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The container port of Buenos Aires in the mega-ship era

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International Transport Forum

The Container Port of Buenos Aires in the Mega-Ship Era

Discussion Paper

169 Roundtable

Olaf Merk
International Transport Forum

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International Transport Forum
2 rue André Pascal
F-75775 Paris Cedex 16
contact@itf-oecd.org
www.itf-oecd.org

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Table of contents

Performance of the container port of Buenos Aires 5
Outlook of the container port of Buenos Aires 5
Performance of the port of Buenos Aires 10
Future requirements for container ports 14
Future trade projections 14
Container ship size 15
Industry consolidation and alliances 19
Regional port competition 19
Policies to adapt to future requirements 21
Current policies 21
How well are policies adapted to future requirements? 23
Suggestions for policy 25
Notes 26
References 27

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Performance of the container port of Buenos Aires

The port of Buenos Aires is the main container port of the country, handling 85% of the nation's containers. The port is the main cargo entry point for the province of Buenos Aires, where most of Argentina's population, economic activity and manufacturing activity is concentrated. The province alone accounts for 37% of the national exports, but the port plays a role for the whole country, with hinterlands that extend to many other parts of Argentina. This paper answers three questions: What are the characteristics of this port? How does it perform, and what are its main challenges?

Outlook of the container port of Buenos Aires

The port of Buenos Aires is very urban. It is located on the River Plate surrounded by the agglomeration of Buenos Aires, home to around 14 million people. Buenos Aires accounts for one-third of Argentina's population, with a density of 5 000 people per km^2. Since the port reforms in the 1990s, the port of Buenos Aires consists of two parts: Puerto Nuevo and Dock Sud, which have separate locations and institutional structures.[1] Puerto Nuevo is inserted in the north-east of a very central urban area, at the heart of the city, the core of offices, government and financial institutions. Further south is Dock Sud, located outside the boundaries of the city of Buenos Aires, and more industrial in character, but still part of the larger agglomeration of Buenos Aires (Figure 1).

The port is located upstream in the River Plate (*Rio de la Plata*) estuary. It is a shallow estuary with depths that mostly range from 3 to 5 metres. In order to access it, ships need to navigate in a 239 km long access channel, which is limited in depth and width, to a greater or lesser extent depending on the specific part of the channel (Figure 2). The last few kilometres of the channel, the *Canal Norte* leading to Porto Nuevo and *Canal Sur* leading to Dock Sud, are the most constrained parts of the channel, with around 60-80 metres width and 9.75 metres depth. The access channels in the River Plate need dredging, which is carried out by the company Hidrovia S.A. that dredges the main channels (Emilio Mitre, Acceso, Intermedio and Punta Indio), which is covered by tolls from the passing cargo ships. The North and South channels are subject to tenders by each port (Puerto Nuevo and Dock Sud) and there is no direct toll on them. The constraint of depth and related dredging costs distinguishes the port of Buenos Aires from the Uruguayan port of Montevideo that is located further downstream and in particular from the Brazilian port of Santos that has deep sea access.

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Figure 1. Buenos Aires and its two ports

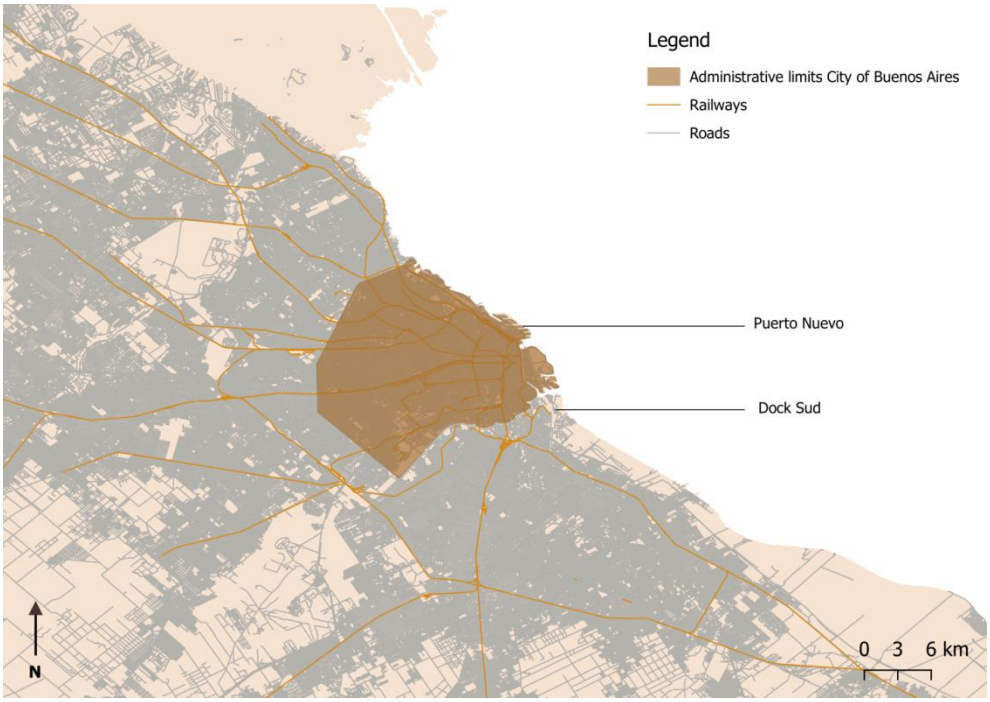
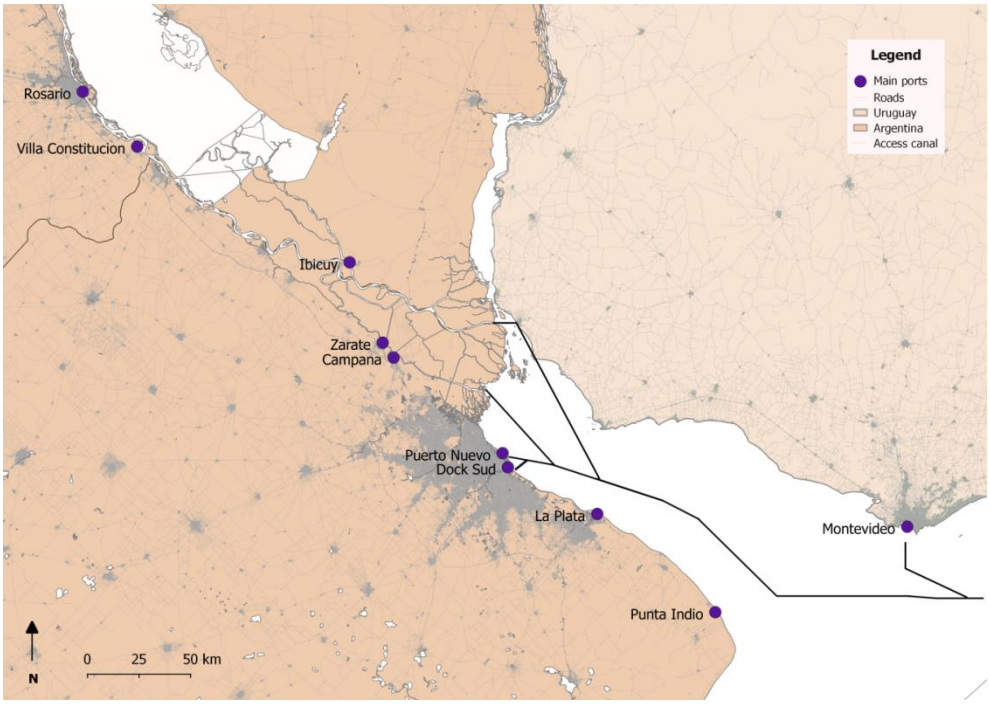


Figure 2. The River Plate Estuary and its ports



Note*:* Access channel indicated by the black lines in the river estuary. The access channel to La Plata is not included in this picture.

