

## **Determinants of international tourism receipts and technical efficiency of tourism sector in Malaysia, Thailand and Singapore**

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### **ABSTRACT**

The purpose of this study is to interpret factors that affect the change of international tourism receipt using the stochastic frontier model with panel data and to study the technical efficiency of tourism sector in Malaysia, Thailand, and Singapore. The secondary data from 2001 to 2010 are used for this study. Significant factors that affect the change of international tourism receipts are (1) available seat kilometer, (2) government spending on transportation and telecommunication, (3) percentage of change of sanitation facilities and (4) government spending on social security and welfare. The mean technical efficiency level of tourism sector among Malaysia, Thailand, and Singapore is 1.09. The country that has the highest level of technical efficiency in tourism sector is Malaysia, 1.17. Singapore has the level of technical efficiency of 1.07. Thailand has the level of technical efficiency of 1.03.

*Keywords:* International tourism receipt, technical efficiency, tourism sector, tourism facilities, stochastic frontier

## 1. Introduction

Tourism industry has been growing up rapidly nowadays and creates tremendous value of GDP for many countries all over the world since the amount of the world tourism has increased. The region that has been growing and being more attractive to tourism is south East Asia or ASEAN. The ASEAN is famous for its nature, architecture, history, cultures, and lifestyles. Moreover, factors that also attract the tourists to travel to ASEAN are the expansion of low cost airlines and the low cost of living of these countries, low cost of goods and services. The three most popular ASEAN countries for tourists are Malaysia, Thailand, and Singapore; tourism industry is counted as their major source of GDP, the more tourist arrival to the country the more tourism receipt. There has been strongly competitive among these three countries. To increase their growth of tourism receipt, there is a need to develop some infrastructures. For instance, 1) international airlines 2) transportation and communication 3) public services 4) sanitation 5) social security and welfare need to be developed. The improvement of these infrastructures depends on the governance efficiency in order to spend the government budget to improve these infrastructures so as to expand the growth of tourism industry. The propose of this study are to interpret the tourism supply that affect the change of international tourism receipt, to interpret the efficiency in tourism supply, and to interpret the mean technical efficiency in tourism supply of Malaysia, Thailand, and Singapore using the Stochastic Frontier Model with panel data.

## 2. Literature Review

**Lungdren (1992)** studied the relationship between the improvement of the infrastructure that related to transportation, access to the potential areas in the field of tourism. By using the geographic analysis and focuses on the development of spatial infrastructure from one country to another country, from one continent to another continent using railway and motorway in order to plan and develop the transportation and also shorten the time and distance of transportation. Moreover the improvement of transport infrastructure lead to develop the other infrastructure in the long term for tourism in Europe.

**Das (2006)** studied the Planning and Management of Regional Infrastructure for Tourism Development in Orissa State, India. The study indicated that infrastructure is necessary for the tourism development and needs to be well planned. The satisfaction of tourists depends on the improvement of the infrastructure and lead to the increase of tourism receipt.

**Khadaroo and Seetanah (2007)** studied about the Transport infrastructure and Tourism Development in Mauritius island from 1978 to 2003. By using number of tourist arrival, Real GDP, exchange rate, number of hotel rooms available distance between home country of tourists and the Mauritius Island and value of transportation infrastructure, using Panel Data Model. The result indicated that transportation infrastructure has positive effect to induce the tourist from Europe America and Asia to travel to the Mauritius Island. The other infrastructure which is not transportation has effect only to induce the tourist from Europe and America only.

### 3. Methodologies

This study uses panel data to investigate the change of international tourism receipts. Moreover, it uses stochastic frontier model to measure the technical efficiency of tourism sector in Malaysia, Thailand and Singapore.

### 4. The Data

In this study, the data is the panel data from 2001 to 2010 summarized by the World Bank and Asian Development Bank. The data includes: 1) available seat kilometer, 2) government spending on transportation and communication, 3) government spending on public services, 4) the percentage of change of sanitation facilities, and 5) government spending on Social security and welfare. The data consist of three countries which are Malaysia, Thailand, and Singapore. The Frontier 4.1 Software is used to analyze.

