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The Relationship Between Air Transport and Rural Tourism in Thailand

Abstract

This study used panel to identify the relationship between air transport and rural tourism in Thailand. The data covered eleven airports in Thailand from 2009 to 2018 (10 years). The airports are located in the eleven poorest provinces in the country, based on the gross provincial product per capita. The study included the total number of air traveler arrivals as the dependent variable and the total number of flight movements, provincial tourism revenue and the average monthly income per household as the independent variables, and used an autoregressive distributed lag model to identify the relationship between air transport and rural areas in Thailand. The results of the study indicate that increasing demand for air transport to rural provinces is significantly and positively generating an increasing number of flights and a decline in tourism revenue and household income in the eleven provinces in the long run. The development of the air transport industry alone is not enough to alleviate the income inequality; it is suggested that provincial governments need to develop the tourism industry and infrastructure further to bring greater benefits to society and to reduce income inequality in the country.

Keywords: autoregressive distributed lag (ARDL) model, rural tourism, air transport, Thailand

1. Introduction

Air transport plays a remarkable role in countries' economies. Traditionally, aviation has been a protected industry, where governments set rules and regulations to protect government-owned flag carriers. In recent decades governments have started to deregulate and liberalize the air transport industry to allow competition domestically and internationally (Dempsey & Jakhu, 2017). Increasing the number of flights drives down airfares, motivates travel and trade, and benefits national economies. Air deregulation has encouraged new airlines to enter the air transport industry. Many of these new airlines offer services to niche markets and to smaller cities to avoid head-to-head competition with flag carriers (Holder et al., 2008). The new flights are connecting rural cities with capital cities, helping rural cities to develop tourist destinations and spreading wealth into and across rural areas. However, there are studies that argue that increasing accessibility to less favourable areas sometimes promotes outmigration (Button & Vega, 2008) and that the low-income tourist travel generated by increasing the air accessibility is of little benefit to the economy (Ardahaey, 2011). But improved accessibility provides benefits to rural communities through access to services, decreasing the level of unemployment, and generating income (Gannon, 2009; Smyth et al., 2012).

The introduction of new private airlines has made airfares more affordable, which has motivated trade and tourism and benefited countries socially and economically. In addition, the newcomers have avoided direct competition with legacy airlines in some markets by offering flights to less popular destinations (Centre of Asia Pacific Aviation [CAPA], 2013). Some disadvantaged rural cities that previously lacked any air access are now connected via air transport routes to and from capital cities. These rural cities had limited air transport access as they were less profitable due to a lack of travel demand. However, private airlines entering the market with a lower cost structure and less competition were enabled to turn such destinations into favourable markets (United States Congress, 1987).

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Air deregulation in Thailand has been aimed at increasing rural mobility to create benefits to the economy by spreading wealth and reducing income inequality across the country (Starkey et al., 2002). As some rural areas in developing countries have higher population densities than their urban areas, closing the gap between rural and urban regions brings economic benefits to a country (Rodrigue, 2020). Using air transport to connect agricultural centers and remote areas with commercial centers allows the movement of people and goods, which benefits a country's economic growth (Vermaak, 2019; Zhang & Graham, 2020). Thus, it is assumed that increased connectivity helps a country by developing local economies, creating jobs and reducing income inequality.

This study examined the relationship between air transport and tourism demand on rural cities in Thailand by reviewing, sorting and analyzing the existing data. Results from previous studies have shown that deregulation of the air transport industry has benefited a country socially and economically. The International Air Transport Association has confirmed that the development of international air transport connectivity is very important to the economic growth of Thailand through the development of the tourism industry (International Air Transport Association [IATA], 2016). Most of the studies on air transport and tourism development have covered the international connectivity with only some limited studies assessing the domestic air transport market and, especially, its impact on the rural region of a country. This paper reduces the research gap and contributes further knowledge on the relationship between tourism and air transport by centering on domestic air transport and its impact on rural areas in a developing country.

