



Business performance of airports: Non-aviation revenues and their determinants



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ABSTRACT

Management of non-core commercial activities has become a key issue amongst the levers for improving modern airport industry. Today airports have increased dramatically their dependence on non-aeronautical revenues, which on average account for half of all revenues with this share being highly heterogeneous across regions and airports. Using a dataset of German airports, this paper discusses the improvement of commercial revenues by exploring its determinants. Previous contributions assessed the impact of a selected set of variables non-aviation revenues. Such approach was mainly the effect of multicollinearity, as the majority of relevant variables are strongly correlated to the size of the structures. We address this issue by using ridge regression and partial least squares. Results suggest the potential conflict of non-aviation revenues per passenger and per square meter with the need to expand the number of passengers.

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1. Introduction

Changes in the modern air transport business have increasingly transformed the role of airports and their perception by travellers and consumers. The joint interaction of factors such as the expansion of low-cost carriers (LCC), raising competition between airlines, increasing ease in purchasing tickets, changes in travelling habits, privatization of infrastructure, have modified the business worldwide (Papatheodorou and Lei, 2006; Graham, 2009; Castillo-Manzano, 2010). As a consequence, the search for revenues maximisation has gradually shifted its main focus from traditional core aeronautical service to non-aviation or commercial sources (Edwards, 2005; Morrison, 2009). In fact, the strong interrelationships between tourism and shopping have convinced airport managers to expand their view of airports from serving the sole transportation of passengers to leisure attraction (Freathy & O'Connell, 1999; Geuens et al., 2004). Today airports provide a wide variety of entertaining services to travellers, besides having expanded traditional shopping-related ones.

Such revolution has been relatively recent. Indeed, airport

managers have dealt with non-aviation activities as important assets for their decisions for six decades (Castillo-Manzano, 2010). However, only since 1980s airports began to transform from central or local government organizations to enterprises capable of generating substantial profits (Kim and Shin, 2001). Starting from about a decade later, non-aviation sources of revenues have considerably grown (Francis et al., 2004; Graham, 2009; Morrison, 2009; Fasone and Maggiore, 2012), to the point that such parallel business has become crucial for many airports, sometimes showing a more rapid rise than passengers traffic (Doganis, 2006; Brechin, 1999; Kim and Shin, 2001; Torres et al., 2005; Fasone and Scuderi, 2012). Such timing goes parallel with the evolution of tourism since the Eighties, from mass phenomenon to larger and highly segmented market (Aguiló Perez and Juaneda Sampol, 2000; Brida and Scuderi, 2013), whose growth and economic effect has put pressure to policymakers in building infrastructures such as roads, airports and harbours (Mak, 2004; Van Vijk and Persoon, 2006).

All this justifies the growing interest towards the assessment of the elements that likely influence commercial or non-aviation revenues (NAR), although the topic has still remained under investigated (Geuens et al., 2004; Castillo-Manzano, 2010). Consistently, different contributors have tried to explain the main factors influencing these important sources for profits. The topic is

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complex, inasmuch as various factors such as passengers characteristics, structure of airport, supply of retail shops and their positioning at the airport, contingent factors as flight delays may cause travellers to spend (Graham, 2008; Castillo-Manzano, 2010). Within the literature, only a limited number of works applied regression models in order to assess the determinants of spending. A subset of them used a demand-based approach and gathered data from direct interviews to passengers. Others adopted a supply-side perspective through airport-level information. Of course, both have provided useful though different indications to managers. The former approach has been usually limited to a single structure – with the exception of Castillo-Manzano (2010) – and it can potentially survey a considerable number of variables that provide highly detailed information on passengers. The latter exploits data from different structures and can be suitable to find significant regularities in the way structures are managed. The present contribution adopts the second approach. We try to learn lessons for management practice from data coming from a set of airports. In a sense, we follow Graham's (2009) and Papatheodorou and Lei's (2006) invitation to test new models for explaining the determinants of airport revenues. It is based on a longitudinal dataset of German airports. However, unlike similar previous studies we extend the set of control variables in order to test the simultaneous significance of different regressors and provide a more complete overview of the topic.

