



# Public versus private airport behavior when concession revenues exist

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## ABSTRACT

The share of revenues from airport concession services among airports worldwide has reached an average level of roughly 50% today. Since concessions may exert downward pressure on the private aeronautical charge, the question is whether price regulation of private airports has become obsolete. The recent literature on airport concessions suggests that private airport pricing may still be excessive from the social viewpoint. This paper complements this literature by considering (i) two distinct types of concession services called retail services and car rentals, (ii) two-sided demand complementarity between aeronautical and concession services, and (iii) specific airport concession services that are welfare neutral in the sense that the surplus derived from concession services is independent of traveling activities. In this setting, airport price regulation can become obsolete, but concession services of the car-rental type can also increase the benefits of airport price regulation.

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## 1. Introduction

The motivation for this paper is based on two observations. First, a growing number of airports are fully or partially privatized and, second, the share of revenues from airport concession services (which includes retailing, advertising, car rentals, car parking and land rents) among airports worldwide has reached an average level of roughly 50% today (for example, [ACI, 2008](#); [ATRS, 2011](#)).<sup>1</sup> Remarkably, the most important revenue source of the world's busiest airport by passenger numbers, Hartsfield-Jackson Atlanta International, is public parking.<sup>2</sup>

Airport privatization is almost always accompanied by some form of price regulation because airports may possess monopolistic market power in the area of aeronautical services, which includes the supply of runway, terminal, and parking capacity for aircraft.<sup>3</sup> However, the increasing relevance of airport concession services has been deemed important by economists and commentators, since the existence of concession revenues may exert downward pressure on private aeronautical charges. The question is whether price regulation has become obsolete as a result.

To analyze this policy question, economists typically concentrate on a single concession service and one-sided demand complementarity, where a reduction of the aeronautical charge can increase the demand for airport concession services, while changes of concession prices cannot change traveling behavior (for example, [Zhang and Zhang, 2003, 2010](#); [Oum et al., 2004](#)). Another feature of these models is that the supply of airport concession services is assumed to increase welfare.

The main contribution of this paper is to consider two distinct airport concession services, two-sided demand complementarity and concession services that are welfare neutral from the social viewpoint. To illustrate why these scenarios may be of practical relevance, consider the supply of food & beverages (F&B) and car rentals as examples for airport concession services (which may also stand for the supply of clothing, car parking and other concession services).

The case of F&B is special because the aggregate demand for F&B inside and outside the airport area may be independent of traveling activities, since individuals will eat and drink whether they decide to travel or stay at home. The supply of airport concession services may therefore be considered as welfare neutral from the social viewpoint. To see this, note that an increase of the passenger quantity and the associated increase of F&B consumption at the airport may not increase welfare derived from F&B. This is because the welfare associated with the consumption of airport F&B may occur outside the airport area when individuals decide to stay at home. In this sense, the airport supply of F&B may be welfare neutral from the social viewpoint. Furthermore, if airport prices for F&B are high relative to the prices outside the airport area, this reduces the benefit of traveling. This may or may not lead to a two-sided demand

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<sup>1</sup> [Forsyth \(2004\)](#) analyzes the role of locational rents for commercial airport services. [Graham \(2009\)](#) discusses the importance of concession revenues to today's airports.

<sup>2</sup> In 2010, Hartsfield-Jackson Atlanta International realized operating revenues of 95,577 thousand US\$ from public parking and 26,665 thousand US\$ from car rentals, while landing fees raised 65,429 thousand US\$ (see the airport's Annual Report 2010). Total revenues were 400,799 thousand US\$.

<sup>3</sup> For example, [Bel and Fageda \(2010\)](#) empirically analyze European airports and find that private, unregulated airports charge relatively high prices compared to public or regulated airports.

complementarity in the sense that an increase of the passenger quantity increases the demand for airport retail services, while a reduction of retail prices can increase the incentives of traveling.<sup>4</sup>

The second case, airport car rentals, is also special. The demand for car rentals may be strongly related to traveling activities, since individuals can make use of their own car when they stay at home. It is therefore likely that the aggregate demand for car rentals depends on traveling activities. Thus, welfare neutrality is most likely not an issue in this case, while the notion of a two-sided demand complementarity may be of particular importance for car rentals. Consider a business traveler as an example. Suppose that the full price of traveling (including ticket and time cost) reaches a prohibitive level when the business traveler has to rely on public transport. Since traveling may occur only when car rentals are available, this clearly illustrates the relevance of two-sided demand complementarity, particularly for business travel where time costs are high relative to leisure travel.<sup>5</sup>

The analysis is based on two models each of which incorporates a congested airport that provides aeronautical services to airlines and concession services to passengers. The first model considers a welfare neutral supply of airport retail services. This model incorporates a *profit parameter*  $\kappa$ , which determines the airport's per passenger profit from retail services, and a *surplus parameter*  $\Phi$ , which measures whether individuals are better off buying retail services inside or outside the airport area. Specifically, an increase of the surplus parameter means that shopping inside the airport area becomes less attractive relative to shopping outside the airport area. Note that the assumption of welfare neutrality is useful for two reasons: (i) it captures the idea that the aggregate demand for retail services may be independent of traveling activities and (ii) it helps to abstract away from further distortions arising from retail markets.<sup>6</sup> The second model abstracts away from retail services and considers car rentals. Here it is assumed that the aggregate demand for car rentals increases when the passenger quantity increases.

