Medical Tourism and Its Implication on Malaysia's Economic Growth

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ABSTRACT

Policymakers in the developed and developing countries already heading toward medical tourism to stimulate economic growth. Nonetheless, the actual impact of medical tourism on economic growth remains ambiguous. Although medical tourism may spur economic growth via its impact on foreign currency earnings, investments, tax revenue, and employment opportunities, it may also leave numerous negative externalities that either direct or indirectly harmful the process of economic growth. Undeniably, the effectiveness of relying on medical tourism to ignite long-term economic growth is remains as a vital research question. Therefore, this study attempts to address the question by assessing the effectiveness of medical tourism in stimulating long-term Malaysia's economic growth through a well-established neoclassical growth model and a set of advanced time series econometric approaches. The key findings of this study are that medical tourism has significant positive impact on Malaysia's economic growth in the long-run. Furthermore, we find that medical tourism Granger-cause economic growth and it is also relatively the most important factor in explaining the variation of Malaysia's economic growth, especially in the long-run.

Keywords: Economic growth; Malaysia; Medical tourism
JEL Classification Codes: C32; O11

1. INTRODUCTION

By reviewing the previous research works on economics, we realised that economic growth has long been recognised as one of the most pivotal areas for research until today. Additionally, policymakers elsewhere also set economic growth as their primary goal in designing their economic policy (Tobin, 1964; Fellner, 1960). Therefore, searching for reliable and effective sources for long-term economic growth gained special attention over the decades by the economists as well as policymakers. In the review of recent applied research works on the determinants of economic growth, we come across the role of tourism and its ability in accelerating long-term economic growth, which is also known as the tourism-led growth (TLG) hypothesis. Numbers of empirical works have been done to assess the validity of the TLG hypothesis in the developed and developing economies (e.g. Tang and Tan, 2015). Nonetheless, the findings of the earlier works are more likely to be diverging. For example, Oh (2005) for South Korea, Katircioglu (2009) for Turkey, Payne and Mervar (2010) for Croatia, Tang (2011) for Malaysia found evidences that economic growth is not the outcome of tourism expansion, but they are more likely to support the growth-driven

tourism hypothesis. On the contrary, Tang and Tan (2013) discovered that even though not all tourism markets are persistently spur economic growth, the TLG hypothesis remain valid in Malaysia. This is because they found that approximately 83 per cent of the tourism markets under their investigation showed supporting results to the TLG hypothesis. Likewise, the recent study conducted by Tang and Tan (2015) also found significant empirical evidence to support the existence of the TLG hypothesis in the context of Malaysia. In principle, the validity of the TLG hypothesis is well tested, but the empirical findings of previous studies remain unclear and controversial.

Among the sub-sectors in tourism, medical or healthcare has emerged as one of the key sectors that expected to generate lucrative return to the economy (Chaynee, 2003). Medical tourism or also known as healthcare tourism is not a completely fresh area for exploration, especially in the field of tourism economics. Many presume that medical tourism is an effective and reliable source for long-term economic growth. Hence, policymakers in the developed and developing economies are heading toward promoting medical tourism with the hope to stimulate economic growth. Based upon our reading of past literature, the actual impact of medical tourism on economic growth remains ambiguous. Medical tourism may spur economic growth on one hand via its impact on foreign currency earnings, investments on infrastructure, tax revenues, and employment opportunities. One the other hand, medical tourism may also leave numerous negative externalities (e.g. infectious diseases, increase in healthcare price, etc.) that either directly or indirectly harmful the process of economic growth and development. Undeniably, medical tourism is one of the unblocked channels to transmit unknown diseases which may infect the local population as well as increase the rate of morbidity and more seriously increase the rate of mortality. According to Cuddington (1993), rising in morbidity rate will reduce labour productivity because sick or worried workers are less productive, whereas rising in mortality rate will reduce the size of the population. For the sake of brevity, either increase in morbidity or mortality rate definitely has a negative impact on output. In Malawi, Cuddington and Hancock (1994) found that the average growth rate of real GDP tends to be low whenever the infectious disease, i.e. AIDS epidemic is high. Specifically, the average growth rate of real GDP is reduced by approximately 1.2 – 1.5 per cent whenever AIDS epidemic is high. Apart from that, a study conducted by NaRanong and NaRanong (2011) in Thailand revealed that abundance of foreign patients will cause medical fees in the country to increase owing to upward shift in demand. Subsequently, the local patients may not be able to afford the jump of medical fees and thus forgo the opportunity to access quality medical services (see also Hazarika, 2010; Gupta, 2008; Ramirez de Arellano, 2007).[1]

