thanks to this potential, sea-to-sea transshipment in Mexican ports is emerging in the Pacific ports of Lazaro Cardenas and Manzanillo, but various issues remain that constrain transshipment functions, such as excessive controls. Customs controls and other inspections on containers apply equally to import and transshipment containers, even if transshipment containers do not actually enter Mexican territory—other than the port area. These controls resulted in containers that have missed their connections with feeder ships and damaged cargo. This situation seems to be the consequence of internal guidelines and work practices of the customs agencies, more so than certain provisions in laws or regulations. Similarly to cabotage trade, there are no dedicated facilities or lanes for transshipment containers. This has particularly impacts in the port of Lazaro Cardenas, where the military is in charge of the security of the port, in order to battle organised crime. The lack of cabotage trade in containers in Mexico has possibly negative impacts on the creation of a Mexican hub port. Restrictive cabotage legislation in China has been



associated with limited feeder connections in the port of Shanghai (Zheng et al., 2014). A similar situation might exist in Mexico.

Current regulation constrains the development of sea-to-sea transshipment activities. The LNCM states that foreign ocean-going vessels may only carry empty containers among Mexican ports, for the purpose of using this equipment for goods exports (Article 468), prohibiting liner shipping companies to carry out transshipment of full containers between the country's ports. In addition, Article 469 prohibits coastal shipping vessels from transshipment of goods from or to ocean-going vessels (Martner, 2002). So this means, that the domestic coastal shipping industry cannot offer feedering services, whereas foreign companies cannot do this either.

In order to facilitate the development of transshipment, customs offices should be instructed to come up with special rules to facilitate transshipment so as to avoid excessive controls of transhipped containers. This would imply information systems that can identify transshipment containers, group these containers separately in terminal yards and make sure that these are not subject to checks and controls, unless very strong overriding reasons. An alternative, but heavier measure would be to create a free trade zone in the ports that would be most likely candidates to develop into important transshipment hubs.

## Facilities and access issues

### *Road access to the port*

The majority of Mexican port hinterland transport relies on road transportation with approximately 80% of cargo moving by road,<sup>8</sup> and 20% moving by rail nationwide (mostly bulk commodities). Some ports however differ substantially from the national average as they enjoy good rail hinterland connection. The Mexican road sector, as discussed in the corresponding chapter has some of the problems of fast developing countries: an ageing fleet, great diversity in terms of equipment and infrastructure at the limit of congestion.

In the specific case of ports major issues related road hinterland movement are associated with:

- Increasing congestion at the gate
- Schedule reliability
- Increasing relevance of environmental externalities.

One of the critical issues in port accessibility is ensuring that port access gates are managed in the most efficient way as possible. The current regime of double gates with inspections and other security procedures both at the entrance of the port and at the entrance of the terminal that seems to be dominant in most of the ports, does not favour the movement of trucks to and from the port efficiently. In several ports, such as Manzanillo and Altamira, trucks are required to station in a waiting area away from the port before being called (*patios reguladores*). While such solution is effective in resolving short-term peaks, it does not provide adequate incentives for port gate systems to improve port accessibility. Those waiting areas are essentially parking lots and do not allow any logistics operations to be performed on the cargo. In the case of Manzanillo, it also contributes to the level of urban road congestion.

Outgoing trucks also seem to suffer delays. The major issue seems to be related to customs inspections procedures. It should be noted, that truck management is one of the main challenges for terminals in global terms. Systems exist to reduce waiting times, expedite gate procedures and resolve terminal gate congestion. Common policies include extended gate times, modal shift often in combination with the development of dry ports, lane prioritisation and IT solutions, ranging from palm recognition to vehicle scanning and automatic identification. It would be recommended that an accurate study of the gate congestion is carried out for all major ports and solutions are likely to require, in addition to investment, policy intervention at a state or federal level, e.g. in relation to opening hours or inspection hours.

