MONASH University
Business and Economics

ASIAN FINANCIAL CRISIS, AVIAN FLU AND TERRORIST THREATS:

ARE SHOCKS TO MALAYSIAN TOURIST ARRIVALS PERMANENT OR TRANSITORY?

Hooi Hooi Lean♣ and Russell Smyth♥

ABSTRACT

International visitor arrivals from Malaysia's ten major source markets are examined using Lagrange Multiplier (LM) unit root tests with one and two structural breaks to ascertain if shocks to the time path of tourist arrivals are permanent or transitory. The LM unit root test with one break is able to reject the unit root null for between 60 per cent of source markets where the break is specified as in the intercept and 90 per cent of source markets where the break is specified as in the intercept and slope. The LM unit root test with two breaks is able to reject the unit root null for all source markets, irrespective of how the break is specified. This result suggests that the effects of shocks on the growth path of tourist arrivals to Malaysia from its major markets are only transitory and that Malaysia's tourist sector is sustainable in the long run. While the effects of shocks are not permanent we do find that following shocks the growth in tourist arrivals from Malaysia's source markets have generally slowed. This result suggests there is a need to reduce the negative effects of slower growth in the recovery phase.

♣School of Social Sciences, Universiti Sains Malaysia, 11800 Minden, Penang, Malaysia

♥ Department of Economics, Monash University, 900 Dandenong Road, Caulfield East 3145, Australia.

Asian Financial Crisis, Avian Flu and Terrorist Threats:
Are Shocks to Malaysian Tourist Arrivals Permanent or Transitory?

1.   INTRODUCTION

In 1980 Malaysia attracted a modest 2.3 million international tourist arrivals and even as late as 2001 the World Travel and Tourism Council (WTTC) referred to the country as one of the world's best kept tourism secrets. However, just a year later in 2002, Malaysia was identified by the World Trade Organisation as one of the world's 30 leading emerging tourist destinations (M2 Presswire, 6 February, 2006). In the quarter century since 1980 international tourist arrivals have increased seven-fold, totalling 16.4 million in 2005. This made Malaysia the second most visited country in Asia in 2005 behind China with 22 million international tourist arrivals, but ahead of Thailand with 11 million international tourist arrivals (New Straits Times, 24 December, 2005). In 2005 the hotel and hospitality sector accounted for 43 per cent of total final services, making tourism Malaysia's most successful services sector and it continues to increase in importance as a source of economic growth (EIU, 11 October, 2005). In 2007, which is being marketed as 'Visit Malaysia Year', Malaysia expects to receive in excess of 20 million international tourist arrivals and earn RM 44.5 billion (US$ 12 billion) from tourism revenue, such that the tourist sector will be the second largest foreign exchange earner after the manufacturing sector.

The existing literature on tourism in Malaysia is primarily descriptive in nature. Several studies have examined the contribution of tourism to economic and regional development (Khalifah & Tahir, 1997; Opperman, 1992; Musa, 2000; Teo, 2003). Other studies have considered environmental aspects of tourism and ecotourism (Wong, 1990; Smith, 1992; Cartier, 1998; Weiler & Ham, 2001; Sahb, 2005); how to manage conflict between tourism and indigenous culture (Din, 1982; Jafari, 1986; Sarkissian, 1998) or implications of conflict between tourism and Islamic identity (Henderson, 2003). There are few studies of the effects of economic or natural crises on tourism in Malaysia; one exception is de Sausmarez (2003) who reviewed the effect of the Asian financial crisis on tourist arrivals. Among the limited econometric studies examining tourism in Malaysia, Anaman and Animah Ismail (2002) analysed the factors determining cross-border tourism from Brunei to Eastern Malaysia and found that age, income, perceived quality of Eastern Malaysia as a place to relax and having friends and family in Eastern Malaysia were significant factors affecting tourist visits to Eastern Malaysia. Tan *et al.* (2002) examined the determinants of tourist flows to Malaysia and Indonesia from six major markets; namely, Australia, Germany, Japan, United States, United Kingdom and Singapore over the period 1980 to 1997 and found that real income in the source markets and the price competitiveness of the destinations were the important determinants of demand.

