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The commercial performance of global airports

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ABSTRACT

Revenues from non-aeronautical business have received increasing attention from airports seeking to enhance their profitability. This study analyzes the commercial performance of global airports using a panel dataset of 75 airports in 30 countries. Applying pooled OLS, random effects and 3SLS estimation frameworks, we identify the main drivers of financial performance. Our results are in line with the existing literature. The share of international passengers, the size of the commercial area as well as airport size and the mix and intra-terminal location of retail space are found to be significant determinants. The latter finding suggests the presence of economies of scale in generating higher commercial revenue and ensuring profitability for an airport's non-aeronautical operations. Staterun and partially privatized airports appear to retain a significantly smaller share of concession sales than their privatized counterparts. Regarding the retail mix, a higher share of food and beverage outlets appears to increase the revenue share retained by the airport while a higher percentage of outlets located airside rather than landside depresses commercial revenues.

1. Introduction

Airports operate in a highly cyclical business environment. The demand for moving people and cargo on airplanes is typically more volatile than equivalents for other industries or even within the transport sector. One possible strategy to reduce exposure to these demand shocks is for airports to expand their non-aeronautical activities and diversify their activities away from full reliance on the aeronautical sector. Another strategy is the installation of activities without a physical connection to the terminal, such as eCommerce projects, for example QR code walls and retail-specific apps at airports owned by the Fraport group (Fraport, 2013, 2015).

The main argument in favor of the first strategy is that the non-aeronautical segment encompasses a more diverse range of customer groups. Apart from passengers, airport employees and visitors that are all closely connected to the aeronautical operations of an airport, the non-aeronautical commercial and retail facilities are additionally also frequented by local residents, employees and visitors of companies locating near the airport and other types of customers that are not airline passengers. Increasingly, airports also include convention centers and other entertainment, business and leisure facilities which are largely independent of fluctuations in air passenger volumes. Furthermore, the

expansion of the non-aeronautical business is also attractive because of its lower operational cost structure compared to the aeronautical business which may make it more profitable. In some cases, non-aeronautical revenues even account for the largest share of the profits of an airport operator. Increasingly, major real estate companies cover airport real estate in their analysis and investments as a distinct property sub-type and credit rating agencies take the diversification of revenue sources into consideration in their financial ratings of airports (Deloitte, 2009).

The importance of airport commercial activities and the airport retail sector in particular has received considerable attention over the last decade, particularly as liberalization and deregulation of the aviation industry has forced airports worldwide to find new sources of income to replace the aviation revenues loss because of the increasing market power of airlines such as Ryanair, EasyJet or other Low Cost Carriers or also to third party ground service operators. Despite the obvious importance of commercial activities in light of these recent developments, research on the commercial performance of airports and its determinants is still scarce. This paper presents the first comprehensive academic study of global commercial airport performance. There exists a growing body of empirical studies of the non-aviation business, particularly on individual business activities ranging from parking space management and parking revenue (e.g. Qin and Olaru, 2013) to

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commercial real estate to the development of airports towards so called airport cities (e.g. Aldridge et al., 2001; Appold and Kasarda, 2013 Pougias, 2009; Reiss, 2007; Tacke, 2008). Several studies focus on the retail sector, for example the characteristics of airport retail, its development and potential for improvement (Giljohann-Farkas, 2008), contractual aspects (e.g. Freathy and O'Connell, 1999; Kim and Shin, 2001) and customer structures (e.g. Geuens et al., 2004). However, the majority of these studies is of descriptive character. Econometric studies in this topic area predominantly deal with retail drivers, in particular drivers of retail revenues in general (Volkova, 2009), determinants of sales (Appold and Kasarda, 2006) and food/beverage consumption and other purchases (Castillo-Manzano, 2010), shopping intentions (Lu, 2014), waiting time (Torres et al., 2005) or time pressure and impulse buying tendencies (Lin and Chen, 2013).

The present study expands on these studies by incorporating a large range of potential explanatory factors that impact on revenues from retail and other commercial non-aviation activities of airports. Our analysis includes both standard factors used in previous analyses of this topic such as the number and characteristics of passengers as well as a variable that has not been tested before in this context: the terms of ownership. The results from this comprehensive quantitative analysis performed on a unique panel dataset of global airports contribute to the state of knowledge on the changing business strategies of airports. In particular, it sheds light on a number of key strategic considerations for airports, for example if expanding the commercial area inside a terminal is likely to reap financial rewards and whether it is more profitable to expand the area on the landside or airside area of a terminal. More broadly, we seek to contribute to the study of economies of scale in the non-aviation operations of airports by investigating the effect of different airport size measures on revenues and yields. Finally, a subset of the airports in this study is analyzed for the effect of privatization to establish if it has any bearing on the bargaining power of the airport when negotiating the fraction of sales to be retained by the airport.