Up to date, there have not been policies with the objective to improve the arrival distribution of trucks during the day. Such policies have been implemented with relative success in other parts of the world, which have allowed for a better use of gates, port infrastructure and hinterland connections. Appointment systems can be developed on a voluntary basis, couples with the application of penalties for operators that do not appear at the terminals at the right time (Huynh, 2009; Guan and Liu, 2009). Notwithstanding some successful examples (e.g. Southampton), the implementation of an appointment system in practice has been met often with scepticism. This is partly because the effectiveness of an appointment system around the world depends on the opening hours of distribution facilities and warehouses, and to some extent on labour and road regulation, so the effectiveness could be limited, if for example, trucks are not allowed to drive in weekends or if warehouses are closed at night (Giuliano and O'Brien, 2007). The PierPASS programme, applied in Los Angeles and Long Beach, was effective in reducing daytime truck arrivals from 90% to 66%, within a few months after introduction (OECD, 2014).

Gate operations are only part of the infrastructure necessary to guarantee schedule reliability. At this stage no reliable statistics could be found on the efficiency of trucking operations, travel times, supply chain disruptions and other metrics relevant to assess the performance of the trucking system from and to the ports. In general, Mexico is placed just above world average and in a comfortable position in terms of the World Bank logistics performance index (in position 50 out of 160 countries, and position 46 in terms of shipment timeliness, just below Chile and Panama). The position of the country has remained rather constant in the last survey, slightly deteriorating between 2012 and 2014. As volumes are expected to grow substantially in the coming decade, maintaining logistics performance will become increasingly challenging.

Even if the largest urbanised areas in Mexico are not located in the proximity of ports, port-related trucking has important impacts in some areas with higher population densities (Altamira/Tampico, Veracruz/Boca del Rio, Guaymas, Acapulco, Puerto Vallarta, Tecomán/Colima/Manzanillo) and along the major transport arteries, often close to large conurbations. It is advisable therefore to consider the external effects that derive from trucking operations in terms of congestion, accidents, pollution and health related risks.

### ***Rail access to the ports***

An alternative to reduce reliance on trucking is to provide stronger incentives for cargo to be moved by rail. Such strategy requires the development of rail corridors connecting the ports and demand areas and a strengthening the position of railroads serving ports. At the moment it seems that bulk cargo is prioritised, as it is characterised

by a more regular scheduling, larger more predictable volumes, and longer-term contractual agreements between railroad companies and cargo owners.

Although ports appear generally well connected to railroads and an investment programme is currently in place to improve this connectivity (*Programa Sectorial de Transportes y Comunicaciones 2013-2018*), most ports have a connection to only one railway concessionaire (Ferromex and Kansas). The exception is Veracruz where the port has recently completed an investment to connect to the lines of the second concessionaires. Port users would benefit from a choice in railway service providers. Trackage rights exist to provide for interline services, but the rail concessions have generally been reluctant to make use of them. Requests for access rights by railroad operators have resulted in legal battles that have prevented the development of competing offers to move rail cargo to and from ports. The negative outcome of such situation is worsened by very high switching costs in inland junctions that make *de facto* unlikely to move cargo across operators. Reforms to the railway law, amended in December 2014 aim to facilitate use of access rights (see Chapter 2).

Port authorities could take a lead in developing hinterland strategies together with the main stakeholders, identifying opportunities for investments to improve efficiency where federal government funds might be attracted to complement investments. In general, there seems to be limited information being collected by the central administration, in order to develop a strategy addressing the real issues of ports.

An option that has been successful internationally is the development of dry-ports inland, allowing for congestion to be relieved at the port and ensuring volumes are sufficient to attract railroads on non-core traffics. The railroad network appears suitable for the developing such infrastructure that would require however the central government to take the initiative at least until volumes are such that dry-ports can be run profitably. The development of dry-ports could also relieve pressure on customs operations at port freeing capacity on terminal yards and improving the efficiency of gate operations.

### ***Modal split***

Lazaro Cardenas has been successful in developing a modal split between road and rail that favours rail (around 50%).<sup>9</sup> The good accessibility of rail terminals to the container terminal has favoured a balanced modal split. Manzanillo has much less favourable rail access, with current infrastructure poorly adapted to large trains with double stacks of containers as the tracks pass through the city centre. There are plans to improve access through construction of a railway tunnel. Although new infrastructure is key to resolving access issues, efficiency at ports is not only a matter of infrastructure, but also co-ordination among various stakeholders. In absence of such co-ordination, the cheaper and more flexible trucking is likely to remain the dominant mode of transport to and from most of the major ports, decreasing the attractiveness of railroad operations.

