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Regional aviation and economic growth: cointegration and causality analysis in Australia

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ABSTRACT

Air transport is a critical link to regional, rural and remote communities in Australia. Air services provide important economic and social benefits but very little research has been done on assessing the value of regional aviation. This research provides the first empirical evidence that there is short and long run causality between regional aviation and economic growth. The authors analysed 88 regional airports in Australia over a period of 1985–86 to 2010–11 to determine the catalytic impacts of regional air transport on regional economic growth. The analysis was conducted using annual data related to total airport passenger movements – for the level of airport activity, and real aggregate taxable income – to represent economic growth. A significant bi-directional relationship was established: airports have an impact on regional economic growth and the economy directly impacts regional air transport. The economic significance of regional air transport confirms the importance of the airport as infrastructure for regional councils and the need for them to maintain and develop local airports. Funding should be targeted at airports directly to support regional development.

1. Introduction

Infrastructure is often considered to be critical as a factor for growth and development of countries and regions (Percoco, 2010). Airports are viewed as strategic infrastructure because of the importance of air transport in connecting regions. This is important in the context of globalisation because air transport is one of the most important means of linking modern industrialised societies (Feldhoff, 2002). However, while considerable research has been done to examine this outcome for major cities, there has been less attention to the contribution of regional air services to non-metropolitan regional development outcomes (Blonigen and Cristea, 2012).

Anecdotal evidence suggests that air transport improves business operations by providing rapid access to input supplies, stimulates interaction by enabling face-to-face meetings, and provides critical input for "on-time" industries (Oxford Economic Forecasting, 2006). However simply accepting a causal association between air transport and economic growth in regional and remote locations may provide the wrong signal to policymakers. It is essential to validate and test the association as it is always possible that there are other factors (out of the policymakers' control) that drive the anecdotal association (Blonigen and Cristea, 2012). One reason for a lack of research in this area is due to a difficult (econometric) simultaneity issue (Green, 2007). In order to robustly infer a causal link between airport services and economic growth, it is important to have panel datasets on both dimensions for a long period of time, something that can be difficult to obtain in regional and remote locations where data series are less well developed. In the absence of regional and remote airport panel datasets, researchers have traditionally used cross-sectional data and applied various techniques to infer causal relationships. However, such analyses are mostly unidirectional. Despite exposing a strong correlation between air transport and economic growth, the direction of causation is unclear (Sellner and Nagl, 2010) and could differ depending on the characteristics of the region under investigation (Mukkala and Tervo, 2013). As no robust evidence exists for the regional and remote airport context, it is certainly reasonable to posit the general observation that airports generally lead to economic growth (Zhang and Zhang, 2001), but it is also reasonable to posit that economic development leads to increased airport traffic. A more fundamental position is to question whether such a relationship would hold in the lower population regional and remote airport context.

Providing empirical support for one or other position, and establishing the direction of causality has important policy

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consequences for government in the development and operation of airports and air service regulation/procurement along with their links with regional economic development policies. These consequences can be explored via the four types of causal relationships between regional air transport and economic growth classified by Van De Vijver et al. (2014). That research suggested four types of relationships. First, the unidirectional causality running from air traffic to economic growth suggests that growth in policy support may contribute to regional economic growth while a reluctance to support airports may be felt in less regional economic growth. Second, if economic growth is the driver of air traffic then an increase in economic growth can possibly result in a growth in airport services. In that situation a policy shift such as a reduction in air service subsidy to a region may have little or no adverse effect on its economic growth. Third, a bi-directional causal relationship suggests that air traffic and economic growth are jointly determined and affected at the same time. Here policy action could be applied in either area to assist regional development. Lastly, the absence of a causal relationship infers that air transport is not correlated with economic growth, which suggests that airport services may not have any effect on economic growth and need not be part of government policy.

An investigation of causal relationships is particularly important for regional, rural and remote (RRR) airports that serve smaller populations that are often growing slowly but at the same time are spread across large distances so that regular air services are critical. This is the case in Australia, where the majority of the nation's air services are supplied along a narrow settled coastal strip, while the residents of the sparsely populated inland need air transport to access the high level services of the coastal cities. RRR airports have not attracted much academic review (Feldhoff, 2002; Graham and Guyer, 2000). Currently, very little knowledge exists on the economic effects of RRR airports (Robertson, 1995) and air services (Merkert and O'Fee, 2013). Although these airports and air services play a vital role in terms of enabling mobility to sustain health, education, tourism, and work opportunities (Adler et al., 2013), their traffic levels are insufficient for profitable operation given high costs of airport maintenance and management (Donehue and Baker, 2012). The majority are managed by local governments (municipalities) that often lack the financial resources or expertise to manage and operate an airport. These challenges are exacerbated by Australian federal policy that favours deregulation and devolution of Commonwealth government accountability.

