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Note

Fare differences between domestic and international air markets on routes from Gran Canaria

Xavier Fageda [a,*], Juan Luis Jiménez [b], Carlos Díaz [b]

[a] Department of Economic Policy, University of Barcelona, Av. Diagonal 690, 08034 Barcelona, Spain
[b] Department of Applied Economic Analysis, University of Las Palmas de Gran Canaria, D. 2-12, 35017 Las Palmas, Spain

ABSTRACT

This paper examines whether airline prices on domestic Spanish routes are higher than those on international routes. We estimate a pricing equation for all routes originating from Gran Canaria, differentiating between national and international routes. A key difference between these route types is that island residents benefit from discounts on domestic flights. When controlling for variables related to airline characteristics, market structure and demand, we find that national passengers who are non-residents on the islands are paying higher prices than international passengers.

1. Introduction

Governments in Europe provide financial assistance for some air services on thin or peripheral routes.[1] In Spain, the government gives a 50% discount to fares paid by residents of the Canary and Balearic Islands on routes linking these islands with other islands and/or the mainland. This paper uses data for routes departing from Gran Canaria airport, including all national and international destinations, to determine whether price differences are specifically attributable to the application of discounts on national routes.

2. Data

The unit of observation is at the level of the airlines operating on each route. We include all European destinations from the island, both national and international, linked by non-stop scheduled flights. The database was constructed for the winter in 2009 and summer in 2010 to control for any potential seasonal effects. Thirty airlines offered non-stop flights from Gran Canaria with 51 connections in the winter to European destinations and 60 in the summer. We exclude intra-Canarian routes from our sample because they present very specific characteristics in relation to the rest of routes that have the airport of Gran Canaria as their origin. These excluded routes are short-haul routes, have a high flight frequency and are served by regional aircrafts. They are, moreover, subject to public service obligations and airlines operating these routes must meet the imposed price caps and frequency floors.

Statistical data on airline prices are difficult to obtain in Spain (and in Europe). We therefore collected the price data required from each airline's webpage according to the following specifications. The prices included are for direct flights between Gran Canaria and the city of destination. The data were obtained from airline web sites employing a homogeneous process in one sample week for each of the two seasons under consideration. Information was collected one month before travelling and the price refers to the cheapest fare for the first trip scheduled in the week (the return being on the following Sunday). The average price for all the routes in our sample is €287.

Flight frequency data for each airline were collected for the same sample week as that for which price data were taken. This information was obtained from the website of the Official Airline Guide. The mean weekly frequency offered by the airlines making up our sample of routes was 4.6 flights. In terms of the percentage of frequencies, the mean share of airlines operating on the route was 0.69, while the mean share of airlines operating at the airport was considerably less. Thus, route competition is generally weak but no one airline has a dominant position in the airport.

We obtained data on passenger numbers on each route from the website of the Spanish airport operator (AENA). The average number of passengers per route was 85,943 per season. Distance data were collected from the website of webflyer.com. The average distance of the routes in our sample was 2867 km. Given that the shortest route was 1385 km, our analysis focuses on long-haul routes. Finally, data on the population and the gross domestic product per capita at the level of NUTS 3 and data on the number of

* Corresponding author.
E-mail address: xfageda@ub.edu (X. Fageda).

[1] See Williams (2005) and Williams and Pagliari (2004) for a review of the use of public service obligations in the European Union and Santana (2009) for an analysis on whether public service obligations have any effects on airline costs.

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tourists at the point of destination at the NUTS 2 level were obtained from the Spanish Statistics Institute and Eurostat.

Fourteen percent of destinations are international, with Madrid and Barcelona the most frequently served national destinations and cities in the UK and Germany the most frequent international destinations. National routes are cheaper in terms of total fare (Table 1) but there is no substantial difference in terms of price per kilometre although national routes are much denser and shorter. Furthermore, airline competition seems to be stronger on these national routes because the mean airline market share and the Herfindahl–Hirschman index (HHI) are lower. However, low-cost carriers represent 72% of observations on international routes but 31% for national routes.

Nevertheless, a multivariate empirical analysis is required to identify price differences between national and international air routes.

Table 1
Average data on national-international routes.