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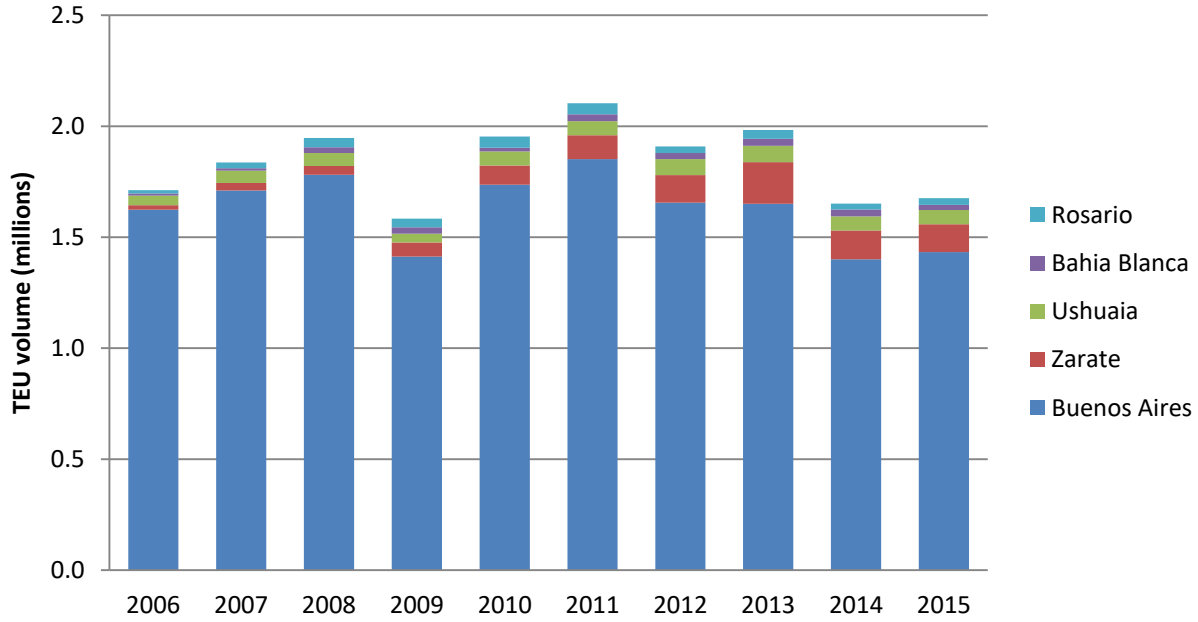
The port of Buenos Aires handled 1.4 million TEUs in 2015, which represents 85% of the nation's maritime container traffic. This market share of Buenos Aires has declined over the last decade from 95% in 2006. Total container volume in Argentina has fluctuated somewhat over the last decade, but its level in 2015 was slightly below the 2006 level, which was 1.7 million TEU (Figure 3). The second container port in Argentina is the river port Zarate, upstream from Buenos Aires, that handled 0.1 million TEUs in 2015. A new Argentinian container port, La Plata, was opened in 2015, but it has for the moment not managed to attract significant container traffic; this port is operated by ICTSI, the global terminal operator headquartered in the Philippines.

The port of Buenos Aires has witnessed a decline of container volumes over the last decade, falling 12%, from 1.6 million in 2006 to 1.4 million in 2015 (Figure 3). This volume makes Buenos Aires the eight-largest container port in Latin America, and the only large container port in the region with declining growth rates.

Figure 3. Container port development in Argentina 2006-15



Source: ITF elaboration based on data from Lloyds Intelligence Unit.

Containerships represent a third of ship calls to the port of Buenos Aires, which is only 10% for the average port in Argentina. The share of tankers in Buenos Aires (almost half of all cargo ship calls) is also higher than the average in Argentinian ports (40%) (Figure 4). Most of the tankers call at Dock Sud that has specialised liquid bulk terminals. Puerto Nuevo is predominantly a container port. Bulk carriers represent the largest category of ships coming to Argentina (almost half), but there are hardly any bulk carriers calling Buenos Aires. One of the major dry bulk ports in Argentina is Rosario. Cruise shipping is an emerging activity, with 102 cruise calls in Puerto Nuevo in the cruise season 2015/16 carrying 313 640 passengers (AGP, 2016).

Major containerised exports from Puerto Nuevo (by weight) include manufactured products (56%), meat (14%), fruits (13%) and chemical products (8%). Main containerised import goods are manufactured goods (40%) and oil products (36%). The loading and unloading of containers are almost perfectly in balance in Puerto Nuevo, with 440 000 TEUs inbound and 441 900 TEUs outbound in 2016. Yet, there is a

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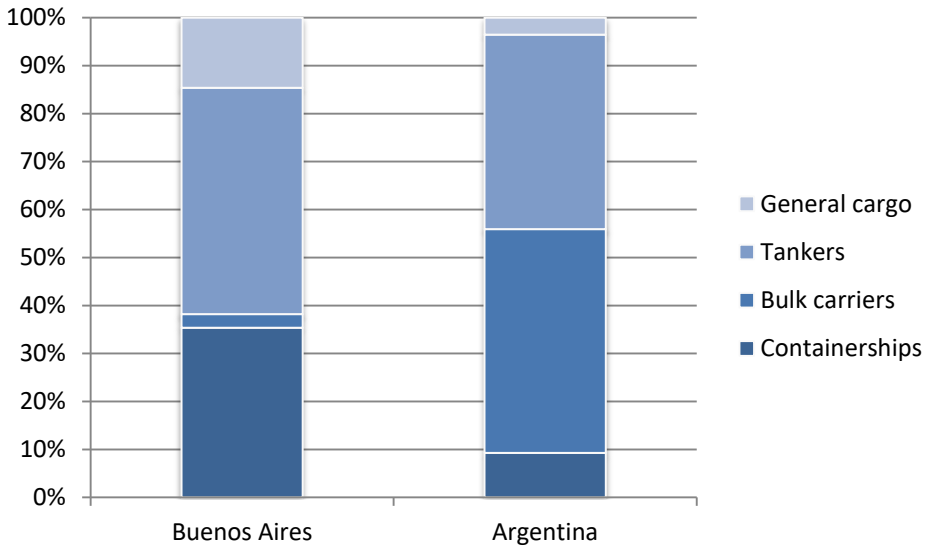
striking difference with regards to full and empty containers: 10% of the import containers in 2016 were empty, whereas 48% of export containers were empty (AGP, 2016).

Container port operations are carried out by private operators with Buenos Aires' port characterised by a high degree of intra-port competition. There are four different container terminals, competing for the same cargo, each of them controlled by one of the four largest global terminal operators, sometimes in joint ventures with local actors. The terminal operators Hutchison, DP World and APMT operate in Puerto Nuevo, whereas PSA operates in Dock Sud (Exolgan) (Table 1). This system of private port operations has been in place since the beginning of the 1990s, when the Argentinian port framework was substantially reformed.

Figure 4. Port calls per ship type in Buenos Aires and Argentina



Source: ITF elaboration based on data from Lloyds Intelligence Unit.

Table 1. Container terminals in Buenos Aires and their operators

Terminal	Place	Terminal operator
Rio de la Plata	Puerto Nuevo	DP World (55.62%)
Buenos Aires Container Terminal Services (BACTSSA)	Puerto Nuevo	Hutchison Port Holdings (100%)
Terminal 4	Puerto Nuevo	APMT (100%)
Exolgan	Dock Sud	PSA (50%) and TIL/MSC (50%)

Source: ITF elaboration based on data from Drewry.

The two largest container terminals in Buenos Aires are Rio de la Plata and Exolgan (Dock Sud), both of which represent around a third of total container port volume in Buenos Aires. The other two container terminals, BACTSSA and Terminal 4, together represent the remaining third of the container volume. The market shares of the two largest terminals have remained fairly constant since 2008, but there have been some changes with respect to the market shares of the smaller terminals, with Terminal 4 increasing from 13% in 2008 to 19% in 2015 and BACTSSA declining from 23% to 12% (Figure 5).

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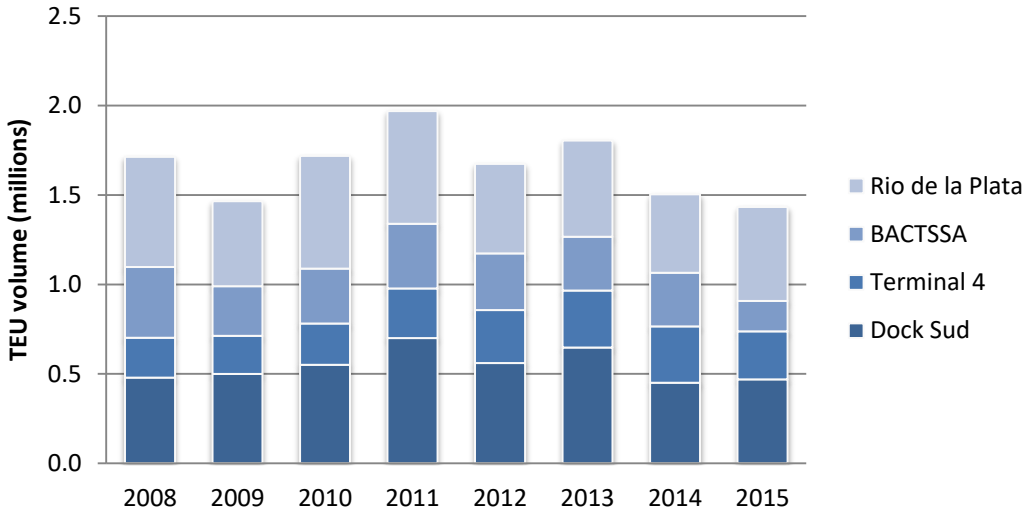
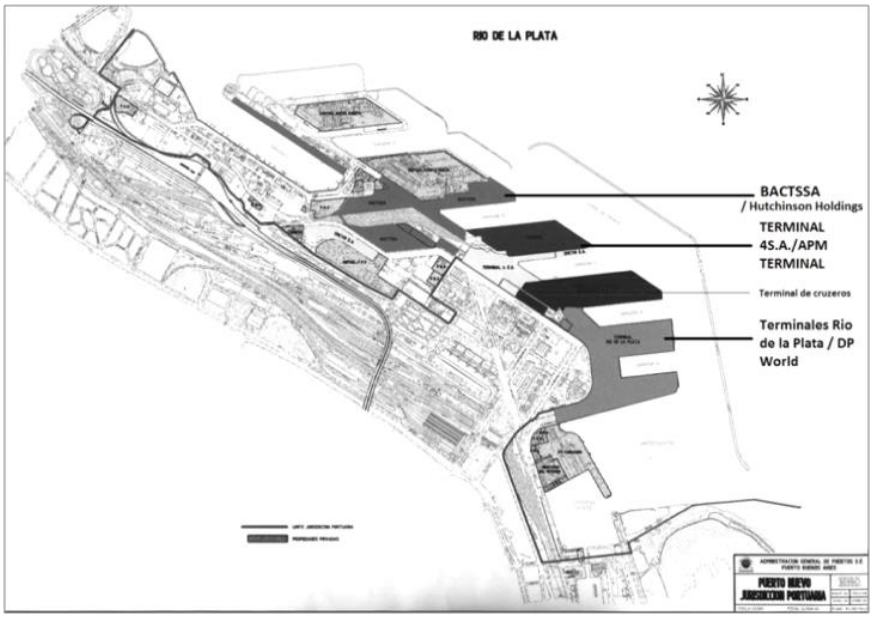
The largest container lines calling Buenos Aires all have their preferred terminals. Not surprisingly this is related to the vertical links of shipping lines and their terminal subsidiaries. So, Maersk uses Terminal 4, the terminal in the hands of its terminal operator APM Terminals. MSC uses Exolgan, in which its terminal operator TIL has a 50% share. Hamburg Süd, second largest carrier in East Coast South America, mainly uses the Rio de la Plata-terminal. Yet, most carriers spread their calls over different terminals: so Maersk also uses Exolgan and Hamburg Süd also uses APM Terminals. The merger of Hamburg Süd and Maersk in 2018 has resulted in a shift of calls to the APM Terminal.

