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Relationship between Health Care and Tourism Sectors to Economic Growth: The Case of Malaysia, Singapore and Thailand

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ABSTRACT

The objective of this study is to examine the relationship between health care and tourism sectors to economic growth in Malaysia, Singapore and Thailand. Panel ARDL test was employed to investigate their long- and short-run relationships by examining annual time series data from 1995–2016. Results show a significant positive short- and long-run relationship between development of healthcare and tourism sectors to economic growth in Malaysia, Singapore and Thailand. As stated in the ASEAN Tourism Strategic Plan 2016-2025, Malaysia, Singapore and Thailand should work together to promote ASEAN as a health tourism destination to the world.

Keywords: Economic growth, healthcare sector, tourism, ASEAN

INTRODUCTION

Over the past few years, demand in healthcare and tourism sectors has shown a steady increase in Malaysia, Singapore and Thailand. Both sectors contributed significantly to the gross domestic product (GDP) of Malaysia, Singapore and Thailand. The healthcare sector contributed 3.9% to Malaysia's GDP; 4.4% to Singapore's GDP; and 4.1% to Thailand's GDP in 2016 (World Bank, 2018). The tourism sector contributed 3.5% to Malaysia's GDP; 7.4% to Singapore's GDP; and 2.7% to Thailand's GDP in 2016 (World Bank, 2018).

Malaysia, Singapore and Thailand are well known as medical tourism destinations for tourists from around the world. By using

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costs in the United States as a benchmark for healthcare services, the average cost savings for Malaysia is 65-80%. Cost savings for Singapore are between 25-40%, and between 50-75% for Thailand (Patients Beyond Borders, 2017). In 2013, 770,134 tourists sought healthcare services in Malaysia. In 2012 850,000 foreign tourists sought treatment in Singapore. In 2013, 520,000 tourists received medical treatment in Thailand (Health-Tourism.com, 2015).

According to Malaysia's Healthcare Travel Council (2014), it has experienced growth in inbound health tourism in recent years. Singapore's health tourism remains strong because its medical facilities were fully accredited by Joint Commission International (JCI). Before this development, Singapore faced stiff competition from Malaysia and Thailand (Euromonitor International, 2014). Thailand has become a world-class health tourism destination for two reasons: (1) it is considered an excellent value-for-money destination, and (2) it offers the highest quality healthcare services in Asia (Euromonitor International, 2014).

Studies have pointed to a positive correlation between health expenditure and economic growth. Atilgan et al. (2017) corroborated this in his case study of Turkey. Tang and Tan (2015) found that promoting tourism in Malaysia contributed to its economic growth in the short- and long-run while Ohlan (2017) found that tourism sector boosted economic growth in India in the short- and long-run.

Lee and Hung (2010) meanwhile pointed to a long-run relationship between healthcare and tourism sectors in Singapore.

Lee (2010) pointed to the long-run relationship between healthcare and tourism sectors in Singapore. Cheah and Abdul-Rahim (2014) meanwhile noted a long-run relationship between economic growth, and the development of healthcare and tourism sectors in Malaysia.

Under ASEAN Tourism Strategic Plan 2016-2025, Thailand is the regional coordinator to promote medical tourism. The ASEAN Tourism Strategic Plan 2016-2025 vision for ASEAN is "*By 2025, ASEAN will be a quality tourism destination offering a unique, diverse ASEAN experience, and will be committed to responsible, sustainable, inclusive and balanced tourism development, so as to contribute significantly to the socioeconomic well-being of ASEAN people.*"

The relationship between healthcare and tourism sectors to economic growth have been studied; for example, 1981-2011 (Cheah & Abdul-Rahim, 2014) and in Singapore from 1978-2007 (Lee & Hung, 2010), but there has been no similar study focusing on Thailand. Because Thailand serves as the coordinator and top tourist destination in ASEAN, the relationships between healthcare and tourism sectors in Thailand is of interest to study. Cheah and Abdul-Rahim (2014) and Lee and Hung (2010) captured the impact of health tourism in Malaysia and Singapore.

