Int. Journal of Economics and Management **1(3):** 345 – 363 (2007) ISSN 1823 - 836X

# Malaysia's Tourism Demand from Selected Countries: The ARDL Approach to Cointegration

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## ABSTRACT

This paper investigates the long-run and short-run relationships between tourist arrivals to Malaysia and tourism price in Malaysia, tourism prices at alternative destinations, traveling costs, incomes and exchange rates, using the bounds testing approach developed within the autoregressive distributed lag (ARDL) framework. The empirical results show that in the long run, tourism price in Malaysia, traveling costs, tourism prices at alternative destinations and incomes are the important determinants of Malaysia's tourism demand from the selected countries namely Singapore, Japan, Hong Kong and Australia. The results also indicate that the 1997-98 East Asian economic crisis and the outbreak of Severe Acute Respiratory Syndrome – SARS significantly affected Malaysia's tourism demand.

**Keywords:** Tourism demand, cointegration, ARDL model

## INTRODUCTION

The Malaysian economy was traditionally dominated by the performance of the primary commodities sector such as rubber, tin, palm oil and petroleum which was subsequently followed by drastic development of the manufacturing sector in the late 1970's. These two major sectors are very sensitive to any change in the

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international economic climate. Any shock to the world economy would severely affect the Malaysian economy. Due to several major global economic recessions, especially in the early 1970's and 1980's, the government started broadening its economic base and the tourism sector was identified as one of the potential industries to be developed. For that purpose, increased development activities in the tourism industry were undertaken in the late 1980's and early 1990's. For instance, numerous incentives and assistance were provided especially to the private sector to stimulate those involved in tourism.

As consequence of these incentives and promotions such as the declaration of 'Visit Malaysia Year' (VMY) in 1990, 1994, 2000 and most recently in 2007, total tourist arrivals increased to 7.4 million in 1990, compared to 2.0 million and 4.8 million tourist arrivals in 1980 and 1989 respectively. Tourism receipts also recorded a positive increment from RM618.9 million in 1980 to RM2,803 million in 1989 and RM4500 million in 1990. However, in 1991 the positive growth of tourism was affected. Total arrivals and total receipt dropped to 5.8 million and RM4300 million respectively. This negative growth was mainly due to the Gulf War and lack of aggressive promotions as compared to the year before. Growth of the tourism sector recovered from 1992 until 1995 plotting positive growth of between 2.9%-10.7% and 6.9%-63.81% for tourist arrivals and tourism receipts respectively. In real figures about 6.0 million tourist arrivals and RM4595 million in tourism receipts was recorded in 1992 and 7.5 million tourist arrivals and RM9174.9 million in tourism receipts in 1995. The positive performance of the tourism industry was to some extent caused by the Visit ASEAN Year in 1992 and VMY in 1994.

Again, in 1996, although the number of tourist arrivals to Malaysia dropped to 7.1 million, a positive growth in tourism receipts (RM10.354 million) was still recorded. No specific reason can be given as to the cause of this situation but it may be due to the lack of promotions. The decrease in total arrivals and receipts continued in 1997-98. The major reason for the decline was due to the global economic crisis. After 1999, international tourist arrivals and tourism receipts showed positive growth rates except for in 2003 where there was a dip which may be due to the outbreak of SARS. Information pertaining to international tourist arrivals and receipts are given in Table 1.

**Table 1 Tourist Arrivals and Tourism Receipts in Malaysia, 1975-2004**

| Year | International Tourist Arrivals | Rate of growth (%) | Tourism Receipts (Million RM) | Rate of growth (%) |
|---|---|---|---|---|
| 1975 | 1,461,553 | - | 289.50 | - |
| 1980 | 2,067,020 | - | 618.9 | - |
| 1985 | 3,109,106 | - | 1543.1 | - |
| 1989 | 4,846,320 | - | 2802.7 | - |
| 1990 | 7,445,908 | 53.64 | 4500.0 | 60.56 |
| 1991 | 5,847,213 | -21.47 | 4300.0 | -4.44 |
| 1992 | 6,016,209 | 2.89 | 4595.4 | 6.87 |
| 1993 | 6,503,860 | 8.11 | 5065.8 | 10.24 |
| 1994 | 7,197,229 | 10.66 | 8298.3 | 63.81 |
| 1995 | 7,468,749 | 3.77 | 9174.9 | 10.56 |
| 1996 | 7,138,452 | -4.42 | 10354.1 | 12.85 |
| 1997 | 6,210,921 | -12.99 | 9699.0 | -6.33 |
| 1998 | 5,550,748 | -10.63 | 8580.0 | -11.54 |
| 1999 | 7,931,149 | 42.88 | 13450.0 | 56.76 |
| 2000 | 10,221,582 | 28.88 | 17335.4 | 28.89 |
| 2001 | 12,775,073 | 24.98 | 24221.5 | 39.72 |
| 2002 | 13,292,010 | 4.05 | 25781.1 | 6.44 |
| 2003 | 10,576,915 | -20.43 | 21291.1 | -17.42 |
| 2004 | 15,703,406 | 48.47 | 29651.4 | -39.30 |

Source: Annual Statistics Report, Tourism Malaysia.

