



International air passenger traffic, trade openness and exchange rate in Brazil: A Granger causality test



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ABSTRACT

Brazil has invested substantially in encouraging international air passenger traffic. The results, however, have fallen far short of expectations, raising the question of what factors should be considered in policy-making to encourage the development of international passenger air traffic in Brazil. Based on indications in the literature, this study explores relations between international trade-related factors and international air passenger movement in Brazil, using the Granger causality methodology. The study results show evidence that changes in international trade indicators hold a long-term relationship with, and precede, variations in international air passenger movement. These indicators also show significant impact on the evolution of international air passenger movement in Brazil. The study indicates a need to rethink policy and may serve as a point of reference for other developing countries.

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1. Introduction

For the past ten years, the Brazilian government has been significantly expanding its bilateral air transport agreements with other International Civil Aviation Organisation member states in order to foster international passenger movement. These agreements move towards 'open-skies' international air traffic. To reinforce this openness, the government undertook rapid liberalisation of international air fares. Along similar lines, the government is pursuing a policy of concessions of major airports to management by private enterprise in an effort to improve capacity and service levels in Brazil's air transport network. Yet another component of this endeavour comprises attracting international mega-events, with a view to making Brazil more widely known abroad, so as to expand demand among foreign tourists. Although these are all substantial measures, the results achieved in attracting more international passengers have fallen far short of expectations (MTur, 2013). Given the Brazilian government's heavy investments in these measures, the impact of such investment on international air transport is in doubt. Our hypothesis is that there are macroeconomic drivers that are more important to Brazil's international air transport policymaking. In that regard, this article seeks to show that air transport industry results – i.e., results in international air passenger traffic in the Brazilian airports – can be better represented by macroeconomic parameters relating to the country's foreign trade. So, when gauging expectations for how international air traffic will respond to whatever investments are made, policy should be formulated considering the relations between international air passenger transport and international trade factors.

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Liberalisation of the air transport industry is signalled as one of the measures that have most favoured growth in the international air transport sector. The literature is concerned largely with examining the effects of air transport liberalisation on demand and on airline fares, which generate economies for the consumer. However, the literature has not explored the macroeconomic factors that – particularly in developing countries, such as Brazil – can significantly affect international air passenger traffic demand. Brazil has taken ample measures to liberalise passenger air transport, offer incentives and improve related infrastructure and, nonetheless, the tendency is for growth in international air transport demand to slow due to macroeconomic factors. That trend shows that the evolution of international air transport should not be considered solely in terms of regulatory provisions or investment in specific infrastructure (in Brazil's case, airports). In other words, funds for investment are scarce, particularly in developing countries, requiring that economic policymakers ponder such investments so that they yield appropriate returns for the country's economy.

In view of these issues, this paper intends to show and discuss causal relations that are crucial to policy making to promote international air transport in Brazil. This Introduction has contextualized the paper and stated its objective. The next section offers a brief review of the literature on similar studies and their findings. The Methodology section sets out the quantitative approach underlying the Case Study presented in the following section. The Results and Discussion sections present, respectively, the analysis of the results obtained by applying the methodology and their contributions and suggestions for more appropriate policy-making to develop international air transport in Brazil. Lastly, the Conclusions summarise the main results achieved and suggest concerns to be considered in formulating international air transport policies in Brazil.

2. Literature review

A number of published studies have related air transport growth to government measures to liberalise prices, bring greater flexibility in freedoms of the air and privatise infrastructure. Some studies relate growth in air transport to income, expressed as *GDP* or *GDP* per capita and some have ventured to explain the related causality. Of particular interest to this paper are Granger studies of causality among macroeconomic series, although there are studies using other methodologies, such as Liu et al. (2013). Adopting a stochastic actor-based modelling framework, they analyse the co-evolution of the world city hierarchy and global air passenger traffic. They found that well-connected cities in the aviation network tend to attract more major offices of globalized service firms, while the co-presence of major offices of globalized service firms in cities, in turn, stimulates the development of aviation connections between them, thus constituting a two-way relationship.

Kuledran and Wilson (2000) investigated the existence of a relation between international trade and international travel flows between two countries. They tested relations between Australia and another four countries using the co-integration and Granger causality approaches. Concluding that such a relationship does exist, they proposed research continue in this direction. Chang and Chang (2009) examined for the existence of a causal relationship between expansion in air cargo movement and economic growth in Taiwan. Their findings showed bi-directional causality between these variables, indicating that expansion in air-transported cargo movement played an important role in promoting Taiwan's economic growth.

Fernandes and Pacheco (2010) tested for a causal relationship between economic growth and domestic air passenger transport in Brazil. Using the Granger causality methodology, they found a unidirectional relationship between *GDP* and domestic revenue-passenger kilometre. Marazzo et al. (2010), studying the behaviour of passenger demand and *GDP* in Brazil, reached findings quite similar to those of Fernandes and Pacheco (2010).

Mehmood and Kiani (2013) examined the hypothesis that, in Pakistan, growth in aviation preceded economic growth. They tested for Granger causality between these variables and concluded that aviation demand contributed positively to economic growth. Mehmood and Shahid (2014) and Mehmood et al. (2015) tested for causality between aviation and economic growth in the Czech Republic and the Philippines, respectively. Their empirical results were similar, revealing co-integration between aviation demand series and economic growth. Applying the Granger test to discover the direction of the causal relationship among these series revealed that aviation demand contributed positively to economic growth. Van De Vijver et al. (2014) analysed trade and passenger traffic on selected Asian-Pacific links. Using Granger causality analysis, they discovered – among other things – that, on the South Korea link to the Philippines, passenger traffic was facilitated by trade and that the opposite occurred on the Australia-Malaysia link.

Hu et al. (2015) used heterogeneous panel data models to examine the Granger causal relationship between domestic passenger traffic and *GDP* for 29 provinces in China. Granger causality tests indicated bidirectional causality between *GDP* and passenger movement. In the short run, however, only domestic passenger traffic displayed a causal effect on *GDP*. Rodríguez-Brindis et al. (2015) analysed for long-run effects between air transport demand and economic growth in Chile, concluding that a long-run relationship does exist between airport passenger movement and economic growth, in addition to there being positive bidirectional Granger causality between these variables in Chile.

From this brief literature review, it can be seen that there is no uniform relationship between air transport and macroeconomic indicators; rather, that causal relations behave differently in the regions considered. These few studies show the importance of discovering how passenger movement behaves in specific regions in order to develop public policies for the air transport industry. The studies directed to economic growth concentrate on income indicators, while those directed to international aviation movement concentrate on foreign trade indicators. Other studies taking geographical and network approaches lie outside the scope of this paper. Accordingly, this study will follow the approach of considering foreign trade-related macroeconomic indicators.

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