This study used data from 1995-2016 and employed the same model as Lee and Hung (2010) and Cheah and Abdul-Rahim (2014) while incorporating different measurements of the variables. We employed real total healthcare expenditures per capita as a proxy for healthcare sector development and total tourist expenditures per tourist for tourism sector development. In comparison, Lee and Hung (2010) and Cheah and Abdul-Rahim (2014) employed government expenditures on healthcare per capita as a proxy for healthcare sector development and total tourist arrivals for tourism sector development.

This study aims to examine the relationship between healthcare and tourism sectors to economic growth of Malaysia, Singapore and Thailand. This is because Malaysia, Singapore and Thailand are the leading players in medical tourism in ASEAN. The study will attempt to show how promoting medical tourism in these countries can boost their economic growth as outlined in ASEAN Tourism Strategic Plan 2016-2025.

DATA AND METHOD

Annual time series data from 1995-2016 were analysed in this study. Data related to real income per capita (*GDP*) was used as a proxy for economic growth in Malaysia, Singapore and Thailand; real total healthcare expenditures per capita (*HEALTH*) served as a proxy for the development of healthcare sector in Malaysia, Singapore and Thailand; and real total tourist expenditures per tourist (*TOURISM*) served as a proxy for tourism sector development in Malaysia, Singapore and Thailand. All the data was obtained from world development indicators, such as the World Bank (2018).

The health-led growth hypothesis by Atilgan et al. (2017) and tourism-led growth hypothesis by Tang and Tan (2015) was examined in this study. To estimate the relationships between the variables and cross countries in this study, the panel ARDL approach is more relevant when compared to ARDL bound tests that only allow for single country estimation at a time.

The panel ARDL approach also allows for the determination of cointegration despite the different order of integration resulting from the use of panel data. The mean group estimator (MG) estimates the dynamic panels for large time observations and large groups (Pasaran & Smith, 1995). A pooled mean group (PMG) estimates the dynamic panels as MG, but PMG considers both averaging and pooling as an intermediate estimator compared with MG (Pasaran et al., 1997). Dynamic Fixed Effects (DFE) restricts the coefficient of the co-integrating vector to be equal across all panels (Pasaran et al., 1997).

Before beginning to estimate the model, it is essential to investigate the order of integration for the variables used. Levin et al.'s (2002) (LLC) test and Im et al.'s (2003) (IPS) test were employed with intercepts and time trends for the level and first difference for each variable. LLC tests are based on homogeneity of the autoregressive parameter (Eq. (1)); IPS tests are based on heterogeneity of the autoregressive parameter (Eq. (2)).

$$\Delta y_{it} = \rho_i y_{i,t-1} + \sum_{j=1}^{p_i} \beta_{ij} \Delta y_{i,t-j} + z_{it}' \gamma_i + \epsilon_{it} \quad (1)$$

$$\Delta y_{it} = \alpha_i + \rho_i y_{i,t-1} + \sum_{j=1}^{p_i} \beta_{ij} \Delta y_{i,t-j} + \epsilon_{it} \quad (2)$$

Next, the panel ARDL approach allows for the determination of cointegration despite the different order of integration resulting from the use of panel data. The MG estimates the dynamic panels for large numbers of time observations and large numbers of groups (Pasaran & Smith, 1995). PMG estimates the dynamic panels as MG, but PMG considers both averaging and pooling as an intermediate estimator compared with MG (Pasaran et al., 1997). DFE restricts the coefficient of the cointegrating vector to be equal across all panels (Pasaran et al., 1997).