The findings of this study can benefit governments and the aviation industry by providing evidence for implementing strategically planned policies for the aviation industry. This paper is divided into five sections plus references. Section 1 provides the introduction and background context. Section 2 contains the literature review and illustrates the relationships between the air transport industry and rural destinations in Thailand. Section 3 identifies the methodology used to examine the correlations between air transport and the chosen determinant variables. Section 4 presents the results of the study and section 5 discusses and summarizes the findings.

2. Literature review

Air transport is the main driver of economic growth in both developed and developing countries according to the Air Transport Action Group (ATAG, 2005). It generates significant social benefits to a country by facilitating tourism and trade, providing employment opportunities, improving living standards, alleviating poverty and promoting social inclusion. Rural areas, also known as the countryside, are defined as locations with low population density. However, different countries use different measurements to classify rural areas. According to the US Census Bureau (2000), a rural area in the USA is classified as a town with fewer than 1,000 people per 2.6 km^2. In the United Kingdom any local government area with more than 26% of its population living in a rural settlement is classified as a rural area (Compton, 2019).

The National Statistical Office of Thailand defines rural areas as non-municipal areas (Goldstein & Goldstein, 1978). Thai rural areas are defined based on per capita income and the number of households within the region. Air transport has an important role in connecting rural areas and islands with urbanized areas of a country (Rocha, 2017). Spreading wealth across a country is important for managing poverty and improving a country's economy. The development of connectivity and improved transportation facilities is one of the key strategies for a government to narrow the gap between the rich and the poor (Yeoh et al., 2013). Governments around the world are implementing different policies to improve connectivity to their less developed areas. Maximizing competitiveness by deregulating the air transport industry has been implemented widely. Private investments are encouraged in the air transportation market to improve transport capacity, which allows governments to direct their resources to other necessities.

Air transport in remote regions has been considered a niche market with a low profit margin. However, with the limited number of service providers, these markets can also create opportunities for airlines (Budd & Ison, 2017). Deregulation has dramatically changed the aviation industry. Increased competition has led to decreases in airfares, which motivates air travel (Sowwattanaku & Wongsurawat, 2013). The intense competition between airlines requires them to improve their productivity and capacity utilization by adjusting routes and equipment (Smith & Cox, 1999). The introduction of low-cost airlines has made air travel more common and accessible to a larger number of people, including those who travel for leisure and to visit friends and relatives (Griffin, 2013). Some low-cost airlines have chosen to operate in niche markets to avoid head-to-head competition with legacy carriers (Thanassupsin et al., 2010). Moreover, limited competition allows airlines to operate monopoly routes with higher profit margins (Binggeli & Pompeo, 2002). With lower cost structures, rural markets have become attractive to the new airlines. In addition, some governments offer subsidies to support airlines that operate flights on less desirable routes so as to maintain connectivity. These subsidies may be in the form of air services subsidies, fuel subsidies and airport charges subsidies (Law, 2017). In the USA the Essential Air Service Program was implemented to support airlines operating flights to connect small communities (Department of Transportation [DOT], 2020). Similar programs have been implemented in Australia as the Regional Aviation Access Program (Department of Infrastructure [DOI], 2020) and in Europe as Public Service Obligations (European Commission, 2020).