The Australian Airports Association (2012) asserts that these airports are facing difficult times – with almost 50% operating at a loss. Many federal and local governments across the globe have decided to withdraw gradually from financing regional airports (Mathisen and Solvoll, 2012; van den Berg et al., 1996). It is therefore critical to assess their economic contribution in a wider economic and social context, rather than focus on a mere assessment in profit margin terms. This will verify the true value of their operation and so clarify the case for any public support that should (or should not be) directed at regional aviation.

This paper aims to provide an assessment of the issues involved here by isolating bidirectional short and long-run causality between measures of regional air transport activity and economic growth in their adjunct communities. This will be done by linking passenger traffic data at regional, rural and remote (RRR) airports in Australia with economic growth data of regions that surround those airports. The following section reviews the international literature on the economic impacts of air transport, and Section 3 provides a broad overview of the role of regional airports in Australia. Section 4 details the methodology of our study, and in Section 5 we discuss the empirical findings. Summarising the results, Section 6 offers conclusions and transport planning and policy recommendations.

2. The causal link between airport activities and economic growth

Airports have been associated with four main types of economic impact: (a) direct impacts – employment and income generated by the direct construction and operation of the airport; (b) indirect impacts – employment and income generated by the chain of suppliers of goods and services; (c) induced impact – the employment and income generated by the spending of incomes from employees created by the direct and indirect effects; and (d) catalytic impacts – the employment and income generated by the role of the airport as a driver of productivity growth, and then as an attractor of new firms (Percoco, 2010). To illustrate the magnitude of the impacts, Oxford Economics and ATAG (2014) have recently estimated that aviation contributes approximately US$2.4 trillion to the global economy.

Most studies assessing the economic impact of airports focus on direct, indirect, and induced contributions. Recently attention has been applied to "catalytic effects" which are the net economic effects on employment, incomes, and government finances generated from the input of aviation to the tourism industry and trade (and their long-term influence on productivity and gross domestic product). This paper focuses on the assessment of these catalytic impacts. Catalytic impacts of air transport have received relatively little empirical attention in the literature (Oxford Economic Forecasting, 2005). A review of studies of the economic impacts of airports found that previous research has applied mainly three types of methods of evaluation: (1) input–output, (2) collection of benefits, and (3) catalytic methods (Transportation Research Board, 2008). Input–output approaches commonly measure direct, indirect, and induced effects, thus an airport's total economic impact is the sum of these three. The collection of benefits method evaluates qualitatively or quantitatively benefits and costs experienced by airports. This includes travel time savings; costs savings by using air transport; capacity enhancements from reliever airports; and stimulation of business, recreation, commercial activities; and community benefits. Catalytic methods measure the spillover effects – or how the airport contributes to the supply-side of economic development. This approach includes influences on investment, trade, and the overall economic productivity. Catalytic impacts are usually measured monetarily (unlike the collection of benefits methods), and consequently, researchers have monetary investment in the assessment of catalytic impacts.

Within the catalytic methodological framework, researchers have developed various statistical models in different contexts in order to establish unidirectional causal links from airports to economic growth. Methods have included regression models (Blonigen and Cristea, 2012), 2-stage least square regression (Allroggen and Malina, 2014; Brueckner, 2003; Green, 2007; Percoco, 2010); dynamic panel data modelling – such as seemingly unrelated regression (Sellner and Nagl, 2010), vector error correction models (Oxford Economic Forecasting, 2005, 2006) and short run Granger noncausality analysis (Mukkala and Tervo, 2013). The spatial scale of analyses used in these studies also varies – ranging from administrative regions (metropolitan statistical areas and provinces) (Blonigen and Cristea, 2012) to neighbouring administrative regions (Percoco, 2010); a 50 km radius of an airport (Allroggen and Malina, 2014); and an entire country in some aggregated studies (Sellner and Nagl, 2010).

The economic impact of different airport types has rarely been studied in the literature. A recent study using panel data from 19 airports in Germany has found positive GDP effects of air services at large and medium sized airports (Allroggen and Malina, 2014). However, the authors report a negative effect for small sized airports. Accordingly the differences are due to the traffic patterns