In this study, the MG model, the PMG model and the DFE model were employed to investigate the long- and short-run relationships based on the models below:

(a) MG long-run relationship models:

$$GDP_{it} = \theta_0 + \gamma_{i1} GDP_{i,t-1} + \gamma_{i1} TOURISM_{it} + \gamma_{i2} HEALTH_{it} + \varepsilon_{it} \quad (3)$$

$$HEALTH_{it} = \theta_0 + \gamma_{i1} HEALTH_{i,t-1} + \gamma_{i1} GDP_{it} + \gamma_{i2} TOURISM_{it} + \varepsilon_{it} \quad (4)$$

$$TOURISM_{it} = \theta_0 + \gamma_{i1} TOURISM_{i,t-1} + \gamma_{i1} GDP_{it} + \gamma_{i2} HEALTH_{it} + \varepsilon_{it} \quad (5)$$

where

i = 1, 2, and 3

$$\theta_i = \frac{\beta_i}{1-\gamma_i}$$

$$\hat{\theta}_i = \frac{1}{N}\sum_{i=1}^{N} \theta_i$$

$$\hat{\beta}_i = \frac{1}{N}\sum_{i=1}^{N} \beta_i$$

(b) PMG and DFE long-run relationship models:

$$GDP_{it} = \mu_i + \sum_{j=1}^{p} \lambda_{ij} GDP_{i,t-j} + \sum_{j=0}^{q} \delta_{1j}^{i} TOURISM_{i,t-j} + \sum_{j=0}^{q} \delta_{2j}^{i} HEALTH_{i,t-j} + \varepsilon_{it} \quad (6)$$

$$HEALTH_{it} = \mu_i + \sum_{j=1}^{p} \lambda_{1t} HEALTH_{i,t-j} + \sum_{j=0}^{q} \delta_{1j}^{i} GDP_{i,t-j} + \sum_{j=0}^{q} \delta_{2j}^{i} TOURISM_{i,t-j} + \varepsilon_{it} \quad (7)$$

$$TOURISM_{it} = \mu_i + \sum_{j=1}^{p} \lambda_{1t} TOURISM_{i,t-j} + \sum_{j=0}^{q} \delta_{1j}^{i} GDP_{i,t-j} + \sum_{j=0}^{q} \delta_{2j}^{i} HEALTH_{i,t-j} + \varepsilon_{it} \quad (8)$$

where

i = 1, 2, and 3

t = $1, 2, 3, \cdots, T$

j = optimum time lag

μ_i = fixed effect

(c) short-run relationship with error correction models:

$$\Delta GDP_{it} = \mu_i + \varphi_i \left(GDP_{i,t-1} - \lambda_1 TOURISM_{it} - \lambda_2 HEALTH_{it} \right) + \sum_{j=1}^{p-1} \gamma_j^i \Delta GDP_{i,t-j} + \sum_{j=0}^{q-1} \delta_{1j}^{i} \Delta TOURISM_{i,t-j} + \sum_{j=0}^{q-1} \delta_{2j}^{i} \Delta HEALTH_{i,t-j} + \delta_{it} \quad (9)$$

$$\begin{aligned}\Delta HEALTH_{it} &= \mu_i + \varphi_i(HEALTH_{i,t-1} - \lambda_1 GDP_{it} - \lambda_2 TOURISM_{it}) \\ &+ \sum_{j=1}^{p-1} \gamma_j^i \Delta HEALTH_{i,t-1} + \sum_{j=0}^{q-1} \delta_{1j}^i \Delta GDP_{i,t-j} \\ &+ \sum_{j=0}^{q-1} \delta_{2j}^i \Delta TOURISM_{i,t-j} + \delta_{it}\end{aligned} \quad (10)$$

$$\begin{aligned}\Delta TOURISM_{it} &= \mu_i + \varphi_i\left(TOURISM_{i,t-1} - \lambda_1 GDP_{it} - \lambda_2 HEALTH_{it}\right) \\ &+ \sum_{j=1}^{p-1} \gamma_j^i \Delta TOURISM_{i,t-1} + \sum_{j=0}^{q-1} \delta_{1j}^i \Delta GDP_{i,t-j} \\ &+ \sum_{j=0}^{q-1} \delta_{2j}^i \Delta HEALTH_{i,t-j} + \delta_{it}\end{aligned} \quad (11)$$

where

i = 1, 2, and 3

t = $1, 2, 3, \cdots, T$

φ_i = Error-correction coefficient

Following this, the Hausman test was employed to decide the appropriate estimator between MG and PMG models. The DFE model was employed as a countercheck for MG and PMG models estimated.