Thailand has the widest income inequality of all of the countries in the Association of South East Asian Nation countries. Indeed, it is one of the worst performers in the world with 10% of Thai people holding 0% of the country's wealth, the poorest 50% holding 1.7%, while the majority of the wealth (85.7%) is held by the richest 10% (Credit Suisse, 2018). The Gini Index is used to measure the distribution of income across the population in a country; the higher the index, the greater the inequality (World Bank, 2020). According to that World Bank data, the Gini Index for Thailand was 42.8 in 2000 and it had reduced to 36.4 in 2018. The decrease in the Gini Index shows reduced income inequality in Thailand, mainly due to the increased net income of the population. However, the gap between the richest and the low and middle income groups remains relatively unchanged (Chandoewit, 2019). Over the past two decades the government has implemented policies to reduce poverty levels by improving the transport network in the country in order to improve the quality of life and to provide a fairer society through better access to jobs (International Business Publications [IBP], 2013). Deregulation of the Thai aviation industry took place on 1 September 2000 and this has led to remarkable changes in the aviation sector. The Asian economic crisis in 1997 devalued the Thai baht (THB), resulting in a decline in the gross domestic product (GDP) (Srisook & Panjakajornsak, 2018). To boost economic activity, the Thai government motivated competition in the aviation sector by relaxing the rules, including those on airline entry, airfares and airline ownership. The government removed barriers to entry of private airlines and allowed companies to offer domestic air transport services in Thailand. The airlines were allowed to set their own ticket prices, with no limitations in the form of price floors and ceilings (Malaysian Aviation Commission [MAVCOM], 2018). The share of foreign airline ownership in Thailand increased from 30% to 49% (Dy, 2019). The policies have attracted airlines to enter the market, especially those operating with low-cost business models. AirAsia from Malaysia entered the Thai aviation market by establishing a joint venture with a Thai partner and forming Thai AirAsia in 2003 (Asia Aviation Public Company Limited [AAV], 2019), and a local enterprise entered the market as Nok Air in 2004 (Nok Air, 2013). The increasing competition and lack of fare restrictions have made travel more affordable (Zhang et al., 2008). Tourism now plays a more important role in Thailand's economy: it contributes 20.6% of the GDP and supports more than 5 million jobs (World Travel and Tourism Council [WTTC], 2017). Aviation has an integral role in Thailand's tourism industry because more than 90% of visitors to the country arrive by air (Koumelis, 2007). Moreover, the increasing number of airlines entering the market is creating a more competitive industry and most of the primary air routes are now serviced by two or more airlines.

The relationship between air transport and economic growth has been widely covered by previous studies (e.g., Ertekin & Berechman, 2003; Jiao et al., 2016; Adeniran & Adeniran, 2017; Lenz et al., 2018). However, only a few studies have covered the importance of rural and regional air transport areas to tourism and, in addition, the majority of these studies covering rural areas have been set in developed countries such as Australia (Nutley, 2003; Donehue & Baker, 2012; Baker et al., 2015) and the USA (Ahmed, 1984; Due et al., 1990; Tam & Hansman, 2002; Rasker et al., 2009; Matisziw et al., 2012; Grubesic et al., 2013). To investigate the relationship between air transport and rural destinations, the study by Baker et al. (2015) used aggregate real taxable income and the number of air passenger movements as the variables measured. Their study revealed that there is a bi-directional relationship between airports and economic growth, which further influences regional air transport in Australia. The study by Rasker et al. (2009) included population, income growth rate and the unemployment rate to identify the economic importance of air travel in rural areas in the USA. The study concluded that airports are important to rural development, contributing to economic growth in the USA. The development of airports in rural areas generates employment growth and income growth (Rasker et al., 2009). The study by Tam and Hansman (2002) reviewed GDP growth, population geography and travel behavior as variables to measure the impact of air transport on regional economies in the USA.

3. Data and method

Based on three studies discussed in the literature review (Tam & Hansman, 2002; Rasker et al., 2009; Baker et al., 2015), it is assumed that there is a relationship between air transport, tourism and the economic growth of rural cities in a country. The following hypothesis is created based on this assumption:

H1: Air transport positively affects rural tourism in Thailand.

The current study includes the total number of air traveler arrivals (AIR) as the dependent variable and the total number of flight movements (FLT), the provincial tourism revenue (REV) and the average monthly income per household (HHI) as the independent variables.

