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The effects of global alliances on international flight frequencies: Some evidence from Italy[☆]

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ABSTRACT

We collect half-yearly data on nonstop flight frequencies offered by carriers on routes originating from Italian regions to European countries in the period 1998–2010. We find that, as the share of flights belonging to global alliances increases, the number of flights offered by airlines simultaneously expands, especially in the case of full-service carriers. Moreover, there is also evidence that the number of global alliances has a positive impact on flight supply.

1. Introduction

Global alliances may be viewed as an intermediate situation between separation and merger.[1] Carriers participating in an alliance agree to be involved in joint activities or to share some resources with other members, i.e. the frequent flyer program, code-share, route scheduling and joint price setting for specific routes. For this reason, the European Competition Commission, as well as the US antitrust authority, have often raised concerns about the wisdom of allowing such agreements (Balfour, 2004). On the one hand, the Commission recognizes that alliances may be beneficial in reducing the excessive fragmentation of the European market; on the other, it intervenes to guarantee a sufficient level of competition on some routes.[2] Indeed, these agreements are often subject to some limitations, such as freezing capacity and introducing constraints on fares in respect of services operated by the parties, and/or providing potential entrants with the access to certain facilities (e.g. freeing some slots).

The choice to focus on global alliances rather than on less tight forms of airline agreements such as code-share is driven by our interest to consider sufficiently stable partnerships, which more easily allow carriers to redesign their networks and modify their flight supply (Gaggero and Bartolini, 2012).[3]

The theoretical literature seems to have reached some consensus on the beneficial role of global alliances, even if it emphasizes some drawbacks. A simple way to analyze welfare implications proposed by the theoretical contributions is to classify these works according to their predictions on how output changes in accordance to alliance formation. As shown by Varian (1985), output growth is a sufficient condition for welfare improvement as a consequence of firms' behavior (i.e. the alliance formation). Since our analysis involves flight frequencies and not capacity supply nor total passenger volumes, the welfare implications may not be so straightforward. Nevertheless, empirical evidence shows that there is a positive and strong correlation between flight supply and

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1 With the term "global alliances" we identify those worldwide agreements, such as Oneworld, Sky Team, etc., mutually signed by a group of airlines.

2 For the US case on airline alliances, antitrust immunity and carve-out, see, e.g., Bilotkach and Hüschelrath (2011); and Brueckner (2003); Brueckner and Proost (2010).

3 Moreover, from an econometric point of view, the use of global alliances, which are not route-specific, reduces potential endogeneity issues that, on the contrary, may arise when the analysis considers code-share agreements.

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available seats/passenger volumes, thereby establishing a positive relationship between these variables.[4] When an airline plans to increase (decrease) its seat supply, first it possibly increases (decreases) the size of the airplanes flying on the given route, and subsequently the frequency. Moreover, since frequency is a main determinant of the quality of flight supply (Brueckner, 2004), the results presented in this work have an additional interpretation in terms of quality.[5] All things being equal, higher frequencies imply a positive shift of passenger demand. If the additional surplus generated by higher quality is split among passengers and airlines, it follows that higher flight frequencies also generate a rise in consumers' utility.

The empirical literature provides evidence that global alliances have a significant impact on flight supply. Armantier and Richards (2008) show that global alliances push carriers to adjust their network and scheduling. Bilotkach and Hüschelrath (2012) identify four major effects of global alliance: expansion of nonstop flights; improvement of online service options; cost reduction; and elimination of double marginalization.

Moreover, global alliances lead to an extensive use of code-share practices,[6] and therefore some of the effects described by the literature on code-share also emerge for global alliances.

A first set of papers groups code-share agreements into two classes: parallel and complementary alliances (Park, 1997; Park et al., 2001; Zhang and Zhang, 2006; Flores-Fillol, 2009). The former occurs when two carriers collaborate on a route where they have been competitors prior to the alliance formation, while the latter occurs when non-competing carriers link up their networks to offer a wider range of destinations and schedules. Parallel alliances tend to soften competition and reduce output, while complementary alliances help to exploit economies of density and expand output.

A second set of papers considers the effects of code-share when carriers have complementary networks apart from inter-hub routes (Brueckner, 2001; Chen and Gayle, 2007; Brueckner and Proost, 2010). Traffic increases on interlined routes since agreements help to reduce the double marginalization problem, while a traffic fall is expected on all the inter-hub routes due to the reduction of competition.[7]

Finally, Morasch (2000) investigates the role of the number of endogenously-formed alliances on output supply. He finds that, in the presence of a single alliance (occurring, in his set-up, when the number of operators is less than six), the output reduces, and with two or more alliances (occurring when there are six or more operators) output increases.[8]

The empirical studies substantially confirm the theoretical conclusions for the US–EU alliances (Park and Zhang, 1998; Brueckner and Whalen, 2000) and for US alliances (Ito and Lee, 2007). Less attention has been devoted to two aspects that we analyze in this paper. First, we add some evidence on the European market, which has not been sufficiently investigated by the literature. Second, we verify the theoretical prediction by Morasch (2000) on the impact of the number of alliances on capacity provision.

