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Low-cost carrier competition and airline service quality in Europe ☆

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ABSTRACT

The authors are investigating whether a higher presence and more efficient operations of low-cost carriers (LCCs) can increase the service quality in terms of on-time performance of all the flights landing at an airport. We sample 100 European airports located in 76 metropolitan areas of diverse sizes in 19 countries on both a daily and flight-by-flight basis during the period from April 2011 to December 2012. We construct a panel dataset at the flight code level comprising about 3.5 million observations. We find that LCCs contribute to a reduction of delays for airlines and flights landing at the observed airport. From the customers' point of view and taking into consideration the level of service, we conclude that the presence of LCCs represents a positive externality for an airport. Airport management may therefore consider the proactive increase of LCCs market share in their long-term business strategies.

1. Introduction

Passengers, airlines, airport management and industry experts all consider flight delay as one of the most important measures of service quality. For instance, several reports in the aviation industry document the most punctual airlines, ranking them in descending order by an on-time performance indicator, such as the percentage of flights delayed less than 15 min. Airlines acknowledge the importance of being punctual and are keen to announce any improvement in their performance score.[1] They regularly implement employee bonus programs to reward achieved on-time performance within the organization (Forbes et al., 2011). In a previous paper, Forbes (2008) finds that consumers complain more often when they fail to receive the higher quality they expect. Suzuki (2000) observes decreasing customer retention and shows that passengers after they have personally experienced delays are more likely to switch airlines for subsequent flights. Moreover, since customers consider delay as a form of product quality, decreasing on-time flight performance has a negative influence on airline fares (see Prince and Simon, 2015).

The impact of airline delay can have detrimental effects for both passengers and airlines. Due to delay passengers may miss a connecting flight, a business meeting or a family celebration, bearing the consequences in terms of wasted time, foregoing earnings or, more generally, opportunity costs, negative utility, annoyance and dissatisfaction. In addition to worsening their on-time performance record, airlines may incur additional operating and compensation costs, since they have to reroute or refund passengers, offer refreshments at best and accommodation, transportation or cash payments at worst.

Indeed, who should actually bear the costs of delay is still being debated. Under various circumstances, the responsibility or cause for the delay may remain undefined, as the reasons for poor on-time performance are manifold.[2] In Europe, regulation (EC) No 261/2004 provides the legal framework for the compensation of and assistance to passengers in the event of being denied boarding, cancellation or long flight delays. However, some airlines (especially low-cost carriers, LCCs) lobby for less regulation in order to transfer part of the risk and the implied costs of delay to the final consumers in exchange for lower fares.[3] For these

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[1] Punctual airlines advertise their on-time performance in their promotional campaigns as a marketing tool to retain or attract new customers. Ryanair even plays a punctuality jingle inside the aircraft, as soon as the airplane lands on-time.

[2] Airport flight protocols authorized by the International Air Transport Association (IATA) identify at least 100 different codes for causes of delay.

[3] For instance, in April 2011 Ryanair introduced an extra charge per passenger to cover the costs of flight cancellations and delays not under the direct responsibility of the airline, such as weather conditions or national strikes. Zhang and Zhang (2006) show that when carriers have market power, they are able to internalize congestion costs by setting a higher ticket price, so that passengers eventually bear the costs.

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reasons, any policy or action apt to reduce flight delay should be promoted.

In this paper we investigate wether a different composition of competing carrier types - full-service carriers (FSCs) versus LCCs - serving an airport, might impact the on-time performance of all the flights landing at such an airport. More specifically, we argue that a higher presence of LCCs at the airport of origin may reduce the average flight delay. This is because the "no-frills" and faster aircraft turn-around policy pursued by LCCs should mitigate airport congestion and the knock-on effect of flight delays, which could otherwise propagate throughout the network. Much faster and more precise operations conducted by LCCs at an airport quickly free up aircraft parking positions and thereby reduce the waiting period for other flights.[4]

We investigate whether the presence of LCCs at the airport of origin can constitute a positive externality by reducing airline delay using a sample of flights operated within Europe, where the phenomenon of LCCs has emerged only in recent years. Our dataset covers 23,402 flight codes, 3270 routes and 100 airports for a total of 3,486,376 observations. Our sample period includes daily observations from April 16th, 2011 to December 23rd, 2012. Applying panel data fixed effect techniques and controlling for the most cited factors affecting airline on-time performance, we find that a stronger presence of LCCs at the airport of origin has a positive and statistically significant effect on the on-time performance of the flights.

This effect is evident in two particular examples of city-pair connections serving a comparable catchment area: London-Madrid and Paris-Barcelona. More specifically, the route originating at London-Heathrow (100% served by FSCs) to Madrid-Barajas has an average delay of 17.3 min per flight, while on the route from London-Stansted (88% served by LCCs) to Madrid-Barajas the average delay is 12.4 min. On the connection Paris-Charles de Gaulle (89% served by FSCs) to Barcelona-El Prat we observed an average delay of 4.8 min per flight, compared to an average early arrival of 5.5 min on the route Paris-Beauvais (100% served by LCCs) to Barcelona-El Prat.

