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Does an increase in subsidies lead to changes in air fares? Empirical evidence from Spain ☆

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ABSTRACT

This paper examines the impact on prices of various regulatory changes in residents' flight subsidies implemented in Spain in recent years. It draws on a large sample of domestic routes for the period 2003–2013 to estimate a price equation that accounts for the panel data and the potential endogeneity of specific explanatory variables. Price differences were not found between the treated routes (routes affected by the discounts) and the control routes (routes not affected by the discounts). This is the case regardless of the discount percentage on prices that island residents enjoy.

1. Introduction

Air transportation is key in supporting mobility around cities and regions that are located in peripheral or remote locations. However, as demand for routes serving peripheral locations may be low, airlines may provide less frequent and more expensive services there, or may not even offer any service at all (Bitzan and Junkwood, 2006; Fageda, 2013). It is widely recognized in the literature that high-density economies in the airline industry (Caves et al., 1984; Brueckner and Spiller, 1994) may help airlines save costs by operating on denser routes with larger planes at higher load factors.

The traditional way of dealing with this problem in the European Union has been to subsidize the population living in peripheral communities or to apply price discounts to specific routes. Furthermore, these subsidies may be accompanied by the imposition of public services obligations (PSO) that put limits on the frequency of service, the size of the aircraft, the schedule for the service, and, on occasions, the maximum permitted fare for some or all seats.

In this regard, several European national and regional governments have introduced sizeable air service discount schemes that benefit island residents on domestic routes that have islands as their endpoints. These discounts are financed by

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governments, which subsidize the price paid by island residents. As they are not embedded in PSO regulations (i.e. they are independent), they can also include additional price reductions. Examples of this type of policy can be found in France, Italy, Spain, Portugal and the United Kingdom.

In particular, populations from outlying regions[1] enjoy these kinds of subsidies because the government is seeking to promote territorial equity. Because these regions are geographically very distant from the European continent, they benefit from specific legislation like this, in order to be protected.[2] In particular, there are differences in the form of the grant, and even in the type of the subsidy (they are predominantly specific or *ad-valorem*).

Although these subsidies are economically significant, as far as is known the relevant literature has not focused on its corresponding importance. Moreover, the analysis of the policies to support air services in remote regions is generally made under the terms of the public service obligation (PSO) declaration.[3] In this regard, several studies have analyzed the design and effects of the PSO applied in different European countries. Williams and Pagliari (2004) and Merkert and O'Fee (2013) identify vast diversity in the instruments and selection of protected routes across Europe. Lian (2010) and Lian and Ronnevik (2011) assess the weaknesses of the PSO regulation implemented in Norway, while Di Francesco and Pagliari (2012) analyze the potential negative impact on airfares of eliminating PSOs on the routes connecting the Italian mainland to the island of Sardinia. Calzada and Fageda (2014) find that PSOs reduce competition on the protected routes, while their effect on the number of flights differs depending on national regulations.

Furthermore, some studies have examined the effects of PSOs on the efficiency of operators. Santana (2009) finds that PSOs increase the operation costs of European carriers, but she does not observe a similar effect in the US system. Merkert and Williams (2013) show that European operators perform better in the early months of the PSO contracts than when the contract is approaching termination, suggesting that airlines have fewer incentives to increase efficiency before the tender finishes due to the absence of competition. Finally, some other papers have examined the design of PSOs in European air markets. Pita et al. (2013) propose an operational planning model to examine the design of subsidized air transportation, and apply this methodology to assess the Azores PSO system; while Pita et al. (2014) extended this model and apply it to an analysis of the PSO network in Norway.

Less attention has been paid to the analysis of price discounts established for residents on islands out of PSOs regulations. In Spain, Calzada and Fageda (2012) show that routes benefiting from price discounts are priced more highly than the remainder of the domestic routes. Fageda et al. (2012) draws on data of routes departing from Gran Canaria airport, including national and international destinations. They compare prices on subsidized routes (domestic flights from Gran Canaria) with those that are unsubsidized (international flights from Gran Canaria), and find that non-resident passengers pay higher prices than international passengers.

Valido et al. (2014) compare the different effects of *ad-valorem* and specific subsidies for resident passengers in air transport markets in a 'market power context'. They show that non-resident passengers may be spelled from the market if the proportion of resident passengers is high enough. They also analyze the most desirable situation between both types of subsidies, *ad-valorem* or specific, showing that their effects depend on the passengers' willingness to pay. Finally, they apply the model to the Canary Island markets, concluding that the *ad-valorem* subsidy is not the best for the conditions of this market. Finally, Cabrera et al. (2011) carry out a comparative description of these kinds of subsidies in European outermost regions (they also analyzed PSO declarations in these regions).

This paper contributes to the literature on price discounts to island residents by examining the impact on prices of different regulatory changes implemented in Spain in recent years. We draw on a large sample of domestic routes (including routes both affected and unaffected by the discounts) for the period 2003–2013 to estimate a price equation that accounts for the panel data of our sample and potential endogeneity of some explanatory variables.

Previous papers about the impact on prices of discounts have simply distinguished between subsidized and unsubsidized routes. Here, the change in the amount of the discount offered in the period under study can be exploited. Specifically, the percentage of price discount that island residents can benefit from has increased gradually from 33% to 50% during the considered period. Hence, we can examine not just price differences between subsidized and unsubsidized routes but also the differential impact of the amount of the subsidy on prices (without discounts) by separately identifying the effect of three different regulatory changes.

In the following section, the price discount policy applied in Spain to protect island residents and its historical evolution is explained. Next, suggestions based on the data are put forward and descriptive statistics are provided. In the last section, the empirical strategy is developed and the results of the econometric analysis are shown. Finally, the paper concludes with some policy recommendations.

[1] In the EU there are nine Outermost Regions: Guadeloupe, French Guiana, Martinique, La Réunion, Mayotte (French overseas departments); Saint-Martin (French overseas collectivity); Madeira and Azores (Portuguese autonomous regions) and the Canary Islands (Spanish autonomous community).

[2] In the words of the European Commission: "These specific measures are designed to address the challenges faced by the Outermost Regions because of their remoteness, insularity, small size, difficult topography and climate, and economic dependence on a few products" See: http://ec.europa.eu/regional_policy/en/policy/themes/outermost-regions/.

[3] In a more general perspective, Nolan et al. (2005) examine the social welfare implications of different regulations: direct subsidies, protected route packages, and revenue guarantees.