From the previous explanations it is clear that several factors seem responsible for the increase and decrease of tourist arrivals to Malaysia. Since this industry is very important to the economy and is identified as one of the major sources of economic growth, serious attention should be given in studying the factors that may potentially affect foreign tourist arrivals to this country. For this reason the main objective of this paper is to identify and estimate the importance of the factors that have an effect on tourist arrivals to Malaysia, focusing specifically on those from a few selected major markets namely Singapore, Japan, Hong Kong and Australia. Knowing these factors would help stakeholders in this industry to respond accordingly should any of the identified factor from these markets change.

This paper is organised as follows: Review of literature on tourism demand, methodology, empirical results and policy implication and conclusion. The demand for tourism will be estimated utilizing the latest cointegration approach based on the ARDL framework developed by Pesaran et al. (2001).

## LITERATURE REVIEW

This section reviews some of studies on the demand for tourism. Various methodologies had been applied to analyze the factors that affect the demand for tourism. In traditional tourism demand analysis, the most popular method of estimation is the Ordinary Least Square (OLS), which has been used since the 1960s. OLS is a static analysis method, and thus relies heavily on the assumption of Classical Linear Regression Model (CLRM).

Some caution should be given when working with time series data using static analysis since such analysis using non-stationary series data may lead to invalid regression estimation if the error term does not fulfill the assumption of CLRM. In order to overcome this problem, the data used in regression analysis should be stationary. If the data are stationary, the error terms would meet all the basic requirements under the CLRM.

The issues of stationary data in the field of tourism have been ignored by many researchers. Hence, estimations arrived at may be flawed (Philips, 1986) or lead to serious problems of spurious regression (Morley, 1998; Song and Witt, 2006). The consequence for ignoring data stationarity is that the estimated parameters are unreliable and the t-tests and F-tests misleading.

To overcome this problem, after the mid-1990's most researchers applied dynamic analysis. One of the most popular dynamic methodologies in the field of tourism at present is the cointegration method. This method was introduced by Engle and Granger (1987) and has proved to be a useful tool in avoiding spurious regression when working with non stationary time series data in econometric modeling. Besides Engle and Granger, there were a few other cointegration analysis approaches. These are the Johansen and Juselius multivariate cointegration framework (1990) and Pesaran and Shin (1995,) Pesaran et. al (1996) Pesaran et. al (1998), Pesaran and Shin (1999), and Pesaran et. al (2001) framework, which is known as the Autoregressive Distributed Lag (ARDL). Some of the latest studies on tourism demand that are based on dynamic cointegration analysis are Narayan (2004); Halicioglu (2004); Toh, Habibullah and Goh (2006) and Norlida et. al (2007).

# METHODOLOGY

## Dependent, Independent and dummy variables

The selection of variables was determined by a review of previous empirical studies on tourism demand analysis.

International tourism demand can be measured in terms of the number of tourist arrivals. Witt and Witt (1995), Crouch (1994) and based on our own reading (Norlida et. al, 2007) revealed that about 75 out of 118 studies on the demand for tourism used total tourist arrivals as a proxy for demand for tourism. This is supported by Li (2004), who reviewed 45 articles published since 1990. He found that 37 studies chose tourist arrivals as the dependent variable. The other possible variable is tourist expenditures. However, due to the difficulties in obtaining information on tourist expenditure, total tourist arrivals from chosen countries of origin, for the period of 1970-2004, has been chosen as the dependent variable.

In his survey of 100 empirical studies on tourism modeling Lim, 1997, found that income and price were the most commonly used explanatory variables. In literature, about 98 and 83 out of 118 studies on the demand for tourism have included price and income in their studies respectively. This study includes both these variables in addition of some other variables such as tourism prices of alternative destinations or substitute prices, traveling costs, exchange rates, word of mouth effect and dummies.

