Transportation Research Part A 118 (2018) 245–257

Contents lists available at ScienceDirect

Transportation Research Part A

journal homepage: www.elsevier.com/locate/tra

Managerial performance of airports in Brazil before and after concessions

Elton Fernandes, Ricardo Rodrigues Pacheco*

Federal University of Rio de Janeiro, COPPE Production Engineering Program, Brazil

ARTICLE INFO

Keywords:
Airport
Managerial performance
DEA
Airport group efficiency

ABSTRACT

This paper examines the performance of airports under Brazil's state enterprise for airport infrastructure, Infraero, which managed the country's main airports until major airport concessions began to be granted in 2012. The dataset comprised the 60 main airports that were under Infraero administration in 2009 and 2015, three years before and three years after concessions began to come into effect. In that period, concessions were granted on 5 major airports previously administered by Infraero, which are among the main hubs in Brazil, and one smaller, new airport. DEA modelling was used to analyse performance in the study years. In 2009, the airports considered accounted for 56% of the market; in 2015, the percentage fell to 52%. The findings show that not only did this set of airports lose market share, their performance declined significantly. In the study period, the enterprise's overall performance index fell from 71.48% to 62.73%, as it failed to encounter pathways to improvement in the scenario of concessions of airports to private administration.

1. Introduction

Airport privatisations and concessions to private management have been discussed and recommended as mechanisms to improve the efficiency of this important component in the air transport production chain. Particularly since the 1980s, the United States, Brazil and other countries with large numbers of airports have adopted mixed models comprising public, private and shared management. The Brazilian case displays a particular feature in this process of introducing private administration of major airports: until 2012 these were administered monopolistically by the state airport infrastructure enterprise, *Empresa Brasileira de Infraestrutura Aeroportuária* (Infraero). In Brazil, the process would suspend Infraero's concession to administer a given airport and hold a public call for tenders, which then set conditions and specified a process to transition administration from Infraero to a majority private-equity consortium. Until the process of airport concessions began in Brazil, Infraero was one of the world's largest airport administrators, which raises the question as to what has happened to the enterprise and to the airports under its administration. Did performance improve or worsen? The Brazilian government's expectation was that, with private participation in managing Brazilian airports, Infraero could be reorganised and improve its performance. Using data envelopment analysis (DEA) and descriptive statistical analysis, this paper examines the performance of 60 airports administered by Infraero, before and after the start of airport concessions to private management. The study also uses simulation to evaluate how – with the withdrawal of four airports from the Infraero portfolio, which were tendered in 2017 – the remaining airports not subject to concession will perform, given no major changes in administration by Infraero. This analysis yields indications that help gauge the dimensions of the enterprise's continuing degradation since the beginning of major airport concessions and the steady losses it has been posting since 2013. Although some

* Corresponding author at: Centro de Tecnologia Bloco F – Sala 108, Cidade Universitária, Rio de Janeiro, RJ 21945-970, Brazil.
E-mail addresses: tglcoppe@gmail.com (E. Fernandes), rpacheco48@gmail.com (R.R. Pacheco).

https://doi.org/10.1016/j.tra.2018.09.003
Received 12 December 2017; Received in revised form 29 August 2018; Accepted 3 September 2018

indicators for airports under the enterprise are showing signs of improved performance, these are not accompanying growth in demand.

The purpose of this study is to show, by performance analysis and descriptive statistics, the situation of Infraero before and after concession of major airports and to discuss some impacts of the process, particularly on regional air transport.

The privatisation, concession and shared (public-private) management of airport infrastructure is a subject of interest worldwide to both governments and investors. The case of Infraero in Brazil, given its proportions, is an important example in world air transport. This paper is also of interest to researchers, because there is no consensus on what management structures are best for country airport networks. At present, airport management in Brazil involves investors from a number of countries, including South Africa, Germany, Argentina, Singapore, France and Switzerland.

The paper is organised into six sections. The first is this Introduction, which contextualises the study proposal. The second offers a Literature Review on the subject, with the emphasis on privatisation and its consequences for airport networks. The third states the analytical Methodology underpinning the DEA. The fourth details the Brazil Case Study, setting out its particular features. The fifth sets out the choice of variables used in the DEA modelling. The sixth reports and discusses the Results of applying the methodology to the Brazilian case. Lastly, the Conclusion summarise the main elements of the study.

