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Public-Private Partnerships in Mexico, Panama, and Brazil: A Focus on Port Performance*

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Abstract

Purpose – This study examines the relationship between public-private partnerships and the performance of ports based on three factors: the quality of the port infrastructure, container throughput, and logistic performance in three Latin American countries, Mexico, Panama, and Brazil, for the period of 1994-2017.

Design/methodology – The selected countries are top ranked in terms of container throughput in Latin America. The methodology employs secondary data from the World Bank (Quality of Port Infrastructure, Logistics Performance Index, and Private Participation in infrastructure database).

Findings – Overall, the results revealed that the private investment of these countries varies significantly over the past couple decades. Panama, with the least public-private investment over the study period, performs better than Mexico and Brazil with regards to port quality infrastructure and container throughput. For ports in the selected countries to keep up with global competition, there is a need to enhance efficiency.

Originality/value – Compared with ports in Asia, Latin American ports are lagging behind with respect to container throughput and efficiency. This study suggests greater collaboration from the private sector, academia, and other organizations, as well as a review of the regulatory framework to ensure better transparency and project allocation. Throwing more light on the public-private investment environment of Mexico, Brazil, and Panama, this study offers policy makers and regulators insightful information on port infrastructure.

Keywords: Latin American Ports, Port Infrastructure, Port Performance, Public-Private Partnerships
JEL Classifications: L91, O10, O18, R42

1. Introduction

The growth of the world trade has brought about some problems for governments, especially those in emerging or developing economies such as Latin American countries due to a lack of infrastructure as well as financial problems.

Ports are under constant pressure to adapt to changes in economic, institutional, regulatory, and operational environments (Hoffmann and Sirimanne, 2017). Further, ports are an important source of income for both individuals and the country. As a result, proper functioning is crucial, and there is also a need for sustainable policies, adequate infrastructures, and support from governments with policies that motivate constant and long-term investment. One way to provide adequate infrastructure is through public-private

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partnerships (hereinafter PPP).

The participation of the private sector in the development of ports has been fundamental. PPPs have been portrayed as an important factor for port development in Latin American ports, specifically in the 1990s. During the restructuring of port models, PPPs have served as accelerators in the modernization of many regional ports, and also as a source of financing for governments.

Garcia-Escribano, Goes and Karpowicz (2015) focused on the transportation sector as a whole and analyzed Brazil's infrastructure with respect to investment, and concluded that Brazil's infrastructure is inadequate, and this huge barrier prevents Brazil from being globally competitive. Laventhal (2009, 46) pointed out that ports do not only contribute to national economic performance but also act as medium for creating jobs. Similarly, Flor and Defilippi (2015) stated that the cost of maritime transport is decided by factors including but not limited to how efficient a port is, and that the opposite could lead to a possible trade obstacle. They mentioned that the enhanced efficiency in some Latin American ports, Brazil for instance, might be partly due to a rise in private sector involvement in offering port services. Most recently, Munim and Schramm (2018), in their international studies, have empirical evidence in support of the benefits of quality port infrastructure. They investigated the relationship between logistics performance, seaborne trade, quality of port infrastructure, and the impact on 91 countries, including Mexico, Brazil, and Panama. Their results indicated that enhancement in logistics performance and quality of port infrastructure would be beneficial to a country's economy.

While previous research such as Tei and Ferrari (2018) covers all countries in Latin America and the Caribbean with regards to the transport (ports, airports, roads, and railways) sector in general (Garcia-Escribano, Goes and Karpowicz, 2015; Tei and Ferrari, 2018), this paper is particularly focused on port performance of the top three countries in Latin America (Mexico, Brazil, and Panama) in terms of container throughput or volume. In addition, compared to other regions, Latin America received the largest public-private investment over time. Since PPP's mechanism seems to have different results in developing countries, it is right to fill the gap in the port development literature by examining the roles PPP has played in the development of Mexican, Brazilian, and Panamanian ports. This study is necessary given that many ports are moving toward smart ports, which require a substantial amount of capital that cannot be wholly, in most cases, provided by one entity. As a result, is it appropriate to update the literature on PPPs in Latin American countries to investigate whether PPPs have achieved the desired results of improving port development.