*Tourism price*: Tourism price refers to relative price. Its calculation is based on the consumer price index (CPI) of all goods and services in the visited destination divided by the CPI of the country of origin (Salman, 2003; Lim, 2004; Dritsakis, 2004; and Toh, Habibullah and Goh, 2006). The calculation is shown below in Equation (1), and the calculated figure shows the cost of living for tourists at the tourism destination, relative to the country of origin. As the relative price (in this study refers to Malaysia) increases, *ceteris paribus*, there will be a fall in tourist arrivals to the visited destination (Malaysia). Thus, price has a negative relationship with the demand for tourism.

$$\frac{CPI_{\text{visited distination n}}}{CPI_{\text{origin country}}} \tag{1}$$

*Income:* The income variable refers to the real per capita income (RPI), refer Equation (3). Income is the most popular variable included in the tourism demand function (Lim and McAleer, 2002; Dritsakis, 2004; and MuHoz, 2006). Normally, higher income will result in increase in total arrivals.

$$RPI_{\text{origin country}} = \frac{GDP_{\text{origin country}}}{POP_{\text{origin country}} * CPI_{\text{origin country}}} \quad (2)$$

*Substitute prices:* Besides tourism price, substitute prices have also been proven to be an important determinant in some studies (Gray, 1966; Kliman, 1981; Papodopoulas and Witt, 1985; Witt and Martin, 1987; Witt, 1980a,b; and Song et. al., 2003). Substitute prices in this study are the tourism prices at the alternative tourism destinations, namely Singapore, Indonesia and Thailand. The calculation of substitute price is similar to that of tourism price in Malaysia, where the visiting destination is refered to as the alternative destinations (please refer to Equation 3). The relationship between the substitute price and the demand for tourism can be positive or negative. A positive sign for substitute price means that the country is a substitute destination to Malaysia, while a negative sign means that the country is a complementary destination to Malaysia.

$$\frac{CPI_{\text{substitute destination}}}{CPI_{\text{origin country}}} \quad (3)$$

*Travelling cost:* Travelling cost refers to the total expenses travelers incur for their transportation from their country of origin to the destination. Since it is difficult to get real data on cost of transportation, the price of crude oil is used as proxy, as done by MuHoz, (2006). Other variables such as air fares between the visited destination and the country of origin (Bechdolt, 1973; Gray, 1966; Kliman, 1981; Kulendran and Witt, 2001; Lim and McAleer, 2002; and Dritsakis, 2004); and ferry fares and/or petrol costs for surface travel (Quayson and Turgut, 1982; and Witt and Martin, 1987) can also be used. However, the two proxies above are not chosen since most of tourists who come to Malaysia may not come directly from their origin countries. Thus, the authors faced difficulty in selection of the appropriate traveling cost. Even if the visitors came directly from their origin countries, the difficulty was that it was quite impossible to know the exact flight

they used. Similar to tourism price, with assumption of other variables are *ceteris paribus*, as the traveling cost rises, the cost of travelling becomes more expensive, and this will reduce the number of visitors travelling. It is hypothesized that traveling cost is inversely related to the arrival of tourists.

*Exchange rates:* Another important variable is the exchange rate. The exchange rate is the ratio of currency values between the receiving country and the country of origin. Changes in exchange rates will affect the currency value of the origin country, refer Equation (4). Any change in exchange rate will lead to an appreciation or depreciation of tourist currency (Salman, 2003; Lim, 2004; Dritsakis, 2004; and Toh, Habibullah and Goh, 2006). Any appreciation in tourist currency may encourage more people to travel.

$$ER = \frac{\text{Cost of Malaysia ringgit}}{\text{The origin country dollar}} \tag{4}$$

*Word-of Mouth:* Word-of mouth (WoM) effect is also included in this study. WoM is proxied by number of tourist arrivals in the past year (Salman, 2003; Dritsakis, 2004; Narayan, 2004; Toh, Habibullah and Goh, 2006; and MuHoz, 2007). Hence knowledge about the destination will be spread out as people talk about their holidays, thereby reducing uncertainty for potential visitors. Thus, it will encourage more tourists to come to that destination.

*Dummy:* In some studies, dummy variables are also included. The purpose of including dummy variables is to measure the impact of "one shot" events. Dummies are specially constructed variables which take the value "1" when the event occurs and "0" otherwise. In 1973 and 1979, during the oil crisis, Witt and Martin (1987) showed that there was a decline in tourist arrivals. Other events that had affected tourist arrivals include the war between Greece and Turkey (explained by Papadopoulas and Witt (1985)), the Gulf War and September 11, 2001 terrorist attacks (Toh, Habibullah and Goh, 2006; and Moñoz, 2006), and the Chernobyl accident in 1986 and the Gulf War (Salman, 2003). Dummy variables in the above studies displayed significant effects on tourist arrivals in the corresponding countries. In this study the dummies are economic crisis (D97) and the outbreak of SARS (D03).