One aspect of tourism in Malaysia that has not been considered is the effect of shocks to the time path of international tourist arrivals and the possible implications of such shocks for the sustainability of Malaysia's tourist sector. By shocks, we mean an event such as a financial crisis affecting income in major source markets or natural disasters, health scares or terrorism threats that affect the perceived desirability or safety of the destination and which can significantly alter the time path of tourist arrivals. Over the last decade Malaysia's tourism sector have been subjected to several such shocks including the Asian financial crisis, outbreak of Avian flu and SARS, the Asian tsunami and the threat of terrorism to name a few that have resulted in sharp declines in international tourist arrivals. In many developing countries tourism is recognised as an important means to diversify the economy and reduce traditional reliance on agriculture and manufacturing. The Malaysian government sees the tourist sector as a means of diversifying and broadening the country's economic structure and has invested heavily in promoting tourism, allocating RM 1.8 billion (US$ 487 million) for upgrading tourist destinations and infrastructure under the Ninth Malaysian Plan (2006-2010) (Xinhua News Agency, 10 May 2006).

The objective of this paper is to examine whether shocks have had a permanent or transitory effect on tourist arrivals in Malaysia through analysing the time series properties of data on international tourist arrivals. Examining the effects of shocks on tourist arrivals is important because shocks not only contribute to instability in revenue from tourism, but potentially alter the time path of tourist arrivals, thus threatening the sustainability of the sector as a source of foreign exchange and as a means of diversifying away from agriculture and manufacturing. Specifically, the paper applies univariate Lagrange Multiplier (LM) unit root tests with one and two breaks to test the null hypothesis that tourist arrivals from Malaysia's major source markets contain a unit root. If tourist arrivals contain a unit root this suggests that, following a shock, arrivals will not return to their stable growth path and the effects of the shock will be permanent. However, if the null hypothesis of a unit root in tourist arrivals is rejected, this is indicative that following the shock, tourist arrivals will return to their long-run growth path and the impact of the shock on varied tourist numbers will only be transitory. The findings from such an analysis have important policy implications for the sustainability of Malaysia's tourism industry. If tourist arrivals contain a unit root, this provides support for questioning the sustainability of the tourist sector because the effects of shocks on tourist arrivals will be permanent, but if the null of a unit root in tourist arrivals is rejected, this implies that shocks will be short-lived indicating that the long-run returns from investment in the tourist industry in Malaysia are sustainable.

The paper builds on a limited number of studies that use unit root tests to examine the effects of shocks on tourism in other countries. Aly and Strazicich (2000) used a univariate LM unit root test

with two structural breaks to examine whether terrorist attacks had a permanent or transitory effect on tourist arrivals in Egypt and Israel. Their results rejected the null and support the alternative hypothesis of a trend-stationary series with transitory shocks. Bhattacharya and Narayan (2005) applied panel unit root tests to examine whether shocks to visitor arrivals to India from its major source markets were permanent or transitory and found that shocks were only transitory. In a series of articles Narayan (2005, 2005a, 2005b) examined the effect of the 1987 political coups on tourist arrivals and tourist expenditures in Fiji using unit root tests with structural breaks proposed by Zivot and Andrews (1992), Lumsdaine and Papell (1997), Vogelsang (1997) and Sen (2003). In each case he found that the coups had a transitory effect on tourist arrivals and tourist expenditure in Fiji. Narayan (2006) and Smyth *et al.* (2006) applied univariate and panel LM unit root tests with one and two structural breaks to examine whether shocks to international tourist arrivals to Australia and Bali respectively were permanent or transitory. Both studies found that shocks to international tourist arrivals were transitory.