The two models are used to compare private versus public airport behavior, where private airports maximize airport profit, while public airports maximize social welfare (sum of consumer and producer surplus). Airport and airline behavior is modeled as a two-stage game. In the first stage, the airport chooses airport charges. In the second stage, airlines are in Cournot competition.

The main insights can be described as follows. The analysis of retail businesses shows that the private aeronautical charge is excessive from the social viewpoint when retail profits (and car rental profits) are zero. It also shows that an increase of the profit parameter reduces the private aeronautical charge, while the welfare-optimal aeronautical charge is independent of the profit parameter. The latter holds true because the supply of airport retail services is welfare neutral. Furthermore, the profit parameter may provide exactly the right incentives for the private airport to behave optimally from the social viewpoint. This means that airport concessions may indeed eliminate the problem of airport market power.

<sup>4</sup> Van Dender (2007) found empirically that the per passenger concession revenues are declining in the passenger quantity, which supports the notion that a reduction of concession prices may increase the passenger quantity. Airport-specific shopping behavior has been analyzed by Geuens et al. (2004), Brown (1992), Timothy and Butler (1995), Rowley and Slack (1999), Dube and Menon (2000) and Sulzmaier (2001).

<sup>5</sup> Morrison (1987), Morrison and Winston (1989) and Pels et al. (2003) found that business travelers have a high time valuation relative to leisure passengers.

<sup>6</sup> For example, distortions can arise from inefficient pricing of retail services outside the airport area and from tax discounts in the area of airport duty-free offers.

The welfare neutrality of retail services further implies that the welfare-optimal passenger quantity is independent of the surplus parameter. Thus, an increase of the surplus parameter must be associated with a reduction of both the welfare-optimal aeronautical charge and the welfare-optimal airfare in order to correct for the disbenefit of inside-airport shopping.

The effect of car rentals on the private aeronautical charge can be positive or negative. The intuition is that the existence of car rentals increases passenger demand and exhibits downward pressure on the aeronautical charge at the same time. The welfare-optimal car rental charge and airfare is equal to social marginal cost in the car rental scenario. Since the aeronautical charge is excessive from the social viewpoint when concession profits are zero, this implies that private airport behavior cannot be welfare optimal in the car rental scenario. Finally, in the integrated scenario with retailers and car rentals, retailers can reduce the private aeronautical charge and the private car rental charge. Altogether, these results complement the findings derived by the recent literature on airport concessions.

Starkie (2001, 2008) provides a graphical analysis and demonstrates that airport concession services can reduce the private aeronautical charge. Zhang and Zhang (2003, 2010) and Oum et al. (2004) find the same relationship but, in addition, they find that the welfare-optimal aeronautical charge should not fully internalize marginal congestion costs to passengers. In their context, this is to increase the surplus generated by airport concession services. This result differs from the results presented in this paper, where the welfare-optimal passenger quantity is unrelated to retail services and airfares should fully internalize congestion cost to passengers in the car-rental scenario. Zhang and Zhang (2003, 2010) find that the private aeronautical charge always exceeds the welfare-optimal aeronautical charge; this is another result that differs from the results presented in this paper, where the passenger quantity can become excessive from the social viewpoint when the profit parameter is sufficiently high.<sup>7</sup>

Czerny (2006) considers an uncongested airport that provides aeronautical and concession services. He finds that concession services increase the private aeronautical charge, as is consistent with the results presented in this paper. However, he abstracts away from concession services like retail services and may therefore underestimate the potential of concessions to reduce the private aeronautical charge.

To concentrate on airport concession services, this paper does not go into the details of airport congestion pricing, carrier market power and carrier market structure. It is well known that the welfare-optimal aeronautical charge can be decomposed into carrier subsidies and a congestion charge. Specifically, if carrier market power increases, this increases the social benefits of subsidization. On the other hand, the congestion charge is inversely related to carrier market shares, since carriers may internalize their self-imposed congestion. The setting employed in this paper does not provide new insights with respect to this topic. For an in-depth analysis of the relationship between carrier market power and the internalization of marginal congestion costs, see Daniel (1995), Brueckner (2002), Pels and Verhoef (2004), Zhang and Zhang (2006), Basso (2008), Basso and Zhang (2008), Brueckner and van Dender (2008) and Czerny and Zhang (2011, 2012), Silva and Verhoef (2001) and Silva et al. (2012).<sup>8</sup> A survey paper that

<sup>7</sup> Fu and Zhang (2010) examine concession revenue sharing of an airport and its airlines. D'Alfonso et al. (2013) analyze airport pricing when concession revenues and passengers with distinct time valuations exist.

<sup>8</sup> The empirical results on the relationship between market shares and congestion provided by Brueckner (2002), Mayer and Sinai (2003), Daniel and Harback (2008), and Morrison and Winston (2007) are controversial, however. A lack of self-internalization could occur when a Stackelberg airline interacts with

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