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Flight cancellations and airline alliances: Empirical evidence from Europe

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ABSTRACT

We show that participating in an airline global alliance significantly increases the likelihood of canceling a flight: an airline is more prone to cancel a flight once it can rely on its partners' network. Alliance membership increases the value of the airline's own network, enlarges route and hub dominance, and simplifies the re-routing of stranded passengers. Since flight cancellation may be affected by carriers' behavior, the frequency of cancellations and their implied inconveniences to consumers should be taken into consideration by regulatory authorities.

1. Introduction

When it comes to studying the service quality in the airline industry, most practitioners and researchers base their assessment on the on-time performance of carriers (Mayer and Sinai, 2003; Mazzeo, 2003). It is very common to find in the first pages of many airline annual reports the list of the most punctual airlines, possibly together with an indicator of passenger satisfaction (Foreman and Shea, 1999). Airlines are aware of the importance to their clients of being punctual: a flight delay implies waste of time, loss of opportunities, and disutility to passengers (Sternberg et al., 2016). For these reasons, many airlines emphasize their on-time performance records as a promotional tool to retain clients or attract new passengers (Suzuki, 2000); Ryanair even plays a punctuality jingle inside the aircraft when its airplane lands on time.

Flight cancellations cause greater inconvenience to passengers, but have received less attention than flight delays (Sternberg et al., 2017). According to the US Bureau of Transportation Statistics, the major causes of flight cancellations are extreme weather (tornado, blizzard, or hurricane), airline or airport operation problems (mechanical problems, shortage of crew, lost baggage, late-arriving aircraft, heavy traffic volume), and security reasons (terminal evacuation due to terrorism threat, re-boarding because of security breach).[1]

Although the above discussion might lead to the conclusion that disruptive events occur at random, scholars and practitioners in

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[1] Seehttps://www.rita.dot.gov/bts/help/aviation/html/understanding.html#q1.

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the field agree that airlines act strategically, i.e. they have some leeway in the decision to cancel or not to cancel a flight (Rupp and Holmes, 2006; Seelhorst and Hansen, 2014).

The operational research literature provides some guidance to airline dispatchers on how to manage irregular traffic operations (aircraft and crew rescheduling, gate reassignment, and ferry flight allocation). More specifically, flight scheduling research suggests a number of different methods that can minimize the number of cancellations, the overall passenger delay, or the total costs (Xiong and Hansen, 2013; Kohl et al., 2007; Thengvall et al., 2001; Yan and Yang, 1996).

Some recent economics literature models disruptive events such as the airline decision to cancel or delay a flight based on the maximization/minimization of a given objective function (Atkinson et al., 2016; Seelhorst and Hansen, 2014). Cancellation decisions are therefore driven by airline preferences, and they can be a way to reduce delays and put an end to irregular operations. In other cases cancellations can be due to low passenger demand or other economic reasons: an airline makes a tradeoff between operating a scheduled flight or canceling it (Rupp and Holmes, 2006; Seelhorst and Hansen, 2014).[2]

Cancellations and delays may generate additional costs, which may include hotel and accommodation expenses for disrupted passengers and crew; monetary compensations to passengers; and ticket payments to other airlines (EC Regulation 261/2004). In order to better handle irregular operations and reduce these costs, airlines often build some flexibility into their schedules: they allow extra buffers between flights; increase idle capacity; and develop more efficient re-planning methodologies (Atkinson et al., 2016; Kohl et al., 2007; Barnhart et al., 2012).

Even though the growing importance of airline alliances is widely recognized (Pels, 2001; Gaggero and Bartolini, 2012), to the best of our knowledge, the empirical link between airline alliances and flight cancellations has not been yet demonstrated. We reckon that there is a combination of different effects, which modify the attitude of airlines toward cancellation when they belong to a global alliance. First, having partner carriers reduces competition and market discipline, thus leading to lower service quality. This result parallels the fact that more concentrated routes tend to experience more delays and cancellations (Rupp and Holmes, 2006). Second, since airlines trade off the marginal costs of disruption against the marginal benefits of hubbing, which in turn are affected by the network size (Mayer and Sinai, 2003), alliance membership amplifies the benefits by enlarging the airline's number of destinations, and hence makes each member more inclined to sustain greater delay and cancellation costs. Third, participating in an alliance gives the option to rely on the partners' network to re-route stranded passengers at a lower cost. Indeed, global alliances usually include revenue-sharing agreements with partners (Hu et al., 2013).

With this paper we aim to investigate the effect of airline alliances on flight cancellation, using a sample of non-stop flights departing from and landing at the major European airports during the period April 2011 – December 2012. Building on the empirical model illustrated by Rupp and Holmes (2006), we find that belonging to a global alliance increases the odds of flight cancellation. Furthermore, a higher share of partners' flights on a route is also associated with larger flight cancellations.

These results highlight an important regulatory issue, previously ignored by the empirical literature. Since flight cancellation may be affected by carriers' behavior, the frequency of cancellations and their implied inconvenience to consumers should be taken into consideration by the regulatory authorities when they assess the drawbacks of market concentration.

The remainder of the paper is organized as follows. Section 2 provides a review of the literature; the sample and the data collection are presented in Section 3, together with a brief descriptive analysis. The econometric model is described in Section 4, followed by a discussion of the results in Section 5 and the robustness checks in Section 6. Finally, Section 7 summarizes and concludes the paper.

2. Literature review

The closest study to ours is the work by Rupp and Holmes (2006), who investigate the determinants of flight cancellation using a probit model on a panel of US domestic flights, observed during the period 1995–2002. They find that flight cancellation is not only determined by a stochastic component (e.g. bad weather), but also by a strategic component (e.g. the airline decision). The main results of the Rupp and Holmes (2006) research are that cancellations are less likely during weekends and on the last flight of the day, since the airline wishes to avoid additional costs, such as those concerning accommodation and meals for the stranded passengers, as well as possible pecuniary compensation. Furthermore, the authors find that other relevant determinants of flight cancellation are: airline profitability on the route; the airport hub status; the route; and airport competition.

The fact that flight cancellation can result from the strategic behavior of the airline is also argued by Fukui and Nagata (2014), who study the impact of the introduction of a new rule by the US Department of Transportation (DOT) to reduce the tarmac delay.[3] Fukui and Nagata (2014) find that the threat of an investigation by DOT spurs airlines to reduce tarmac delay, but increases gate departure delays and, more importantly, flight cancellations.

Cao et al. (2017) apply the fractional response model described by Papke and Wooldridge (2008) to a panel of US flights observed during the period 2005–2012 on a monthly basis. As in Rupp and Holmes (2006),Cao et al. (2017) find that the relationship between

[2] The extreme decision by Ryanair to ground thousands of flights between autumn 2017 and spring 2018 provides additional evidence of how airline strategic behavior affects cancellation. The airline's official explanation for this decision was the poor planning of pilot holidays and the objective to increase punctuality (Economist, 2017a; Economist, 2017b). Other explanations concern the fact low payments and poor working conditions have induced many pilots to leave the budget carrier (Independent, 2017).

[3] A tarmac delay is the delay induced by holding an aircraft on the ground before the take-off or after landing with no possibility for the passengers to disembark. The rule introduced by the DOT is called the "Enhancing Airline Passenger Protections", or "tarmac delay" rule. See also Xiong and Hansen (2013) for further investigation of ground delay.