RESULTS

The results in Table 1 show *GDP* and *HEALTH* both are I(0) variables and *TOURISM* is I(1) variable.

Table 1
Results of the LLC test and IPS test

	LLC		IPS	
	Level	First Difference	Level	First Difference
GDP	-4.1541***	-2.5198***	-2.8536***	-1.7753**
HEALTH	-2.7731***	-4.7049***	-1.7423**	-2.7164***
TOURISM	-1.5183*	-1.6552**	-1.2848*	-2.1557**

*, ** and *** indicate significance at 10% level, 5% level and 1% level respectively

The results of the estimations are shown in Table 2, Table 3 and Table 4 below.

Table 2
Results of panel ARDL (Dependent variable: GDP)

	PMG	MG	DFE
	Long Run Parameters		
	Coefficient	Coefficient	Coefficient
HEALTH	19.73743***	17.9812***	15.2228***
	(0.000)	(0.000)	(0.000)
TOURISM	0.6584	1.7532	0.6090
	(0.153)	(0.003)	(0.606)
	Average Convergence Parameter		
ECT	-0.4516***	-0.6311***	-0.6424***
	(0.001)	(0.000)	(0.000)
	Short Run Parameter		
∆HEALTH	5.9773***	3.6958***	3.2978***
	(0.000)	(0.000)	(0.000)
∆TOURISM	0.8441	0.0985	-1.0401
	(0.536)	(0.955)	(0.596)
Constant	1250.3980**	3298.3620	4167.3470***
	(0.024)	(0.216)	(0.000)
	χ^2	P-value	
Hausman Test[a]	11.82***	0.0027	

Note: The corresponding p-value s given in (…)
[a]PMG is an efficient estimation than MG under null Hypothesis
*, ** and *** indicate significance at 10% level, 5% level and 1% level respectively

Table 3
Results of panel ARDL (Dependent variable: HEALTH)

	PMG	MG	DFE
	Long Run Parameters		
	Coefficient	Coefficient	Coefficient
HEALTH	0.0570***	0.05058***	0.0574***
	(0.000)	(0.000)	(0.000)
TOURISM	0.2320*	0.0452	0.2390***
	(0.078)	(0.761)	(0.008)
	Average Convergence Parameter		
ECT	-0.2161	-0.6534***	-0.4356***
	(0.167)	(0.000)	(0.000)

Table 3 *(continue)*

	PMG	MG	DFE
	Short Run Parameter		
ΔHEALTH	0.0223	-0.0016	0.0012
	(0.120)	(0.697)	(0.834)
ΔTOURISM	-0.0163	-0.0025	0.0373
	(0.178)	(0.845)	(0.320)
Constant	-190.0545	-184.1313	-212.0843***
	(0.291)	(0.274)	(0.000)
	χ^2	P-value	
Hausman Test[b]	3.42	0.1812	

Note: The corresponding p-value is given in (…)
[b]PMG is an efficient estimation than MG under null Hypothesis
*, ** and *** indicate significance at 10% level, 5% level and 1% level respectively

Table 4
Results of panel ARDL (Dependent variable: TOURISM)

	PMG	MG	DFE
	Long Run Parameters		
	Coefficient	Coefficient	Coefficient
HEALTH	-0.1545	0.0506***	0.0574***
	(0.530)	(0.000)	(0.000)
TOURISM	0.9367	0.0452	0.2390***
	(0.831)	(0.761)	(0.008)
	Average Convergence Parameter		
ECT	-0.0463	-0.6534***	-0.4356***
	(0.492)	(0.000)	(0.000)
	Short Run Parameter		
ΔHEALTH	0.0747	-0.0016	0.0012
	(0.268)	(0.697)	(0.834)
ΔTOURISM	0.0559	-0.0025	0.0373
	(0.894)	(0.845)	(0.320)
Constant	132.8278	-184.1313	-212.0843***
	(0.385)	(0.274)	(0.000)
	χ^2	P-value	
Hausman Test[c]	15.27***	0.0001	

