THE ECONOMIC IMPACT OF AIRLINE SERVICE ON SMALL COMMUNITIES

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ABSTRACT

Interest in scheduled airline service to relatively small and remote communities has been limited to how government subsidies are coordinated and "packaged" into "essential air service" to service thinly traveled routes. We examine the economic impact of airline service on 12 cities and municipalities in the Philippines using airline service related variables such as the number of airline passengers embarking and disembarking at the airport serving the community, number of cities with scheduled airline service to the community, and a dummy variable indicating a direct airline service with Metro Manila, the country's premier financial and commercial center. The results indicate that airline service has a positive economic impact, measured as per capita regional gross domestic product, on the communities in the sample. The positive economic impact of airline service suggests that the government should encourage airline operators to serve new routes to improve air connectivity and enhance economic growth and development in more cities and municipalities in the country.

Keywords: Economic impact of airline service, Small airports

INTRODUCTION

The primary objective of supplying scheduled airline service to remote communities, especially in archipelagic countries like the Philippines, is to provide small and isolated communities access to other parts of the country by linking them with the national air transport network. The United States (US) Office of Technology Assessment (1982) argues that scheduled airline service plays a crucial role in the economic growth and development of "small- and medium-sized cities" since connectivity to other parts of the US may result in more investments as well as increased industrial and commercial activity. In the Philippines scheduled airline service to small and isolated communities may spur economic growth and development through tourism and related activities and the resulting commercial activities that come with a thriving tourism industry. Scheduled airline service also links these communities with the larger global community, resulting in increased tourism and commercial activities that invariably underpin the development of tourism, transport, and related industries in the aforementioned communities.

The air transport literature suggests that scheduled airline service creates positive externalities that impact on the economic growth of small communities. The Air Transport Action Group argues that "[g]rowth in aviation fosters growth in the wider economy, enhances connectivity and is a supporter of millions of jobs both directly

and as a result of the trade and tourism that air transport makes possible" (Air Transport News, 2013). This paper examines the economic impact of airline service on 12 cities and municipalities in the Philippines for the period 2000–2011 using panel data analysis.

We organize our paper as follows. The literature review follows the introduction while the third and fourth sections of the paper discuss the empirical model and the data and method, respectively. The discussion on the estimation results and analysis follows while the last section concludes the paper and presents a number of policy implications.

LITERATURE REVIEW

Access to varied forms of transportation systems invariably facilitates the growth of industries and promotes positive externalities to the communities where such transportation systems operate. Access to transportation facilities allows for easier trade of goods and services as well as promotes business and investment opportunities in urban and rural communities, although the impact of access to reliable transportation systems is more pronounced in rural and remote communities due to limited alternatives. Civil aviation and the growth of commuter airlines provide the impetus in developing the growth of economic activities such as tourism and trade, among other things (Nolan et al., 2005). Commuter airlines servicing small communities result in greater or improved economic growth and development in communities that lack access to larger urban areas before the introduction of scheduled airline service.

Two fundamental assumptions underpin the availability of commuter airlines in small and remote communities: first, that the potential demand for robust tourist arrivals and business activities exists, and second, that providing scheduled airline service to these communities is a matter of government policy, requiring regional and commuter airlines to service relatively small communities.

With the well-developed tourism markets of small island tourism economies (SITEs) such as Barbados, Cyprus, Dominica, Fiji, the Maldives, and Seychelles that are being sustained by extensive transportation and related industries (Shareef and McAleer, 2005; Harwood, 2010), examples that support the first assumption abound. The SITEs provide empirical evidence that remote island communities thrive when scheduled airline service connects them to larger markets, despite tourism and air transport demand being conditional on natural disasters, conflicts, unrest, and global terrorism. The experience of the US requiring regional and commuter airlines to service small communities via subsidies in the interest of ensuring access to the entire air transportation network supports the second assumption. Consequently, the US Deregulation Act of 1978 guaranteed "essential air service" to small communities for 10 years to support economic growth and development and the growing need of population decentralization (US Office of Technology Assessment, 1982).