## MODEL SPECIFICATION

In this study four major markets were selected for Malaysian tourism demand, namely Singapore, Japan, Hong Kong, and Australia. Selection of these countries was based on their importance as representatives from their regions. For example, Singapore is the major contributor to tourist arrivals to Malaysia from ASEAN countries, Japan and Hong Kong are important marketw from East Asia; whereas Australia is an important market from Australasia. The proposed model for Malaysian tourism demand is shown in Equation (5) below:

$$\ln TA_t = \beta_0 + \beta_1 \ln TP_t + \beta_2 \ln TC_t + \beta_3 \ln SPSgp_t + \beta_4 \ln SPThd_t + \beta_5 \ln SPIndo_t + \beta_6 \ln RPI_t + \beta_7 \ln ER_t + \beta_8 D97 + \beta_9 D03 + \varepsilon_t \quad (5)$$

where:

$\ln TA_t$ - the log of tourist arrivals from the country of origin to Malaysia in year t;

$\ln TP_t$ - the log of tourism price from the country of origin to Malaysia in year t;

$\ln TC_t$ - the log of traveling costs from the country of origin to Malaysia in year t;

$\ln SPSpg_t$ - the log of substitute price of country of origin to an alternative destination, which refers to Singapore, in year t;

$\ln SPThd_t$ - the log of substitute price of country of origin to an alternative destination, which refers to Thailand, in year t;

$\ln SPIndo_t$ - the log of substitute price of country of origin to an alternative destination, which refers to Indonesia, in year t;

$\ln RPI_{it}$ - the log of real per capita income of country of origin in year t;

$\ln ER_{ijt}$ - the log of the exchange rate between the country of origin and Malaysia in year t;

*D97* - the dummy for economic crisis in 1997-98; and

*D03* - the dummy for SARS outbreak in 2003.

Note: the origin countries refer to Australia, Hong Kong, Japan and Singapore.

## METHODOLOGY

The ARDL has been chosen since it can be applied for a small sample size as is the case in this study. Furthermore, it can estimate both the long-run and short-run relationships simultaneously in a tourism demand model. It can distinguish dependent and explanatory variables and allows tests for the existence of relationships between variables in levels irrespective of whether the underlying regressors are purely I(0), I(1) or mutually cointegrated. Thus, Equation (5) in the ARDL version of the error correction model can be expressed as Equation (6):

$$\begin{aligned}\Delta LTA_t = {} & \beta_0 + \sum_{i=1}^{m} \beta_1 \Delta LTA_{t-i} + \sum_{i=0}^{m} \beta_2 \Delta LTP_{t-i} + \sum_{i=0}^{m} \beta_3 \Delta LTC_{t-i} + \sum_{i=0}^{m} \beta_4 \Delta LSPSgp_{t-i} \\ & + \sum_{i=0}^{m} \beta_5 \Delta LSPThd_{t-i} + \sum_{i=0}^{m} \beta_6 \Delta LSPIndo_{t-i} + \sum_{i=0}^{m} \beta_7 \Delta LRPI_{t-i} + \sum_{i=0}^{m} \beta_8 \Delta LER_{t-i} \\ & + \beta_9 LTA_{t-i} + \beta_{10} LTP_{t-i} + \beta_{11} LTC_{t-i} + \beta_{12} LSPSgp_{t-i} + \beta_{13} LSPThd \\ & + \beta_{14} LSPIndo_{t-i} + \beta_{15} LRPI_{t-i} + \beta_{16} LER_{t-i} + \beta_{17} D97 + \beta_{18} D03 + \varepsilon_t \end{aligned} \quad (6)$$

The left-hand side of the equation is the demand for tourism proxied by the number of tourist arrivals. Expressions nine until sixteen on the right-hand side correspond to the long run relationship. The remaining expressions with the summation sign and dummies represent the short run dynamics of the model.

We developed the Unrestricted Error Correction Model (UECM) based on the assumption made by Pesaran et al.(2001) in Case III (unrestricted intercepts and no trends). From the UECM, the long run elasticities are the coefficients of the one lagged explanatory variable (multiplied with a negative sign) divided by the coefficient of the one lagged dependent variable (Bardsen, 1989). For instance, from Equation (6), the long-run tourism price and transportation cost elasticities can be calculated as $(-\beta_{10}/\beta_9)$ and $(-\beta_{11}/\beta_9)$ respectively.

To investigate the presence of long-run relationships among the LTA, LTP, LTC, TSP, LRPI and LER, under the bound test approach developed by Pesaran, et al. (2001), after regression of Equation (6), the Wald test (*F*-statistic) was calculated. The Wald test can be conducted by imposing restrictions on the estimated long-run coefficients of LTA, LTP, LTC, TSP, LRPI and LER. The null and

alternative hypotheses are $H_o$: $\beta_9 = \beta_{10} = \beta_{11} = \beta_{12} = \beta_{13} = \beta_{14} = \beta_{15} = \beta_{16} = 0$, where there is no cointegration− among− the variables, against $H_a$ : $\beta_9 \neq \beta_{10} \neq \beta_{11} \neq \beta_{12} \neq \beta_{13} \neq \beta_{14} \neq \beta_{15} \neq \beta_{16} \neq 0$), where there is cointegration among the variables.