With the exceptions of Altamira and Lazaro Cardenas, the majority of infrastructure projects are road investments, planned in the absence of a comprehensive vision for improving connectivity and the competitiveness of the logistics and port system, and in particular the need to complement road transport with rail services to resolve increasing external costs. While in general, competition between rail and road is beneficial because it tends to moderate transport prices, the advantages that road transport enjoys in terms of gaps in regulation (no regulation of driving time and rest hours for example—see Chapter 1) and limited accountability of external costs, could put railways at a disadvantage.

An additional problem is related to the limitation of the space at the port and near the port, deriving from alternative uses of urban spaces and infrastructure, as in the cases of Veracruz and Manzanillo, where tourism development could pose a threat to port and hinterland infrastructure expansions. Some ports have port-related road congestion in the city, e.g. in Manzanillo. In many cases train connections also cross city centres where the city has encroached upon the port area, increasing the possibility of future port-related congestion in the city. There have been investments to solve some of these bottlenecks (e.g. the planned railway tunnel in Manzanillo, new rail link for Veracruz; new highway bypasses, truck parking areas), but the problem is likely to remain especially if new investments do not take into account traffic growth projections. Railroad crossings are also a source of delays and avoidance of potential accidents and investments in grade-separated crossings (bridges and tunnels) should be prioritised.

## Economic and institutional issues

### *Competition in port services*

Since the 1993 port reforms in Mexico, the port system has been characterised by decentralisation, privatisation and competition. The privatisation process implied the promotion of competition between ports and private operators, but also the liberalisation of tariffs for port services and the elimination of cross subsidies and barriers to market entry. Regulation of tariffs is limited to cases where there is only one operator or only one service provider. This regulation requires the establishment of maximum prices (price-caps) and inflation adjustment mechanisms. The maximum prices are based on information of operating costs, capital costs, traffic and prevailing tariffs in Mexico and internationally. The price regulation could be eliminated if the Federal Competition Commission considers that there is a fair competition environment (OECD, 2011). The 1993 LP stipulates that the tariffs for so-called infrastructure services (meaning access channels, dockage and wharfage) need to be set by SCT, as these services are only offered by the APIs. Pilotage services are also regulated by the SCT, but for all other services tariff regulation or free tariff setting is applied (see Box 4.2). Ports services in Mexico are similar to those in other countries and refer to infrastructure maintenance (including dredging of access channels and maintenance of docks and wharfs), pilotage,<sup>10</sup> towage,<sup>11</sup> mooring<sup>12</sup> and bunkering services.<sup>13</sup> In case of complaints on tariffs for which no tariff regulation is required, there exists the possibility of intervention by the Federal Competition Commission. Its intervention has so far focused mainly on port terminal operations and to a lesser extent for port service providers (OECD, 2011).

There is competition for cargo handling services in the large ports, but many port services are monopolies, which is not uncommon across the world. As was mentioned in the section on port organisation, there are various global terminals active in the main Mexican ports. In the container sector, most of the terminals are dominated by Hutchison Port Holdings (HPH), but competition is increasing as new terminals have been awarded to competing terminal operators, such as APM Terminals and ICTSI. Most of the oil terminals are operated by PEMEX, expression of their dominant position in the national petro-chemical industry. Whereas cargo handling in the main Many port services around the world, such as pilotage, towage and mooring, are offered by only one service provider, in some cases public, in some cases private. Mexican ports are not exceptional in this respect: in most ports across the world, pilotage services are monopolies. For the other port services, competition is more common, at least in the largest ports. Considering

that the main Mexican ports use several tug boats (indicating large enough size), it would be possible to envisage competition in towage services and possibly other port services.