2.   Economic Importance of Tourism to Malaysia

In the 1970s the Malaysian government started to develop tourism as a means to meet several development objectives such as increasing foreign exchange earnings, increasing employment and income and fostering regional development (Khalifah & Tahir, 1997; Musa, 2000). In the 1980s the Malaysian government focused on promoting tourism in the private sector with incentives given to the private sector to develop accommodation, visitor centre facilities and encourage Bumiputera participation (Khalifah & Tahir, 1997; Musa, 2000). During the Fifth Five Year Plan (1986-1990), emphasis was placed on the development of coastal resorts in addition to developing principal tourist destinations such as Kuala Lumpur and Penang (Wong, 1990; Musa, 2000). Since the Seventh Five Year Plan (1996-2000) the focus has switched to marketing and promotion of Malaysia as a relatively cheap and safe tourist destination (Hall, 1997).

As outlined in the introduction, the result has been rapid growth in the importance of tourism to the local economy. In 2004 the direct effect of travel and tourism in Malaysia was to generate 494,900 jobs, representing 4.9 per cent of total employment and RM 21.3 billion (US$5.6 billion) of GDP, equivalent to 5.1 per cent of GDP (WTTC, 2004). When the indirect effect of travel and tourism is taken into account the economic effects are larger than this number. In 2004 travel and tourism directly and indirectly accounted for 1,267,000 jobs, representing 12.7 per cent of total employment and RM 61.9 billion (US$16.3 billion) of GDP, equivalent to 14.7 per cent of GDP (WTTC, 2004). Between 2005 and 2014 Malaysia's travel and tourism is expected to realize annualised real growth of 5.9 per cent in total travel and tourism demand and 3.7 per cent in travel and tourism GDP (WTTC, 2004). In terms of employment in travel and tourism as a percentage of total employed, Malaysia ranked 53rd on the WTTC World Table and in terms of travel and tourism as a

percentage of GDP Malaysia ranked 47th on the WTTC World Table in 2004, placing Malaysia in the mid-range of countries in the Asia-Pacific (WTTC, 2004).

Insert Table 1

While Malaysia is the third most popular tourist destination in Asia in terms of international tourist arrivals, it ranks only tenth in terms of tourist receipts, which reflects the fact that the majority of international tourists in Malaysia are from relatively low-yield neighbouring markets. Table 1 shows tourist arrivals from Malaysia's top ten source markets. Singapore is the largest source market, accounting for over 50 per cent of international tourist arrivals. Other important markets are Thailand and Indonesia. The United Kingdom and United States are Malaysia's two major long-haul markets. Over the decade 1995 to 2005 some markets such as Brunei, China, Indonesia, Singapore and Thailand registered substantial growth in arrivals, while other markets such as Japan and Taiwan were relatively stagnant. The average length of stay increased from 4.6 nights in 1990 to 5.8 nights in 2000, but this figure is still low by international standards.

There are considerable differences across source markets in terms of contribution to the formal accommodation sector. For example, in 1999 there were 4.9 million tourists to Malaysia from Singapore who stayed an average of 2.7 nights, but generated only 3.1 million bed nights in registered accommodation – 0.6 nights per tourist arrival. By comparison, 136,000 arrivals from the United Kingdom resulted in 2.4 million bed nights, an average of 17.5 per arrival (WTTC, 2000). An important reason for these differences relates to the purpose of the trip. According to an inbound visitor survey conducted by the Malaysian Tourism Promotion Board in 1998, 43 per cent of tourist arrivals in Malaysia are for holidays, 15 per cent for visiting friends and relatives (VFR), 8 per cent for business and 3 per cent for conferences and conventions (WTTC, 2000). The figure of 15 per cent for VFR is unusually high with the comparable figures, for example, in Hong Kong and Singapore being 5 per cent and 4 per cent respectively (WTTC, 2000). Many of the tourists arriving to visit friends and relatives are low yield tourists from Singapore.

3.   SOURCES OF POTENTIAL SHOCKS TO INTERNATIONAL TOURIST ARRIVALS

Over the period 1995 to 2005 there have been several episodes that represent potential shocks to international tourist arrivals. In this section some of the main events are discussed.