We collect half-yearly data for the period 1998–2010 on flight frequencies offered by carriers on routes originating from Italy to Europe. We find robust evidence that, as the share of flights belonging to alliances increases, the number of flights offered by airlines simultaneously expands, especially in the case of full-service carriers. Moreover, there is also evidence that the number of alliances has a positive impact on flight supply.

2. Empirical framework

We build a panel composed of 20 Italian regions and 24 European countries over 25 semesters (half-yearly data, 1998–2010) for a total of 12,000 observations. We estimate the following equation:

$$\log(y_{rct}) = \alpha' X_{rct} + \beta' Z_{rct} + \rho_{rc} + \tau_t + \varepsilon_{rct}, \qquad (1)$$

where r indicates the Italian region; c the foreign country; and t the semester of observation. The variable y_{rct} represents the bi-directional nonstop flight weekly frequencies on the region-country pair provided by, alternatively, all types of carriers as a whole, Full-Service Carriers (FSCs), and Low-Cost Carriers (LCCs).[9] The vector X_{rct} comprises our variable of interest, based on two different measures of alliance presence.[10] The first one is the ratio of the flight frequencies of the FSCs belonging to a global alliance to the total FSCs flight frequencies in region-country rc during period t (*Alliance share*). The second one is the total number of global alliances with at least one member offering nonstop air services in the pair rc during period t (*# Alliances*).

The other regressors, gathered in the vector Z_{rct}, aim to control for various determinants of the flight supply: the geometric mean between the Gross Domestic Product (GDP) of the foreign country and the GDP of the Italian region, to provide a measure for the size and income of the areas[11] the Italian people of region r living in country c (*Italians*) and the foreign people of country c living in region r (*Foreigners*), to capture the basic potential for travel demand; and the *Oil price*, to proxy the operating costs. In addition, vector Z_{rct} includes the percentage of flights that are in a code-sharing agreement on the region-country pair (*Codesharing*), this variable allows to separate the effect of codesharing from the effects of the participation in a global alliance.

Finally, the region-country fixed effects and the half-year fixed effects are captured by the parameters ρ_{rc} and τ_t, respectively, whilst the error term of the regression, assumed random with zero mean, is represented by ε_{rct}. All the economic variables are in constant prices with the reference year set in 2005. Table 1 reports the main descriptive statistics of the variables included in the database and their sources.

[4] The linear correlation coefficient between flight frequency and seat availability in our data is about 98 per cent.

[5] We are grateful to an anonymous referee for this suggestion.

[6] Carriers of the same alliance have a high share of routes in code-share, and only occasionally sign agreements with airlines of other alliances on specific routes (e.g. Alitalia and TAP on Rome–Lisbon). In sum, although there is no exact correspondence between code-share and global alliances, the latter not being a subset of the former or vice versa, it is also true that most of the code-share agreements are signed between carriers belonging to the same global alliance.

[7] The two approaches are similar, but the first one ignores the possibility of interline service in the pre-alliance situation.

[8] Other papers related to our work concentrate on the endogenous nature of alliances (Bilotkach, 2005; Zhang and Zhang, 2006; Goetz and Shapiro, 2012; Gaggero and Bartolini, 2012).

[9] We have also collected data on weakly capacity supply. Because of the high correlation of the two variables, as expected, the results are very similar. The estimates using seat availability, instead of flight frequencies, are available upon request.

[10] To construct these variables, we operated as follows. Our original data stem from Official Airline Guide (OAG), which includes information on the weekly flight frequencies by route and carrier on a half-yearly basis (winter and summer schedule) over 13 years. We complement this information with data concerning the evolution of global alliances over the same period. For each record (route-carrier-semester) we therefore add information on whether the carrier operating the flight is a member of a global alliance or not, together with the name of the alliance.

[11] In formula, $GDP_{rc} = \sqrt{GDP_r * GDP_c}$. Several applied works use a combination of the GDPs at the endpoints of the routes, mostly under a gravity model framework (Grosche et al., 2007; Jorge-Calderon, 1997; Russon and Riley, 1993; Verleger, 1972).