#### Box 4.2. **Tariff regulation and tariff setting in ports in Mexico**

The basis for tariff regulation is formed by Article 16 of the Ports Law, which states that the SCT can establish the basis for tariff regulation if in any port only one terminal exists, or only one terminal for specific merchandises exists, or only one service supplier exists. In such cases SCT can ask for the intervention of the competition commission.

In addition, Article 26 of the Ports Law states that the concession must contain the basis of tariff regulations and Article 60 mentions that SCT can establish in concessions and permits the basis for prices and tariff regulations for the usage of certain assets in ports, marines, shores and services providers, when there are no other port options or means of transport which can promote competition, which will remain in place until competition arises.

Article 61 of the Ports Law indicates that regulation can set maximum and minimum prices for specific and joint services and also the updating mechanisms and periods of applicability. In case that regulated firms consider that there are no reasonable grounds to establish tariff regulation, they can ask the opinion of the Competition Commission and if this Commission finds that competition conditions do not justify the regulation, the regulation must be modified within 30 days.

This tariff regulation has been established for services such as handling services, storage services and pilotage in the ports of Lazaro Cárdenas, Manzanillo, Mazatlán, Veracruz, amongst others.

*Source:* Port Law and SCT.

Increasing ship size will make existing terminals less suitable for operation, but incumbent operators could always bid for new port development projects. The LP stipulates that port terminals can extend their area up to 20% and if they would like to exceed such limit, they would need to bid for a new terminal (Art. 25 of the LP). According to some observers, this limits the possibilities of incumbent operators to increase the scale of their operations, considering the rapid pace with which ships have increased, e.g. the doubling in the average size of a containership over the last decade. This has dramatic implications for terminals that would need longer quays, more storage space and deeper berths to be able to accommodate these larger ships.

#### ***Co-ordinated investment for hinterland infrastructure***

Hinterland connectivity differs from port to port with some being characterised by increasing congestion (e.g. Manzanillo) while others by their underutilisation (e.g. Lazaro Cardenas). Although, for every port the needs and requirements in terms of hinterland development can differ substantially, the following common themes can be identified as relevant for the country:

- Lack of capacity of hinterland connections
- Issues with road access to the ports
- Challenging rail access to the port
- Conflict for road and rail for port traffics and modal split issues.

The competitiveness of a seaport depends on the extent that cargo handled in such port can reach its hinterland destination (e.g. Acciaro and McKinnon, 2013). The importance of hinterland connections has been recognised as one of the most critical issues in port competitiveness and development in most ports around the world. One of the main issues related to the development of adequate hinterland connections in ports is the need to co-ordinate multiple actors often with conflicting mandates, that constitute the group of private and public institutions governing port hinterland infrastructure development.

Ports around the world have developed multiple strategies to improve their hinterland connections in response to the challenges imposed by increasing traffic, shrinking public budgets, competition for road and rail usage from passengers, and the proximity of many ports to densely urbanised areas.

These strategies have resulted in a variety of policies such as:

- Development of dry-ports. The benefit associated with dry ports include: cost-efficiency, environmental performance and logistic quality. These benefits are usually enjoyed by a big spectrum of stakeholders. Dry ports are usually associated with improved competitiveness of local and regional businesses, increased attractiveness of the region and sustainable logistics development. (e.g. Bergqvist, Wilmsmeier and Cullinane, 2013a; 2013b; Roso, Woxenius and Lumsden, 2009)
- Improving stakeholder management (e.g. Bergqvist, 2012)
- Extending operation times: this policy option has helped in reducing traffic congestion during the week days in Los Angeles, and it has been implemented as well in Vancouver and New York. As traffic has smoothed including expansion during the weekends, it helped in reducing emissions as the truck traffic is better organised, helping to mitigate environmental risks. (e.g. Giuliano and O'Brien, 2008)
- Extending the borders of the port beyond the port precinct (Veenstra, Zuidwijk and van Asperen, 2012) or
- Influencing the port modal split. Monios and Lambert remark the virtues of bringing together the public and private actors to allocate efficiently investment in port infrastructure improvements, this way there will be tangible benefits for the private sector. In order to achieve a successful project there is a crucial need of co-ordination among the private and the public sector (e.g. Monios and Lambert, 2013).