The objective of this study is twofold. First, it examines how the port performance of three Latin American countries, Mexico, Panama, and Brazil, has been influenced by the degree of private investment they have received. For comparison, one Asian country, the Republic of Korea, is also reviewed briefly. Second, it investigates whether these private investments have achieved the desired purpose with regard to port development in the selected countries. The selection of these three Latin American countries is centered on a practical and theoretical perspective. With regards to the practical viewpoint, they are top ranked in terms of container throughput in Latin America. Theoretically, all three countries followed what Hoffmann (2001) referred to as the Latin American Model, which is the approach adopted by Latin American countries in engaging private sector participation, based on five features. Hoffman (2001) pointed out that Mexico and Panama are two countries that have successfully implemented private sector participation.

This is qualitative research based on secondary sources, which are drawn from journal articles, the World Bank database, and the official port websites of the selected countries. This study has three important contributions to port development literature. First, it has given an

account on public-private partnership of three significant countries in Latin America over more than two decades. Second, this study touches on the state of quality of the port infrastructure of Mexico, Brazil, and Panama that plays key role in international trade. Finally, this study compares the logistics performance index of the aforementioned countries.

The remainder of this study is organized as follows. Section II reviews public-private partnerships. Section III presents the participation of public-private partnerships in Latin America. In Section IV, we evaluate the port performance of the three countries, and Section V provides concluding remarks.

2. Literature Review of Public-Private Partnerships

According to the World Bank (2016), PPPs are a mechanism for government to acquire and implement infrastructure and services of the private sector. However, Panayides, Parola and Lam (2015) suggested a broader definition of PPPs as a cooperation between public and private sectors, developing products and services, sharing risks, costs and benefits, and creating mutual added value.

It is not uncommon to find PPP referred to as PPI (Public Private Investment), PFI (private finance initiative), or PSP (private sector participation). Tei and Ferrari (2018) noted that these terms are often used interchangeably. The distinction of PPPs lies in the collaboration between the government and private sector in order to provide infrastructure, or make services more efficient.

PPP is usually a long-term cooperative arrangement between two or more public and private sectors with a common goal of improving an existing (new) infrastructure or service. To achieve successful infrastructure investments, support of governments is required through different policies that promote the participation of private sectors in the medium-and long-term.

Hodge and Greve (2007) classified PPPs into financial and organizational dimensions. However, for the purpose of this study, we lean more toward the financial dimension. Hodge and Greve (2007) pointed out that PPPs are considered financial tools that enable the public sector to have access to private financial capital in a way that improves the possibilities of both the government and the private company.

These partnerships can involve new projects, or simply projects under existing infrastructures. PPPs can take different forms, including Build-Own-Transfer (BOT), Build-Own-Operate (BOO), Build-Lease-Transfer (BLT), Rehabilitate-Operate-Transfer (ROT), Build-Transfer-Operate (BTO). Hence, having several forms of partnerships allowed PPPs to be flexibly embraced (Adeoye and Islam, 2019). Hodge and Greve (2007) referred to this as contractual arrangements. The infrastructure can be completely private or public at the end of the partnership, depending on the type of private involvement in a project (Tei and Ferrari, 2018).

Numerous studies have also pointed to the negative effects of PPPs. Because public and private partners have different orientations, such partnerships can also be a source of conflict of interest (Rosenau, 1999). Some studies have documented the lack of transparency, reliability, or corruption (e.g., Adeoye and Islam, 2019; Hemming et al., 2006; Marks, 2013) with respect to institutions or processes.