Figure 5. Volumes at Buenos Aires container terminals 2008-15



Source*:* ITF elaboration based on data from Drewry.

Figure 6. The layout of Puerto Nuevo



Note*:* TRP is also covering the area indicated as "Terminal de Cruzeros"; container vessels are also operated there

Source*:* AGP.

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The lay-out of Puerto Nuevo is characterised by finger piers, with seven port basins (Figure 6). This design, originating from traditional cargo ports, is considered less adapted for modern containerships, as it means that there are no linear quay lines and there is limited space for stacking containers. Dock Sud has linear quays.

Performance of the port of Buenos Aires

Port performance can be schematically broken down into three parts: maritime connectivity, port operations and hinterland connectivity. How does Buenos Aires perform on these indicators?

Maritime connections

The port of Buenos Aires is relatively well connected with other ports. It has direct connections with around fifty non-Latin American ports worldwide via a number of weekly services provided by container lines. Most of these connections are with ports in North America (13), Asia (10), North Europe (10) and Mediterranean (8). There are 21 container lines that offer regular services that include the port of Buenos Aires. Many of these services are shared between container lines, so are identical. If corrected for this, six weekly services to Asia were identified in 2015, 5.1 weekly services to North America, 4.5 weekly services to North Europe and four weekly services to the Mediterranean (Table 2). As such, the port of Buenos Aires is one of the best-connected container ports at the East Coast of South America. Only the Brazilian ports of Santos and Paranagua have more direct port connections.

Table 2. Main maritime connections of the port of Buenos Aires in 2015

Region	Number of weekly services	Ports connected
Far East	6	Busan, Qingdao, Shanghai, Ningbo, Chiwan, Shekou, Yantian, Hong Kong, Singapore, Port Klang
North Europe	4.5	Rotterdam, Hamburg, Bremerhaven, Tilbury, Antwerp, Le Havre, Vigo, Bilbao, Lisbon, Sines
Mediterranean	4	Tangier-Med, Valencia, Gioia Tauro, Livorno, Genoa, Marseille, Algeciras, Barcelona
North America	5.1	New York, Philadelphia, Norfolk, Baltimore, Charleston, Jacksonville, Port Everglades, Houston, New Orleans, Savannah, Altamira, Tampico, Veracruz

Source: ITF elaboration based on data from container shipping lines.

A challenge to the maritime connectivity of the port of Buenos Aires is the draft limitation in the port and access channel in the River Plate. Current maximum depth at Puerto Nuevo is 36 feet, which roughly allows 10.36 metres depth for navigation. As larger containerships generally have drafts that are deeper than this, these ships have difficulties calling the port of Buenos Aires. There are two ways in which shipping lines have managed to adapt to these constraints. First, some of the largest container shipping companies calling in South America, in particular Hamburg Süd and Maersk, have deployed ships that were tailor-made for South America trades, which compensate for shallow draft by being broader (and with high reefer plug capacity needed for fresh food products). Maersk even deploys a series of ships that are aptly called South America Maximum (SamMax) ships. A second way in which shipping lines currently deal with the draft limitations is via the structure of the ports network. The trick is to call twice at the port of Santos, first to unload the import cargo, so that the ships are much less full, which means

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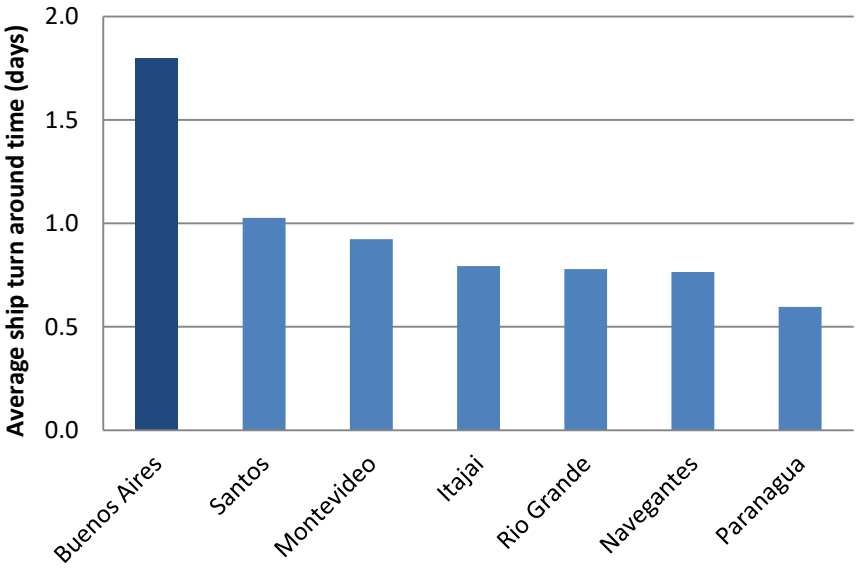
that they ride higher in the water and are able to continue with calls to ports like Buenos Aires where they unload import cargo and load export cargo. After such calls to Buenos Aires and Montevideo, ships call again at Santos to take on Brazilian export cargo.

Port operations

The average container ship turnaround time in Buenos Aires was 1.8 days in 2015. This is considerably longer than in other main container ports in the region, for which the average ship-turnaround times are below one day (Figure 7). According to the AGP (2011-16), the port authority of Buenos Aires, the average number of ship moves per hour in Puerto Nuevo was 59 in 2015, up from 52 in 2014, although it is not entirely clear what definition of ship moves per hour was used to arrive at these numbers. On the same indicator, a few differences between terminals were noticeable, with Terminal 4 scoring consistently higher scores than Terminals 1-3 and Terminal 5 scoring the highest monthly score, namely 80 container moves per hour in November 2015. Such indicators are not available in the public domain for the Exolgan terminal.

In addition, many ships calling the port of Buenos Aires face waiting times before entering the port. Our numbers over 2015 show that approximately half of the vessels calling the port of Buenos Aires wait at the La Plata anchorage point; the average waiting time for these ships is 0.5 day. Delays in maritime access to the port are related to one-way traffic in parts of the access channel; some of these delays are related to priority for passenger ships, such as cruise ships, priority for LNG vessels and slow speeds when Panamax bulkers come down from Rosario of San Lorenzo.

Figure 7. Ship turn-around times in Buenos Aires and other ports (2015)



Source*:* ITF elaboration based on data from Lloyds Intelligence Unit.

Dwell times in container ports do not seem to be structurally measured, at least, we have not come across specific container dwell time data in Puerto Nuevo; this could be a serious concern if it indicates that such numbers do not exist, because it would be difficult to manage if unmeasured. Some indicative observations could be drawn from World Bank's Logistics Performance Indicators for Argentina. Its 2016 data indicate an average export lead time in port or airport supply chain of two days, and four days for

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imports. A considerable share of this lead time seems related to inspections: clearance time without inspections is on average one day, but four days in case of physical inspections. Physical inspections take place in 28% of the imported shipments. One of the scores on sub-items in the LPI in which Argentina scores well below the average of peer countries is on customs (World Bank, 2016). This observation is confirmed in other studies: almost 30% of Argentinian firms in manufacturing perceive customs and trade regulation as a major constraint for doing business, the worst score found among Latin American countries (OECD/UN-ECLAC/CAF, 2013).

The costs of container transport via Buenos Aires are relatively high. The average cost of import (via port or airport) in 2014 was USD 1 670 in Argentina; this was USD 1 015 for Brazil (World Bank, 2014). Part of the difference in price might be related to relatively high port costs in Buenos Aires. According to Filadoro and Sanchez (2016), 23% of the costs of a container vessel calling Buenos Aires are related to the toll for the access channel and 14% for pilotage services needed to navigate on the access channel. These costs translate in USD 49 per TEU and USD 30 per TEU respectively.

Hinterland connectivity

Considering the port's central role in the national port system, hinterland connectivity is a crucial element. Its hinterland is extensive: it not only includes the province of Buenos Aires, main centre of population and economic activity, but also various other regions of Argentina, in particular the northern provinces of Cordoba and Santa Fe. Considering that a high share of Argentina's exports (more than 65%) is time sensitive (OECD/UN-ECLAC/CAF, 2013), smooth connections with the hinterland are all the more relevant.