To examine the relationships between the dependent variables and air passenger demand, this study applied the Pooled Mean Group (PMG) autoregressive distributed lag (ARDL) model to examine the long-run relationship between the variables. The ARDL model is an applied ordinary least squares based model. The ARDL model chosen for this study has some advantages compared with other cointegration methods. These advantages are that (1) the ARDL method does not need the chosen variables to be integrated to be of the same order, (2) the ARDL test is relatively more efficient in cases with small sample data sizes and (3) an estimate of the long run model can be obtained (Harris & Sollis, 2003; Narayan & Narayan, 2004; Belloumi, 2014). The model is used for non-stationary time series with mixed order integrations, i.e., I(0) and I(1) (Pesaran & Pesaran, 1997; Shrestha & Bhattab, 2018). Two estimators – mean group (MG) and PMG – were used to verify heterogeneity bias caused by heterogeneous slopes in the dynamic panels (Pesaran & Smith, 1995). The MG estimator estimates each group separately and the coefficient across groups in the panel dataset, and the PMG estimator allows for different short-term parameters between groups and restricts long-run coefficients to being equal (Pesaran et al., 1999). The Hausman test was applied to identify the appropriate estimator to use (Hausman, 1978).

The model further integrates the short-run with the long-run equilibrium through the error correction model. The model provides consistent short-run dynamic adjustments and long-run equilibrium specifications (Khumaloand et al., 2011). A negative and significant coefficient of the error correction term indicates the presence of a long-run causal relationship between the explanatory variables and the dependent variable.

The following ARDL model is developed based on Pesaran et al. (1999):

$$\Delta lnAIR_{it} = \alpha_i + \sum_k \phi_{1k}\Delta AIR_{it-k} + \sum_p \phi_{2p}\Delta lnFLT_{it-p} + \sum_q \phi_{3q}\Delta lnREV_{it-q} + \sum_q \phi_{4r}\Delta lnHHI_{it-r} + \theta_1 lnFLT_{i,\,t-1} + \theta_2 lnREV_{i,\,t-1} + \theta_3 lnHHI_{i,\,t-1} + \nu_{it} \quad (1)$$

where k, p, q and r denote the optimal lag length variable; Δ is the first difference operator; α_i is the specific intercept, and v_{it} in the equation indicates the error correction term. θ is the speed of adjustment i. Included in the model are AIR, FLT, REV and HHI.

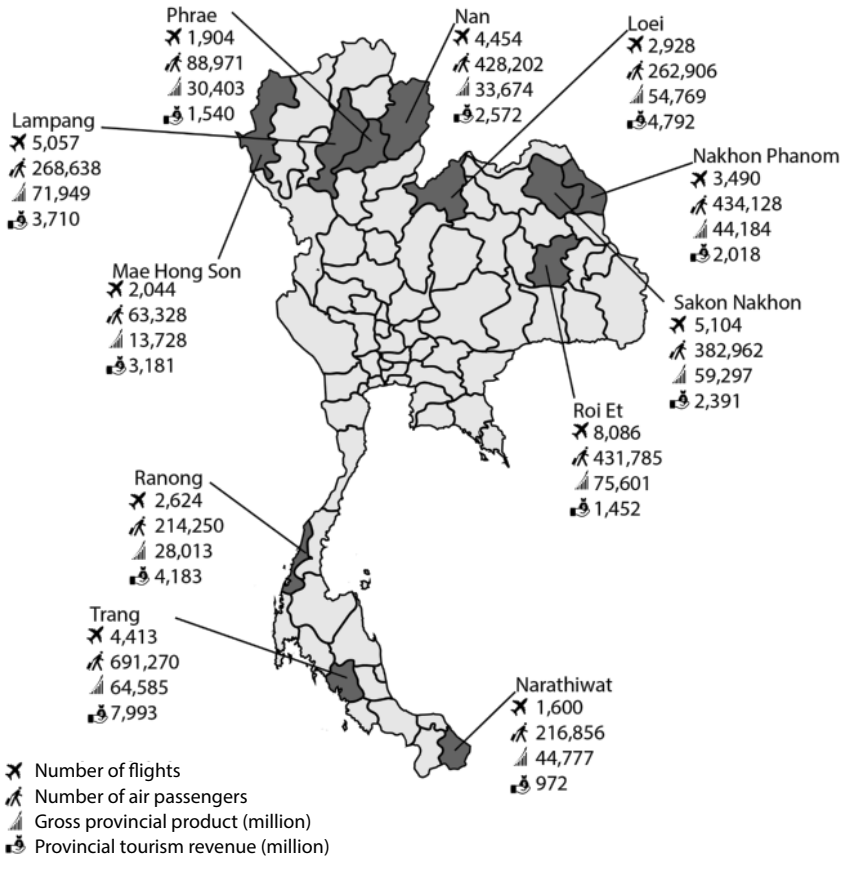
If there is a long-run relationship between the variables, the ARDL model can be transformed to the error correction model by grouping the variables in the levels in Equation (1):