### 5. Empirical Results

**Table 5.1** Parameter that affect the change of International Tourism Receipt

Variables	Parameter	Coefficient	Standard Error	T-ratio
Constant Variable	$\beta_0$	59.675195	7.3822039	8.0836558
Percentage change of Available seat Kilometer	$\beta_1$	3.7442817	0.67280524	5.5651792
Percentage change of Government spending on Transportation and Communication	$\beta_2$	0.36538249	8.7179898	4.1911323
Percentage change of Government spending on general public services	$\beta_3$	0.-099378430	0.061817913	-1.6075992
Percentage change of Sanitation Facilities	$\beta_4$	42.802378	11.529935	3.7122827
Percentage Change of Government spending on Social security and welfare	$\beta_5$	0.19208379	0.060049221	3.1987725

Source : Calculation

Table 5.1 shows the infrastructure which is the factor that affects the change of international tourism receipt at the significant level of 0.05. The factor that can explain the change of International Tourism are 1) available seat kilometer, 2) government spending on transportation and telecommunication, 3) the percentage of change of sanitation facilities, and 4) government spending on social security and welfare. As the percentage change of available seat kilometer increases 3.7442817 percent, the international tourism receipt increases 1 percent. As the Percentage change of government spending on transportation and communication increases 0.36538249

percent, the international tourism receipt increases 1 percent. As the percentage change of sanitation facilities increases 42.802378 percent, the international tourism receipt increases 1 percent. As the percentage change of government spending on social security and welfare increases 0.19208379 percent, the international tourism receipt increases 1 percent.

**Table 5.2** The Technical Efficiency in Tourism Supply of Malaysia, Thailand and Singapore using Technical Inefficiency Model

Variables	Parameter	Coefficient	Standard Error	T-ratio
Constant Variable	$\delta_0$	63.696839	9.2024595	6.9217190
Percentage change of Available seat Kilometer	$\delta_1$	5-.4533577	0.66812513	8-.1621801
Percentage change of Government spending on Transportation and Communication	$\delta_2$	0.40407143-	0.67779100	0.59615933-
Percentage change of Government spending on general public services	$\delta_3$	0.19279847-	.071809907	2-.6848450
Percentage change of Sanitation Facilities	$\delta_4$	92-.499572	0.40231965	22-.991562
Percentage Change of Government spending on Social security and welfare	$\delta_5$	-0.35353921	0.11548118	-3.0614444
sigma-squared		579.27052	0.35505668	1631.4875
gamma		0.99999753	0.041085798	24.339251

Source : Calculation

From the calculation of technical inefficiency model to explain the technical efficiency in tourism supply, the factors that can explain the technical efficiency at the significant level of 0.05 are: 1) percentage change of available seat kilometer, 2) percentage change of government spending on general public services, 3) percentage change of sanitation facilities, and 4) percentage change of government spending on social security and welfare. As the percentage change of available seat kilometer increases 5.4533577 percent, the technical efficiency in tourism supply increases 1 percent. As the percentage change of government spending on general public increase 0.19279847 percent, the technical efficiency in tourism supply increases 1 percent. As the percentage change of sanitation facilities increases 92.499572 percent, the technical efficiency in tourism supply increases 1 percent. As the percentage change of government spending on social security and welfare increases 0.35353921 percent, the technical efficiency in tourism supply increase 1 percent.

**Table 5.3** The level of Technical Efficiency of Malaysia, Thailand and Singapore from

Year	Technical Efficiency		
	Malaysia	Thailand	Singapore
2001	2.5752742	1	1
2002	1.0258755	1.3333362	1
2003	1	1	1
2004	1.1227042	1	1.122817
2005	1	1	1
2006	1.033544	1	1.5707275
2007	1	1	1
2008	1	1	1.0310487
2009	1	1	1
2010	1	1	1
Mean Technical Efficiency	1.17573979	1.03333362	1.07245932

Source: Calculation

Table 5.3 shows the calculation of the level of technical efficiency and mean technical efficiency. It illustrates that the tourism supply of Malaysia, Thailand, and Singapore are efficient. From the mean technical efficiency, it shows that the country that has the highest level of efficiency of tourism supply is Malaysia at the level of 1.17; and Thailand is the second that has the mean technical efficiency at 1.03; and the third is Singapore that has the mean Technical efficiency at 1.07.

## 6. Conclusions

This study has found that tourism facilities does effect on the decision making of tourists for traveling into Malaysia, Thailand and Singapore. Increasing in number of tourist arrival to the country will also increase the tourism receipt for them; this leads to the growth of their GDP. Well planned in tourism facilities which include infrastructure investment and spending of both private and government sectors, will generate the efficiency of tourism sector of country. The investment will also improve the GDP and well-being of the population.

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