The problems faced by Mexican ports in fostering the efficiency of their hinterland transportation networks are not unique, although the specific geo-economic characteristics of Mexican logistics networks make some of those issues more urgent. The geography of Mexican production chains, concentrated in a few areas away from the coast, the configuration of Mexican rail networks, and the overall policy that has governed the country transport system in the last decades, among other factors, all have favoured the development of freight corridors and a heavy reliance on trucking.

### ***Development of ports***

The National Infrastructure Plan 2014-2018 establishes the main policy framework for ports policy in Mexico. It foresees approximately port investments of MXN 70 billion over 2014-18 in the main 20 ports. Its aim is to promote an integral and complementary port system, with four world class ports at its core (Manzanillo, Lazaro Cardenas,

Veracruz and Altamira). The philosophy behind this implicit port strategy is that ports mainly compete with foreign ports, not so much with each other.

This assumption of competition with foreign ports might be somewhat correct for transshipment functions, but much less so for gateway functions, which are much more substantial in the current Mexican context. As was mentioned before, the four main ports in Mexico can be considered to compete for the same hinterland, the metropolitan area of Mexico City; this competition is particularly real between the ports on the same coast (Manzanillo-Lazaro Cardenas and Veracruz-Altamira). Sea-to-sea transshipment functions are limited on the Mexican Pacific Coast and non-existent on the Mexican Gulf Coast. Ports such as Manzanillo and Lazaro Cardenas could be gateway ports for the US Mid-West and as such, compete with US West Coast ports such as LA/Long Beach and Seattle/Tacoma, but for the moment this represents a negligible cargo flow. Although policy support might indeed be needed to expand the transshipment functions of selected Mexican ports, this should not mean that competition between Mexican ports be avoided. In fact, the incentive of competition between main Mexican ports could reduce logistics costs and should thus be stimulated. As competition between the gateway ports in Mexico is mainly determined by the rail corridors related to the ports, more competition between ports would imply increasing the inter-operability of the freight railway networks.

Despite the policy discourses with focus on four main ports, investment portfolio for ports in Mexico is fairly fragmented. Investment projects are foreseen for the twenty largest Mexican ports, including substantial projects in smaller ports like Mazatlan and Tuxpan. One can wonder how this aligns with the stated ambition to develop four Mexican ports into world-class ports. The situation of relative fragmentation of port investments might be related to the function of SCT as a national port authority. A more delegated form of port governance, in which ports would be more self-financing, would be less subject to inter-regional equity concerns and might be helpful in concentrating efforts to achieve the ambition to develop Mexico's four main ports into world-class ports.

Although Mexico moved to a landlord model with the 1993 port reforms, in practice the autonomy of the port corporations is fairly limited. As part of these reforms, ports were granted with autonomy in administration and finance through the creation of 24 different APIs. Their main functions are the management and exploitation of the Mexican ports. However, the port authority functions in policy formulation, supervision, concessions and penalties, remain within SCT, in particular the General Coordination of Ports and Merchant Navy. APIs are the holders of concessions granted by the SCT, and in turn provide many port services through private companies.

Mexico should consider moving towards a next stage of the port landlord model (in which port authority functions are public, but separate from terminal operations which are in private hands), in which more of the regulatory functions could be transferred to the APIs. In comparison with many ports in the OECD countries, the APIs are still very dependent on the federal ministry. As part of the suggested delegation of functions, APIs should acquire larger financial autonomy, which could include keeping part of the revenues they bring in and the possibility to engage in partnerships with financial institutions. By means of example, the port of Rotterdam – Europe's largest port – is corporatised, with the municipality of Rotterdam and the State as shareholders; it is free to use its profits apart from an agreed dividend to its shareholders. In Mexico, although the 1993 port reforms aimed at limiting cross-subsidisation of ports, the substantial national port investment programmes could be considered to be effectively doing this.

The role of the federal government could be to make sure that the main Mexican ports are well connected to national hinterland infrastructure networks and promote and supervise deals with the main railway companies on port connectivity.