$$\Delta lnAIR_{it} = \alpha_i + \sum_k \phi_{1k}\Delta AIR_{it-k} + \sum_p \phi_{2p}\Delta lnFLT_{it-p} + \sum_q \phi_{3q}\Delta lnREV_{it-q} + \sum_q \phi_{4r}\Delta lnHHI_{it-r} + \theta ECT_{i-1} + v_{1it} \quad (2)$$

where ECT_{i-1} is the error correction term. A negative and significant coefficient θ (speed of adjustment) denotes how fast a deviation from the long-run equilibrium is eliminated following changes in each variable.

The panel data covered eleven provincial airports in Thailand from 2009 to 2018 (10 years). These airports are located in the eleven poorest provinces in the country based on the gross provincial product (GPP) shown in Figure 1. The airports included in the study were Loei, Nakon Phanom, Sakon Nakhorn and Roi Et [Northeast]; Phrae, Lampang, Mae Hong Son and Nan [North]; Narathiwat, Ranong and Trang [South]. The data for the total numbers of air traveler arrivals and flight movements was collected from the Department of Airports, Thailand (DOA, 2019). The travel and tourism contributions to tourism revenue (REV), and the average monthly income per household (HHI) data were collected from the Thailand National Statistical Office (NSO, 2019). Following Tabachnick and Fidell (2012), the model was transformed into a natural logarithm so that the value can be deliberated by a linear regression equation to improve the model fit.

Figure 1
The eleven lowest gross provincial product provinces with air transport mobility in Thailand, 2018



Remark: Thailand GDP in 2018 THB16,365,573 million. The top five GPP provinces with air mobility in Thailand in 2018 (million THB) – Bangkok: 5,386,803, Chon Buri: 1,030,949, Songkhla: 248,386, Chiang Mai: 247,830 and Phuket: 234,027.
Source: Department of Airports, Thailand (2019); National Statistical Bureau (2019).

Table 1
Variable definitions and sources

Variables	Definitions	Sources
AIR	Number of air passenger arrivals (total)	DOA (2019)
FLT	Number of flights (total)	DOA (2019)
REV	Tourism revenue (provincial, THB in million)	NSO (2019)
HHI	Average monthly income per household (THB)	NSO (2019)

Table 2 provides more information about the variables used in the estimation procedure.

Table 2
The descriptive statistics

Variables	Mean	Standard deviation	Observations	Years
AIR (total)	164,079.400	172,789.700	110	10
FLT (,000)	2,540.280	1,911.880	110	10
REV (THB, million)	2,465.052	1,828.822	110	10
HHI (THB)	19,242.990	6,071.672	110	10

4. Results and discussion

The model is tested for the existence of multicollinearity and autocorrelation problems. The testing results indicated that all the independent variables in this study have no signs of multicollinearity.