Based upon the compelling arguments, the actual implication of medical tourism cannot be assured of benefiting the economy as a whole. In light of this, we attempt to conduct scientific research to verify how well of medical tourism in stimulating long-term economic growth using Malaysia as a case study. Chee (2010) narrated that Malaysia is among the first group of countries in the Asian region that heading toward promoting medical tourism. Poon (2008) noted that the Malaysian government has allocated at least RM110 billion for healthcare to build new public hospitals as an initiative to further develop the medical tourism in Malaysia. Despite Malaysia is one the key medical tourism destinations in the world, empirical research on the role of medical tourism in economic growth seem not exists in the literature, especially in the context of Malaysia. Therefore, the Malaysian economy becomes the choice of this study to analyse the implication of medical tourism on economic growth. To achieve the objective of this study, we utilise a set of advanced time

[1] Interested readers may read Grag (2013), Hall (2011), Chee and Whittaker (2010), Bezruchka (2000) and Bishop and Litch (2000) for other negative externalities of medical tourism.

series econometric approaches, including cointegration, Granger causality and variance decomposition. In doing so, this study will not only assess the validity of the medical tourism-led growth hypothesis, while we can also ascertain the effectiveness and reliability of setting medical tourism as a long-term catalyst of growth for the Malaysian economy.

The rest of this paper is configured as follows. Section 2 provides the methodology and results used in this study. The concluding remarks will be presented in Section 3.

2. METHODOLOGY AND RESULTS

The aim of this study is to find the effect of medical tourism on economic growth in Malaysia. In light of this, we apply the theoretical growth model proposed by Tang and Tan (2015) which is extended from Feder (1983) to assess the role of medical tourism in Malaysia's economic growth. In short, the growth model applied in this study can be written as follows:

$$\ln GDP_t = \beta_0 + \beta_1 \ln K_t + \beta_2 \ln MTOUR_t + \beta_3 \ln XG_t + \varepsilon_t \quad (1)$$

where $\ln GDP$ is the natural logarithm of per capita real GDP, $\ln K$ is per capita real capital, $\ln MEDT$ is per capita real medical tourism receipts, $\ln XG$ is per capita real export of goods and ε_t is the disturbance term.

This study covers the quarterly data from 1998:Q1 to 2013:Q4 and the data are extracted from several reliable sources, namely *International Financial Statistics* (IFS) published by the International Monetary Fund (IMF), *Monthly Statistical Bulletin* published by Bank Negara Malaysia, *Tourism Satellite Account* (TSA) published by Department of Statistics, Malaysia. Additionally, the GDP deflator (based year 2005) is used to compute the real values of each variable.

Table 1: Results of ADF ad DF-GLS unit root tests

Variables	ADF	DF-GLS
$\ln GDP_t$	–2.895 (5)	–2.807 (5)
$\Delta \ln GDP_t$	–4.749 (4)***	–4.408 (4)***
$\ln K_t$	–3.071 (4)	–2.004 (2)
$\Delta \ln K_t$	–4.395 (3)***	–10.217 (1)***
$\ln MTOUR_t$	–3.579 (0)**	–2.782 (0)
$\Delta \ln MTOUR_t$	–10.878 (0)***	–7.557 (0)***
$\ln XG_t$	–2.430 (2)	–1.816 (2)
$\Delta \ln XG_t$	–8.723 (1)***	–8.779 (1)***

Note: *** and ** denote significant at the 1and 5 per cent levels, respectively. Figure in (.) indicates the optimal lag length selected by Akaike Information Criterion (AIC).