2. Literature review

Indicators for technology catch-up and total factor productivity (TFP) in relation to the efficiency frontier were developed initially to explain convergence in countries' economic development as measured by per capita income or labour productivity per hour, using data on OECD countries after World War II (Färe et al., 1994). Färe et al. cite the work of Abramovitz (1986, 1990), Baumol (1986), Baumol et al. (1989) and Dowrick and Nyugen (1989), who studied the effect of technology catch-up on countries' development. The convergence announced in these studies is questioned in later work by Lowe and Fernandes (1994) in relation to newly industrialised countries in Latin America, a group that includes Brazil. That line of studies went on to examine specific sectors of the economy, considering both international differences and examining countries' domestic behaviour, with reference to their own production facilities. Air transport is one of these sectors, the research approach being directed more specifically to airports. Parker (1999) and Oum et al. (2006, 2008) are examples of such studies.

A number of researchers have taken an interest in studying transport sector efficiency evaluation. Bibliometric studies of the literature on performance in the sector, and more specifically in air transport, have been published by Cavaignac and Petiot (2017), Graham (2005), Liebert and Niemeier (2013), Markovits-Somogyi (2011), Merkert et al. (2012) and others. Gillen and Lall (1997) showed that the most recent studies were motivated by the need to investigate the outcomes of the deregulation, privatisation and commercialisation processes that were taking place in the sector. Since the time of these authors' observations, many studies have addressed the sector, among which those addressing airport efficiency, concessions and privatisation are of special interest to this paper. Some studies deal specifically with preparations for concession or privatisation (Fragoudaki et al., 2016; Martín and Román, 2001; Pacheco et al., 2006).

The studies of airports largely focus their analysis on single airport. There are situations, however, where a given organisation manages a significant set of airports, which may be limited to just one country (as is the case with Infraero in Brazil) or, as has been occurring in recent years, may span several countries (this is the case with Fraport in Germany and others). Taking reference to these authors as the starting point and limiting the search to application of the DEA methodology in studies of airport deregulation, privatisation and commercialisation, 74 papers were identified in the Web of Science data base (https://login.webofknowledge.com); those considered most significant were then selected to form the basis of the literature review of this paper. Although the bibliometrics of this paper does not cover the whole universe of studies in this field, it is believed to be sufficiently comprehensive and to delimit properly the knowledge generated.

Using DEA, Parker (1999) examined the performance of the British Airport Authority (BAA) across its set of airports, before and after privatisation. The study found no evidence of BAA's performance having improved as a result of the privatisation of its airports. Parker speculated that management may have responded to Thatcherism and the prospect of privatisation by improving performance before the actual sale. Abbott and Wu (2002) examine 12 leading Australian airports together with 13 airports in other developed countries, using Malmquist analysis to discuss the minimum real price reduction imposed on each airport by the Australian government and airport productivity indexes. They concluded that, as compared with airports overseas, the Australian airports charge appropriately, considering their efficiency levels. Vogel (2006) evaluated the financial performance of 35 European airports during the period 1990 to 2000, using partial factor productivity, financial ratio and DEA. Comparing airports under public administration with those totally or partly privatised, he found that private or partly private airports operated more efficiently than public ones.

Barros and Dieke (2007) used DEA modelling to evaluate the performance of Italian airport authorities and their respective airports. They concluded, among other things, that the airports under private management were more efficient than the publicly-managed ones. Malighetti et al. (2007) used a DEA model to study the efficiency of 34 Italian airports, finding that efficiency was related to airport size and showing that, in airside management, the private airports were more efficient than the public airports. Barros and Weber (2009), who used a Malmquist index to estimate TFP for 27 UK airports operating from January 2000 to May 2004, found no clear relationship between airport management type (public or private) and improved productivity in that period.

Ablanedo-Rosas and Gemoets (2010) used DEA to examine the operating performance of Mexico's 37 leading airports, the 22 most important of which were managed by private companies and the others, by Mexican government agencies. The results showed no significant differences in performance between public and private management. Gitto and Mancuso (2012) analysed the operating performance of 28 Italian airports from 2000 to 2006, using DEA and the Malmquist production index. They found evidence that the