Road transport is the dominant hinterland transport mode. Although there are no official statistics on this, it is estimated that 93% of the containers handled in Puerto Nuevo are transported by truck, 6% by train and 1% by barge. Although such shares are not unusual in South America – and indeed globally – it is also clear that various ports have managed to achieve a more balanced modal share. In the case of Argentina, this would be perfectly possible considering an extensive network of railways and navigable waterways that were used in the past.

The high modal share of trucks, in combination with the location of the port, results in high interference of port truck traffic with regular urban road traffic. Port traffic uses main central city road axes, such as the Madero-Huergo axis that links Puerto Nuevo and Dock Sud and that carries 10 000 truck movements per day (Figure 8). This situation is exacerbated by the lack of truck waiting areas, which means that waiting times at the port gate translate to congestion of the urban road network.

Argentina has an extensive railway network, but it has suffered from poor maintenance in the past. Of the 37 000 kilometres of railway network, only 18 000 kilometres are operational (CNRT, 2015) A large part of the railway network is in mediocre shape and does not support heavy loads, even at low speeds (Martínez, 2014). The system is operated by four different operators, three of them private concessionaires operating since the 1990s. The inter-operability of the whole network is challenging as there are three different rail gauges. One of the challenges for the port of Buenos Aires is the linkage to the railway network. Urban rail traffic gets preference, therefore container trains use night hours for operation. Most of Argentina's railway branch lines have traditionally served its inland waterway and most of the maritime ports, yet most ports have gradually lost their railway links. Puerto Nuevo has rail access to the north and south of the port, but both connections are somewhat complicated by illegal land occupancy and informal settlements.

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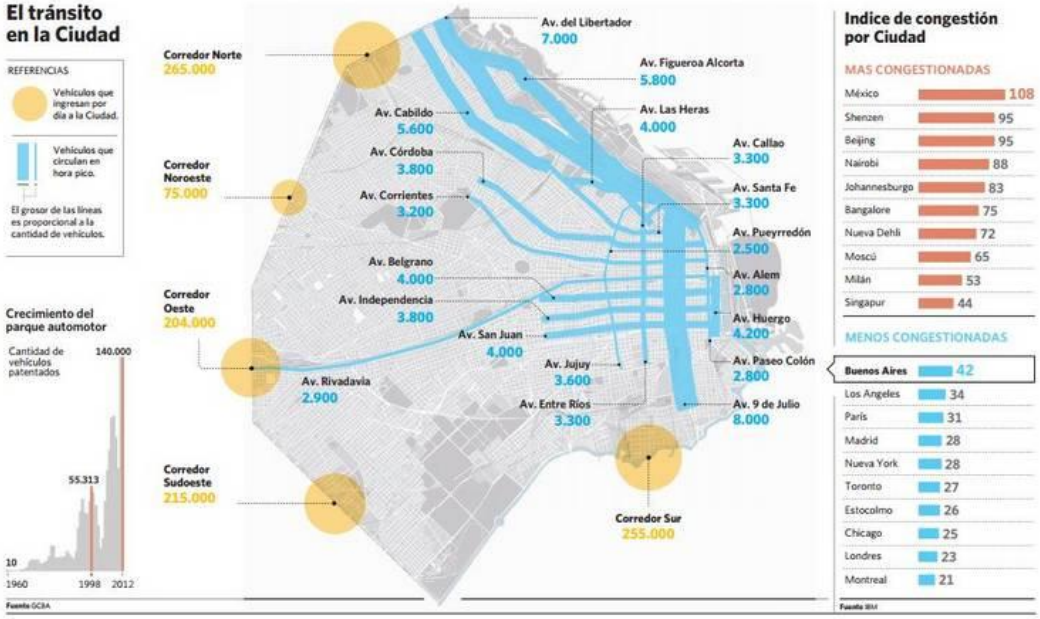
Figure 8. Road congestion in the city of Buenos Aires



Note: This figure indicates the level of road congestion in Buenos Aires. The yellow numbers indicate the daily amount of cars passing through the respective points. The blue indicates the hourly number of cars in peak hours at the respective places.

Source*:* http://www.clarin.com/ciudades/atascos-calle-crecen-tiempos-viaje_0_955704555.html.

The River Plate estuary is strategically located at the mouth of the Paraguay-Paraná river complex. This is a huge navigable river-system connected to Argentina, Bolivia, Brazil, Paraguay and Uruguay, providing potential for freight transport. Current use is fairly modest: in 2010 around 14 million tonnes of freight were transported on it. According to World Bank (2010), Argentina makes use of the river in four different ways:

1. to move domestic dry bulk from the northern regions to the transfer area in the River Plate estuary
2. to receive cargo from upstream countries, such as soy and iron ore, for processing in its manufacturing plants
3. to transfer freight to ocean-going vessels
4. to facilitate imports to Paraguay and Bolivia, such as fuel and wheat.

The principal river container traffic flow of Buenos Aires is with Asunción; smaller flows connect Buenos Aires with Zarate; and there is an incipient flow from Rosario to Montevideo. It should also be noted that Uruguayan port of Nueva Palmira is a major transfer port for the inland waterway transport.

There are various infrastructure constraints on the Paraguay-Paraná river-system, related to limited depth, signalling, maintenance, high costs and union working conditions. No less than two dozen studies since 1962 have suggested recommendations to improve the navigability of the river system but progress has been slow, basically related to a lack of international co-operation. Co-operation between the five countries of the river-system is needed as the costs and benefits of improvements are unevenly distributed. Argentina has the most to gain from improvements of the river-system, whereas most of the

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costs would be incurred in Bolivia and Paraguay. In such a context, national or bilateral measures can at best only partially resolve the challenges.

Consequently, the costs of hinterland transport are high in Argentina. The average land transport costs of importing a 40-feet container in 2014 were USD 2 943 in Argentina and USD 1 191 in Brazil; these numbers are USD 1 842 and USD 1 000 for exporting via land transport. Data by CEDOL show that the logistics costs over 2016 have risen with 32%. This undermines the competitiveness of Argentina's exporting sectors, such as the soybean cluster (Gauthier et al., 2016).

Planning for the whole freight transport chain is complicated by the division of responsibilities over different government levels. The AGP is a federal body that acts as the port authority of Puerto Nuevo, the only port that has not been decentralised to provinces. In contrast, Dock Sud, the other port in the metropolitan region, is administered by the province of Buenos Aires. An additional layer of complexity is generated through the geographical proximity of the port to the city, which means that the city of Buenos Aires – not a stakeholder in the AGP – has limited incentives to accommodate demands of the port – and might indeed be more focused on using parts of the port land for urban development. The division of responsibilities over different government tiers also complicates planning and governance with regards to connection of the port to the hinterland.

Future requirements for container ports

Future requirements for container ports are shaped by future demand for containerised transport services and probably even more important: the way these containers will be transported. Important elements in this respect are the size of containerships and consolidation of the industry, which will determine port network structures.

Future trade projections

The long-term trade prospects for Argentina – and the Buenos Aires region - are favourable. This can be concluded from the prognoses of the ITF Freight model, which projects the flows of 18 different cargo types between 226 places in 84 different countries (Martinez et al., 2014).[2] For the Buenos Aires region the model foresees trade volumes in 2050 to be five times the volumes of 2010. This would be driven by strong growth in exports of manufactured goods and food. The question is how such trade growth might translate into growth of containerised transport. Some of Argentina's major exports, grain and soy, are currently mostly transported as bulk goods, not in containers. Yet, it would be possible to transport these in containers – as long as oil prices are low - since similar products are transported thusly with low container freight rates. Focusing on high value added export products might be a way to avoid the current empty backhaul containers from Buenos Aires, which represents almost half of all outgoing containers at the moment. Depending on assumptions of containerisation rates, demand for containerised transport to the Buenos Aires region could rise with a factor of three to four by 2050.

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Container ship size

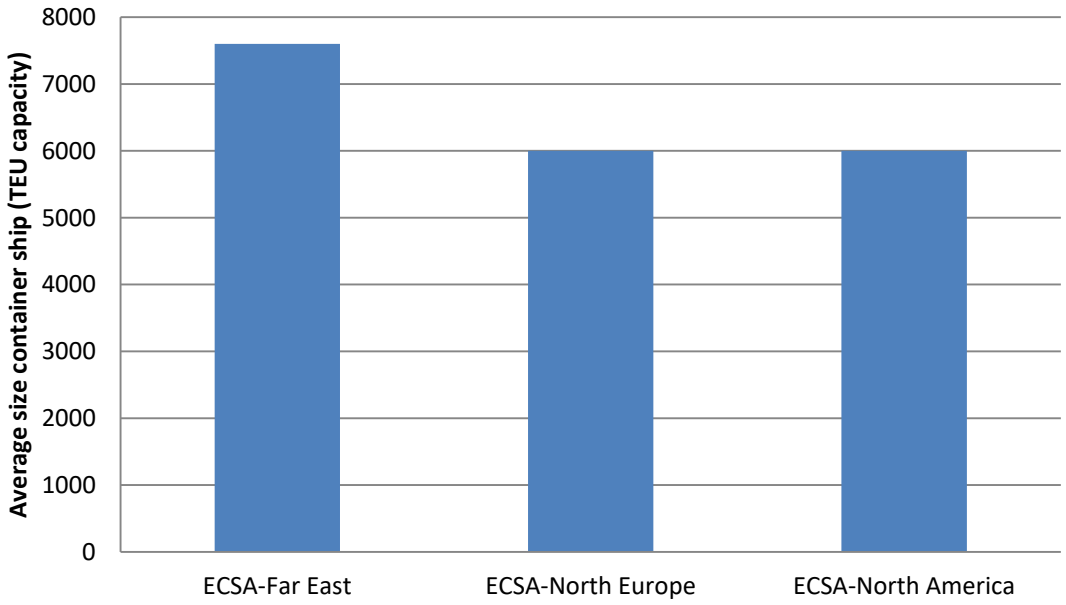
Container ship size has quadrupled over the last two decades (ITF, 2015). The average global container ship capacity in 2016 was around 4 000 TEU, with the largest container ships able to carry 19 200 containers. The increase in container ship size is driven by the quest for economies of scale, in particular on the Far East-Europe trade line where the largest ships are deployed. This deployment has effects on all maritime trade lanes, via cascading of vessel types: due to the new larger ships, the ships that were used previously on Far East-Europe trade lanes will become superfluous and will be used on other trade lanes, such as Transpacific routes; the ships previously used on this trade lane may then be used in other trade lanes, and so on. These cascading effects also touch the East Coast of South America.