We begin the analysis of this study by determining the degree of integration using Augmented Dickey-Fuller (ADF) and Generalised Least Squares of Dickey-Fuller (DF-GLS) unit root tests. Table 1 shows the results of ADF and DF-GLS unit root tests. At the 5 per cent significance level, the results of the ADF test suggest that medical tourism is *I*(0) while

other variables are *I*(1) process. Nevertheless, the DF-GLS test suggests that all variables, including medical tourism are integrated of order one, *I*(1). As a result, we can conclude that the order of integrations are mixed among the variables of interest, indicating that the bounds testing approach to cointegration introduced by Pesaran et al. (2001) is suitable to assess the presence of a cointegrating relationship between real GDP and its determinants in Malaysia. To do so, we estimate the following unrestricted error-correction model (UECM) with OLS estimator:

$$\Delta \ln GDP_t = \alpha + \theta_1 \ln GDP_{t-1} + \theta_2 \ln K_{t-1} + \theta_3 \ln MTOUR_{t-1} + \theta_4 \ln XG_{t-1} + \sum_{j=1}^{k} \delta_j \Delta \ln GDP_{t-j} + \sum_{j=0}^{k} \gamma_j \Delta \ln K_{t-j} + \sum_{j=0}^{k} \varphi_j \Delta \ln MTOUR_{t-j} + \sum_{j=0}^{k} \lambda_j \Delta \ln XG_{t-j} + e_t \quad (2)$$

Δ is the first difference operator and e_t is the disturbance term assumes to be normally distributed, serially uncorrelated and white noise. The results of bounds testing approach to cointegration are presented in Table 2.

Table 2: Results of bounds test for cointegration

Calculated F-statistic		
$F_{\ln GDP}\left(\ln GDP \mid \ln K, \ln MTOUR, \ln XG\right)$	6.231***	
# Critical values (F-test):		
Significance Level	Lower *I*(0)	Upper *I*(1)
1 per cent	4.690	6.143
5 per cent	3.435	4.583
10 per cent	2.843	3.923
Conclusion:	Cointegrated	

Note: *** denote significance at the 1per cent level. # Unrestricted intercept and no trend (k = 3 and *T* = 65) critical values are obtained from Narayan (2005).
R-squared: 0.972; Adjusted R-squared: 0.942; F-Statistic: 32.586 (0.0000);
Shapiro-Wilk: 0.9681 (0.1508); Ramsey RESET [1]: 1.026 (0.3111), [2]: 3.421 (0.1808);
Breusch-Godfrey LM test [2]: 0.214 (0.8985), [4]: 2.051 (0.7264);
ARCH test [2]: 0.421 (0.8101), [4]: 1.976 (0.7402)
[ ] refer to the diagnostics tests order; ( ) refer to the p-values.

We find that the calculated F-statistic for bounds test is 6.231 and it is greater than the 1 per cent upper bound critical values provided by Narayan (2005). This result implies that there is a long-run equilibrium relationship between real GDP, real capital, real medical tourism and real export of goods in Malaysia over the period from 1998:Q1 to 2013:Q4. Since we have witnessed the existence of a long-run relationship between these 4 variables and our key interest is to assess the response of economic growth to medical tourism, capital and export of goods in Malaysia, we estimate the long-run coefficients by setting real GDP as the dependent variable. The estimated cointegrating equation is given in Table 3 and we find that all variables are statistically significant at the 10 per cent level or better. We realise that the contribution medical tourism contribute is slightly higher than the rest of the 2 determinants. Specifically, a 10 per cent increase in medical tourism, on average, real GDP

will increase by approximately 1.1 per cent in the long-run. However, economic growth only increases about 0.67 per cent and 0.98 per cent for every 10 per cent increase in real capital and real export of goods respectively.