The Dickey-Fuller test was used to test for stationarity (Dickey & Fuller, 1979). The results of the unit root test shown in Table 3 confirm that the variables are non-stationary. The test at the first difference in the individual intercept and at the individual intercept plus trend indicated that all series of the null hypothesis of the unit root test were rejected at the 5% level of significance. This shows strong evidence that all of the variables are integrated and are useful to the study.

Table 3
The panel unit root test (IPS)

Variables	Deterministic	The IPS test	
		Level	First difference
lnAIR	Individual intercept	27.7376	65.7205 ***
	Individual intercept and trend	38.6090 ***	71.6428 ***
lnFLT	Individual intercept	63.1689 ***	72.5002 ***
	Individual intercept and trend	52.5071 ***	59.4244 ***
lnREV	Individual intercept	66.9691 ***	84.0102 ***
	Individual intercept and trend	61.4124 ***	56.1858 ***
lnHHI	Individual intercept	61.0483 ***	58.3024 ***
	Individual intercept and trend	33.3615	49.2893 ***

Note: *** denotes significance at 1% level.

To examine the long-run and short-run relationships between air transport and the tourism relationships with rural tourism in Thailand, the ARDL model was used. The best combination of ARDL is chosen based on the smallest values of the Akaike info criterion and the Schwarz criterion. The ARDL (1,1,1,1) model was adopted based on the value of the Schwarz criterion in the study as it is the consistent estimator of the true lag order with a large sample size (Asghar & Irum, 2007). To determine the appropriate estimator between MG and PMG for this study, the Hausman test was performed, which indicated a chi-square statistic value of ($\chi^2(3)=0.53$, p= .912). The result of the test indicated that the null hypothesis is rejected at 1%. As a result, the PMG estimator is found to be better than the MG estimator and thus the PMG estimator is applied to this study.

Table 4
Panel ARDL model results (dependent variable: lnAIR)

Variable	Coefficient	Standard error	t-Statistic	Prob.
Long run equation				
lnFLT	1.12536	0.002045	550.3291	0.0000
lnREV	-0.640632	0.026542	-24.3660	0.0000
lnHHI	-2.154609	0.019348	-111.3593	0.0000
Short run equation				
ECT	-0.629197	0.196624	-3.199999	0.0027
D(lnFLT)	0.409527	0.291192	1.406381	0.1671
D(lnREV)	0.341864	0.933294	0.366298	0.7160
D(lnHHI)	0.497648	0.426830	1.165915	0.2504
C	2.392014	0.742592	3.221169	0.0025
Mean dependent variable	-0.002920	S.D. dependent variable		0.455263
S.E. of regression	0.137923	Akaike info criterion		-1.900351
Sum squared residue	0.779936	Schwarz criterion		-0.379978
Log likelihood	152.067400	Hannan-Quinn criterion		-1.285205

The results in Table 4 show that in the long term all variables have a significant effect on air travel demand at a significance level of 5%. A 1% increase in flights generated a 1.1% increase in air travelers to rural airports. A 1% increase in tourism revenue would lead to a 0.64% decrease in air passenger traffic. A 1% increase in local household income results in a decrease in air passenger traffic by 2.15%. The result is aligned with previous studies, the increasing domestic flights in Thailand are creating a surge of air travelers travelling to domestic destinations (Sowwattanaku & Wongsurawat, 2013). The deregulation of the Thai aviation industry has attracted new airlines serving the secondary airports which have attracted more air travelers (Zhang et al., 2008). In addition, it has been argued that the increase in air passenger traffic to the rural areas of Thailand has diverted passengers from other transport modes through the introduction of low cost airlines (Thanassupsin et al., 2010; CAPA, 2018). These air travelers are mainly travelling to visit friends and relatives and claimed to have lower household income and less spending during their trips (Backer & King, 2014). Similar results were acknowledged in the studies of the domestic travel markets in the USA and Australia. The findings of a study in Northern America indicated that most travelers visiting friends and relatives stay at private accommodation and tend to have smaller daily spending (Griffin, 2013). A similar result was also revealed in New Zealand: when examining Australian tourists visiting New Zealand, people travelling to visit friends and relatives are spending 50% less than the leisure travelers (Ministry of Business, Innovation and Employment [MBIE], 2018). Hence, their contribution to the tourism revenue of the provinces and the local household income was limited. The results of this study have verified that increasing air passenger traffic to rural destinations in Thailand has a limited impact on tourism revenue and provincial household income.