Table 3. Dimensions of container ships

Vessel	TEU capacity	Length (m)	Width (m)	Draught (m)
MSC Oscar	19 200	399	60	16.0
CMA CGM Tigris	10 600	300	48	14.8
Hamburg Süd Cap San Nicolas	10 500	333	48	14.0
Hamburg Süd Santa Clara	7 100	299	43	13.5

Source: ITF elaboration based on data from Dynamar and SeaIntel.

Figure 9. Vessel size on selected East Coast South America trade routes in 2016



Source: ITF elaboration based on data from Dynamar and SeaIntel

The ECSA trade route in which the largest containerships are used is with the Far East. The average ship capacity on this route was 7 600 TEUs in 2016, slightly larger than the capacity of the Santa-class ships of Hamburg Süd. The average ship capacity is lower on trade lanes with North Europe and North America, namely 6 000 TEUs (Figure 9). The largest container ships that has called the port of Buenos Aires is the CMA CGM Tigris that has a capacity of around 10 600 TEUs. A more or less similar carrying capacity is

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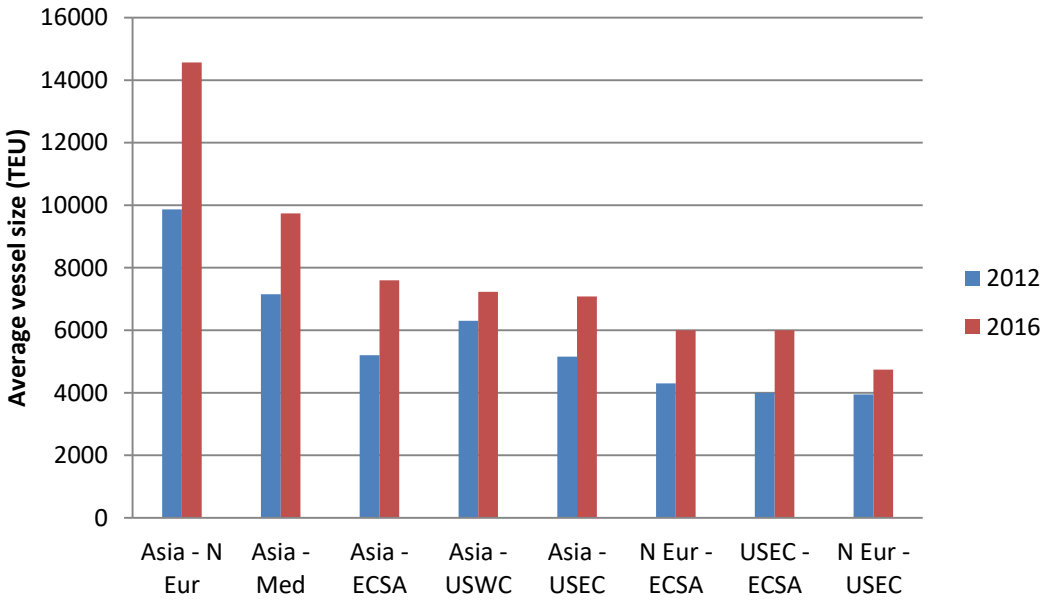
reached with the "Cap"-class ships deployed by Hamburg Süd, an example of the tailor-made ships for South America, with shallower draft compensated by length. These ships are considerably smaller than the largest container ship, the MSC "Oscar"-class deployed on Far East-Europe routes (Table 3).

The average container ship size calling Buenos Aires has grown substantially over the last years. This is part of a global phenomenon reflecting what happens on other trade lanes. Nevertheless, there are indications that the increase since 2012 has been particularly fast for the East Coast of South America (Figure 10). The average container ship size on the trade lane with the US East Coast has over 2012-16 increased with 50%, 46% on the trade lane with the Far East and 40% on the trade lane with North Europe.

Figure 10. Increases in vessel size on selected trade routes 2012-16



Source: ITF elaboration based on data from Dynamar and SeaIntel.

This trend of larger container ship sizes is going to continue over the next years. According to ISL's Container Fleet Forecast, the share of ships with more than 18 000 TEU will increase from 0.7 % in 2016 to 6.8 % in 2025, their number will increase from 35 to around 350 (Figure 11). Especially the large number of new orders for ships with 400 metres length and 59 metres beam will fuel the crowding-out of smaller units from the Europe-Far East trades. Within a short time, ships of 18 000 TEU and more will be standard on the major North Europe-Far East routes, while operators will continue to use smaller ships on the minor Europe-Far East routes such as Mediterranean-Southeast Asia. According to the cascade model, which estimates how ships will move from one trade area to another based on scale economies, the pressure to use much larger ships on the Transpacific trade (i.e. the "smaller" 18 000 TEU units crowded out of Europe-Far East) is imminent and ships of 18 000 TEU may be crossing the Pacific soon – even if the current 21 000 TEU ship design remains the largest until 2025.

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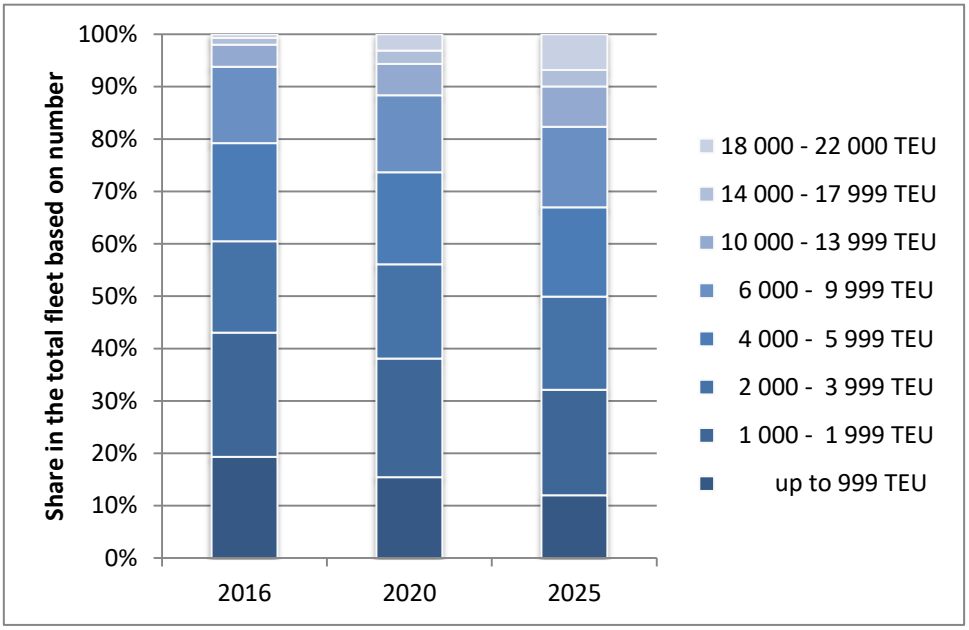
Figure 11. Container fleet forecast 2016-25 by size classes



Source: ITF (2016).

Through the cascade effect, this ship size increase will also affect South America trades. On the Latin America-Asia trade lane, we may soon see the first 18 000 TEU vessels trickling down from the major East-West trades. After further ordering of 20 000+ TEU from 2017/18 onwards (delivered after 2020), we may even spot first 20 000 TEU vessels on this route by 2025. The average ship size on these trades will grow substantially from 7 700 TEU in 2016 to 12 100 TEU in 2025. A rather surprising result of the model is the rather modest ship size growth until 2020 despite the Panama Canal opening, that can accommodate vessels with capacity up to 14 000 TEU. First, the services between Europe on the one hand and the Caribbean and the South American East Coast on the other hand are not affected as post-Panamax vessels are already used on this link. Second, despite the massive withdrawal of Panamax vessels from the fleet, there will still be many Panamax units looking for employment in the not-so-far future. Due to the age structure of the fleet, scrapping of Panamax vessels will accelerate after 2020 and lead to an acceleration of the cascade effect in the medium size classes, possibly moderated by the possibility of new SamMax vessels. Therefore, the average size on the Latin America-Europe services will increase markedly until 2025 (Figure 12). At the same time, many of the “old” 18 000 TEU vessels – today still the state-of-the-art for the major East-West trades – will be looking for employment elsewhere and may also be spotted between Latin America and Europe.