The computed F is then compared with the critical value (upper and lower bound) given by Pesaran, et. al. (2001). If the F-computed exceeds the upper critical bound, then the $H_0$ will be rejected. We conclude that there is cointegration among the variables. However, if the F-computed is less than the lower critical bound, then $H_0$ cannot be rejected. We conclude that there is no cointegration among the variables. If the F-computed falls between the lower and upper bounds, then the result is inconclusive.

## EMPIRICAL RESULTS AND POLICY IMPLICATION

### Unit root test

Even the bounds test for cointegratiom does not depend or no *priori* knowledge about the integration is needed, but to ascertain the order of integration, the work begins through applying the Augmented Dickey Fuller (ADF) and Phillip Perron (PP) unit root test. The ADF and PP tests suggest that all the variables included in this study are integrated at level and order one, I(0) and I(1).

### The cointegration test

The estimation and identification of cointegration using the ARDL approach is based on the Ordinary Least Square (OLS). Results of the bound test are given in Table 2. The calculated F for each individual country as reported in Table 2 are greater than the upper bound critical value at 5% level. Thus, the null hypothesis of no cointegration is rejected. There is indeed a cointegration relationship among the variables (tourism price, substitute price, traveling cost, income and the exchange rate) as presented in Equation (6).

### The Long-run Elasticities of the Selected Markets

The discussion of long-run elasticities of the selected markets in this study is based on the data in Table 3 below.

**Table 2 Bound Test Based on Equation (6)**

| | Critical value | | | |
|---|---|---|---|---|
| | Lower | | Upper | |
| Level of Significant (5%) | a 2.365 | b 2.272 | a 3.553 | b 3.447 |
| Singapore | - | - | 7.4499*** (7,15) | - |
| Japan | - | - | - | 7.4060*** (8,17) |
| Hong Kong | - | - | - | 6.9578*** (8,17) |
| Australia | | | | 3.8505*** (8,18) |

Note: The critical values are taken from Pesaran, *et al* (2001), Table Case III, Intercept and no trend. Page 300. a and b refer to the number of parameters (variables) a = 7, b=8.
*** denotes significant at 1%, 5% and 10% level of significance.

*Tourism price:* Tourism price is only significant in Hong Kong and Singapore and has the correct sign (negative) which indicates that as price of tourism increases lesser tourists from these markets come to Malaysia. Hence, a 1% increase in tourism price in Malaysia would reduce, by more than 8 %, the tourism demand from Singaporeans and by more than 5%, tourists from Hong Kong, in the long run. This variable is not significant for Japanese and Australian tourists possibly because they are from rich counties and changes in prices of tourism in Malaysia do not adversely affect them.

*Travelling cost:* Traveling cost is significant in the Singaporean, Hong Kong and Australian markets. However, they are inelastic. For the Singaporean and Australian markets a 1% increase in traveling cost will lead to a decrease in tourism demand by 0.65% and 0.46% respectively. For the Hong Kong market the sign is positive and inelastic. Here, increase in traveling cost does not deter tourists from Hong Kong from travelling to Malaysia especially business and higher income travelers.

*Substitute prices:* From the substitute aspect, we can see that *Singapore* is more likely to behave as a complementary destination to Malaysia for Japanese and

**Table 3 Long-run Elasticities of tourism demand determinants**

| | Tourism price in Malaysia ($LTP_{ijt}$) | Traveling cost ($LTC_{ijt}$) | Tourism price in Singapore ($LSP_{izt}$) | Tourism price in Indonesia ($LSP_{izt}$) | Tourism price in Thailand ($LSP_{izt}$) | Income ($LRPI_{it}$) | Exchange rate ($LER_{ijt}$) |
|---|---|---|---|---|---|---|---|
| Singapore | –8.4485*** | –0.6504*** | - | 0.2577 | 8.6105*** | –1.4012*** | –3.8461 |
| Japan | 1.7262 | 0.0813 | –2.8033*** | –0.2568 | –0.4289 | 4.5685*** | –0.1776 |
| Hong Kong | –5.3849** | 0.6025*** | 3.1582** | –0.7540** | 0.4505 | 3.3403*** | 3.1740*** |
| Australia | 1.2495 | –0.4587*** | –4.2868*** | 0.0783 | 3.5130*** | –4.3407 | 0.5842 |

Note: ***, ** and* denotes significant at 1%, 5% and 10% level of significance.