Variable	National routes	International routes
$Price_{ik}$	178.00 (105.21)	329.74 (197.9)
Price per km_{ik}	0.0990 (0.057)	0.0987 (0.051)
Pax_k	229980 (307286)	29074 (24019)
$Share_{ik}$ (route)	0.48 (0.34)	0.78 (0.28)
$Share_{ik}$ (airport)	0.04 (0.01)	0.01 (0.01)
HHI_k	0.52 (0.30)	0.78 (0.26)
Number of $destinations_i$	6.7 (3.6)	7.5 (5.2)
$Low\text{-}Cost_i$	0.31 (0.47)	0.72 (0.44)
Distance	1828.1 (298.7)	3277.6 (445.04)

Note: Standard deviation among brackets.

3. The model

We estimate the following price equation for airline *i* on route *k* in season *t*:

$$\begin{aligned} Price_{ikt} = \; & \alpha_0 + \alpha_1 Number\_destinations_{it} \\ & + \alpha_2 D_i^{Low\ Cost} + \alpha_3 D_k^{National} \\ & + \alpha_4 D_t^{Summer} + \alpha_5 Distance_k \\ & + \alpha_6 Demand_{kt} + \alpha_7 HHI_{kt} + \varepsilon_{ikt} \end{aligned} \quad (1)$$

- $Number\_destinations_{it}$ is the number of destinations from Gran Canaria airport offered by airline *i* in season *t*. We expect a negative sign of the associated coefficient. An airline could cut costs by offering a higher number of routes from this airport as it would be able to share the fixed costs among a higher number of passengers. In addition, its planes and crew could be employed more intensely. Given there is no airline dominating Gran Canaria airport, no hub premium effect is expected.
- $D_i^{Low\ Cost}$ takes a value of one if airline *i* is a low-cost carrier defined as an airline that offers a single fare class across its network of routes. We expect a negative sign for the coefficient associated to this variable because such carriers, with lower costs per seat than other types of airline, can transfer their economic efficiency to passengers in terms of lower fares.
- $D_k^{National}$ takes a value of unity if route *k* has a national destination. After controlling for the characteristics of airlines and routes, we expect the price differences between national and international destinations to be largely explained by the subsidy policies applied to national destinations. The price discounts can lead to greater demand by island residents for domestic destinations; and, price elasticity of demand may well be lower on these routes leading to airlines charging higher fares for national destinations.[2]
- D_t^{Summer} takes a value of one if the season falls within the summer. We expect a positive sign for the coefficient because Gran Canaria is a tourist destination, and travellers will presumably be willing to pay a higher price during the summer.
- $Distance_k$ is the air distance from Gran Canaria to the destination. Route length is a major determinant of airline costs. The sign of its coefficient is expected to be positive and lower than unity; i.e. the increase in costs is less than proportional to the increase in the number of kilometres flown. Long-haul routes involve faster average speeds, less intense consumption of fuel, and lower airport charges per kilometre.
- $Demand_{kt}$ is the number of passengers on route *k* in *t*. The expected sign of this variable is ambiguous. Airlines may make cost savings by exploiting economies of density on thicker routes but the mark-up on costs may also be higher on thicker routes due market power.
- HHI_{kt} is the Herfindahl–Hirschman index of concentration calculated as the sum of the squares of shares of the airlines operating on route *k* in *t*. The airlines' shares are expressed in terms of weekly frequencies. We expect a positive sign for the coefficient. A high concentration index implies that competition is not great and so prices may be higher.

To help identification differences in the fares charged by airlines on national and international routes, we seek to ensure that the sample of routes involves conditions that are largely homogenous. All the routes depart from the same airport where the island's residents benefit from price discounts on national routes. The airport serves a major tourist destination that had more than 2.4 million tourists in 2010, meaning that the analysis focuses on peripheral, though not necessarily thin routes because several enjoy a high volume of traffic. All routes departing to continental Europe are relatively long with intermodal competition not viable on either national or international routes. Finally, no airline dominates the airport.

4. Results

As the variables influencing demand and those of the concentration index may be simultaneously determined, the estimation is made by two-stage least squares. The concentration and demand variables are also are highly correlated so their individual identification may be distorted if they are jointly included as regressors in Eq. (1); thus we estimate different specifications of the equation:

1. A specification that includes the demand variable as a regressor but not the concentration index.
2. A specification that includes the concentration variable as a regressor but not that of demand.
3. A specification that includes both the variables of demand and concentration as regressors.

The use of the two-stage least squares estimator requires the use of instruments that must be correlated with the variables instrumented and are not endogenous. We include the following instrumental variables of the demand and concentration variables: $Population_k$ (population at destination *k* in 2009), GDP_k (nominal gross domestic product per capita at *k* in 2009), *tourists*$_k$ (number of tourists in *k* in 2009).

