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Contribution of disaggregated tourism on Thailand's economic growth

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ABSTRACT

The objective of this research was to evaluate whether expansion of the tourism industry has contributed to Thailand's economic growth, and vice versa. This study used international tourist arrivals from different continents in order to pinpoint which of these continents contributes the most to Thailand's economic growth. Time series techniques including cointegration and Granger causality tests were used to test the hypothesis of tourism-led economic growth in Thailand. The results showed that tourists from South Asia led Thailand's economic growth, and Thailand's economic growth also increased the number of tourists from Oceania. The results from this study suggest that in order to promote tourism industry, policy-makers should place emphasis on the Oceania and South Asian markets. Therefore, study on the behavior and preferences of tourists from these continents would help to find ways to increase the numbers of tourists from these regions.

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Introduction

The tourism industry is an important sector in Thailand since it is considered by the Thai government as one of the most important industries for income generation. The Tourism Authority of Thailand reported that since 2014, Thailand has received around THB 2,000 million per year in tourism receipts ranking it the 10th highest income source for the tourism industry in any country (Ministry of Tourism and Sports, 2016). The inflow of funds generated from tourism-related activities led to the creation of around 2.4 million jobs in 2015, which represents 6.8 percent of total employment. Therefore, development of the tourism sector is one of the main points in Thailand's economic development plans. It is worth mentioning that the strategies used to develop the tourism sector in the hope of generating income for the Thai economy would be better served if there is a full understanding of the relationship between tourism expansion and economic growth. However, at the moment, such understanding has not been fully investigated in Thailand.

Expansion of the tourism sector has been linked to economic growth in several ways. According to McKinnon (1964), foreign exchange earnings from tourism are used to purchase productive capital goods, which in turn are used to increase economic growth. Tourism has also been found to increase employment, income, and tax revenues (Archer, 1995; Belisle & Hoy, 1980; Davis, Allen, & Consenza, 1988; Durbarry, 2002; Khan, Seng, & Cheong, 1990; Uysal & Gitelson, 1994; West, 1993). Furthermore, according to Brida and Pulina (2010), growth in the tourism sector stimulates investment in new infrastructure and generates employment. Therefore, it is generally hypothesized that tourism expansion may lead to economic growth.

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Investigation of tourism-led economic growth has yielded varied results in the literature. Studies using aggregated tourist data, including Akinboade and Braimoh (2010), Belloumi (2010), and Katircioglu (2009), have found evidence of the tourism-led economic growth hypothesis. Several studies have found evidence that economic growth leads to tourism expansion (Arslanturk, Balcilar, & Ozdemir, 2011; Ghosh, 2011; Katircioglu, 2009; Oh, 2005; Wang, 2010). Similar to the aforementioned studies, Untong (2014) used aggregated tourist data to test for tourism-led economic growth in Thailand, and found evidence that tourism expansion did help economic growth in Thailand. However, his study only provided a general indication that tourism has led economic growth since it used aggregated data. Utong's study, however, did not provide any indications on whether Thailand's economic growth equally benefits from expansion of tourism from different markets.

The use of aggregated tourist data may cause bias, since tourist arrivals from different countries may either contribute unevenly or not at all (Tang & Tan, 2013; Tang, 2010, 2011). Moreover, the results of these studies may offer little guidance for policy-makers when developing strategies and policies for the tourism industry (Oh, 2005). On the other hand, formulating policies in the tourism industry based on findings from studies using disaggregated data (country or continental level) may be more efficient because such studies would pinpoint which tourist markets contribute to the economic development of a country.

On a side note, a common practice used to test the tourism-led economic growth hypothesis has been to use Gross Domestic Product (GDP) as a measure of economic growth. There are several disadvantages to this approach. For instance, GDP is only available on a quarterly or yearly basis, which limits the quantity of data that can be used to test for tourism-led economic growth. Furthermore, using the GDP from many years back may not reflect the current situation of the tourism industry which has changed from time to time. Tang (2010, 2011) posited that using the Industrial Production Index (*IPI*) as a proxy of economic growth would be better since it is available on a monthly basis. Studying the relationship between economic and tourism growth using high frequency data has the advantage that it can capture changes between the two variables in the short run. Therefore, it is reasonable to use IPI as a proxy of economic growth (Lean & Tang, 2010; Seo, Sung, & Larry, 2009; Tang & Tan, 2013; Tang, 2010, 2011).