While the first assumption holds true in many tourism markets, especially in relatively small communities and remote islands, the industry structure of businesses—including the airline industry—will have a huge impact on the viability and

sustainability of the tourism industry, which depends on how the transportation and related industries would develop and behave based on the existing market structure (Tisdell, 2002).

The experience of the Philippines on scheduled airline service to remote or relatively small communities is no different from the US policy of providing "essential air service" to isolated communities to facilitate local and regional economic growth. The country's flag carrier and majority-owned by the government until the late 1990s, Philippine Airlines (PAL), provided scheduled air service to a number of small communities or islands, which were popularly known as missionary routes. These missionary routes were intended to spur economic development in selected remote communities and island-provinces. Three years after the government liberalized the domestic airline industry in 1995, however, PAL withdrew from these routes in late 1998 as competition from new entrants intensified, shifting its operations on more profitable routes. With access to scheduled airline service made more affordable by low cost carriers (LCCs) such as Cebu Pacific Air and Air Philippines (PAL's subsidiary and renamed Airphil Express) the demand for airline service has grown rapidly in the last ten years. The aforementioned LCCs reintroduced scheduled airline service to most routes that lost air service when PAL withdrew from those markets in late 1998. With the entry of South East Asian Airlines (SEAir) into the scheduled airline service in 2003 (Manuela Jr., 2007) remote island communities with tourism potential (e.g., Busuanga, Cuyo, El Nido in 2003; Cuyo lost scheduled air service in late 2008) were connected to the domestic air transportation network. The expanded operations of three airlines—Airphil Express, Cebu Pacific Air, and Zest Airways (formerly Asian Spirit)—in the last five years resulted in more competition and choices even in relatively smaller airline markets and introduced scheduled airline service to more communities served by class 2 and community airports (e.g., Ozamiz City in 2007, Cauayan City in 2008, Siargao in 2009, and Vigan City in 2011).

Although airline operators may provide service to relatively small and isolated communities, Bitzan and Chi (2006) report that airfares to communities with less than 300,000 people tend to have higher fares, as a result of low traffic density, compared with communities with more than 300,000 people. Kahn (1993) observes a similar trend—average fare per mile on low traffic density routes is higher compared with high traffic density routes. The government used to subsidize the operations of PAL in order for the airline to continue providing air service to relatively small and isolated communities. With the absence of government subsidy following the privatization of PAL, however, the airline withdrew from thinly traveled routes in late 1998 because charging higher fares to cover the higher cost of serving small airline markets will only reduce the already meager demand (Manuela Jr., 2007).

Invariably, the agency risk of such a policy is how to sustain unprofitable routes with subsidies and of what subsidy method is appropriate to drive demand for increased air connectivity (Nolan et al., 2005). Both the US and the Philippines have supported a government policy of providing subsidies for scheduled airline service to service relatively smaller, and often, remote communities.

With the liberalization of the Philippines' domestic airline industry in 1995 under Executive Order 219, the intense competition that ensued between PAL and the new entrants resulted in the withdrawal of PAL from 34 domestic markets in late 1998, as the incumbent airline diverted its resources to the 22 relatively more profitable routes with sizeable passenger traffic all year round. The importance of scheduled airline service to and from relatively small and remote communities, though costly and inefficient, cannot be overemphasized, however, as the US Office of Technology Assessment (1982) states:

> The principal function of the low-density, short-haul air service provided by the commuter airlines has been to provide small- and medium size communities with access to the Nation's primary air transportation system. This service is particularly vital in areas that are isolated by low population density, long distances and physical barriers.

EMPIRICAL MODEL

The econometric model consists of two equations due to the endogeneity of the city or municipal income (tax and nontax income) in the per capita regional gross domestic product equation. The per capita gross domestic product equation, or the economic impact equation, has four explanatory variables, all of which are exogenous, except for the city or municipal income variable. The economic impact equation is specified as follows.

$$\text{LN PCRGDP (xy)} = \beta_0 + \beta_1 \text{ LN INCOME (xy)} + \beta_2 \text{ LN PASS (xy)} + \beta_3 \text{ LN CONNECT} + \beta_4 \text{ MNL (xy)} + \varepsilon \text{ (1, xy)}$$