The following section reviews the existing literature in more depth to set the scene for the specification of our empirical panel data model of airport commercial revenues and feasibility.

2. State of research

There is a distinct gap in the literature on financial performance and economies of scale of airports, particularly with regard to non-aeronautical operations. Pels et al. (2003) perform an analysis of European airports and find that they are on average inefficient and operate on constant returns to scale when producing air transport movements and on increasing returns to scale when producing air passenger movements. However, their analysis is restricted to aeronautical operations only. Similarly, Martin and Voltes-Dorta (2010) perform an analysis of 41 global airports and find significant economies of scale. In theory, airports should be able to increase their profitability in the commercial sector with increasing size as the marginal cost of managing the commercial operations such as retail outlets and other facilities should fall. Fixed cost elements can be spread over a larger base of commercial operations. Further benefits may accrue from access to specialized labor and equipment which may not be available to smaller establishments. There may be additional size effects for airports which go beyond the definition of economies of scale in the narrow sense of the term. For example, some high-revenue facilities, for example an airport-based convention center, may only be feasible for airports above a certain size threshold. Retail operations may also be affected by airport size, in terms of the scope and depth of the retail products that are offered. However, Empirical evidence in the retail sector is rare. Arndt and Olsen (1975) study the Norwegian retail sector and find only limited evidence of economies of scale. The authors point out a number of limitations to economies of scale in retail, the most important among these being that retail is not a closed system such as manufacturing and retailers have very limited control over production and customer flows. Thus, economies of scale may be

both difficult to achieve and difficult to measure in a retail context. This limitation is particularly true for the present analysis which does not include measures of production costs due to unavailability of suitable data and instead proxies size effects with available measures such as size of the commercial area and total number of passengers of an airport.

An overview of studies on commercial revenues at airports, their main drivers, and their main conclusions is provided in Table 1. These are typically single-country studies, particularly in the United States and Spain, drawing on figures reported by the airports directly and, in a few cases, on consumer surveys. Recent econometric studies conclude that the size of an airport and the number of passengers, average flight times and accordingly the fraction of passengers on international flights and the amount of retail space are the most important drivers of airport commercial revenues. Additionally, Castillo-Manzano's (2010) analysis implies that the share of frequent flyers is a distinct and important as this group may spend more at airport retail outlets.

However, leisure travelers tend to spend more money at the airport than business travellers due to longer average dwell times which have a significant impact on an individual's expenses. It is considered that the waiting time prior to embarking and the inclination of travelers to spend more money if they are on a holiday trip explain the decision to consume food/beverages and to make a non-food purchase. Once the decision has been made to spend money, the amount has been shown to increase in line with a passenger's waiting time. Castillo-Manzano (2010) reports that the likelihood of food/beverages being consumed and a purchase being made increases by 31 and 19 percent respectively if the waiting time exceeds 3 h while the amount spent increases by almost 41 percent. The demographic and social characteristics of passengers are found to be important predictors of spending behavior (Castillo-Manzano, 2010):

- families with children have a higher likelihood to make a purchase or to consume food/beverages, but this factor is also the greatest curb on the amount spent,
- elderly people have a less likelihood to make a purchase or to consume food/beverages,
- homemaker purchase rarely at an airport,
- people in a group consume more food/beverages on average than if they are alone,
- passenger being accompanied to an airport eat/drink something with the accompanying individual.

A further theme of empirical studies of non-aviation revenues is the impact of the location and quality of the airport retail outlets and the role of the regulatory environment of airports (Del Chiappa et al., 2016; Forsyth, 2004). In particular, an evaluation of single and dual till models is undertaken in some studies but the discussion as to which approach is preferable remains controversial (e.g. Evangelinos et al., 2011; Kratzsch and Sieg, 2011; Zhang and Zhang, 2010). While the information on single or dual till regulation was not available in our global study of airports, the distinction between the two models may have ramifications for the commercial success of an airport. The single-till approach takes all areas of the airport including the non-aviation sector into consideration in determining the remuneration levels in the regulated aviation sector. By contrast, the dual-till approach typically separates areas of an airport which are necessary for the actual provision of services in air transport from the revenues (or income) from the commercial activities in the non-aviation sector. Non-aviation expenditure and costs incurred in this sector are then excluded from the regulation of charges in the aviation sector in the dual-till model. In a related study, Bel and Fageda (2009) find that the level of charges that airlines have to pay airports depends on the ownership structure (state-run, partially privatized, fully privatized) but their study does not include commercial revenues.

A further strand of the literature is concerned with physical and network characteristics of an airport and their impact on commercial performance. For instance, Van Dender (2007) reports that concessions revenues per departing passenger are lower at hub airports in the United

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