3.1   Asian Financial Crisis

Several studies have suggested that the Asian financial crisis had a negative effect on the short-term viability of tourism in East Asia (Leiper & Hing, 1998; Pine *et al.,* 1998; Prideaux, 1999; de

Sausmarez, 2003). Malaysia was one of the worst affected countries in the region. In 1998 international tourist arrivals to Malaysia declined 13.5 per cent and tourism receipts declined 11.2 per cent. The decline in tourist arrivals was the second largest among APEC countries (after Indonesia) and the decline in tourist receipts was the fifth largest among APEC countries (after Peru, Singapore, Hong Kong and the Philippines) (APEC, 1999). In mid-1998 hotel occupancy rates on the island resort of Langkawi for three-star hotels and lower were 10-27 per cent and for four and five star hotels were 42-52 per cent. The Langkawi taxi owners association reported that 80 per cent of its members faced difficulties in making monthly repayments on their vehicles because of a decline in business (Far Eastern Economic Review, 23 July 1998). The decline in tourist arrivals reflected smaller numbers arriving from countries in which incomes were most affected by the crisis including the ASEAN countries, Hong Kong, Taiwan and South Korea, all of which are among Malaysia's main source markets (Sunday Times, 7 February, 1999).

3.2   Tension between Malaysia and Singapore

The effect of the Asian financial crisis on tourist flows was compounded by tension between Malaysia and Singapore in early 1997 over agreement on railway services and tourist promotion that was reflected in a decline in inbound tourism from Singapore throughout 1997 (Musa, 2000).

3.3   Health Scares

In mid-1997 an outbreak of dengue fever struck Penang, Malaysia's second most important tourist destination. Around the same time Coxsackie B virus killed more than 40 children in Sarawak and Sabah was hit with a cholera epidemic (Soon, 1998). In April 2003, China, which is Malaysia's fifth largest source market, ordered travel agencies to stop Chinese tour groups to Malaysia, Singapore and Thailand because of the outbreak of SARS (Reuters, 11 April, 2003). In 2003 international tourist arrivals fell to 10.6 million visitors from 13.3 million visitors in 2002 as a result of fears arising from SARS and Avian flu in the region (*Asia Times Online,* 4 January, 2005). Occupancy rates in Malaysian hotels were as low as 30 per cent in April 2003, while airline bookings were 40 per cent lower than usual because of SARS. The Minister for Tourism, Abdul Kadir Sheikh Fadzir, is reported as stating that the effects of SARS on tourism in Malaysia were worse than the 9/11 attacks or the Bali bombings (Reuters, 8 April, 2003).

3.4   Burning of Forests in Indonesia

In May 1997 Malaysia was covered by a pall of smoke, which also affected other countries in Southeast Asia. This was caused by the burning of forests in Indonesia to create agricultural estates. While the smoke affected the whole region, the smoke pall over Malaysia received the

most coverage in the international media (Musa, 2000). Malaysia suffered a 30-40 per cent cancellation rate by foreign tourists and there was a similar decline in hotel occupancy rates (Chik, 1998). Malaysia was declared smoke-free at the beginning of October 1997, but cancellations continued into the first quarter of 1998 because of concerns about whether the haze might recur (NERP, 1998). A similar smoke haze occurred in August 2005 in Kuala Lumpur, also resulting from forest fires in Indonesia. As a result of the haze some hotels experienced cancellations and tourism-related businesses such as Sunway Lagoon, Kuala Lumpur's number one amusement park, were forced to close (Dow Jones International, 13 August, 2005).