Our main objective is to present a detailed study on the topic of airline delay based on a comprehensive and unique sample of European airports; previous empirical examinations of airline delay focus exclusively on U.S. airports.[5] Indeed, the richness of our dataset allows us to cover both the peak and the off-peak seasons, thereby offering a complete year-round picture of airline on-time performance in Europe.[6]

The choice of working with European data is further motivated by the fact that European airspace is characterized by congestion problems and insufficient airport capacity (Raffarin, 2004; Santos and Robin, 2010). As air traffic within Europe grows because of the enlargement to the east and because of a deeper integration among countries, flight delay (or congestion-related delay troubling all modes of transport) is becoming an important economic and policy issue. One of the main priorities under the European Union's research program "Horizon 2020" is, in fact, to make transport systems seamless through better mobility and less congestion.

The next section reviews the literature. This is followed in Section 3 by a description of the data and a brief analysis. The econometric model is presented in Section 4, while the results of the study are discussed in Section 5. Section 6 summarizes our findings.

2. Literature Review

A very large number of applied works studying on-time performance are based on data from the United States, typically from the U.S. Bureau of Transportation Statistics. Mazzeo (2003), for example, sampled 50 U.S. airports in January, April and July 2000 to study the effect of airline market concentration on flight delays. He finds that on monopoly routes the prevalence and duration of flight delays is significantly greater. Although meteorological conditions, congestion and scheduling are the main causes of delay, he is able to show by controlling for such factors that increasing competition on the route level is correlated with better on-time performance. A more recent study by Greenfield (2014) comes to similar conclusions by analyzing the top 100 airports in the U.S. serving most arrivals and departures. Based on a limited number of observations he finds that an increase in market concentration is correlated with an increase in delay. Rupp et al. (2006), on the other hand, arrives at the opposite conclusion, namely that more competition on U.S. routes worsens on-time performance. The authors reach this conclusion by using a greater degree of schedule differentiation occurring on the less competitive routes. Similar results are obtained by Prince and Simon (2015), who find a worsening on-time performance of incumbents at U.S. airports *post* entry or even in cases of an entry threat of a LCC, such as Southwest Airlines. They explain this trend by the incumbents' efforts to reduce costs, such as the utilization of stand-by crews or aircraft, in order to compete on price *prior* to entry by a LCC, which leads to a reduction of service quality.

We challenge the belief that increased competition reduces service quality and demonstrate that more competition by LCCs on certain city-pair markets would not only lead to a reduction in average fares, but moreover increase service quality. We believe that, as fares of FSCs and LCCs on certain (competing) routes converge, the main competitive advantage among carriers for attracting passengers is the quality dimension, measured in on-time performance (Rupp and Sayanak, 2008). This belief is supported by solid economic theory (Tirole, 1988) which predicts that in oligopolistic markets, where prices converge at marginal cost levels, the substitutability for similar products occurs through vertical differentiation such as product quality (see, for example, Forbes and Lederman, 2010). If one competitor is able to offer high quality products in a particular market, the long-term equilibrium is, all else equal, established at a point of low price and maximum (technically and economically feasible) quality.

Mayer and Sinai (2003) suggest two potential causes of flight delays: hub and spoke policy and congestion externality. The former spurs hub carriers to schedule a large variety of potential connections and destinations within a relatively short time span adding convenience for, say, business travelers. Congestion externality is due to airports allowing unrestricted landings and take-offs by airlines and ignoring the fact that their marginal scheduled traffic during peak periods increases queueing and travel time for other airlines.

However, in Europe large hub airports are capacity-controlled in terms of the maximum number of available slots per time period (such as per hour) by a coordinator, and such airports participate in the bi-annual scheduling conferences organized by the International Air Transport Association (IATA). Therefore, similar to the findings of Mayer and Sinai (2003), hubbing strategies could be a primary driver of air traffic congestion in Europe as well. LCCs, to the contrary, have a point-to-point network strategy, where passengers' itineraries through one or more connecting airports do not play a vital role in their business model; thus

[4] Around 47% of delays are due to airline-related operations at airports, e.g. aircraft turn-around operations, while the remaining delays mainly stem from air traffic control, weather and airport capacity constraints (Eurocontrol, 2001).

[5] See the works by Mazzeo (2003), Forbes (2008), Rupp and Sayanak (2008), Rupp (2009), Forbes and Lederman (2010), Forbes et al. (2011) Ater (2012), Prince and Simon (2015).

[6] The lack of a comprehensive dataset on flight delays and the available capacity at European airports has hindered any empirical study on the European aviation market (Bel and Fageda, 2010; Santos and Robin, 2010).