Table 3: Results of long-run coefficients - OLS

Variables	Coefficients	Std. Errors	t-statistics
Constant	7.9940***	0.2758	28.9807
$\ln K_t$	0.0673***	0.0227	2.9636
$\ln MTOUR_t$	0.1075***	0.0048	22.3879
$\ln XG_t$	0.0989*	0.0516	1.9160

Note: *** and * denote significant at the 1 and 10 per cent level.

Next, we examine the Granger causality between economic growth and its determinants by estimating the following vector error-correction model (VECM):

$$(1-L)\begin{bmatrix} \ln GDP_t \\ \ln K_t \\ \ln MTOUR_t \\ \ln XG_t \end{bmatrix} = \begin{bmatrix} a_1 \\ a_2 \\ a_3 \\ a_4 \end{bmatrix} + \sum_{j=1}^{k}(1-L)\begin{bmatrix} A_{11,j} & A_{12,j} & A_{13,j} & A_{14,j} \\ A_{21,j} & A_{22,j} & A_{23,j} & A_{24,j} \\ A_{31,j} & A_{32,j} & A_{33,j} & A_{34,j} \\ A_{41,j} & A_{42,j} & A_{43,j} & A_{44,j} \end{bmatrix} \times \begin{bmatrix} \ln GDP_{t-j} \\ \ln K_{t-j} \\ \ln MTOUR_{t-j} \\ \ln XG_{t-j} \end{bmatrix}$$

$$\begin{bmatrix} \psi_1 \\ \psi_2 \\ \psi_3 \\ \psi_4 \end{bmatrix} \times \left[ECT_{t-1}\right] + \begin{bmatrix} e_{1t} \\ e_{2t} \\ e_{3t} \\ e_{4t} \end{bmatrix} \quad (3)$$

where $(1-L)$ is the first difference operator and $\ln$ is the natural logarithm. The residuals e_{it} are assumed to be normally distributed and white noise. ECT_{t-1} is the one period lagged error-correction term computed from the cointegrating equation. The t-statistic on the coefficient of the ECT_{t-1} indicates the statistical significance of the long-run Granger causal effects. Nonetheless, the likelihood ratio (LR) statistics on the first difference lagged explanatory variables indicates the statistical significance of the short-run Granger causal effects.

The Granger causality results are presented in Table 4. Based upon the results, we have witnessed that the coefficients of ECT_{t-1} are statistically significant at the 5 per cent level in all estimated VECMs. These results indicate that economic growth, medical tourism, capital and exports of goods in Malaysia are Granger-cause each other in the long-run. With reference to the short-run causality results, we find that capital and exports of goods are statistically significant at the 1 per cent when economic growth and medical tourism are dependent variables of VECM. Additionally, economic growth is significant at the 1 per cent level merely in capital and export of goods equations, but not in the medical tourism equation. Finally, medical tourism is statistically significant at the 5 per cent level or better only in economic growth and capital equations. For the sake of brevity, we could summarise that in the short-run, there are bi-directional causalities, i.e. between economic growth and

exports of goods, between economic growth and capital, and between capital and medical tourism in Malaysia. However, in the short-run, there is uni-directional causality running exports of goods to medical tourism and medical tourism to economic growth in Malaysia. As we have witnessed that medical tourism Granger-causes economic growth in both the short- and long-run, we can conclude that medical tourism is an effective catalyst for growth of the Malaysian economy. In general, our empirical findings are consistent with those of Tang and Tan (2013; 2015a, 2015b), but contrary to Tang (2013).

Table 4: The results of the Granger causality test – VECM

Explanatory variables	Dependent variables			
	$\Delta \ln GDP_t$	$\Delta \ln K_t$	$\Delta \ln MTOUR_t$	$\Delta \ln XG_t$
	Likelihood ratio (LR) statistics			
$\sum \Delta \ln GDP_{t-j}$	–	14.233***	0.068	63.239***
$\sum \Delta \ln K_{t-j}$	28.529***	–	27.079***	0.070
$\sum \Delta \ln MTOUR_{t-j}$	33.086***	17.221**	–	3.010
$\sum \Delta \ln XG_{t-j}$	58.091***	1.447	34.288***	–
ECT_{t-1} [t-statistics]	–0.541** [–2.7240]	–0.673*** [–3.4433]	–0.641*** [–4.9522]	–0.557*** [–3.5229]

Note: The asterisks *** and ** denote significance at the 1 and 5 per cent levels, respectively.