To the best of our knowledge, investigation of the relationship between international tourism and Thailand's economic growth using disaggregated tourist markets and monthly *IPI* as a proxy of economic growth has yet to be undertaken. Therefore, this study aimed to shed light on the relationship between economic growth in Thailand and tourist expansion by analyzing how tourists arrivals from different continents affect the economic growth of Thailand. Knowing which continent contributes more to economic growth can help policy makers develop policies that attempt to increase the flow of those international tourist continents which will further improve the country's economic growth.

Methodology

Data

The data used in this study included Thailand's *IPI* and international tourist arrivals per continent (*Tr*) from January 2008 to November 2015. Thailand's *IPI* was calculated based on Laspeyre's index using Thailand's production extracted from the Office of Industrial Economics of Thailand. In turn, the numbers of top-ten international arrivals was extracted from the Ministry of Tourism and Sports, and were divided into four continents—East and Southeast Asia (China, Malaysia, Japan, Korea, Singapore, and Laos), South Asia (India), Europe (the United Kingdom and Russia), and Oceania (Australia). The data was seasonally adjusted in order to reduce biased estimations caused by seasonality, and thereafter, all variables were transformed into logarithmic form.

Time Series Properties of Data

It is important to study the time series properties of the data since these properties will affect the appropriate econometric specification used to test the tourism-led economic growth hypothesis (Tang & Jang, 2009). The time series properties that were uncovered include the order at which the variables are stationary, and the existence of a long-run relationship (cointegration) between the variables. The following procedure was used to investigate the time series properties. First, all the time series data were transformed into natural logarithmic forms, and then Augmented-Dickey Fuller (ADF) (Dickey & Fuller, 1979, 1981) tests were used to find at what order each individual time series was stationary. If the ADF tests showed that the variables were characterized by an I (1) process, then Johansen's cointegration (Johansen & Juselius, 1990; Johansen, 1988) test was used to find whether there was a long-run relationship between *IPI* and *Tr*.

Econometric Specification

An important issue to consider when investigating causal relationships between a set of variables is that even if causality among the variables is found, questions about the direction of the causality are raised (Tang & Jang, 2009). This is very important because in the literature, several researchers have provided valid grounds for both the tourism-led growth hypothesis and the economic-led tourism growth hypothesis (Akinboade & Braimoh, 2010; Belloumi, 2010; Katircioglu, 2009). Furthermore, several studies have not only found evidence of economic-led tourism growth and tourism-led economic growth, but also a bidirectional relationship between economic and tourism growth (Arslanturk et al., 2011; Ghosh, 2011; Katircioglu, 2009; Oh, 2005; Wang, 2010). Consequentially, testing for causality between tourism and economic growth using a single equation method that assumes that one of the variables is exogenous would not be valid.

An alternative to investigate causality between economic growth and tourism growth is to use vector autoregressive (VAR) models. VAR models allow for all variables to

be included as endogenous variables (Sims, 1980). Furthermore, VAR models have the added advantage in that modifications in these models can help study causality between tourism and economic growth using non-stationary and/or cointegrated time series. According to Asteriou and Hall (2007), a basic VAR is given by Equation (1)

$$y_t = A_0 + A_1 y_{t-1} + A_2 y_{t-2} \ldots + A_k y_{t-k} + \varepsilon_t \quad (1)$$

where y is a vector of time series variables, A_0 is a vector of constants, A_k is a matrix of parameters, ε is a vector of error terms, and k is the number of lags included in the VAR model. In its basic form, the VAR will provide spurious results in the presence of variables that are stationary at the first order. According to Oh (2005), this issue can be resolved if the first difference of the logarithmic forms of *IPI* and *Tr* (number of tourist arrivals per continent) were in included in Equation (1). This would then modify Equation (1) into the following VAR shown as Equation (2):

$$\begin{bmatrix} \Delta IPI_t \\ \Delta Tr_t \end{bmatrix} = \alpha + \beta_1 \begin{bmatrix} \Delta IPI_{1t-1} \\ \Delta Tr_{2t-1} \end{bmatrix} + \beta_2 \begin{bmatrix} \Delta IPI_{t-2} \\ \Delta Tr_{t-2} \end{bmatrix} + \ldots + \beta_{k'} \begin{bmatrix} \Delta IPI_{t-k'} \\ \Delta Tr_{t-k'} \end{bmatrix} + \varepsilon_t \quad (2)$$