The negative effects and significance of the error correction terms indicated that there are significant long-run relationships between the number of flights, provincial tourism revenue, monthly average household income and air traffic demand. The convergence speed value is -0.62, which demonstrates that a deviation from the long-run equilibrium can be restored with an adjustment period of about 1.6 years. But the short-run effects of the number of flights, total tourism revenue and household income are not statistically significant to air transport demand.

The results in Table 5 show that air transport demand to rural airports has casual relationships with the number of flights, tourism revenue and household income in the eleven provinces in the study.

Table 5
Summary of causal relationships between air passenger demand and the number of flights, tourism revenue and household income

			Coefficient
Air passenger demand	→	Number of flights	0.108841***
	→	Tourism revenue	0.060566***
	→	Average monthly income per household	0.424836***

Note: *** denotes significance at 1% level.

5. Conclusion

Deregulation in Thailand's air transport industry has made significant changes to the airline industry. The increased capacity has lowered airfares, which has made air travel more affordable. This has attracted airlines to operate flights to some rural areas in the country previously seen as unattractive. This study aimed to identify the relationship between air transport and rural tourism in Thailand. The panel data used in this study covered the eleven poorest provincial airports in Thailand from 2009 to 2018. The study used an ARDL model to identify the relationship between air transport and rural areas in Thailand. The study has concluded that there have been positive and significant relationships from increased air transport demand on the number of flights, tourism revenue and household income in the studied rural provinces in the long run. However, one can see that an increase in air traveler arrivals results in a decrease in tourism revenue and household income. Therefore, one can conclude that more tourism crosses a threshold and the additional tourists have low incomes and do not spend much money. In addition, the money spent is not distributed among the local population since household income is also diminished. So it can be concluded that the increase in air travel is not erasing inequalities in income in Thailand.

Thailand has been considered to have some of the highest wealth inequality in the world. Many studies have indicated that air transport helps to reduce the gap between the rich and poor in metropolitan and rural areas. The development of the air transport industry in other countries has helped to spread wealth across those countries. The development of the tourism industry has also been effective in spreading wealth across the population. This study has defined that the increase in domestic air passenger demand has generated an increase in the number of domestic flights, but a decrease in tourism revenue and local household income. The study provides evidence that the development of the domestic aviation industry in Thailand has generated limited economic benefits through tourism to rural areas in Thailand.

5.1. Policy recommendations

Rural provinces in Thailand are rich in built and cultural heritage and natural resources, and these resources could be shaped as famous tourist attractions. Thai authorities should implement plans to upgrade the rural airports in the country. Most rural airports in Thailand are lacking facilities and have small passenger terminals and limited aircraft parking space. For substantial growth, the development of the air transport industry alone is not enough; it is suggested that provincial governments need to develop the tourism industry to deliver greater benefits to the local people. Further investment in tourism infrastructure and destination marketing can increase the number of leisure travelers, thereby extending tourism revenue and household income. Implementing promotional campaigns to stimulate high-income domestic and international leisure travelers to visit the rural destinations by air is important, as it helps to distribute wealth from the major cities to the rural areas and allows a sustained reduction in the income inequalities in the country. The income received can be used to finance other sectors, including education and health, in order to break the poverty cycle.

5.2. Limitations

The availability of economic and tourism variables for the Thai provinces are limited. Other variables such as the unemployment level, the number of hotel rooms available and occupancy rates could be important

considerations in a further examination of the impact of air transport deregulation on economic and tourism growth in Thai provinces.

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