Where for each city or municipality *x* and year *y*,

PCRGDP	=	per capita regional gross domestic product
INCOME	=	total tax and nontax income
PASS	=	total airline passengers
CONNECT	=	number of cities with direct air service to the city or municipality
MNL	=	dummy variable: "1" indicating a direct air service to Metro Manila, the largest metropolitan area in the country; "0" otherwise
ε	=	error term

Since the National Statistical Coordination Board (NSCB) does not publish per capita gross domestic product data at the city or municipal level, we used the per capita regional gross domestic product (RGDP) as proxy. We expect that the use of aggregated data will underestimate the economic impact of airline service and the other explanatory variables. Three variables in the economic impact equation—PASS, CITY, and MNL—will estimate the economic impact of airline service.

The per capita regional gross domestic product (PCRGDP) should respond positively to the income variable because communities with higher incomes are able to provide more government services to its constituents. Since the passenger variable includes tourists and businesspeople the PCRGDP should respond positively to more airline

passengers due to the additional revenues earned by the transport, food, and hospitality industries in the area while PCRGDP should increase as more cities have direct air service connections to the community due to improved access to the area resulting in increased tourism and commercial activities. The MNL dummy variable should have a positive impact on PCRGDP because having direct airline service to Metro Manila, the major gateway to the Philippines and the country's premier financial and commercial center, may result in more tourism and commercial activities in the area.

The total income equation has three explanatory variables, including a dummy variable, and specified as follows.

$$\text{LN INCOME (xy)} = \beta_0 + \beta_1 \text{ LN PASS (xy)} + \beta_2 \text{ LN POPN (xy)} + \beta_3 \text{ CITY} + \varepsilon \text{ (1, xy)}$$

Where for each city or municipality *x* and year *y*,

POPN = population
CITY = dummy variable: "1" indicating a city; "0" indicating a municipality

The other variables are as specified in the economic impact equation.

Income should respond positively to the passenger variable due to increased commercial activities. A higher population and being a city should impact income positively due to more tax and nontax income collected; cities have higher property taxes than municipalities.

All continuous variables are specified as natural logarithms so that we can interpret the coefficients as elasticities (Manuela Jr., 2007; Schipper et al., 2002).

DATA AND METHOD

The sample consists of 12 communities—two cities and 10 municipalities. All airports serving the 12 communities in the sample are classified as 'principal airport class 2' by the Civil Aviation Authority of the Philippines (CAAP) except for one—El Nido. The newest airport classification system used by CAAP does not include the airport in El Nido because the government does not own the airport.

While the title of our paper indicates that the sample consists of small communities, not all communities in the sample are small but they are relatively smaller compared with Metro Manila (2010 population: 11,855,975), Metro Cebu (2010 population: 2,551,100), or Zamboanga City (2010 population: 807,129), the cities that most of these "small communities" have direct air service connections. Table 1 shows the selected 2010 statistics of the communities in the sample.

All airline-related data come from the Civil Aeronautics Board based on the reports submitted by the airlines to the agency. Socioeconomic data such as population and gross domestic product, as well as land area, come from various editions of the Philippine Statistical Yearbook published by NSCB. The city or municipal tax and

nontax income comes from the Bureau of Local Government Finance of the Department of Finance.

Table 1 – Selected 2010 statistics of the communities in the sample

Community	Population	Passengers	Income
Basco, Batanes	7,907	17,136	36.16
Boac, Marinduque	52,892	19,234	91.91
Bongao, Tawi-Tawi	79,362	16,155	105.25
Busuanga, Palawan	21,358	169,022	78.38
Catarman, Northern Samar	84,833	68,511	36.79
El Nido, Palawan	36,191	1,427	130.13
Jolo, Sulu	118,307	9,350	135.55
Malay, Aklan	45,811	626,794	178.06
Masbate City, Masbate	85,227	41,848	339.18
San Jose, Antique	57,847	93,770	65.64
Surigao City, Surigao del Norte	140,540	81,352	480.74
Virac, Catanduanes	66,951	44,615	111.02

Data source: National Statistical Coordination Board for population, Civil Aeronautics Board for airline passengers, and the Bureau of Local Government Finance, Department of Finance for income. The income is in millions (PHP), current prices.