where α is a vector of constants, β_1, β_2 until β_k are matrices of parameters to be estimated, and ε_t is a vector of identically and independently distributed residuals. In turn k' is the number of optimal lags determined by the Akaike Information Criterion (AIC). After estimation of the VAR model in Equation (2), Granger causality based on VAR was used to test for the direction of the causality between economic and tourism growth (Tang & Jang, 2009). Granger causality tests start by first estimating the following VAR Equations (3) and (4):

$$\Delta IPI_t = \alpha_1 + \sum_{i=1}^{k'} \beta_{1i} \Delta Tr_{t-i} + \sum_{i=1}^{k'} \gamma_{1i} \Delta IPI_{t-i} + \varepsilon_{1t} \quad (3)$$

$$\Delta Tr_t = \alpha_2 + \sum_{i=1}^{k'} \beta_{2i} \Delta Tr_{t-i} + \sum_{i=1}^{k'} \gamma_{2i} \Delta IPI_{t-i} + \varepsilon_{2t} \quad (4)$$

and then investigating the existence of Granger causality by testing the joint significant of the coefficients β_{1i} and γ_{2i} using the Wald statistic, where the distribution follows a standard χ^2 with degrees of freedom equal to the number of restrictions (Dolado & Helmut, 1996; Hall & Milne, 1994; Mosconi & Giannini, 1992).

The estimation of Equations (3) and (4) and the joint significance tests of the aforementioned coefficients may yield three possible results. First, if $\beta_{1i} \neq 0$, then *Tr* Granger causes *IPI* (i). Second, if $\gamma_{2i} \neq 0$, then *IPI* Granger causes *Tr* (ii), and last if $\beta_{1i} \neq 0$ and $\gamma_{2i} \neq 0$, then *Tr* Granger causes *IPI* and *IPI* also Granger causes *Tr* (iii). Granger relationships such as (i) and (ii) are called unidirectional causality whereas (iii) is called bidirectional causality. According to Kim, Chen, and Jang (2006), if Granger causality of type (i) is found, then tourism expansion leads to economic growth; however, if type (ii) Granger causality is found, then the economic growth leads to tourism expansion. In addition, if type (iii) is found, it can be concluded that both tourism expansion and economic growth have causal effects on each other.

It is important to mention that since Equations (2)–(4) are estimated using the first differences of *IPI* and *Tr*, they only capture the short-term price dynamics between economic and tourism growth. A problem arises when there is a long-run relationship between *IPI* and *Tr* (said differently, if IPI and Tr are cointegrated). In the presence of cointegrated variables, the VAR in Equation (2) would then have to be re-written as a VECM in the form of Equation (5):

$$\begin{bmatrix} \Delta IPI_t \\ \Delta Tr_t \end{bmatrix} = \alpha + \beta_1 \begin{bmatrix} \Delta IPI_{1t-1} \\ \Delta Tr_{2t-1} \end{bmatrix} + \beta_2 \begin{bmatrix} \Delta IPI_{t-2} \\ \Delta Tr_{t-2} \end{bmatrix} + \ldots + \beta_{k'} \begin{bmatrix} \Delta IPI_{t-k'} \\ \Delta Tr_{t-k'} \end{bmatrix} + \Pi \begin{bmatrix} IPI_{t-1} \\ Tr_{t-1} \end{bmatrix} \varepsilon_t \quad (5)$$

Equation (5) is analogous to Equation (2); however, Equation (2) contains Π, which is a 2×2 matrix of long term coefficients and the speed of adjustment to equilibrium coefficients (Asteriou & Hall, 2007). Granger causality can then be investigated using a similar approach explained earlier. However, the existence of a long-run relationship between *IPI* and *Tr* would then require the addition of the cointegrated vector found in the Johansen's cointegration test and its respective speed of adjustment term into Equations (3) and (4). These modifications would then derive Equations (6) and (7):

$$\Delta IPI_t = \alpha_1 + \sum_{i=1}^{k'} \beta_{1i} \Delta Tr_{t-i} + \sum_{i=1}^{k'} \gamma_{1i} \Delta IPI_{t-i} + \varphi_1 \pi + \varepsilon_{1t} \quad (6)$$

$$\Delta Tr_t = \alpha_2 + \sum_{i=1}^{k'} \beta_{2i} \Delta Tr_{t-i} + \sum_{i=1}^{k'} \gamma_{2i} \Delta IPI_{t-i} + \varphi_2 \pi + \varepsilon_{2t} \quad (7)$$

The coefficients in Equations (6) and (7) are the same as those defined in Equations (3) and (4). However, the former contain the long-run cointegrating vector, π, as well as the speed of adjustment coefficient φ. Granger causality would then be investigated by estimating Equations (6) and (7), and then testing the joint significant of the lagged first-differenced coefficients β_{1i} and γ_{2i} using Wald statistics.