Note: The corresponding p-value is given in (…)
[c]MG is an efficient estimation than PMG under null Hypothesis
*, ** and *** indicate significance at 10% level, 5% level and 1% level respectively

Based on the result of the Hausman Test as shown in Table 2, H_0 is rejected at a 5% significance level. All of the *ECT* terms for the three models above are negatively statistically significant, and 0 < *ECT* <1, indicates that there are both long- and short-run relationships for the estimated models. It can be concluded the PMG model is preferred and supported by DFE model. A significant positive long-run and short-run relationship between healthcare sector development to economic growth was noted. Therefore, the health-led growth hypothesis supports this finding. The results of short-run Panel ARDL by country are shown in Table 5 below.

Results of the Hausman Test in Table 3 and 4 show that PMG models are preferred. However, the *ECT* terms for the PMG models above are not negatively statistically significant indicating long- and short-run relationships do not exist for the models.

Table 5
Results of short-run panel ARDL (PMG model) by country

	Malaysia	Singapore	Thailand
Average Convergence parameter			
ECT	-0.6820***	-0.2273	-0.44542*
	(0.000)	(0.193)	(0.086)
Short Run Parameter			
ΔHEALTH	4.6123	7.0278	6.2921*
	(0.377)	(0.140)	(0.096)
ΔTOURISM	2.7493**	-1.7993	1.5824***
	(0.028)	(0.511)	(0.002)
Constant	1201.1730***	2232.7190	317.3021**
	(0.002)	(0.191)	(0.080)

Note: The corresponding p-value s given in (…)
*, ** and *** indicate significance at 10% level, 5% level and 1% level respectively

Malaysia and Thailand *ECT* terms show significant short-run relationship at 5% and 10% level respectively. Malaysian tourism development shows a significant positive relationship to economic growth in Malaysia. Development of tourism in Malaysia has boosted its economic growth. In Thailand, healthcare and tourism development will lead to positive economic growth. Both healthcare and tourism sectors in Thailand play an essential role in promoting economic growth. Therefore, the health-led growth hypothesis and tourism-led growth hypothesis of this study are supported in Thailand in the short-run.

The long-run and short-run results of this study prove that health-led growth hypothesis is correct for the case of Malaysia, Singapore and Thailand but not for the case of tourism-led growth hypothesis. The increase in health expenditure will lead to higher economic growth for the case of

Malaysia, Singapore and Thailand. Results of this study are in line with Atilgan et al. (2017) and Lee and Hung (2010). The present study also found tourism development has a significant positive relationship to economic growth in Malaysia which contradicts with the findings of Cheah and Abdul-Rahim (2014). Different proxy for tourism development was employed compared with Cheah and Abdul-Rahim (2014) who used tourist arrival as its proxy.

CONCLUSION

Malaysia, Singapore and Thailand are already well known for their low-cost healthcare services among Asian countries. Increasing public health expenditures will promote medical tourism which in turn will boost economic growth in Malaysia, Singapore and Thailand.

Tourism sector development in Malaysia and Thailand also plays an essential role in promoting economic growth in the short-run. Malaysia and Thailand are rich in natural resources and forest reserves compared with Singapore. The vast green forest rich in biodiversity attracts many tourists as part of health tourism (Patients Beyond Borders, 2017).

There is a need for Malaysia, Singapore and Thailand policymakers to come up with a common policy on promoting health tourism. A low cost medical and health tourism package should be introduced to compete with non-ASEAN member countries. Cross-border health and medical tourism can be promoted between Malaysia, Singapore and Thailand. Thailand as coordinator for promoting health tourism can play an important role in realising the objectives of ASEAN Tourism Strategic Plan 2016-2025.

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