So far, we have verified the effectiveness of medical tourism on economic growth in Malaysia via the cointegration and Granger causality analyses. Although these two tests are necessary, the analyses are still insufficient because they are in-sample tests. Furthermore, Buiter (1986) also emphasised that the Granger causality test alone is less informative in determining the effectiveness of an economic policy. Therefore, we conduct the generalised variance decomposition analysis proposed by Pesaran and Shin (1998) to further affirm the effectiveness or relative strength of real capital, real medical tourism and real exports of goods in stimulating Malaysia's economic growth. Since the variables are cointegrated, the VECM framework is used to perform the generalised variance decomposition analysis. This is because VECM provides more efficient results by covering both short- and long-run information in a single analytical framework. Table 5 shows the results of the generalised variance decomposition analysis with reference to economic growth.

Table 5: Generalised variance decomposition analysis of lnGDP

Horizon	$\ln GDP_t$	$\ln K_t$	$\ln MTOUR_t$	$\ln XG_t$
1	45.84	11.57	17.66	24.93
4	43.68	8.79	25.50	22.04
8	38.28	8.78	31.39	21.54
12	35.03	10.30	33.17	21.49
24	30.07	10.55	37.99	21.39

Note: The above generalised variances are re-scaled into 100.

In the short-run (i.e. 4 quarters), we observed that most of the variation in Malaysia's economic growth is explained by its own innovation. Approximately, 43.7 per cent of the

variation in economic growth is attributed to its own innovation in the short-run. However, a shock in real capital, real medical tourism and real export only explain about 8.8 per cent, 25.5 per cent and 22 per cent respectively. In the long-run (i.e. 24 quarters), the results show that real medical tourism explains approximately 38 per cent of the variation in economic growth. Nonetheless, real exports of goods and real capital only explain about 21.4 per cent and 10.6 per cent respectively. As a summary of this analysis, we can conclude that medical tourism is the key determinant of Malaysia's economic growth compared to export of goods and capital. Therefore, medical tourism is relatively the most effective sector in the process of accelerating Malaysia's economic growth in both the short- and long-run. Any policies that aim to promote medical tourism would effectively generate long-term economic growth and this is in line with the finding of Tang and Tan (2015).

3. CONCLUSIONS

Medical or health tourism is one of the fastest growing sub-sectors in the world and Malaysia is heading toward positioning the country to be an attractive destination for medical tourism with the hope to gain a lucrative return. However, previous studies failed to assure its actual implication on the economy because apart from various positive effects, medical tourism would also bring in varieties of negative externalities to the host country which either direct or indirectly retard the process of economic growth. Therefore, the purpose of this study is to examine the importance research question of how well of medical tourism in generating Malaysia's economic growth, especially in the long-run. To answer this research question, we employ the cointegration, Granger causality and also the generalised variance decomposition tests.

The principle findings of this study can be recapitulated as follows. In line with many empirical studies, we find that economic growth, medical tourism and other determinants in Malaysia are cointegrated. This implies that a meaningful long-run relationship between economic growth, capital, medical tourism and exports of goods can be derived. For comparative purposes, we first estimate the long-run growth model and we find that the response of economic growth to medical tourism is slightly higher than capital and export of goods. Likewise, the generalised variance decomposition analysis also yields the relatively same conclusion where medical tourism is the most important factor in explaining the variation of Malaysia's economic growth in both the short- and long-run. Moreover, our empirical results also suggest that medical tourism Granger-cause economic growth in Malaysia, regardless of short- or long-run. With these empirical findings, we can surmise that medical tourism is an effective catalyst of growth that can speed up the upgrading process of the Malaysian economy to the status of a developed country.

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