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The effect of code-share agreements on the temporal profile of airline fares ☆

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ABSTRACT

This paper aims at investigating how the pricing strategy of European airlines is affected by code-share agreements on international routes. Our data cover several routes linking the main UK airports to many European destinations and includes posted fares collected at different days before departure. By analyzing the temporal profile of airline fares, we identify three main results. First, code-share increases fares especially for early bookers. Second, the higher prices in code-shared flights are offered by marketing carriers. Finally, in single operator code-shared flights (unilateral code-share), the pricing profile is flatter than under parallel code-share.

1. Introduction

Code-share (henceforth CS) agreements are contracts between two carriers in which one airline, acting as Marketing Carrier (MC), is allowed to sell seats on a flight operated by the other airline, acting as Operating Carrier (OC).[2] In recent years, such agreements have become increasingly popular (Brueckner and Whalen, 2000; Brueckner, 2003a,b).

The large expansion of code-sharing agreements is indicative of their mutual advantage for the involved airlines. In addition to providing benefits in the form of cost saving, risk reduction and network expansion, CS is relevant because it can pave the way to more integrated forms of cooperation such as an alliance or even a merger (Brueckner and Pels, 2005; Gaggero and Bartolini, 2012). Indeed, to harmonize the activities of the airlines involved, CS comprises the definition of a set of commercial and operational agreements concerning, among others, pricing, seat inventory and frequent flyer programs (Chen and Ross, 2000; Iatrou and Alamdari, 2005).

Because these agreements may reduce the functioning of the market, they are often under the scrutiny of antitrust authorities (Gayle, 2007; Gayle and Brown, 2014). In Europe, Article 101 of the European Treaty prohibits agreements between two or more independent market operators, which restrict competition. This article is similar in spirit to the first

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[2] For instance, the flight BA781 operated by British Airways from London Heathrow to Stockholm Arlanda is also sold under the code AY5936 by Finnair. In this example British Airways is the operating carrier, whilst Finnair is the marketing carrier.

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Section of the Sherman Act (1890) in the US legislation.[3] Both sets of norms, albeit with minor differences, accept that code-sharing agreements can be allowed in principle, only if they are in favor of consumers, and, more specifically, when the antitrust commission expects that the agreement would not increase fares and/or would not lead to a reduction in the competition.[4] For this reason, code-sharing agreements are evaluated case by case and decisions are taken in terms of the impact on prices or on consumer surplus. Such decisions may also involve the imposition of such remedies as slot conditions or frequency freeze.

The theoretical literature has also highlighted the existence of different factors playing in favor and against code-sharing agreements. Using a simulation analysis Brueckner and Whalen (2000) show that allied partners charge lower fares, thereby increasing consumers' surplus and welfare. Brueckner (2001) uses a hub-and-spoke model to show that both consumer and total surplus rise after the formation of an alliance. He argues that the benefits of alliances arise because of lower fares set by the partner airlines in the interline markets. Park (1997) finds that, depending on the size of the market and on the economies of traffic density, complementary alliances increase economic welfare, while parallel alliances reduce it. Bilotkach (2005) shows that alliances without antitrust immunity are welfare enhancing. While he argues that the impact of alliances with antitrust immunity on welfare is ambiguous, he concludes that alliances increase total welfare, the larger the spoke-to-spoke traffic relative to traffic between hubs of alliance partners. Czerny (2009) demonstrates that interline passengers are better off under code-share agreement, whilst non-interline passengers are worse-off.

Various empirical papers investigate the effects of CS practices, mostly using US data. Park and Zhang (2000) find that consumers are generally made better off by the alliances in the North American aviation markets. Armantier and Richard (2006) examine the influence of the alliance between Continental Airlines and Northwest Airlines on prices; they find evidence of lower prices across markets in which the two airlines establish a code-share agreement. A companion study to Armantier and Richard (2006) is conducted by Gayle (2008), who focuses on the Delta/Continental/Northwest code-share alliance. He also does not find empirical evidence in favor of collusive pricing on the overlapping routes served by these carriers. The conclusion that fares on code-share itineraries are cheaper than in otherwise similar non-code-share itineraries is also reached by Ito and Lee (2007). To sum up, most of the existing literature investigates the role of code-sharing agreements on US routes providing a generally positive influence on consumer welfare.

This paper contributes to the literature on the role of CS in the airline industry in a number of ways; first, it focusses on European airline markets and second, it explores whether different types of code-sharing agreements are likely to affect not only the level of fares, but also their temporal profile. Our data cover several routes linking the main UK airports to some of the largest European destinations and include posted fares collected at different days before departure. As discussed in Gaggero and Piga (2011) and Dobson and Piga (2013), looking at how fares evolve over time is relevant for consumer welfare because different passengers categories (e.g. leisure or business) may be characterized by a different purchasing behavior. In general leisure travelers book in advance and business traveler book late. Thus, also in the occurrence of no impact on the overall welfare, there can still be a significant re-distributive effects. This issue has not been investigated in previous works, because the data structure does not allow to consider it.[5] Moreover, we distinguish the impact of CS on the fare temporal profile studying whether the airline under investigation code-shares its flight or not, is the operating carrier or the marketing carrier, there is a single or multiple operator code-shared flight (e.g. unilateral or parallel operations).

The econometric analysis is conducted by taking into account the antecedent decision by airlines to operate a flight in code-share. First, we estimate the likelihood that two carriers enter a code-share agreement, using a probit procedure. In the second step, we use this information to "correct" the estimates in the carriers' pricing equation (Heckman, 1979; Maddala, 1983; Campa and Kedia, 2002). By analyzing the temporal profile of airline fares, we identify three main results. First, code-share increases fares especially for early bookers. Second, the fare shift in code-shared flights is due to higher prices offered by marketing carriers. Finally, when flights are in unilateral code-share, the pricing profile is flatter than under parallel code-share.

The remainder of paper is structured as follows. The next section surveys the different types of code-share agreements, as well as the reasons generally considered to be effective in inducing an airline to do code-share. Section 3 presents the data. Section 4 provides a brief descriptive analysis, while Section 5 discusses the empirical model and estimation. Section 6 concludes.

2. Code-share practices

Code-sharing agreements may differ depending on a number of various dimensions (Heimer and Shy, 2006; Whalen, 2007; Ito and Lee, 2007). For instance, based on the geography of the route, CS may be conducted under "parallel operations"

[3] In some cases companies are allowed to sign cooperative agreements, which allow firms to collaborate without the risk of the intervention of the antitrust authority. In Europe, airline industry exemptions are called individual or block exemptions; in the US, antitrust immunities. In both legislations, the use of exemptions has been largely decreasing over time.

[4] See for instance the cases of Lufthansa/SAS in 1995, British Midland/Lufthansa/SAS in 2001, Lufthansa/SAS/United in 2002, KLM/Northwest in 2002, Lufthansa/Austrian in 2002, British Airways/SN Brussels in 2003, British Airways/Iberia/GB Airways in 2003, Air France/Alitalia in 2004, SAS/Austrian 2005.

[5] Many studies on airline pricing use DB1B database provided by the US Bureau of Transportation Statistics. This database contains a random draw of 10% of all US airline tickets, collected on a quarterly basis since 1993. In the current study we use posted fares retrieved on a daily basis from the Opodo website. Although the authors acknowledge the advantage of using transaction fares to study the airline pricing behavior in those circumstances in which price-capacity relation is paramount, the DB1B database can be less useful in other cases because it does not comprise the information on the date when the ticket can be booked. Thus, with the DB1B database it is not possible to track the fare changes over time as, instead, we do in our work with posted fares.