Relations with cities could be improved with more efforts for joint planning. The main Mexican ports are urban ports, and constrained by urban development that is encroaching on port activity. As a result, ports and their cities have become heavily interlinked; for instance, port truck traffic has led to urban congestion; environmental impacts have deteriorated the health of urban citizens; and urban development around ports has limited the possibilities to expand the current facilities. Even if there are some efforts to long term planning, as the new container terminal in Veracruz, that will take place at some distance from the city centre, still remains the necessity to align port and urban planning.

At this moment, the municipality in which the port is located has one seat in the board of its API, which is generally dominated by federal representatives. This provides a functional link, but additional mechanisms would be needed to improve the relations between ports and their cities, in order to increase the alignment of urban policies and port policies, and also sustain the long term “license to operate” ports in an urban environment despite the impacts for the local population. The additional port-city mechanisms might take the form of regular contacts between mayor and port director, joint planning exercises, and port-city forums.

## Recommendations

Stimulate the establishment of dedicated areas and free of border controls in terminals for coastal shipping. Mexican ports hardly have any transshipment traffic due to cabotage legislations, which allows foreign ocean-going vessels only to carry empty containers between Mexican port (not full containers) which evidently limits the possibilities for transshipment and coastal shipping.

**Considering opening up the maritime cabotage market;** Mexican companies with more than 49% foreign capital could be allowed to acquire cabotage permits. Another measure could be to relax the priority given to domestic crews, as in Australia or New Zealand, possibly in parallel with an obligation in cabotage permits to train Mexican seafarers.

The current system of renewable three-month permits could be replaced by renewable one-year permits, in order to reduce red tape. Mexico could also consider the introduction of an international shipping register; one of the advantages for ship-owners of such an international register could be that it would allow for cabotage trade in Mexico.

The coastal shipping provided by cabotage permits represents around one third of the total domestic shipping in Mexico, the other two thirds is concentrated by Mexican ships transporting gas for PEMEX. The cabotage permits are widely used. In 2009, it was estimated that nearly 500 permits are granted or renewed every year.

The customs service should be instructed to introduce a specific regime to facilitate transshipment, avoiding excessive controls on bonded containers in transit. Mexican ports hardly have any transshipment traffic due to cabotage legislations which allows foreign ocean-going vessels only to carry empty containers between Mexican ports, not full containers, which evidently limits the possibilities for transshipment and coastal shipping.



Investments in ports and hinterland connections should be more concentrated to achieve the ambition to develop Mexico's four main ports into world-class ports by focusing on the implementation of the national infrastructure plan 2013-18 and by focusing investment on these four ports. The ports system in Mexico is relatively concentrated compared to similar sized countries, despite the large number of ports and terminals. This concentration is particularly visible in containerised cargo and oil products. Approximately, 95% of the total container volume of 4.9 million TEUs is handled in four hub-ports.

**Customs and other inspection agencies should more often be open 24 hours per day**, in line with the working hours of several port terminals. Several port terminals are open 24 hours per day, which is not the case for customs and other inspection agencies. Requests can be submitted to have customs work at night but reportedly, almost all these requests are refused.

Envisage introducing competition in towage services, and possibly other port services. Mexican ports are not exceptional in this respect: in most ports across the world, pilotage services are monopolies. For the other port services, competition is more common, at least in the largest ports. Considering that the main Mexican ports use several tug boats (indicating large enough size), it would be possible to envisage competition in towage services and possibly other port services.

Transfer more of the regulatory functions to the APIs, which should acquire larger financial autonomy. In comparison with many ports in the OECD countries, the APIs are still very dependent on the federal ministry, hindering the best investment decisions for each individual port. Although the 1993 port reforms aimed at limiting cross-subsidisation of ports, the substantial national port investment programmes could be considered to be effectively doing this. The role of the federal government could be to make sure that the main Mexican ports are well connected to national hinterland infrastructure networks and promote and supervise deals with the main railway companies on port connectivity.