Rosenau (1999) mentioned that while the private sector seeks to develop markets, recover returns of invested funds, and take risks, the public sector tries to exert political influence, legislate, and minimize risks. Hemming et al. (2006) pointed out different risks involved in PPP projects such as construction risks, financial risks, availability risks, demand risks, and residual value risks. In developing countries, the participation of private partners seems to be

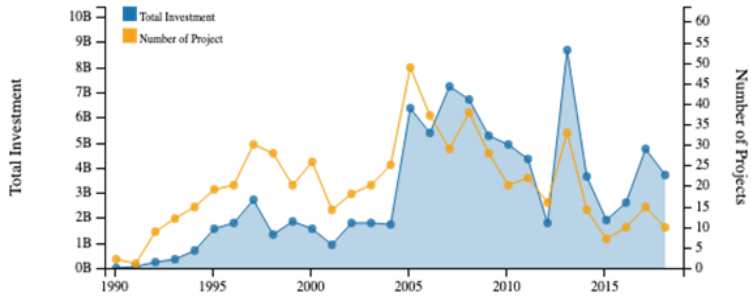
less attractive. This may be partly due to the financial risk involved on the part of private investors. In order to reduce this risk, some governments provide excessive guarantees to make projects more attractive for private investors. Colombia, South Korea, and Mexico have some cases of excessive fiscal risk, in which the government had guaranteed a huge part of private investments. For instance, in Colombia during the 1990s, guaranteed revenue on toll roads, an airport, and payments by utilities that entered into long-term power-purchase agreements with independent power producers. Even though the guarantees encouraged valuable investments, a lower-than-expected demand and other problems required the government to make payments of US$2 million by 2005 (Irwin, 2007, 110; World Bank, 2014). In addition, South Korea experienced a similar situation in the 1990s when the government guaranteed 90 percent of forecast revenue for 20 years on a privately financed road linking Seoul to the airport at Incheon. When the road opened, traffic revenue turned out to be less than half the forecast, and the government had to pay tens of millions of dollars every year (Kim Jay-Hyung et al., 2011; World Bank, 2014).

3. Public-Private Partnerships in Latin America

3.1. Statistical Overview of International PPP

The interest of countries to operate more efficient ports and improve competitiveness begun in the mid-nineties. Political reforms that enhanced PPP in the port sector through investments with amounts exceeding previous decades were enacted in most emerging and developing countries. For example, South Korea designed a PPP Act in 1994, Mexico in 1993, Brazil in 1994, and Panama in 1995. Fig. 1 shows the global trend of PPPs in ports for the period 1990 - 2018. It is clear that the largest investment, with an amount of US$ 8,676.010 million, took place in 2013. As expected, the total investment in the nineties is relatively low compared to the later year of 2005. This might partially be attributed to the introduction of PPPs in the early nineties in most developing and emerging countries, as indicated above.

Fig. 1. PPPs Worldwide (1990-2018)



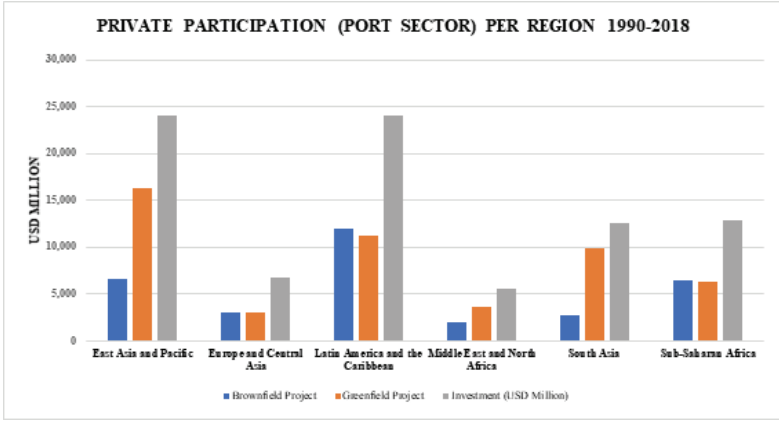
Note: 2018 is only for the first half of the year.
Source: World Bank (2018b).