The average capacity of containerships calling the port of Buenos Aires could be around 12 000 TEUs for the trade lane with the Far East and 6 500 TEUs for the trade lanes with North Europe and North America in 2025. Disregarding draft limitations for a moment, the largest container vessel calling Buenos Aires by 2020 could have a capacity of around 14 000 TEUs and 18 000 TEU by 2025. The essential question is if the port of Buenos Aires – but also the other ports in ECSA - would be able to handle such a situation? And related to that, will the two mechanisms highlighted earlier, namely tailor-made ships and double dipping in Santos, still work in such a situation?

It is likely that the share of tailor-made ships for the South American market will decrease. Already now a significant share of the large ships operating in South America have cascaded from other trade lanes

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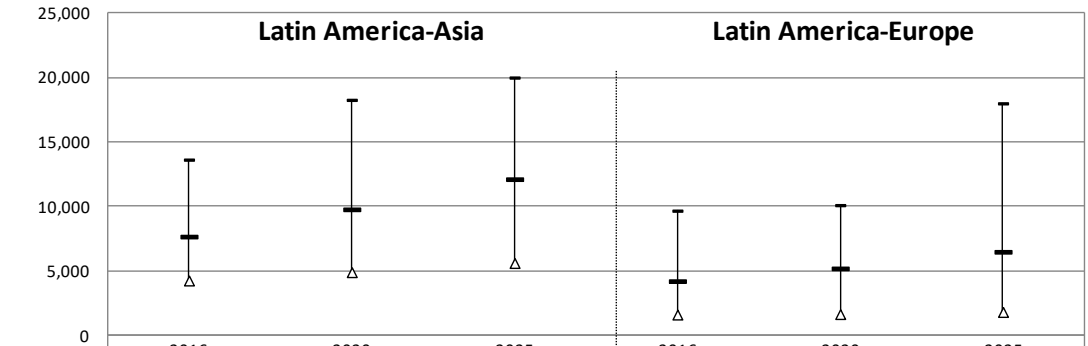
where these ships started their operations. The current situation of huge overcapacity and uncertainty over the future of trade – and with it the future deployment of ships – makes ship owners wary of ordering additional ships for one specific trade. This means that future container ship size will predominantly be determined by cascading effects, at least for the next decade.

Figure 12. Forecast of ships deployed on major intercontinental routes up to 2025



	2016	2020	2025	2016	2020	2025
△ Minimum	4,250	4,896	5,610	1,608	1,645	1,808
– Average	7,659	9,773	12,114	4,202	5,189	6,477
▬ Maximum	13,630	18,270	20,000	9,669	10,100	18,000

Source: ITF (2016).

Larger ships mean larger call sizes, so a larger amount of containers per ship. For Buenos Aires, located at the end of a string of ports in South America, this means that ships approaching the port of Buenos Aires will generally have deeper drafts than is currently the case. The average call size in Buenos Aires was 2 220 TEUs per ocean going vessel in 2015, 20% higher than the year before (AGP, 2015). These call sizes will of course be different according to the trade lane. The reason of the double dipping in Santos is that this is more beneficial for shipping companies than using Santos as a hub and adding feedering services from Santos to the other ECSA ports. This might change if the ships become too large to call the other ECSA ports effectively, so if the relative call size needs to decline to make calls still possible. This is influenced by conditions in Brazilian trade and ports, i.e. conditions on the whole port range. Cargo volumes from the Plate estuary are considerably smaller than the ones generated by Brazil, so the question is: why would Brazilian exporters prefer to have a very large ship around to Argentina more than 70% before they can use it for their exports?

Another consequence of larger ships and the related larger call sizes is more intense peaks to handle within the terminal. If cargo flows are less spread out over the week but come all at once, the container yard risks becoming quickly congested. So, larger ships increase the need for low dwell times and additional buffer capacity. The ports that are visited by larger ships also have larger terminal space to be able to handle the peaks in the yard.

It cannot be excluded that at some point in the 2020s there will be even larger ships than currently ordered. Studies show that 25 000 TEU and even 30 000 TEU ships would be technically feasible, to be deployed on Asia-Europe routes. Whatever one might think about the desirability or economic logic of this, the fact is that some ports have already prepared for 25 000 TEU ships, in terms of depth, quay length and yard capacity, so availability of suitable ports is probably not going to be a constraining factor for shipping companies. The result of such a development could be the emergence of ships larger than 18 000 TEU at the East Coast of South America.

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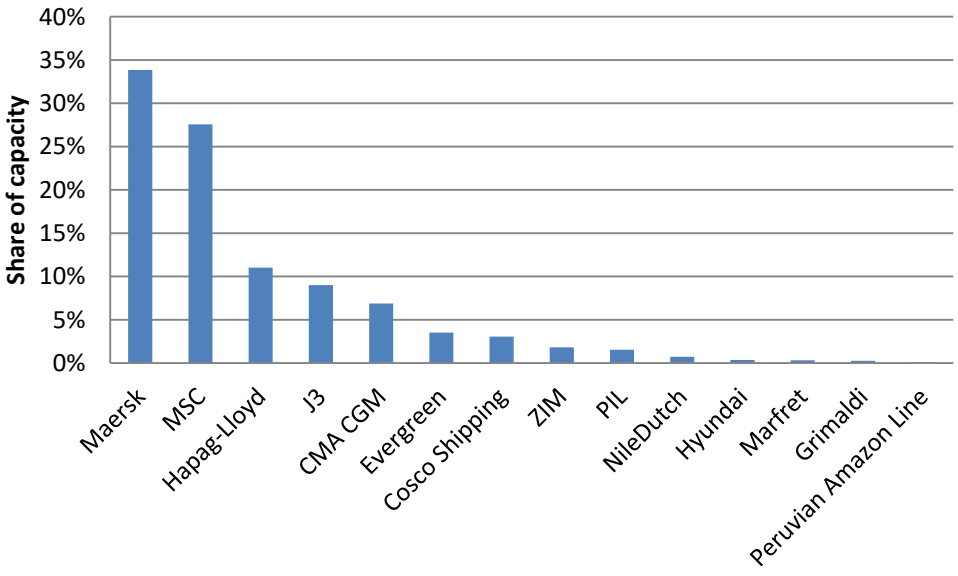
Industry consolidation and alliances

Recent years have been characterised by increasing consolidation in container shipping. Various mergers have led to a much more concentrated industry; when all the currently announced mergers are operational in 2018, the top seven carriers will have a global market share of 77%. In parallel, the coverage of alliances has increased and since April 2017 the number of alliances has been reduced from four to three. These developments playing out at a global scale have clear impacts on the ports system on the East Coast of South America.

The container shipping industry active in East Coast South America will in turn become highly concentrated: we estimate that the two dominant firms will have around 62% of the market share in 2018, when all of the currently announced mergers are operational. In 2018, the top four carriers might have a market share of 82%; this was 67% in 2010, already an indication of high concentration (Figure 13). The recent merger between Hapag Lloyd and CSAV, made Hapag Lloyd the third carrier in ECSA in 2015. The merger that had the biggest impact is Hamburg Süd-Maersk, respectively the second and fourth carrier active in ECSA. Competition authorities have approved that merger only under the condition that the merged entity gives up some of its combined network in South America.

Figure 13. Potential concentration rates of carriers active in ECSA in 2018



Source: ITF elaboration based on data from Dynamar and SeaIntel.

The global developments with regards to alliances will have less impact. In contrast to the East-West container trades, vessel sharing agreements on the ECSA are more flexible and do not follow the general pattern for the major East-West trades. We would expect that competition authorities would prohibit 2M (Maersk-MSC) joint services to ECSA, considering their projected market share of 62%.

Regional port competition

Increasing ship size and alliances could give rise to concentration of port systems. With stable cargo flows, the combination of bigger ships and industry consolidation leads to less service frequency and less