Opportunities for joint planning between port authorities and municipal governments should be sought. This might take the form of regular contacts between mayor and port director, joint planning exercises, and port-city forums. The main Mexican ports are urban ports, and constrained by urban development that is encroaching on port activity. As a result, ports and their cities have become heavily interlinked; for instance, port truck traffic has led to urban congestion; environmental impacts have deteriorated the health of urban citizens; and urban development around ports has limited the possibilities to expand the current facilities.

**Develop policies with the aim to simplify port gate operations:** investigate the development of appointment systems for trucks to reduce waiting times and port gate congestion, explore IT solutions for driver and vehicle recognition, and investigate the possibility of better exploiting waiting times for trucks at the *patios reguladores* by relocating some controls to these areas. Main bottlenecks in ports are linked to the release of cargo due to various controls and administrative procedures. There are various projects in place to reduce administrative burdens, such as paperless port and one single window but these initiatives are not implemented in similar fashion across ports and do not encompass all procedures.

Develop an integrated logistics strategy for the main four Mexican ports to determine the potential for the consolidation of cargo at inland dry ports, in order to increase the volume of containers that could be carried on railroads instead of road and improve efficiency. The lack of capacity of hinterland connections is a widely-recognised issue and infrastructure expansion is well underway in several ports and critical links. Ports are clearly identified as critical nodes in the logistic infrastructure of the country and, as it is often the case, road connections appear more developed than rail. Several sections of the road, however, need to be upgraded and as cargo volume increases, it is likely that road congestion will become an issue.

**The resources available for enforcement should be increased.** The number of SCT inspectors for roadside checking of heavy goods vehicles needs to be substantially increased. Police resources for vehicle inspections also need to be increased and consideration given to establishing a dedicated unit charged only with enforcement of heavy vehicle regulations.

## Notes

1. Art. 3 and 5. Law of Ports.
2. Art. 16, LP.
3. Art 16, Frac VIII. Law of Ports.
4. Calculations of ship turn-around times are based on vessel movement data over May 2014 and May 2011 from Lloyds Intelligence Unit. The estimated coverage of this database is > 95% of all vessel movements. For the purpose of this analysis only fully cellular container ships with GT >100 were taken into account. The database has per vessel call an arrival time at berth and a departure time from berth, allowing for calculation of duration of port stays. For the analysis all port stays were excluded that were smaller than 0.20 days and longer than 7 days. In this way, bunkering calls and extreme values were excluded. The database that resulted included 38 843 port calls in May 2014 and 25 989 port calls in May 2011.
5. Permisos temporales de navegación.
6. Cabotage is defined as the navigation between two ports or spots within the Mexican maritime zones.
7. The overall LPI score of Mexico of 3.13 is slightly above the relevant peer groups: the Upper middle income countries that scored 2.82 and the Latin American and Caribbean countries with a score of 2.74. Mexico has improved its score on the LPI since 2007, when it scored 2.87, but its score and ranking has been relatively stable since 2010. The LPI consists of different indicators; the indicator on which Mexico scores worst is “Customs” where it ranks 70th of the world with a score of 2.69. On the other indicators (infrastructure, international shipments, logistics quality and tracking and tracing), Mexico consistently ranks around the 50th position. This is more or less in line with the ranking of the Mexican port infrastructure (62nd position) in the 2014 World Economic Forum Competitiveness Report.
8. Information gathered as part of the interviews to stakeholders to prepare this report.
9. Traffic in the port of Lazaro Cardenas has decreased, however, for reasons attributable to external factors, i.e. security issues in the region.
10. Generally the pilot acts as advisor to the Master or Captain regarding the route into (or out of) the port, berthing and un-berthing, drawing on his experience and knowledge of the local maritime area. In many countries, the requirements of the pilot while on board are set out in the pilotage rules or regulations regarding the advice that he can give, the relationship between the pilot and Master and his duties with regard to reporting of the pilotage mission (PWC, 2012).
11. An act by which one vessel, known as the tug, supplies power in order to draw another vessel, called the tow.
12. To secure a ship with cables or ropes.
13. Bunkering services refer to the practice and business of refuelling ships. Bunkering operations are located at seaports, and they include the storage of "bunker" (ship) fuels and the provision of the fuel to vessels.

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