Interestingly, as Fig. 2 shows, most PPP projects in Latin America and the Caribbean (LAC) are brownfield, while projects in East Asia and the Pacific are greenfield.

The development of ports implies well-structured, long-term projects, together with efficient management of resources. However, governments do not always have the financial

resources or the know-how. As a result, they cannot create an institutional environment that facilitates the success of projects. To address these disadvantages, some governments seek countries with certain similarities and analyze how they overcame these problems. Our review of the port development literature indicates that some Asian countries in general, and South Korea in particular, faced similar problems to many Latin American countries with regards to private participation. In line with this, we briefly touch on the problems related to PPPs in South Korea.

Fig. 2. PPP per region (1990-2018)



Source: World Bank (2018b).

Choi Bong-Ho (2018) noted that South Korea experienced similar problems related to poor port performance about three decades ago. Bagchi and Paik Seung-Kuk (2001) noted critical areas of inadequate capacity, insufficient infrastructure, and a lack of coordination as problems the port of Busan (among the major ports of South Korea) faced at that time. Consequently, PPPs began in 1995, similar to many Latin American countries. Kim et al. (2011) pointed out that by 2008, PPPs had reached KRW 3.7 trillion (3.3. US$ billion), and by 2009 Korea, had 203 projects, of which only 17 corresponded to ports facilities; they amounted for around US$6.4 billion. Presently, the port of Busan is 5th among container ports worldwide. Kim Yoon-Jeong, Ha Myung-Shin and Choo Sun-Ae (2018) noted that the speed at which South Korea overcame port problems was based on an action plan through a committee composed of both the public and private sectors aimed at improving port development. Bagchi and Paik Seung-Kuk (2001) concluded that the success of this experience was based on a close public-private partnership.

3.2. Port System in Latin America

An important topic noted when discussing PPPs in Latin American ports was the legal reform process that allows for private sector participation. Before port reforms, ports were owned by governments. Beato (1996) detailed two models of infrastructure provision in the 1980s; the traditional model, where the government is the owner and the manager of infrastructure, and the new model, where the private sector could lease concessions. This is the case of landlord ports, one of the four classifications for ports (Public Service Port, Private Service Port, Tool Port, and Landlord Port). In this case, activities related to superstructures

(equipment and buildings) and cargo handling are leased to private companies. Port administration, nautical management, and nautical infrastructure are exclusively responsibility of government.

Private participation was not an easy task for Latin American countries. For instance, Galvão, Robles and Guerise (2017) pointed out that Brazil experienced two port reforms. The first was in 1990 in response to a dissolution of a state-owned company, while the other was to boost private participation. In Mexico, the reform of port law in 1993 allowed for important changes for the ports. Villa (2017) pointed out that these changes consisted of the creation of the Planning Committee; an increase of 7 percent of the proposed investment in the amount of guarantees that concessionaires have to provide in order to develop terminals or other facilities, and the opportunity for the terminal concessionaires to increase the operation area beyond the predefined 20 percent when another similar terminal offers the same services. Interestingly, Panama is the only Latin American country that received support from the Inter-American Development Bank (IDB) in order to develop plans to offer concessions in 1995.

3.3. Private Participation in Latin America

PPP is different in each country and region. Political stability, reforms, and government interests could be some of the reasons influencing the degree of private participation. During the 1990s, international organizations such as the World Bank and International Monetary Fund pressured governments to privatize services and increase their dependence on the private sector. Concerning Latin America, Hoffmann (2001) studied the approach taken by the region, and called it the Latin American model. The model consists of five characteristics,: (1) the landlord type in most ports, with concessions for periods between 12 and 30 years and a mono operating system (the operator who had the concession was also providing the stevedoring services at a terminal); (2) a private specialized port and terminals; (3) new private ports; (4) strong foreign participation compared to other regions; and (5) except for Panama, in Latin America there were no hub ports competing with other ports.