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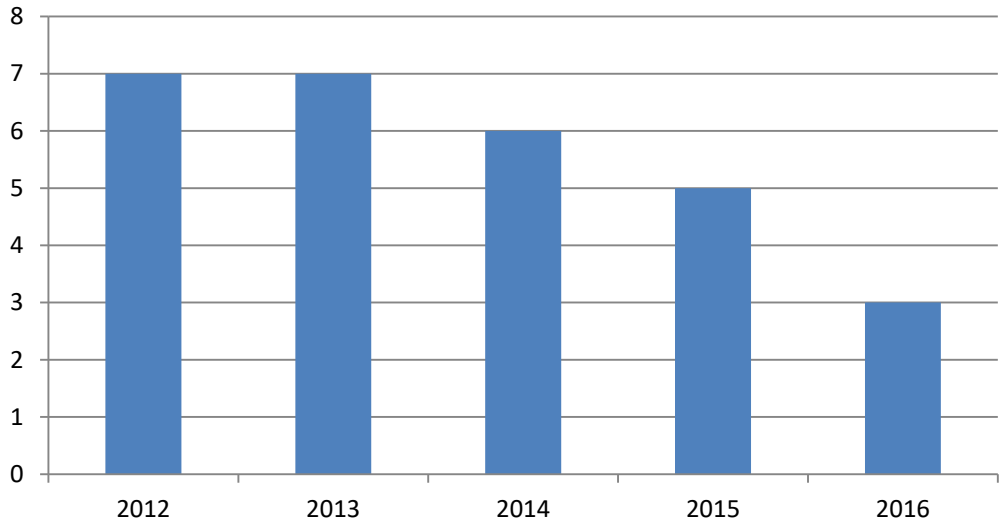
direct port-to-port connections. This is happening in many world regions, including in East Coast South America. For example, the number of weekly ECSA-Far East container services has declined from seven in 2013 to three services in 2016 (Figure 14). Similar reductions in service frequency have taken place on other major ECSA trade lanes: with North Europe, the Mediterranean and North America. This means increased peak concentration in the ports used in these services. The reduction of the number of different ECSA ports visited is not yet taking place on all trade lanes, but has been observed on the ECSA-Med trade lane (from 16 ECSA ports in 2013 to 13 in 2015) and the ECSA-North America trade lane (from 17 ECSA ports in to 15 in 2015) (Dynamar, 2015). We already mentioned that bigger ships have led to larger absolute port call sizes, which means requirements for deeper drafts. The additional effect of alliances is a reduction of the number of ports called at, so larger relative call sizes for some of the larger ports. Some of the smaller ports in the string of ports will be left out of the loops, increasing the share that the remaining ports will handle. In terms of consumer markets, Buenos Aires would be well placed to increase market share; the challenge is how to accommodate larger call sizes, considering draft limitations and peak effects. If no convincing answer is found to these challenges, it is likely that other ports will take market share from Buenos Aires. There is port competition in the region that makes this a real possibility.

Figure 14. Weekly ECSA-Far East container services 2012-16



Source: ITF elaboration based on data from Dynamar and SeaIntel.

Regional port competition takes different forms. For the gateway traffic from and to the larger Buenos Aires region, Puerto Nuevo and Exolgan continue to be the most logical choices, but TecPlata could be an alternative provided that it improves its hinterland connections. If maritime accessibility and spatial constraints in Puerto Nuevo do not improve, shipping companies might reach a point where leaving Buenos Aires out of their direct intercontinental connections is beneficial. Traffic to and from Buenos Aires could in that case be assured via feedering services with ports like Montevideo, Paranagua or Santos. With regards to transhipment cargo, it should be noted that Buenos Aires is the dominant container port in Argentina, but in fact not used as the main hub for other Argentinian ports. A large share of Argentina's grain exports is transported via the port of Rosario to deep sea ports like Santos where it is transhipped to larger ships before continuing. Similarly, much of the cargoes coming from the south of Argentina use ports like Bahia Blanca, Ushaia, Puerto Deseado, Puerto Madryn and Mar del

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Plata to go to Montevideo or South Brazil where the cargoes are transhipped to larger ships. Using the port of Buenos Aires is not an option as it adds cost and travel time considering its location more than 200 kilometres upstream on the River Plate. Although enough cargo flows are generated in Argentina to justify an Argentinian container port hub, the upstream location does not make Buenos Aires suited to such a role.

Policies to adapt to future requirements

Bigger ships, industry consolidation and increased trade will pose numerous challenges for the port of Buenos Aires, already constrained by modest performance. Policies have been adopted to improve this situation; these are reviewed in this section and additional potential measures are discussed.

Current policies

Improving trade and infrastructure is central to the agenda of the Macri government that took office December 2015. Its medium-term strategic framework focuses on four critical priorities: poverty eradication, economic reforms to boost longer-term productivity growth, improved governance and global integration. As part of its economic reforms it intends to facilitate international trade and invest in infrastructure, including in ports, railways, roads and waterways. As part of its priority of global integration, the government wants to engage in trade talks on various fronts. Since it took office, the government has brought import licenses in line with WTO procedures and lifted or reduced export taxes.[3] These trade-friendly measures will facilitate the maritime trade of Argentina and growth in cargo handling at Argentinian ports.

The government's transport agenda for 2016-19 contains many elements that should improve freight transport and maritime trade in Argentina. It is based on three strategic pillars (infrastructure investment; connectivity and safety; quality and sustainability), covering all modes and providing an investment envelope of USD 30 billion. While most of these funds are reserved for roads, a substantial part is also to be invested in freight rail and ports (Figure 15), in particular the port of Buenos Aires (USD 1.5 billion). Goals to be achieved in 2019 include an increase of rail freight transport of 50% and faster and more reliable water transport.

The question is how government policy addresses the main challenges related to the port of Buenos Aires, as identified in previous sections. This will be treated below, by assessing policies on container terminal capacity, port-city interfaces, hinterland connectivity and governance.

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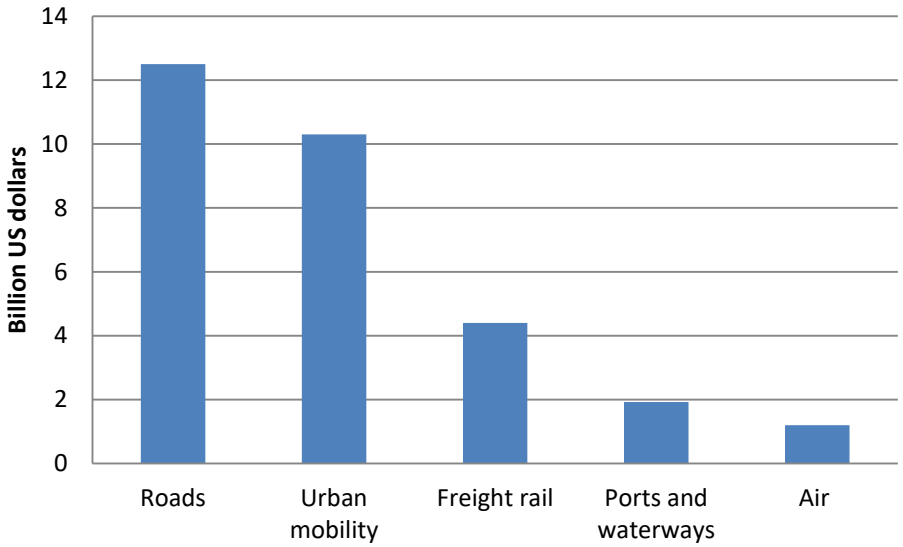
Figure 15. Planned government investments in transport 2016-19



Source: ITF elaboration based on data from Argentina government.

Container terminal capacity

The immediate concern is to secure container handling capacity, considering the imminent expiration of concessions of the three container terminals at Puerto Nuevo. The concessions of all three container terminals will expire in the course of 2019. Expiration in 2019 was intended at the granting of the concessions for Rio de la Plata and Terminal 4. The concession for Terminal 5 officially expired in October 2012, was then temporarily extended and then granted an additional extension of five years in 2015 (Table 4). Although AGP, the port authority of Buenos Aires, did not intend to grant extensions of the concessions or renegotiate contracts for existing concessions, it will extend existing concessions to 2020.

Table 4. Expiration of container terminal concessions at Puerto Nuevo

Terminal	Concession-holder	Expiry date
Terminal 1-2-3	Rio de la Plata	November 2019
Terminal 4	APM Terminals	February 2019
Terminal 5	BACTSSA	October 2019

Source: ITF elaboration.

AGP has formulated a plan to make the port ready for the largest container vessels. This plan essentially consists of land reclamation in the current port, which will transform some of the current finger piers into linear quays. This new port layout would make it possible to accommodate 14 000 TEU ships with a length of 365.5 metres and beam of 51.2 metres. A crucial element of the plan is to move from three to one container terminal, which would increase terminal size. The needed investments are stated to be USD 1.2 billion, half of which would be paid by the Argentinean government and the other half by the new terminal operator. The duration of the new concession is said to be 50 years or 35 years with a possible 15 years extension.

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Hinterland connectivity

The government has announced major infrastructure investments that should improve the freight transport system connecting the ports to their hinterlands. In particular this is the case for the investments in road infrastructure and freight railways, specifically aimed at better connecting North West Argentina. We have not come across a strategic analysis by the government identifying the largest bottlenecks, the main current and potential freight flows and where it would make most sense to improve networks. So, at this point it is difficult to assess how current infrastructure investments might improve the freight transport network.

Government policy with respect to hinterland connectivity of the port of Buenos Aires might have mixed results. An important project in this respect is the Paseo del Bajo project that will connect the Buenos Aires-La Plata and Illia highways, whilst creating new green spaces in the El Bajo area of Buenos Aires. Its aim is to relieve congestion in the city and improve the North-South connections with 12 new lanes over six kilometres, including a semi-underground road of four lanes intended for heavy vehicles. This new access will allow freight traffic to exit the Buenos Aires-La Plata highway, cross the centre without traffic lights and to enter the port directly, which could improve travel times. Yet, as part of the works associated with the Paseo del Bajo project, the national government is putting some key port land up for sale: the railway sidings at Empalme Norte (Retiro) and practically all of the customs warehouses adjacent to the container handling facilities in Puerto Nuevo. This might complicate railway access and detract from value added logistics services in the port: it takes rear space away from the port necessary to keep the port operational.

How well are policies adapted to future requirements?