Australian tourists as shown by their negative sign of elasticity. For example a 1% increase in Singapore tourism price would lead to a decrease of 2.8% of Japanese tourists and 4.3% of Australian tourists to Malaysia. However, for Hong Kong, Singapore is a substitute to Malaysia. When price of tourism in Singapore increases by 1%, their arrivals to Malaysia will increase by 3.2%.

As for *Indonesia,* it is shown in all selected markets, except for Hong Kong, that it is not a significant alternative. Hong Kong tourists consider Indonesia as a complementary destination to Malaysia. A 1% increase in tourism price in Indonesia causes a reduction of 0.75% Hong Kong tourists to Malaysia.

*Thailand* is an important alternative tourism destination for Singaporeans and Australians. To them, Thailand is a substitute destination to Malaysia. Each percent increase of tourism price in Thailand would increase tourists from Singapore and Australia traveling to Malaysia by 8.6% and 3.5% respectively.

*Income:* Income is an important variable in all markets except for Australia. They all have the correct sign except for Singapore, and they are elastic. For example, a 1% increase in income in Japan and Hong Kong would increase their arrivals by 4.6% and 3.3% respectively. However, for Singaporeans, a 1% increase in income tends to decrease their arrivals by 1.4%.

*Exchange rate*: Exchange rate is not a very significant variable influencing tourist arrivals to Malaysia from the selected markets except for Hong Kong where a 1% improvement in their exchange rates will lead to a 3.2 percent increase in their arrivals.

Out of the seven variables affecting the arrival of tourists to Malaysia from these markets only one variable, namely tourism price in Malaysia, is within the control of the country. It is found to be elastic which means any small percentage increase in price would cause a significant reduction in arrivals. Thus, the government should closely monitor all tourism service providers such as hotels, restaurants, tourist operators, and transportation companies such as airport taxis and tourist buses to ensure that they do not charge 'unreasonable' prices for their services. Appropriate rules and regulations can also be formulated for them to be implemented in the delivery of their services to tourists. Some other variables such as tourism prices in neighboring countries, income of other countries, rates

of exchanges and traveling costs are beyond our control. However, the government and the various stakeholders in the tourism industry should take into consideration the changes since changes in these variables may require certain relevant policy and business changes

## The Short-run Elasticities of the selected Markets

The short-run elasticities estimation of the selected markets is shown in Table 4. Most of the selected variables are significant in the selected markets. Details are as below.

**Table 4 Short-run Granger Causality of the Selected Markets**

| | **Singapore** | **Hong Kong** | **Japan** | **Australia** |
|---|---|---|---|---|
| $DLTA_{ijt-1}$ | -0.0048 | - | 1.4483*** | -0.4065** |
| $DLTA_{ijt-2}$ | - | 0.3740*** | 0.7992*** | - |
| $DLTP_{ijt}$ | - | -4.3839*** | - | - |
| $DLTP_{ijt-1}$ | 7.7334*** | - | - | -2.1992 |
| $DLTP_{ijt-2}$ | - | - | 1.3159 | - |
| $DLTC_{ijt}$ | - | 0.2659* | - | 0.5010*** |
| $DLTC_{ijt-2}$ | 0.1085 | - | - | - |
| $DLSP_{izt\,(Singapore)}$ | - | - | -1.7042 | - |
| $DLSP_{izt-1\,(Singapore)}$ | - | - | - | 1.6914 |
| $DLSP_{izt-1\,(Indonesia)}$ | -1.5078** | - | - | - |
| $DLSP_{izt-1\,(Thailand)}$ | -5.5672*** | 1.7562** | - | - |
| $DLRPI_{it}$ | -3.9191*** | - | - | -3.7749** |
| $DLRPI_{it-1}$ | - | - | -7.8810*** | - |
| $DLRPI_{it-2}$ | - | 2.1074** | - | - |
| $DLER_{ijt}$ | 2.4672*** | - | - | - |
| D97 | -0.8454*** | -0.4714** | -0.3255** | - |
| D03 | -0.2802** | - | - | -0.2579 |
| Diagnostic test | | | | |
| $LM_{(SC)}$ | 2.0566 (0.1674) | 1.0734 (0.3666) | 0.9753 (0.8399) | 3.0003 (0.1011) |
| ARCH test | 2.0976 (0.1423) | 0.5661 (0.5743) | 0.5308 (0.5940) | 5.4878 (0.0260) |
| $LM_{(N)}$ | 0.6770 (0.7128) | 0.5013 (0.4720) | 0.3814 (0.0411) | 0.4424 (0.8015) |
| RRT | 0.0415 (0.8414) | 1.7187 (0.2084) | 2.6827 (0.1209) | 1.9888 (0.1474) |
| Cusum | No structural break | | | |

Note: ***, ** and* denote significant at 1%, 5% and 10% level of significance
Figure in the parenthesis ( ) show the probability.