Moreover, Wilmsmeier and Monios (2016) pointed out the importance of port infrastructure for the economy and the role of institutions created by port reform in the 1990s as a critical factor in Latin America.

Currently, Latin America is the region with the highest private participation from 1990 until the first half of 2018 (US$ 24,040 million), followed by East Asia and the Pacific (US$ 24,041 million), and Sub-Saharan Africa (US$ 12,825 million). Fig. 3 shows the evolution of PPI (Public-Private Investment) in the region. Private participation in most Latin American countries intensified as of 2007, and a decline in 2009 can be observed as a result of the global crisis.

It is evident that private investment received by the selected countries seems to differ with regards to amount from 1993 to 2017. Brazil appears to lead with a total investment of (US$ 12,495 million), followed by Mexico (US$ 2,799 million) and Panama (US $1,374 millions). Fig. 4 shows the distribution of the PPPs of the three countries compared with the rest of the world. Of the three selected countries, Brazil represents 15 percent of global PPPs. On the contrary, Mexico and Panama represent 3 percent and 2 percent, respectively.

Over the same time period, there appear to be no variations in PPP projects with regards to infrastructure. Put simply, all selected countries adopt, if not the same, similar contractual arrangements. They all adopt the build, operate, and transfer model and rehabilitate, operate, and transfer model. These are known as Greenfield and Brownfield, respectively.

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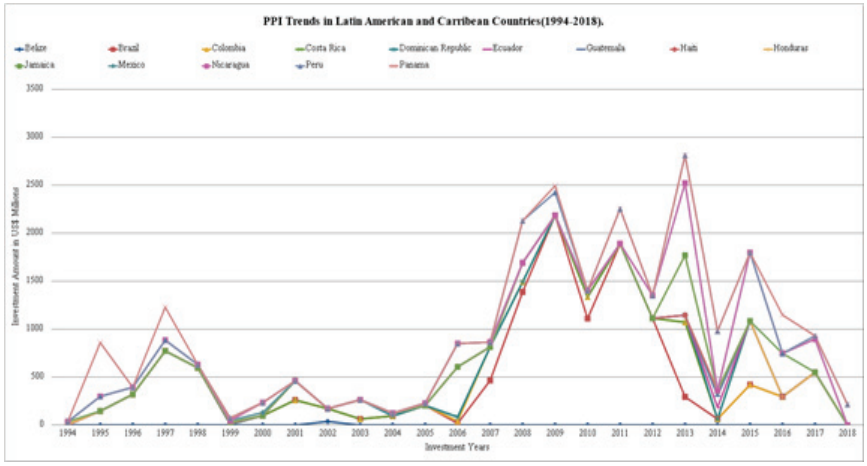
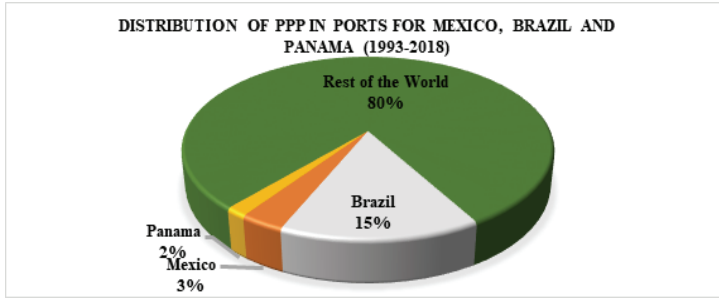
Fig. 3. PPPs in the Latin American Region



Source: Author's configuration from the World Bank (2018b).

Fig. 4. Distribution of PPPs (1993-2018)



Source: Author's configuration from the World Bank (2018b).

4. Port Performance in Latin American Countries and Policy Implications

Port performance can be measured by a variety of factors. However, for the purpose of this review, we focus on the quality of the physical infrastructure, volume of containers received, and the logistics performance of the selected countries.