The AGP proposal foresees deepening of the access channels in the River Plate to 11 metres. Earlier we showed that the arrival of 14 000 TEU ships in Buenos Aires by 2020 and 18 000 TEU ships could be the outcome of cascading effects from current and future ship orders of mega containerships up to 2020 and 2025. Considering that most of these ships are not tailor-made for South America, a depth limit of 11 metres would impose limits on the extent to which these ships could be loaded when calling Buenos Aires. None of the generic containerships would be able to call Buenos Aires half loaded or more; ships up to 10 000 TEU could only call at the port if loaded at 25% of capacity (Table 5). Ships with a capacity larger than 10 000 TEU would only be able to call Buenos Aires if loaded less than 25%. Dredging the River Plate to 12.8 metres is generally considered to be the maximum feasible, considering geology and other characteristics of the river. Dredging to that depth would make it possible to have calls from ships with capacity up to 20 000 TEUs as long as these are not loaded beyond 25% capacity.

The proposal for restructuring of the container terminals would increase yard space, but only fairly modestly. The current container yard space of the three terminals together is 77 hectares; in the proposal this would increase to 91 hectares. One could wonder if this will provide the appropriate buffer capacity needed for handling larger ships. It is well-known that the number of unproductive yard moves (reshuffling) increases exponentially when yard utilisation rates exceed 80%. The high call sizes of larger ships create peaks during which these critical thresholds are exceeded – unless considerable changes in procedures are considered. In order to avoid this, some buffer capacity is needed. It has been shown that doubling average ship size calling at a terminal requires around a third more yard capacity, if terminal congestion needs to be at similar levels (Drewry, 2016). Ship size is increasing quickly; in ECSA average ship size increased 40-50% between 2012 and 2016 and is expected to rise at similar pace in the coming years. This suggests that the buffer capacity created by the additional yard space is fairly limited. This

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means that congestion of the container yard can only be avoided by increasing the quay side productivity, decreasing dwell time in yards and improving port gate policies.

Table 5. Draft requirements of container ships according to size and utilisation rate

	Draft requirements with utilisation rates of:			
Ship capacity	100%	75%	50%	25%
> 20 000 TEU	18.0	16.2	14.4	12.6
≤20 000 TEU	16.5	14.9	13.2	11.6
≤15 000 TEU	16.0	14.4	12.8	11.2
≤10 000 TEU	15.5	14.0	12.4	10.9
≤5 000 TEU	14.0	12.6	11.2	9.8
≤3 000 TEU	13.9	12.5	11.1	9.7

Note: This table reflects generic designs of containerships, not tailor-made SamMax ships.

Source: ITF elaboration based on data from Palsson et al.

If container volumes grow by a factor of three to four as predicted by our freight model, there will be a moment in the next three decades when demand will exceed projected container terminal capacity. In the short term there certainly is not a lack of container port capacity – although most of this capacity might not be suitable for the ship sizes that will soon come to the East Coast of South America. Currently available capacity (almost 3 million TEU handling capacity in the Buenos Aires region) is around double the volume handled. If all of the possible extensions and announced plans would be realised, this capacity would even rise to almost 4 million TEU.

Table 6. Maximum capacity of main ECSA container terminals

Terminal	Current capacity (mln TEU)	Max. future capacity (mln TEU)
Dock Sud (Buenos Aires)	0.9	1.1
TecPlata	1.0	1.0
TCP (Montevideo)	0.9	1.9
Tecon Rio Grande	1.1	2.0
Tecon Paranaguá	1.5	2.5
Brasil Terminal Portuario (Santos)	1.5	2.2
Embraport (Santos)	1.2	2.5
Tecon Santos	2.0	2.4

Source: ITF elaboration based on data from Dynamar, Drewry, terminal operators and port authorities.

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Table 7. Projected capacity of Buenos Aires container ports

Port	Volume 2015	Capacity 2015	Max. planned capacity
Puerto Nuevo	1.0	1.5	1.8
Dock Sud	0.5	0.9	1.1
TecPlata	0.0	0.5	1.0
Total	1.5	2.9	3.9

Source*:* ITF elaboration based on data from Dynamar, Drewry, terminal operators and port authorities.

Suggestions for policy

The government can be commended for its willingness to solve challenges related to the freight transport system. Infrastructure investments might solve bottlenecks and the focus on improving the port of Buenos Aires could reduce transport costs and thus facilitate Argentina's trade. The government has made a principled choice to open a public tender with competitive bids. The AGP has come up with a proposal based on the assumption that the port of Buenos Aires is only viable in the future if it has fewer but larger terminals with linear quays. Although these ideas are correct, one can wonder if the proposal in its current form will appeal to potential bidders.

The proposal for Puerto Nuevo is framed as a solution for the long term, but it is most likely only a solution for the short – and possibly medium – term. The rapid increase of container ship size, consolidation of the container shipping sector and rationalisation of port networks means fewer but much larger call sizes. The container port of the future needs to be deep and large with a fast turnaround. The port of Buenos Aires is at this moment none of the above. The AGP proposal will only solve these challenges partially. It envisages the deepening of the access channel, but to a depth that will only be sufficient for a few years, so dredging would need to be guaranteed constantly for the next 35-50 years. In addition, it is not very clear how current bottlenecks – such as waiting time in the access channel, high ship turnaround times, long container dwell times and expensive hinterland transport – will be solved with the proposed changes. Moreover, the plan has a considerable price tag, to be covered by bidders for the two concessions. Future concessionaires would want to recover their investment costs, which means that the concession duration would need to be relatively long, e.g. 20-25 years.

Buenos Aires is an interesting market for a global terminal operator, but not against all odds. It is the gateway to Argentina, second largest economy in South America, with huge potential for growth. Not surprisingly, Buenos Aires is one of the few places on earth where all four large global terminal operators have a terminal. However, this is not a guarantee for future interest. The place of Buenos Aires within the port system of the East Coast of South America is under pressure. If other ports in the regions – with deep sea access and larger terminals – would become more attractive, shipping companies might decide to cut Buenos Aires out some of their loops if they have cheaper alternatives available, e.g. in the form of hub-and-spoke networks. So the interest of potential bidders cannot be taken for granted. This means that the task for AGP is delicate: it has a vision on what Puerto Nuevo could look like, but could end up with a lack of interest in the tender.

This is not an issue for Buenos Aires alone. The question at stake is: what is the most effective future container transport system for Argentina as a whole? This requires careful analysis of current and potential future trade flows and transport costs. The trade competitiveness of Argentina would benefit from the lowest possible transport costs for its exporters. This might be achieved in different ways;

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options could include using Buenos Aires, but also other ports that might not yet exist. More frequent and faster feedering connections could also be a way to provide value added to Argentinian shippers, avoiding some of the negative impacts of ever larger ships to a port that is highly constrained by its urban context. The expiration of the terminal concessions provides the opportunity to discuss such solutions. The risk is to create a lock-in of existing systems that look sub-optimal considering developments in ship size and the maritime industry. Ideally such a strategic examination might be undertaken before launching a public tender procedure for new container terminal concessions at Puerto Nuevo.

In case the government considers that the tender procedure needs to go ahead quickly, AGP might need to build in some safeguards for potential bidders. A safeguard would be needed with regard to possible future port development – in addition to Puerto Nuevo - that might be better suited to future requirements of shipping companies, and thus more attractive to terminal operators. Potential bidders for a new Puerto Nuevo terminal might want to be reassured that they would not be excluded from bidding or be disadvantaged in case there would be a future public tender in a few years for a new container port in Argentina. Even if the public tender procedure at Buenos Aires Puerto Nuevo would go ahead quickly, there is still a need to initiate a strategic discussion on how the container transport system of Argentina could develop in the future.

At a more strategic level, the evolution of a strategic vision on gateway performance in a competitive global economy raises questions about the role of local competition in a global economy. At some point micro competition can lead to fragmentation and time delays that are harmful in adjusting to the real competition which is global or continental. Local competition strategies, like those at the origin of the Argentina port reform of the 1990s, seem less appropriate for the Argentine economy in 2017. There are new policy options that seem better suited to efficient gateway performance and policy in the coming decades. Elements of such a policy could include: road investments; support for rail investments as long as industry is reorganised; port administration reform; dredging to selected ports, possibly with port corporate reorganisation; research and support for information technology to facilitate more efficient integration of port, inland transport and warehouse operations, based on a holistic view of freight transport flows in Argentina.

Notes

1 Prior to these reforms the port authority was the port of Buenos Aires and South Dock. The 1990s port law delegated ports to provinces, which meant that the South Dock became a port of the province of Buenos Aires.

2 The model takes into account changes in location, changes in value/weight ratio for products over time and reduction in "fixed costs" with distance. This work is part of the ITF Transport Outlook prepared by the International Transport Forum at the OECD. The projections are based on a global freight network model, using actual routes and related real distances, that converts trade in value into freight volumes in tonne-kilometres. These growth rates for specific cargo flows have been translated into growth projections of port calls of the corresponding ship types.

3 Export taxes on agricultural goods (including beef, wheat and corn) were eliminated. The tax on soybeans was reduced by 5 percentage points. Export taxes on almost all manufactured goods, including cars, textiles and chemicals, were lifted.

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The Container Port of Buenos Aires in the Mega-Ship Era

Can the container port of Buenos Aires be adapted to the demands of the mega-ship era? Ever-larger ships and the cargo peaks they cause imply new requirements for container ports. This paper examines strategies for Argentina's largest port, whose three container terminal concessions will expire in 2020.

International Transport Forum
2 rue André Pascal
F-75775 Paris Cedex 16
+33 (0)1 45 24 97 10
contact@itf-oecd.org
www.itf-oecd.org

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