Table 2 shows the results of the estimation of the pricing equation. The overall explanatory power of the model is reasonably

[2] Calzada and Fageda (forthcoming) show that Spain's discount policy has resulted in an increase in the quantity of seats demanded and a lower price elasticity of demand among the islands' residents.

Table 2
Pricing equation estimates.

Variables	Model (1)	Model (2)	Model (3)
$\text{Number\_destinations}_i$	−10.53*	−13.04*	−9.65
$D_i^{\text{Low Cost}}$	−90.10*	−79.97*	−93.73**
D_k^{National}	147.47**	139.35**	149.31**
D_t^{Summer}	98.61*	84.05*	103.78*
Distance_k	0.19*	0.19*	0.19*
Demand_k	−0.0003*	–	−0.000
HHI_k	–	186.31*	−66.11
Constant	−192.17*	−343.67**	−138.58
F test	16.20*	19.61*	12.62*
R^2	0.48	0.49	0.44
Hansen *J*-test	1.68	2.18	1.23
Partial R^2 (Excluded instruments)	0.23	0.25	0.22 (demand)/0.25 (HHI)

Note: *** 10%, ** 5%, *1% significance.

good and the instrument suitability tests show a high correlation between the variables instrumented and the instruments and are indicative of the exogeneity of the latter. The coefficients of the explanatory variables are in line with expectations. That of the variable of the number of destinations offered by the airlines is negative and statistically significant (except in the model that jointly considers the influence of the demand and concentration variables) implying airlines operating several routes from Gran Canaria charge lower fares because their costs are likely to be lower.

As expected, low-cost carriers charge significantly lower prices than other airlines and a high proportion of passengers are willing to pay more in the summer to fly to what is considered an attractive tourist destination. The coefficient associated with the distance variable is positive and statistically significant but is value is less than one confirming the existence of distance economies. The demand and concentration variables are highly correlated – the level of competition being highly dependent on the amount of traffic that a route can generate – but when we estimate the two variables separately, we obtain the expected result. Airlines charge lower prices on routes for which demand is greater because they are able to exploit economies of density. Furthermore, they charge higher fares on routes with more concentration and where competition is not as strong. When demand and route concentration are considered jointly in the fare equation, neither is statistically significant because of the multicollineality. This problem does not distort the results of the remaining explanatory variables with the exception of the number of destinations, which maintains its negative sign but is no longer statistically significant.

Finally, the coefficient associated with national destinations is positive and significant in all the models; fares are about 50% higher on domestic routes than they are on international routes. After normalising by distance, demand, intensity of competition and airline attributes, domestic passengers appear to pay about €140 more than international passengers.[3] These differences could be because residents of Gran Canaria enjoy significant discounts on flights to national destinations. The lower elasticity of demand of this group of would seem to allow airlines to charge higher prices.

5. Conclusions

From the results of our estimations, it can be inferred that Spanish nationals who are non-residents in the islands are paying higher fares for domestic air services from Gran Canaria than those being paid by international passengers. This would imply a sort of cross-subsidisation from non-resident national passengers to national island residents. Moreover, given that airlines are charging relatively high prices on discounted routes it can also be inferred that in practice the discount policy serves to subsidize airlines rather than a specific group of passengers. Finally, it would appear that contrary to EU regulations airlines practices a form of price discrimination centred on the nationality of passengers; national passengers who are non-residents on the islands are paying higher prices than international passengers.

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References

Cabrera, M., Betancor, O., Jiménez, J.L., 2011. Subsidies to Air Transport Passengers: Efficiency of The European Policy Practice. Paper presented at 14th ATRS Conference. Porto.

Calzada, J., Fageda X., forthcoming. Discounts and Public Service Obligations in the Airline Market: Lessons from Spain. Review of Industrial Organization.

Santana, I., 2009. Do public service obligations Hamper the cost competitiveness of regional airlines? Journal of Air Transport Management 15, 334–349.

Williams, G., 2005. European experience with direct subsidization of air services. Public Money and Management 25, 155–161.

Williams, G., Pagliari, R., 2004. A comparative analysis of the application and use of public service obligations in air transport within the EU. Transport Policy 11, 55–66.

[3] These result are in line with those of Calzada and Fageda (forthcoming) and Cabrera et al. (2011) in their analyses of Spanish domestic routes.