It was previously mentioned that the time series properties of the data will have an effect on the econometric specification used to test for causality between tourism and economic growth. In this section, we explained that bivariate models that contain cointegrated variables are best estimated using a VECM rather than a VAR. However, in the absence of cointegrated variables, modeling causality between *IPI* and *Tr* using Equations (2)–(4) would still be valid (Tang & Jang, 2009). Taking this into consideration, we tested Granger causality between *IPI* and *Tr* of different continents the following way. If the variables in question are stationary at first difference and not cointegrated, then a VAR in the form of Equations (2)–(4) was used to test Granger causality between economic and disaggregated tourist from said continent. In turn, if the variables in question are cointegrated, then a VECM in the form of Equations (5)–(7) was used instead.

Results and Discussion

Unit Root Tests and Cointegration

In order to verify that the order the data is stationary, Augmented Dickey-Fuller was used to test whether the null hypothesis of unit root is rejected at level and/or first difference. The results in Table 1 show that Thai *IPI* and *Tr* from the four continents included in the study are non-stationary at level, but stationary at first difference.

Johansens cointegration tests were employed to test for the existence of a long-run relationship between IPI and Tr. These results are important since they will determine the model specification used to test for causality between IPI and Tr. Findings of the cointegration tests (Table 2) showed that the bivariate models that contained *IPI* and tourist arrivals from Europe, South Asia, and East and Southeast Asia were not cointegrated. Therefore, causality between economic growth and tourist arrivals from these three continents was modeled using a VAR with Equations (3) and (4). On the other hand, the cointegration tests results indicated that there is a long-run relationship between *IPI* and Oceania. Consequentially, investigating the relationships between *IPI* and *Tr* from Oceania would require the use of a VECM with Equations (6) and (7).

Results from the Granger Causality Tests

Granger causality was used to test the hypothesis of tourism-led economic growth in Thailand as well as the economic-driven tourism expansion hypothesis. The results of these tests are shown in Table 3. Tourist arrivals from South Asia were observed to have Granger-causality on economic growth in Thailand. In turn, the findings provided indications that economic development and growth in Thailand had Granger-causality on the number of tourist arrivals from Oceania. In other words, economic growth in Thailand was influenced by the number of South Asian tourist arrivals. In turn, growth of the Thai economy led to an expansion in the number of tourist arrivals from Oceania.

Finding economic growth coming from tourist expansion from South Asia, although surprising, is supported by information published in the Tourism Authority of Thailand annual reports, indicating that a total of one million Indian tourists have visited Thailand per year. Tourist arrivals from India are have a middle-class income and each person spends around THB 4,751/day. There are several reasons why Indian tourists prefer to travel to Thailand. One reason is that the Thai government promotes tourism by either waiving or discounting the tourist visa fees to Indian tourists during high season. Furthermore, travel to Thailand is convenient since there are almost 100 direct flights from India to Thailand every week. More interestingly, Indian organizations like to hold meetings, conventions, exhibitions, and weddings in Thailand. Therefore, there are sufficient grounds that support our findings that tourist arrivals from South Asia led Thailand's economic growth.

On a different note, reasons that explain why economic growth and development drives tourist arrivals from Oceania can be found in Khadaroo and Seetanah (2007). They concluded that the state of the transportation infrastructure in a tourist destination will affect the decision of high- and middle-income tourists to visit that travel destination. In other words, the economic growth in Thailand, as shown in terms of transportation infrastructure availability and accessible telecommunications, can persuade Australian tourists, who are identified by the World Bank as a high-income group, to visit Thailand.