4.1. Quality of Port Infrastructure

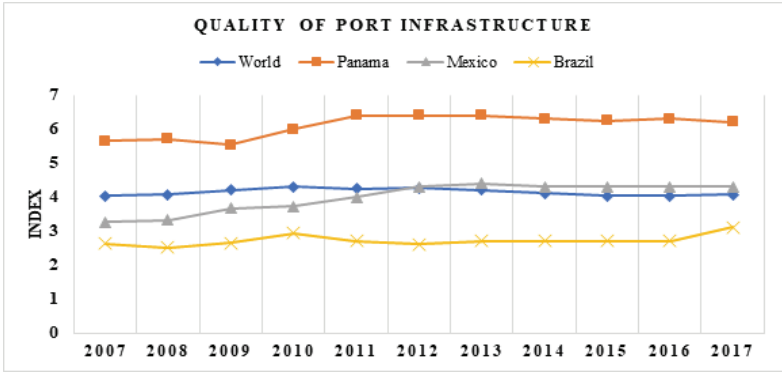
The quality of port infrastructure is very essential in terms of internal factors such as

delivery cost and time, along with reliability, and it gives a country competitive edge in the global playground. One way of improving the quality of a country's infrastructure is through private sector involvement.

All things held equal, the country with the highest investment among the three countries (in this case, Brazil) should perform higher on the quality of port infrastructure index. However, the result of this study shows the opposite. Interestingly, Panama, with the lowest investment from 1994 to 2017, seems to outperform both Brazil and Mexico. As indicated in Fig. 5, Brazil, with the highest investment, shows below average performance for all periods except 2010 and 2017. On the other hand, Mexico and Panama exhibit an upward trend from 2010 to 2013. This result appears to support the argument that PPPs in developing countries may be an obstacle for port development in the Latin American region, because comparing these countries with South Korea in 2017, South Korea (5.2) outperformed Mexico (4.3) and Brazil (3.1), but did not reach Panama's results (6.2). A further empirical study is required to investigate this phenomenon.

The argument with regards to the effect of improved infrastructure on the economy is mixed. Cabrera, Suárez-Alemán and Trujillo (2015) stated that infrastructures and services have become essential for the sustainability and competitive development of Maritime sector. On the contrary, Munim and Schram (2018) argue that containerization and continuous reduction in the number of port jobs as a result of automation have ameliorated the economic benefit of ports. Similarly, Jung Bong-Min (2011)'s "Economic Contribution of Ports to Local Economies in Korea" attributed the decline in employment in major port activities to the emerging industry of technological innovation.

Fig. 5. Quality of Port Infrastructure Performance for Mexico, Panama, and Brazil (2007-2017)



Source: Author's configuration from the World Bank (2019).

4.2. Container Throughput

Hoffmann and Sirimanne (2017) pointed out that the share of container traffic by region during the year 2016 was led by Asia (64 percent), followed by Europe (16 percent), North America (8 percent), and developing American countries (6 percent).

Compared to countries in other regions, Latin American countries appeared to have more public-private investment as shown in Fig. 2. Interestingly, with respect to container throughput, they are outperformed by emerging countries in other regions: for example, China. However, in general, container throughput in the entirety of Latin America and the

Caribbean shows an upward trend from 2000 to 2013, except for 2009, which exhibited a downward trend. This might be partly due to the global economic crisis in 2008 which spilled over into 2009.

Table 1 shows the ranking of the top ten ports of Latin American countries. It is evident that Colon and Balboa ports of Panama are ranked first and third, respectively. Santos of Brazil and Manzanillo of Mexico are positioned in the second and fourth place accordingly. The positions of Brazil and Mexico are not that surprising because they had relatively high private investment for ports infrastructure improvements. Ceteris paribus, advanced ports quality infrastructure tends to enhance a port's competitiveness. In case of Panama, we assert that their high ranking among other countries in Latin America and the Caribbean (LAC) may be partially due to its geographical location rather than private investment. Further empirical research is required to investigate this phenomenon.