*Singapore market:* The tourism demand for Malaysia by the Singapore market is Granger cause by tourism price in Malaysia and the alternative tourism destination refers to Indonesia and Thailand, income, exchange rate, the dummy D97 and D03 and their values are 7.7, –1.5, –5.6, –3.9, 2.5, –0.8 and –0.3 respectively.

*Hong Kong market:* The Hong Kong market shows that all variables are statistically significant Granger cause the tourism demand for Malaysia. The coefficients of the variables are word-of mouth effect (0.37), Tourism price in Malaysia (–4.38), traveling cost (0.27), tourism price in Thailand (1.76), income (2.11) and D97 (–0.47).

*Japan market:* For the Japan market, three variables are significant Granger cause the tourism demand for Malaysia in the short run, namely, word-of mouth effect, income and D97. Their coefficients are 1.45, –7.88 and –0.33 respectively.

*Australia market:* The Australian market also has three variables significant Granger cause the Malaysian tourism demand that is word-of mouth effect with the value of –0.41, traveling cost of 0.5 and income of –0.26.

## CONCLUSION

This paper attempts to estimate Malaysian tourism demand from the selected major markets, namely, Australia, Japan, Hong Kong and Singapore. These markets are chosen due to their importance within their regions. A single cointegration technique, ARDL in version ECM, was applied to estimate their demand for tourism in Malaysia. Tourism price, substitute prices, traveling costs, incomes and exchange rates have been selected as the determinants in the long-run as well as short-run. Lagged dependent and dummies for the economic crisis and SARS were also included as short-run determinants.

The empirical results show that most of the variables are significant for tourism demand for Malaysia in the long-run as well as in the short-run. Although some variables are slightly contradictory to the demand theory, the inconsistency can be explained on a case by case basis.

The empirical results reveal a stable long-run relationship between the determinants and the number of tourist arrivals from the selected markets. In order to encourage more tourists to come to Malaysia and to strengthen the Malaysian

tourism industry, certain recommendations have been made. Changes in certain variables such as fluctuations in the rate of foreign exchange, global economic climate and unpredictable incidence of natural disasters/diseases are however, outside our control and hence it is quite difficult to formulate related recommendations to respond to changes in these variables.

## REFERENCES

Bechdolt, B.V. (1973) Cross-Sectional Travel Demand Functions: U.S. Visitors to Hawaii, 1961-1970. *Quarterly Review of Economics and Business,* **13**(4): 37-47.

Crouch, G.I. (1994) The Study Of International Tourism Demand: A Survey of Practice. *Journal of Travel Research,* **32**, 41-55.

Dickey, D.A., and Fuller, W.A. (1979) Distributions of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association*, **74**, 427-431.

Divisekera, S. (2003) A Model of Tourism for International Tourism. *Annals of Tourism Researc*h, **30**, 31-49.

Dritsakis, N (2005) Tourism as a Long-run Economic Growth Factor: An Empirical Investigation for Greece Using Causality Analysis. *Tourism Economics*, **10**(3). 305-316.

Dritsakis, N. (2004) Cointegration Analysis of German and British Tourism demand for Greece. *Tourism Management,* **25**, 111-119.

Eviews 4.1. (2002) *Quantitative Micro Software,* Irvine, CA.

Engle R.F, & Granger C.W.J (1987) Cointegration and Error Correction: Representation, estimation and testing, *Econometrica*, **55**, 251-276.

Gray, H.P. (1966) The Demand for International Travel by the United State and Canada. *International Economic Review,* **13**, 83-92.

Johansen, A. & Juselious. (1990) Maximum Likelihood Estimation and Inference on Cointegration with Application to the Demand for Money. *Oxford Bulletin of Economics and Statistics,* **52**, 169-209.

Halicioglu, F. (2004) An ARDL Model of Aggregate Tourism Demand for Turkey. *Global Business and Economics Review 2004 Anthology,* 614-624.

Hollander, G. (1982) Determinants of Demand for Travel to and from Australia. Working paper no.26. Australia: Bureau of Industry Economics.

Kliman, M.L. (1981) A Quantitative Analysis of Canadian Overseas Tourism. *Transportation Research*, **15**A(6), 487-497.

Kulendran, N., and Witt, S.F. (2001) Cointegration Versus Least Squares Regression. *Annals of Tourism Research,* **28**, 291-311.

Leob, P.D. (1982) International Travel to the United State: An Econometric Evaluation. *Annual of Tourism Research,* **9**, 7-20.