Thailand has experienced a fast-growing economy, and has used this growth to develop its basic infrastructure and services. Thailand's infrastructure stock has expanded to all types of transportation including 63,100 km of highway road, 6 international deep sea ports, 3,885 km of rail track, and 36 airports (NESDB, 2012). Moreover, access to telecommunications is widespread in Thailand and also

Table 1
Results of unit root test

Variable	Augmented Dickey-Fuller (ADF)	
	Level	First difference
IPI	−1.4088	−10.6614*
East and Southeast Asia	−1.0789	−12.1282*
Europe	−1.4001	−8.1492*
Oceania	−2.1493	−14.9546*
South Asia	−1.6742	−12.7156*

Note: The asterisks * represents statistical significance at the 5 percent level

Table 2
Results of the cointegration tests between IPI and tourist arrivals from each continent

Bivariate model	Trace statistics		Max-eigenvalue statistics	
	r = 0	r ≤ 1	r = 0	r ≤ 1
IPI and East and Southeast Asia [5]	12.0928	0.2705	11.8223	0.2705
IPI and Europe [2]	6.2584	1.9277	4.3309	1.9277
IPI and Oceania [8]	23.0181*	3.4738	19.5444*	3.4748
IPI and South Asia [7]	11.5348	2.0421	9.4927	2.0421

Note: r denotes number of cointegrating vectors
The asterisks * represents statistical significance at the 5 percent level
Figure in brackets [ ] indicates the optimal lag length

Table 3
Results of Granger causality testing

Bivariate model[a,b]	Tourism-led economic growth hypothesis		Economic-led tourism growth hypothesis	
	χ^2	*p*	χ^2	*p*
East and Southeast Asia [2]	2.790	.248	0.546	.761
Europe [2]	0.807	.668	3.495	.174
Oceania [8]	12.955	.113	18.780	<.05
South Asia [6]	17.377	<.05	1.984	.921

Note: Figure inside brackets [ ] indicates the optimal lag length
[a] Granger causality tests for the bivariate models IPI-East and Southeast Asia, IPI-Europe and IPI-South Asia are based on VAR using time series at first difference
[b] Granger causality tests for the bivariate model IPI-Oceania are based on VECM using time series at first difference

available for tourists. Therefore, the economic growth in Thailand, as shown in terms of transportation infrastructure availability and accessible telecommunications, can persuade Australian tourists to visit Thailand. In turn, South Asian tourists do not use transportation infrastructure as a criterion to select travel destination. This explains why Thailand's economic growth did not lead tourists from South Asia as shown in the result of unidirectionality between economic growth and South Asian tourists.

Overall, the results from Table 3 provide evidence that supports the tourism-led economic growth hypothesis in Thailand. The contribution of tourism to economic growth was observed in terms of employment generation and visitor exports (World Travel and Tourism Council, 2015). On the other hand, economic-led tourism growth has also been identified, which is reasonable since improvements in infrastructure and the number of businesses would attract more tourists to Thailand. These findings are similar to those reported by the Office of Industrial Economics (2016) where IPI had a similar directional trend to that of tourist arrivals from Oceania. Therefore, policy-makers should place emphasis on the formation of strategies that promote the Thai tourism to tourists from South Asia as they were found to help economic growth in Thailand. Furthermore, investment in transportation structure also can increase the number of tourists from high- and middle-income countries, especially Oceania. Therefore, studying the behavior and preferences of tourists from these continents should be carried out in future studies.

This study did not find evidence of economic growth stemming from tourism expansion from East and Southeast Asia. These finding seems counterintuitive since there is a large number of East and Southeast Asian tourists that visit Thailand, and also because Thailand is located very near these markets. We would like to emphasize that although not direct, there still exists the possibility that tourism expansion can cause economic growth in Thailand through the increase in economic activity and development of tourist provinces and/or cities (such as Chiang Mai, Bangkok, and Phuket) Therefore, future research studying the link between tourism-led economic development in tourist provinces (and/or cities) with the economic growth that such provinces contribute to the country would help to shed light on the relationship between economic growth and tourism expansion.

Conclusion

This study aimed to find evidence of the tourism-led economic growth hypothesis in Thailand using international tourism arrivals from four continents and IPI as a proxy of economic growth. In order to accomplish this aim, Granger causality tests in different forms were utilized to identify the direction of the causal relationship between tourism and economic growth. The findings indicated that not all continents contributed to Thailand's economic growth. The tourist arrivals from Southeast Asia were observed to lead to economic growth in Thailand. In turn, economic growth in Thailand was found to lead to an expansion in tourist arrivals from Oceania. Therefore, studying the behavior and preferences of tourists from South Asia and Oceania should be carried out in future studies. In addition, a deeper understanding of the relationship between economic and tourism growth could be obtained from future study that attempts to link the economic development of major tourist provinces (or cities) that is brought about by tourist expansion with the contribution of the tourist destination to the overall economy of Thailand.

Conflict of Interest

No conflict of interest.

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