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Efficiency determinants of container terminals in Latin American and the Caribbean

Ivone Pérez, Lourdes Trujillo*, María Manuela González

Universidad de Las Palmas de Gran Canaria (ULPGC), Departamento de Análisis Económico Aplicado (DAEA), Facultad de Economía, Empresa y Turismo, Campus de Tafira, 35017 Las Palmas, Spain

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ABSTRACT

Extensive use of containerized cargo has caused technological changes in the maritime industry and consequently port transformations. To face these new challenges, port reform processes were designed, coming to Latin America in the 90s. The main objectives were the modernization of ports and the promotion of competition and efficiency. However, there still seems to be potential for improving port efficiency. To assess the potential of this margin, this article analyses the evolution of the efficiency of the main container terminals in Latin America and the Caribbean, and determinants of inefficiency. One question this paper seeks to answer is whether increases in efficiency resulting from port modernization subsequent to reforms in Latin America and the Caribbean have been maintained over time. In addition, and in order to contribute to the definition of economic policies, the main objective of this paper is to analyse the factors that are currently influencing container ports inefficiency – specifically inter-port and intra-port competition. The estimation of a Stochastic Production Frontier shows an average level of technical efficiency of 83% in the 2000–2010 period, and a technological change of 5%. These results show that port efficiency has evolved positively, although affected by the economic crisis. Our findings also indicate that container terminals located in Mercosur countries, and ports with three or four container terminals, are the most efficient, and that transhipment ports are less efficient than other type of ports. According to our findings, LAC decision-makers should consider promoting inter-port competition and strengthening intra-port competition.

1. Introduction

In 2014, trade in goods from Latin America and the Caribbean (LAC) represented 37.4% of LAC GDP and about 6% of world trade (World Bank, 2015). Most Latin American countries are currently basing their growth on the development of exports. To this end, they must consider effective and efficient logistics (Guasch, 2011), including both the quantity and quality of infrastructure required to transport goods, as well as appropriate management of this infrastructure and associated services.

Since the mid-twentieth century, the port model has been undergoing changes. The generalization of containerized cargo and the appearance of container ships have brought about the transformation of port infrastructure. However, the LAC countries were not prepared to respond to the new prerequisites of the industry. Both demand and supply of infrastructure were adjusted and investments were insufficient (Perroti and Sánchez, 2011).

According to Fay and Morrison (2007), infrastructure deficiencies can thwart trade and competitiveness in the region. The challenge for the countries of LAC was to develop modern and efficient ports that, by improving commercial relations, would contribute to regional development. A series of reforms and modernizations were carried out in the LAC port sector, since the opportunities in maritime transport would be lost if the ports were not operated properly.

Reforms initiated in the 90's in LAC resulted in important modifications -mainly in terms of port management model, technological advances and coverage and quality of infrastructure. Through the reforms, private initiatives were introduced to improve intra-port and inter-port competition. On the one hand,

* Corresponding author.
E-mail addresses: iperez@acciones.ulpgc.es (I. Pérez), lourdes.trujillo@ulpgc.es (L. Trujillo), marianela.gonzalez@ulpgc.es (M.M. González).

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trade alliances formed in 1991 promoted trade between certain ports. The objective of the "Mercosur"[1] trade alliance was to encourage the free circulation of goods, services, factors of production, and people among countries; the establishment of a common external tariff; the adoption of a common commercial policy with respect to third parties; the coordination of macroeconomic and sectorial policies; and the commitment to harmonize laws and strengthen integration. This allowed the ports to form a competitive bloc. On the other hand, the increasing number of operators caused competition for load, especially with regard to transhipment traffic.

This paper aims to investigate whether these changes in the LAC port industry have improved port efficiency during the last decade and the determinants of inefficiency, including the influence of inter-port and intra-port competition. The study focuses on 40 main container terminals (resulted from the aggregation of single container terminals in each port) for 19 LAC countries over the 2000–2010 period.

Following this introduction, Section 2 describes the principal characteristics of the port system in LAC and the processes of reform. Section 3 reviews the literature relating to efficiency in port activity with particular reference to contemporary studies relevantin LAC. Section 4 presents the data and methodology applied to estimate efficiency, and expounds the results. Finally, the main conclusions of the study are explained in Section 5.

