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Estimating the impact of airport privatization on airline demand: A regression-based event study

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ABSTRACT

This paper develops an empirical model of passenger demand for routes of airports subject to either imminent or recent privatization. We investigate whether the privatization process produces a sequential impact over traffic. By employing a regression-based event methodology and controlling for fixed effects, price endogeneity and sample selection, we perform an econometric analysis of pre-privatization and post-privatization dynamic patterns of demand to infer the demand consequences of the major change in airport governance. We examine recent Brazilian airport privatization experience as a case. The main results suggest that privatization produced an overall increase in airline demand and that the airport notably recognized with the greatest demand potential and with the largest market penetration of a fast-growing low cost newcomer had the highest estimated *ceteris paribus* effect of privatization on demand.

1. Introduction

This paper develops an empirical model of passenger demand for routes of recently privatized airports aiming at inspecting if a privatization process producing a sequential impact on traffic. By employing a regression-based event methodology, we investigate whether the change in ownership and management control has any effect on the efficiency of both airports and airlines to generate additional demand. We perform an econometric analysis of pre-privatization and post-privatization dynamic patterns of demand to infer the demand consequences of the major change in governance and its anticipation by involved enterprises and all stakeholders.

Privatization is widely seen as a mechanism to promote competitiveness of a sector or a whole country by enhancing the efficiency of stated-owned enterprises (SOEs). In the air transport literature, some recent studies so far have suggested that airports operated by a majority private firm achieve higher efficiency than those operated by a majority public firm – for example, Oum et al. (2008) and Oum et al. (2006). However, the literature has not yet directly addressed the important issue of the impact of airport privatization on passenger demand. We argue that, in contrast to the state-owned enterprise, a privatized airport may be more effective not only in attracting new airlines but in producing route development strategies such as route support and risk sharing with existing airlines, which ultimately stimulates demand. We suspect that privatization produces effects not only through airport capacity expansion, the new regulatory framework and the potentially enhanced efficiency, but it also has a relevant impact in the short run. We suspect that privatization preparation, announcement, the transfer of management control, and the inevitable temporary effects of terminal and runway constructions and renovations may dictate these short run effects. By testing the effects on the dynamic pattern of passenger demand following the privatization of airports, we intend to fill the gap in the literature with respect to assessing its *ceteris paribus* impact on demand and also contribute to the scarce literature on the empirical modeling of airport privatization and its consequences. We consider the privatization timetable of Donaldson and Wagle (1995) to separate the short run from the long run effects in terms of sequential

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privatization stages.

To estimate the dynamic effects of demand following privatization, we develop an econometric model of passenger market demand by considering the Brazilian airline industry and its recent airport privatization experience. We consider the effects of the privatization package of 2011–2012 that included major airports São Paulo/Guarulhos (GRU), Brasília (BSB) and São Paulo/Viracopos (VCP) – respectively, the country's international gateway, the geographically centrally located domestic hub, and the only effective secondary airport in the country. From our regression-based event, we estimate a set of privatization-related coefficients and promote empirical tests of the sequential impact of privatization on demand. Our empirical model considers the endogeneity of price and therefore, makes use of an instrumental variables approach in a panel data framework. We also utilize a correction procedure for sample selectivity due to the fact that the short list of airports selected to be privatized is likely to be determined based on socio-economic criteria and airport performance indicators, and not randomly.

The present paper is organized in the following way: Section 1 presents a theoretical framework, with a literature review, the presentation of our conceptual model and investigation proposal. Section 2 presents the empirical model development. Section 3 contains our empirical modeling and presentation of estimation results. The final section contains the concluding remarks.