Table 1. Ranking of Ports in Latin America

Ranking	Port	Total TEU (2017)
1	Colon (Panama)	3,891,209
2	Santos (Brazil)	3,578,192
3	Balboa (Panama)	2,986,617
4	Manzanillo (Mexico)	2,830,370
5	Cartagena (Colombia)	2,978,005
6	Callao (Peru)	2,250,224
7	Guayaquil (Ecuador)	1,871,591
8	Kingston (Jamaica)	1,560,000
9	Buenos Aires (Argentina)	1,468,960
10	San Antonio (Chile)	1,296,890

Source: Author's complication based on ECLAC (2018).

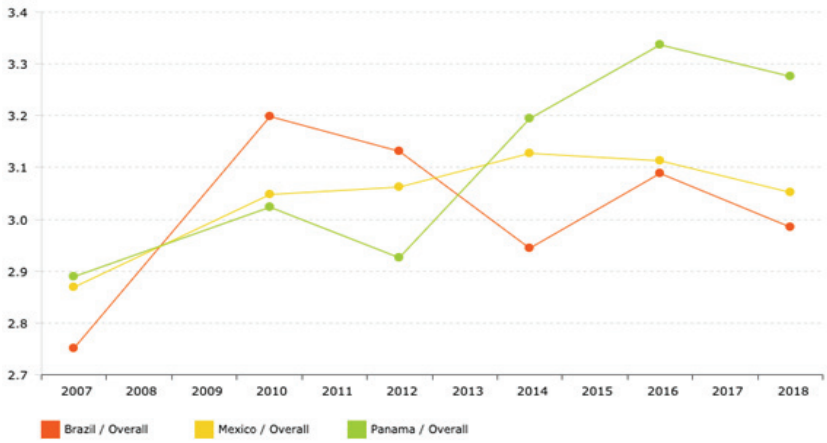
4.3. Logistics Performance

Previous studies have evidence in support of a correlation that exist between quality of port infrastructure (which appears to be mostly dependent on investment, in this case private) and logistics performance. Using data from the World Bank, Munim and Schramm (2018) examined the impact of port infrastructure and logistics performance on 91 countries over a three-year period of 2010, 2012, and 2014. They found a positive relationship (0.674) between port infrastructure and port logistics performance.

The logistics performance index (LPI) consists of six indicators. This comprises efficiency of customs, quality of trade and transport infrastructure, ease of arranging competitively priced services, competence and quality of logistics services, ability to track and trace consignments, and frequency with which shipments reach consignees within scheduled or expected delivery times (World Bank, 2018a). It is measured on a 1 (worst) to 5 (best) scale. In this context, it was found that Brazil had a better logistics performance specifically related to the timeliness of shipments in 2010, and Panama related to logistics competence over the same period. Overall, it can be said that with regards to logistics performance, Panama is ahead of Brazil and Mexico, as shown (refer to Fig. 6). However, South Korea outperformed Panama (38 place), ranking 25th in 2018. Mexico and Brazil occupied the 51st and 56th positions, respectively, out of 160 countries. These findings do not seem to be related to the degree of private participation since Mexico and Brazil are below Panama. It would be appropriate to make a comparison of both logistics performance and port infrastructure prior

to PPP inception in the three countries; however, data from the World Bank prior to 2007 are not available.

Fig. 6. Logistics Performance of Mexico, Panama, and Brazil 2007-2018



Source: Author's configuration from the World Bank (2018a).

4.4. Policy Implications

We have discussed how public-private investment mechanisms have an effect on port activities. However, it is also important to analyze factors that can strengthen these relationships between the public and private sectors.