Li, G. (2004) Tourism Forecasting-An Almost Ideal Demand System Approach, Unpublished Ph.D thesis, University of Surrey.

Lim, C. (2004) The Major Determinants of Korean Outbound Travel to Australia. *Mathematics and Computers in Simulation,* **64**, 477-485.

Lim, C., & McAleer, M. (2002) A Cointegration Analysis of Annual Tourism Demand by Malaysia for Australia. *Mathematics and Computer in Simulation*, **59**, 197-205.

Lim, C., and McAleer, M. (2001) Cointegration Analysis of Quarterly Tourism Demand by Hong Kong and Singapore for Australia. *Applied Economics,* **33**, 1599-1619.

Martin, C.A., and Witt, S.F. (1988) Substitute Prices in Models of Tourism Demand. *Annals of Tourism Research,* **15**(2), 255-268.

Morley, C.L. (1998) A Dynamic International Tourism Demand Model. *Annual of Tourism Research,* **25**, 70-84.

MuHoz, T.G. (2006) Inbound International Tourism to Canary Islands: a dynamic panel data model. *Tourism Management,* **27**, 281-291.

Narayan, P.K. (2004) Fiji Tourism Demand: The ARDL Approach to Cointegration. *Tourism Economics*, **10**(2), 193-206.

Narayan, P.K. (2005) The Saving and Investment Nexus for China: Evidence from cointegration test. *Applied Economics,* **37**, 1979-1990.

Norlida Hanim, M.S., Ahmad, S., Law, S.H. , Zaleha, M.N and Sridar, R. (2007) ARDL Model of Tourism Demand for Malaysia by Major ASEAN Countries. *IIUM Journal of Economics and Management,* 15(1), forthcoming.

Pesaran, M.H., and Shin, Y. (1995) Autoregressive Distributed Lag Modeling Approach to Cointegration Analysis. DAE Working Paper Series No 9514. Department of Economics, University of Cambridge.

Pesaran, M.H., and Shin, Y. (1999) An Autoregressive Distributed Lag Modeling Approach to Cointegration Analysis, In Storm, S., ed, *Econometrics and Economic Theory in the*

*20th Century: the Ragnar Frish Centennial Symposium,* Cambridge University Press, Cambridge, chapter 11.

Pesaran, M.H., Shin, Y., and Smith, R.J. (1996) Testing the existence of long-run relationship. DAE Working Paper Series No 9622. Department of Applied Economics, University of Cambridge.

Pesaran, M.H., Shin, Y., and Smith, R.J. (2001) Bound Testing Approaches to The Analysis of Level Relationships. *Journal of Applied Econometrics,* **16**, 289-326.

Philips, P.C.B. (1986) Understanding Spurious Regression in Econometrics. *Econometrica,* 311-340.

Quayson , J., and Turgut, V. (1982) A Tourism Demand for the Okanagan, BC. *Tourism Management,* **4**, 108-115.

Salman, A.K.(2003) Estimating Tourism Demand Through Cointegration Analysis: Swedish data. *Current Issues in Tourism,* 323-338.

Song, H., and Witt, S.F. (2000) *Tourism Demand Modeling and Forecasting: Modern Econometric Approaches,* Amsterdam: Pergamon.

Song, H., and Witt, S.F. (2003) Tourism forecasting: The General-To-Specific Approach. *Journal of Travel Research,* **42**, 65-74.

Song, H., and Witt, S.F. (2006) Forecasting International Tourists Flows to Macau. *Tourism Management,* **27**, 214-224.

Toh, R.S., Habibullah, K., and Goh, L. (2006) Japanese Demand for Tourism in Singapore: A cointegration approach, *Tourism Analysis,* **10**, 369-375.

Tourism Malaysia. (Annual) Annual Statistical Report, 1970-2004, Tourism Malaysia.

Uysal, M., and Crompton, J.L. (1984) The Demand for International Tourist Flows to Turkey. *Tourism Management*, **5**, 288-297.

Witt, S.F. and Martin, C.A. (1987) Econometric Models for Forecasting International Tourism Demand. *Journal of Travel Research,* **25**(3), 23-30

Witt, S.F. (1980a) An Abstract Mode-Abstract (Destination) Node Model of Foreign Holiday Demand. Applied Economics, **12**(2): 163-80.

Witt, S.F. (1980b) An Econometric Comparison of U.K and German Foreign Holiday Behavior. *Managerial and Decision Economics*, **1**(3):123-31.

World Bank. (2006) *World Development Indicator2006*. Softcopy Database. World Bank.

World Tourism Organization. (annual) *Yearbook of Tourism Statistic*, World Tourism Organization, Madrid.