We collected annual panel data for the 12 communities for the period 2000–2011. The panel data set is unbalanced due to missing data in a number of communities in the sample—unavailability of scheduled airline service to Basco from 2000–2001, Busuanga and El Nido from 2000–2002, Jolo and Bongao from 2001–2002, and Boac in 2007.

We estimated the econometric model consisting of two equations using the generalized methods of moments based on the Newey-West covariance estimator, using a fixed effects model, because this estimation method yields robust standard errors even in the presence of autocorrelation and heteroskedasticity (Angrist and Pischke, 2009; Cameron and Trivedi, 2005; Greene, 1997; Johnston and DiNardo, 1997; Wooldridge, 2010).

ESTIMATION RESULTS AND ANALYSIS

Table 2 shows the estimation results of the economic impact equation, the first equation in our econometric model. All the explanatory variables impact PCRGDP positively. The income and MNL variables are highly significant while PASS and CONNECT are significant at the 5% level.

A percent increase in city or municipal income results in a 0.11% increase in PCRGDP while a percent increase in the number of embarking and disembarking passengers at the airport serving the community results in a 0.05% increase in PCRGDP. An additional city with direct scheduled airline service with the community increases the PCRGDP by 0.16% while having a direct airline service to and from Metro Manila increases the PCRGDP by almost 1%. As mentioned in the empirical model section, the aggregation at the regional level of the economic variable (gross domestic product) underestimates the economic impact of the explanatory variables.

Table 2 – Estimation results of the economic impact equation

Variable	Coefficient	Standard Error	t-Statistic
Constant	7.188	0.771	9.325 ***
INCOME	0.107	0.041	2.617 ***
PASS	0.051	0.024	2.127 **
CONNECT	0.164	0.076	2.167 **
MNL	0.993	0.103	9.671 ***
Adjusted R-squared			0.544
Included observations			130
Total system observations			260

***Significant at the 1% level (highly significant). **Significant at the 5% level.

Table 3 shows the estimation results of the total income equation, the second equation in our econometric model. All the explanatory variables impact total income positively. The dummy variable CITY is highly significant while PASS and POPN are significant at the 10% level.

Table 3 – Estimation results of the total income equation

Variable	Coefficient	Standard Error	t-Statistic
Constant	14.311	1.496	9.564 ***
PASS	0.102	0.056	1.840 *
POPN	0.223	0.125	1.779 *
CITY	2.222	0.283	7.841 ***
Adjusted R-squared			0.455
Included observations			130
Total system observations			260

***Significant at the 1% level (highly significant).*Significant at the 10% level.

A percent increase in the number of passengers that passed through the airport serving the community results in a 0.10% increase in tax and nontax income for the city or municipality while a percent increase in the city or municipal population increases the tax and nontax income by 0.22%. Since cities have relatively higher property and other taxes than municipalities, being a city increases total income by more than 2.22%.

The instruments used in estimating the system of equations are CITY, INCOME, MNL, PASS, POPN, the land area of the city or municipality, the number of airlines serving the community, and a dummy variable indicating a direct connection with Zamboanga City, which connects two municipalities in the sample to the rest of the air transport network in the Philippines.

CONCLUSION

This paper estimated the economic impact of airline service on relatively smaller communities using panel data consisting of 12 cities and municipalities for the period 2000–2011. The results indicate the airline service related variables such as the number of embarking and disembarking passengers at the airport serving the community, number of cities with scheduled airline service to the city or municipality, and a direct air connection with Metro Manila contribute to increasing the per capita regional gross domestic product.

While the effects are small due to the aggregation of the per capita GDP at the regional level in the absence of local GDP data, the positive impact scheduled airline service has on relatively smaller and remote communities in an archipelagic country like the Philippines indicates that positive externalities do exist, that providing airline service to communities results in economic growth and development, as evidenced by the positive impact the airline service related variables have on the per capita regional GDP. While the Philippine government can no longer compel airline operators to service small and remote communities with low traffic density, the government can provide better airport facilities and related infrastructure at principal airport class 2 and community airports in the country. With improved air transport infrastructure airline operators may be persuaded to provide reliable scheduled airline service to six cities and municipalities with class 2 airports and to more than 30 cities and municipalities with community airports.

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