A well-functioning port can only be possible through clear and transparent policies. Accordingly, governments that do not offer concessions under standardized criteria are unable to guarantee success in projects. With regards to the selected countries, we found little or no information on neither bidding criteria nor the method of awarding PPP projects due to the unavailability of data from the World Bank. This lack of information could create information asymmetry that may result in bribery and corruption that negatively influence port competitiveness. Thus, countries considered in this study should encourage the parties concerned to cultivate a culture of disclosing relevant information. As pointed out by Cabrera, Suárez-Alemán and Trujillo (2015), this will assist in completely assessing the information of the concession processes now and in the future.

Llacer (2006) stated that awarding of concessions was to be informed by transparency and objectivity, designed to prevent monopolies and encourage the participation of international operators. Considering the degree of private participation in the ports of the region is relatively large, ports in Latin American countries in general, Brazil and Mexico in particular (refer to Fig. 4), are struggling to offer competitive services.

Moreover, it seems that the success of PPPs in other countries is intimately related to governance. In this sense, it can also be suggested that adequate legislation that manages private investment, as well as evaluates and monitors the progress of projects in the port sector, is desirable.

Finally, there should be cooperation among stakeholders for policies and research that aid port efficiency. For example, in the case of South Korea, the government works together with the private sector and the academe in order to coordinate public-private actions to promote

better logistics performance (Cipoletta, Pérez and Sánchez, 2010, 30; ECLAC, 2017). This has helped the country achieve a level of development, particularly in infrastructure and logistics, among the best globally, in a very short time. To achieve the objectives of projects among the PPPs, it is necessary that governments maintain a close approach with private actors and promote policies that favor both parties as well as a regulatory framework that guarantees the best practices.

5. Discussion and Conclusion

As global trade increases, the pressure on ports in developing and emerging countries to stay internationally competitive cannot be ignored. Ports are under constant pressure to adapt to changes in economic, institutional, regulatory, and operational environments (Hoffmann and Sirimanne, 2017). This is necessary because ports are an important source of income; therefore, proper functioning involves sustainable policies and adequate infrastructure. For emerging and developing countries, solely financing a port's infrastructure is burdensome. As a result, governments and private sectors join hands in the form of public-private partnerships with the main goal of strengthening the development of projects that promote economic and social progress.

Mexico, Brazil, and Panama are countries that, over the years, have received relatively high public-private partnership among LACs. However, compared to other countries, they appear to be lagging behind, although there has been evidence of an upward trend in container throughput in Latin America. Consequently, this paper investigates the performance of Mexico, Panama, and Brazil with regards to PPPs. Also, it examines if the desired purposes of the PPPs were achieved. The results of this study are as follows.

First, the examination of public-private participation in Mexico, Brazil, and Panama indicates significant variations between public-private investments for the selected countries. For example, over the period 1994-2017, Brazil saw the largest investment, followed by Mexico, and then Panama. With regards to PPPs, all selected countries were engaged in the international best practices of Brownfield and Greenfield projects in enhancing port infrastructure.

Second, the result of Panama outperforming Brazil and Mexico in terms of port quality performance as well as logistics performance creates a first glance conclusion that public-private partnerships have not achieved the goals of enhancing the quality of infrastructure in the selected countries' ports. However, it is evident that further research is needed to empirically investigate this field. This will enable regulators and policy makers to derive appropriate measures to enhance the efficiency of private investment. Further, research should also investigate if these investments are acting as barrier to development in Brazilian and Mexican ports, as pointed out by Laventhal (2009).

Third, for ports in Latin America and the Caribbean to be very attractive on the global stage, they must improve efficiency through the adoption of third generation smart ports. The Hamburg Port Authority and Algeciras in Spain are already adopting smart port logistics in order to enhance information efficiency (Heilig, Schwarze and Voß, 2017).

The results of this study indicate that factors other than PPP are essential in port development. This is evident in the case of Mexico and Brazil. In practice, there is a need for governments to implement policies that enhance the international best practices of port governance. This is essential in improving transparency with regards to awarding concessions which will result in enhanced port efficiency.

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