Brazilian international airports: An assessment of their catchment area and passenger demand

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The aim of this article is to build up a visual image and to examine demand perspectives of the major Brazilian international airports. Specifically, the objective is twofold: (i) to calculate and analyze the catchment areas for the main Brazilian international airports; and (ii) to investigate the core determinants of the demand for international air transport passengers in Brazil. The present study carries out a few innovative approaches. First, we used both spatial information and airport indicators to determine the airports’ catchments areas. Second, we take into consideration a weighted measure of income (GDP) for the catchment area and a proxy variable for cultural distances between Brazil and the other origin/destination country to estimate passenger demand.

According to the United Kingdom Civil Aviation Authority (2011), airport catchment areas might be defined as the “geographic area from which a large proportion of an airport’s outbound passengers originate, or inbound passengers travel to, and their geographic distribution within this area”. Although the most traditional and simple method to generate a catchment area might be by drawing simple circles with a determined radius around the location of the airport (Marcucci and Gatta, 2011), others focus on the spatial distribution of the potential passengers and their distances from the closest airports (Rosu et al., 2014). Lieshout (2012) takes into consideration the attractiveness of the airport, mainly the number of direct flights and their frequencies.

The demand analysis for air transport systems plays an important role for short-run and long-run planning (Sivrikaya, 2013). According to ICAO (2006), the main variables that condition a passenger choice for an airport are the market size, flight fare, quality of service, flight schedule and access conditions to the airport.

As for the methodological procedure, the present study combines both the spatial and the airport attractiveness elements in the conception of catchment areas for the ten biggest international airports in Brazil. The distance to the airport is

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measured in time bands based on a Geographic Information Systems (GIS) software. Other crucial variable is the attractiveness of each airport, measured by the number of direct flights to foreign countries and their frequency. These aspects form the mass of a given airport inspired by gravity models.

The demand for international flights is estimated by using a panel data model. Given the conception of catchment area, which overcomes the problem of overlapping areas, the main gravity variables (income and distance) are obtained. The cultural distance variable (Hofstede approach) is constructed by each airport.

The main results indicate that the catchment areas of the airports located in metropolitan areas tend to be spatially large and with a high rate of growth overtime. This concentration phenomenon is magnified by the fact that the largest airport in the country (São Paulo-Guarulhos) shows the highest number of international flights and the more diverse set of destinations. Although these aspects would seem to hamper the possibility of development of other airports, access infrastructure was a significant impedance and two international airports can efficiently compete for international passengers within the same metropolitan area. It is also worth mentioning that large regional airports have extended their catchment areas to become regional hubs for international flights.

The investigation of the main determinants of international passengers reveals that the weighted income of the catchment area significantly affects passenger throughput. That result not only confirms the importance of the calculation method used in this study but also allows us to infer about the economic conditions of the airport area. Distance and flight yield (adjusted by exchange rate) were also statistically significant. Interestingly, the cultural distance variable was also found to exert a significant influence on demand.

As concluding remarks, we are able to point out that the catchment areas obtained in this study not only avoid the overlapping effect but also takes into account access and infrastructure conditions. Besides, the catchment area map is an essential input for the demand analysis. The econometric results support the concentration hypothesis although some regional hub airports have been growing boosted by regional income, distance and supply-side variables.
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