2. Port sector in Latin America and the Caribbean

Until a few decades ago, port systems in LAC countries were characterized by regulated and centralized ports (Silva, 2008) where the national government was responsible for the construction, maintenance, administration, and operation. The sector had a number of features that made it unfavourable to international commerce, such as low levels of investments; low quality of services, equipment and installations; and high port tariffs. According to Hoffmann (2000), Latin American ports were inefficient and expensive, aggravated by a particular labour regime that, rather than attending to commercial considerations, was shaped by historical factors and union power. Accordingly, governments did not generally have much interest in port efficiency, since these infrastructures were seen as non-tariff barriers to foreign competition. Furthermore, in some cases they represented a means of granting political favours and creating employment. Initially, in spite of the commencement of port reforms, technological advances were not incorporated so as to avoid layoffs. As such, the port labour regime was unaltered[2] even when containerization was extended and container cranes were acquired. The necessity of teamwork in the port sector was favourable to unionisation. Given the high impact that their actions had on commercial activity, unions possessed a certain degree of power.

In general, reforms have occurred as follows: legal reform, decentralization, liberalization, private participation, and re-regulation. In Latin America, 97.5% of transport privatisation projects were materialized in concession contracts. According to Estache and Trujillo (2004, 2008), private participation is associated with improvements in technology, productivity, and quality of services. In particular, profitability increased by more than 40% in countries such as Mexico, Argentina, or Peru. The government and companies shared efficiency gains but these did not flow to users. A policy of maximum prices led to an increase in the cost of capital and tariff rates. In the port sector, private participation and modernization were encouraged and in the 1990s, the total value of investments undertaken equalled the same amount for the four previous decades (Hoffmann, 2000).

Privatisation was part of the global trend of implementing a new model, the so-called landlord port, in which ownership remains in the public sector and the private sector provides services through concessions. This model favoured the liberalization of services and re-regulation in those cases where it was necessary (for example, services with characteristics of natural monopoly). Modernization of both infrastructure and superstructure was also encouraged, and management that had been oriented to satisfying social and political interests shifted to an emphasis on obtaining economic benefits. Hoffmann (2000) suggested that undertaking reforms in the sector does not necessarily imply alteration of the labour regime. However, labour issues are seen as affecting the environment for private investment and thus the establishment of new port models. Countries like Chile or Panama (as opposed to Brazil), involved labour representatives in the reform and industry transformations process.

The first port reforms took place in Chile (1981), Colombia and Venezuela (1991), Argentina, Mexico and Uruguay (1992), Brazil (1993), and Panama (1994). In his study of the reform process more than a decade on, Sánchez (2004) drew up a classification of the countries in the region divided into four groups: countries with private holding of the main ports; countries that are moving towards the private-holding model; countries with partial private holding; countries with public ports. The first group is made up of countries that have seen substantial investment and efficiency gains (Argentina, Bolivia, Brazil, Chile, Colombia, Cuba, Mexico, Panama, Paraguay and Uruguay). The countries in the second group (Costa Rica, Ecuador, and El Salvador, among others) are those that are undertaking structural changes, following the experience of the firstgroup. Countries in the third group maintain management and planning in the hands of the public sector. However, they have promoted labour reforms that have contributed to an expanded role for the private sector, for instance in relation to stevedoring. In the fourth group are countries that have not undertaken a process of port reform.

According to Hoffmann (2000), net gains from these reforms are perceived as positive as they have given rise to greater inter-port and intra-port competition associated with the increased number of operators. The introduction of private initiative ports expanded the number of terminals to seven in Buenos Aires, although one of them later went bankrupt. In Panama, four terminals competed mainly for transhipmnet cargo. In Santos, the introduction of competition caused cost reduction and increased of productivity. Overall, there was also an apparent increase port traffic, a reduction in operation prices, and improvement in performance (time and quality of services). However, some issues remain unresolved about access to and connections with intermodal transport systems, environmental protection, and regulations and customs procedures (Sánchez, 2004).

The LAC port industry has grown in terms of number of containers handled. Maritime transport now presents a radial network around central ports, mainly transhipment ports, strategically selected by shipping companies that distribute the cargo in a secondary transport network. Additionally, traffic has been moved from the East to the West coast of Central America (CEPAL, 2014).

[1] Mercado Común del Sur; in English: the Southern Common Market.

[2] For example, 20 workers continued to be used to unload a container ship when, generally speaking, only six stevedores are required (Hoffmann, 2000).

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