The peculiar empirical strategy we will adopt in what follows is addressed to handle an estimation issue that has heavily influenced the approach and related findings of previous contributors. The latter used to drop relevant variables in order to avoid collinearity, which would create instability in parameters estimation, when not making estimation itself far from being performed – see for instance Papatheodorou and Lei (2006) and Lei and Papatheodorou (2010). Actually, when dealing with airport-level data, size is one of the most crucial elements to account for (Papatheodorou and Lei, 2006) as it is highly correlated with many candidate explanatory variables of NAR. Just to cite some size-related aspects, larger airports have wider supply of retail shops, larger retail surface, higher number of shops, more passengers and more movements than smaller ones (Jarach, 2001; Geuens et al., 2004; Graham, 2009). The resulting high correlation, and the related selection of a limited number of explanatory variables, sometimes led to exclude relevant variables to policymakers. In statistical literature collinearity has been addressed by several regression techniques, under a literature that is still under development. In this paper we apply two classic regression techniques, namely ridge and partial least squares (PLSR) for the sake of accounting for the high correlation between covariates. We will initially provide a description of the state of the art of the literature on NAR and their determinants. We will then illustrate the models and their advantages. Discussion of results and their comparison with previous contributions will conclude the work.

2. Background

Successfully, airport managers and retailers have increasingly seen passenger's stay at the terminal as key element to develop their operational approach. This has been the consequence of many factors such as the evolution of the airport sector from public utility to commercialised and privatised industry (Kolk & Van Der Veen, 2002; Graham, 2009), the decrease in aviation revenues that followed the low-cost revolution and government regulations (Sull, 1999; Francis et al., 2004; Doganis, 2006; Pate and Beaumont, 2006; Wallace et al., 2006; Graham, 2008, 2013), the underuse of many airports and their need to pursue financial sustainability (Papatheodorou and Lei, 2006; Castillo-Manzano, 2010), the

reliance of many airports on LCC, especially secondary and small ones (Vlaar et al., 2005; Dobruszkes, 2006; Hunter, 2006).

Today airports have increased dramatically their dependence on NAR, which on average account for half of all revenues (Graham, 2009) with this share being highly heterogeneous across regions and airports (Zhang and Zhang, 1997). After all, diversification of airport business through commercial activities has been proven to increase the efficiency of airports (Huang and Kuai, 2006a, 2006b; Tovar and Martín-Cejas, 2009; Brida et al., 2014). Consequently, the same design of terminals has been taking into account such novel needs (Edwards, 2005), with the check-in and departures areas being the most crucial elements (Bandeira and Correia, 2012). Retail plays the very major role, as it is the largest and most important commercial source (Graham, 2009). However, and unlike outer shops, airport managers' challenge is the achievement of a balance between commercial and aeronautical aspects, inasmuch as the retail function may interfere with the normal flows of passengers through the airports. In addition, other operational concerns regard the managing of revenues sources as single (total revenues) or dual (commercial and non aviation) financial entity (Graham, 2009). Related to the latter point, other decisive aspects are the choice between direct managing and concession agreements and their various forms, where the latter are prevailing in modern airports (Kim and Shin, 2001). Also from a theoretical point of view, the model where concessionaire subsidises aeronautical operations has been shown to increase social welfare (Zhang and Zhang, 1997).

2.1. Motivation to shopping at airport

Airport is the first and last point of tourists' contact in their destination, where managers are required to fulfil travellers' expectations of minimizing the travel time and enjoying shopping and leisure at the commercial area (Martín-Cejas, 2006). The increasing success of profit maximizing strategies based on NAR can be attributed to the idea that shopping is the oldest and most important aspects of tourism, with the belief in the "urge to shop" being a motivator to travel (Geuens et al., 2004). The waiting time at the commercial area has to be managed in such a way that shopping can be part of the experience especially of holiday or leisure travellers (Castillo-Manzano, 2010) who spend relatively long time of waiting at the airport (Vester, 1996; Geuens et al., 2004). This has generated the supply of a wide variety of goods and services that serve the twofold function of maximising sales and entertaining the traveller through the improvement of her satisfaction while waiting for the flight (French, 1994; Kim and Shin, 2001; Kasarda, 2009). To common retail shops as duty-frees, food and beverage services, passenger and leisure facilities, some airports have added structures as golf facilities, karaoke, swimming pool and bathing room (Kim and Shin, 2001; Geuens et al., 2004). This way, the passenger has become a shared customer of both airlines and airports with complex commercial relationship with each other (Gillen and Lall, 2004; Castillo-Manzano, 2010).

Consumers perceive airports as special environments (Geuens et al., 2004) where their engagement in commercial activities is influenced by various shopping motivations, mainly related to the use of their dwell time to reduce anxiety and boredom (Li and Chen, 2013). In addition to the traditional needs for shopping, the specific infrastructure and atmosphere can incite travellers to consume. Geuens et al. (2004) come to these conclusions from direct surveys to travellers where they found that functional, social and experiential motivations are added with the travel-related ones of escaping out of the routine. This testifies the active role of the terminal policymakers in stimulating expenditure of passengers through the design of an appropriate environment and marketing strategies. This is also the conclusion of Li and Chen (2013) who

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