2. Theoretical framework

2.1. Literature review

One of the most commonly observed objectives of a privatization program is to enhance the efficiency of state-owned enterprises. Consequently, the air transportation literature has frequently discussed the relationship between airport ownership and performance. The conclusions over the relative performance of airport operators under alternative governance schemes are still not clear, however. For example, Oum et al. (2008) estimate that there is an eighty percent probability that airports operated by a majority private firm achieve higher efficiency than those operated by a majority public firm. Those results are also found in Oum et al. (2006). In contrast, Scotti et al. (2012) find that public airports are more efficient than private and mixed ones. As Megginson and Netter (2001) discuss, there are theoretical arguments for arguing that the impact of privatization ultimately depends on the degree of market failure. For example, if competition is naturally strong, than state enterprises may be forced to enhance productive efficiency, and the impact of ownership change of privatization may not be substantial. The authors survey several studies applied to many sectors of both transition and non-transition economies and conclude that the overall research supported the proposition that privately owned firms are more efficient and more profitable.

In addition to the relationship of airport ownership and efficiency, other subjects that have also been investigated by the literature were the link between privatization and profitability and the impacts and incentives of airport capacity expansion following privatization. Oum et al. (2008) conclude that as privatized airports are more efficient, they are also more profitable. Noruzoliaee et al. (2015) suggest that increases in airport capacity depend on efficiency: a more efficient owner has more capital to invest in infrastructure and capacity expansion than a less efficient one. Zhang and Zhang (2003) discuss that airport capacity expansion is usually seen as improving the quality of service by reducing or eliminating airport congestion, which results from the heavy use of the existing airport. The authors conclude that given growing demand and lumpy capacity – i.e., capacity increase through large indivisible lumps, such as when a new runway is built – decisions over capacity expansion by private airports are suboptimal from a social point of view. Specifically, in their study, private airports tend to introduce capacity expansion later than comparable public airports.

As far as we are concerned, the literature has not yet directly addressed the issue of the impacts of airport privatization on passenger demand. There are indirect analyses linking privatization to demand through airport capacity expansion and efficiency – for example, Zhang and Zhang (2003) and Noruzoliaee et al. (2015) – but no study aimed at primarily inspecting this relation. In case privatization proves to be a successful demand-enhancement initiative, its effects must be accounted for in both the airport's and the airlines' demand forecasts and business plans. Additionally, the possibility of an increase in future demand of privatized airports should be explicitly considered in the asset valuation problem of the pre-privatization economic appraisal study. Given an expectation of future improved demand, airlines may regard the privatized airport as more attractive with respect to strengthening their flight frequency positions and even considering it as a possible hub or a focal airport. Megginson et al. (1994), and La Porta and López-de-Silanes (1999) show that some demand increase is induced in the wake of privatization episodes – an actually standard effect that has been observed in a wide sample of firms, in an equally broad set of industries and countries.[1] Our econometric model aims at not only filling the gap in the airline literature regarding the demand impacts of privatization but also at providing estimates of its dynamic effects that may produce benefits to the air travel consumer over time.

An important issue for our empirical framework is related to the privatization timeline. The actual implementation of privatization typically depends on the model of privatization adopted by governments. According to Graham (2008) and Carney and Mew (2003), airport privatization can be categorized into five types: share flotation, trade sale, concession, project finance privatization, and management contract. Consider the privatization timetable of Donaldson and Wagle (1995), presented in Fig. 1 – henceforth, DW95. Designed to assist the World Bank, and in particular, the International Finance Corporation (IFC), in analyzing privatizations in several sectors around the world, this general framework may be regarded being consistent with all privatization categories.

2.2. Conceptual model

Our main objective here is to present a representation of the air passenger demand key drivers and their interactions. The resulting conceptual model is shown in Fig. 2.

As we can observe from Fig. 2, passenger market demand is jointly determined with ticket price, as indicated by the bidirectional arrow (endogeneity). Key (exogenous) demand drivers are origin and destination population and average income, gravity terms that are explicitly modeled as regressors in our econometric framework. We also consider average route attributes – such as distance, flight time, intermodal competition, etc. – and other exogenous demand shocks, such as the seasonality, cultural and sports events, and touristic booms at both the origin and destination. All these idiosyncratic factors have their average effect accounted for in our approach by the use of route and time fixed

[1] Moreover, the authors provide evidence of an extra appeal commonly found with these destatization policies: in most of the cases, demand increase seems to be uncoupled from undesirable side effects such as unemployment and price increases, and it also comes without the need for extra investments, revealing that productivity gains can be explored by the private management.