3.5   Threat of Terrorism

In 1998 after the bombings in Kenya and Tanzania that killed 50 people, Malaysia's image as a tourist destination was tarnished when, following the bombings, the United States listed Malaysia as one of the countries where terrorism may occur and issued a safety directive to its citizens to be particularly careful in Malaysia (McNulty, 1998). It has been suggested that these warnings may have frightened off some tourists from attending the Commonwealth Games that was staged in Kuala Lumpur in 1998 (Musa, 2000). In 2000, Abu Sayyaf guerrillas seized 21 people, including Western tourists, from a diving resort on Sabah's Sipadan Island, later freeing them in exchange for large ransoms. Following 9/11 there were renewed fears about the threat of terrorism in Malaysia. Since 9/11 Malaysia has reportedly detained more than 100 Islamic militant suspects, many of whom are alleged members of Jemaah Islamiyah (Dow Jones International, 24 June 2005). The international media attention of Jemaah Islamiyah's presence in Malaysia has received has had a negative effect on tourism. The cover of the February 11, 2002 edition of Time Magazine showed a shadowy profile of Osama bin Laden superimposed on the Malaysian flag. An article in the issue claimed Malaysia was a hotbed for terrorist activities, while the back cover carried an advertisement by Tourism Malaysia. In protest the Malaysian Tourism Promotion Board subsequently threatened to cancel future advertisements with Time Magazine. In October 2002, the bombings in Bali in Indonesia killed 202 people. In the wake of the Bali bombings Australia and the United States issued travel advisories, warning of the potential for a Bali-style attack in Malaysia. An article in the Asian Wall Street Journal (15 October, 2002) suggested that Bali created a ripple effect throughout Asia that was being felt in Malaysia because international tourists did not distinguish between Indonesia and Malaysia.

3.6   Natural Disasters

The effects of the Asian tsunami at the end of 2004 were not as large for Malaysia as the neighbouring countries. Altogether 68 people died and the tsunami caused losses estimated at around RM 30 million (US$ 8 million) in the four northern states of Penang, Kedah, Perlis and

Perak (Asia Times Online, 4 January 2005). While beach hotels in Penang suffered minor damage, most of Penang island, including Georgetown, the capital, and Bayan Lepas in the southeast were spared. Nevertheless, although property damage was minimal, there was still a drop in international tourist arrivals which affected the island resorts, particularly along the tourism belt of Batu Ferringhi in Penang. There was a 20 per cent cancellation rate following the tsunami as tourists saw Malaysia as being near the epicentre of the Sumatra earthquake and feared aftershocks (Channel NewsAsia, 14 January, 2005). In the international media there was also some adverse publicity spill-over from reports of damage in Aceh in Indonesia and Phuket in Thailand. CNN and other news channels lumped Aceh, Langkawi and Phuket together, which may have created an adverse and misleading impression in the minds of potential tourists.

3.7 Public Safety and Adverse Publicity in China

In 2005 international tourist arrivals to Malaysia from China fell by half compared with 2004 following a directive by the China National Tourism Administration (CNTA) in April 2005 to Chinese travel agents to cancel all group tours to Malaysia (Bernama Daily Malaysian News, 11 September, 2005). The actions of the CNTA were in response to a series of negative reports concerning the manner in which Chinese tourists were treated in Malaysia. One incident that received wide media coverage in China and Malaysia related to a female Chinese tourist who was, according to reports, ordered to strip naked and do ear-squats at a police lock-up (Bernama Daily Malaysian News, 19 March 2006). Another incident that was reported in the Chinese media concerned the Genting Highlands Resort which had to compensate a large Chinese tour group who protested at staff drawing pigs on their key cards to denote their nationality (Travel Trade Gazette Asia, 21 October 2005). There was also a spate of adverse publicity in China about 'zero-dollar' tours, package tours on which many Chinese had visited Malaysia. Many of the reports told stories of Chinese tourists being exploited by such tours which entailed low cost upfront payment and where tourist operators made profits on commission through taking tour groups to outlets such as restaurants, electronics stores and jewellery shops selling low quality goods and services at high prices (New Straits Times, 31 October, 2005).

Another reason for falling tourist numbers from China in 2005 was the CNTA travel advisory to Chinese nationals not to visit Malaysia because of high crime rates. The advisory was issued primarily in response to a perceived increase in street crime directed at Chinese nationals in Malaysia (Travel Trade Gazette Asia, 21 October, 2005). But concerns about crimes committed against tourists extended beyond Chinese nationals. The crimes of a serial rapist who had raped and sodomised tourists from Ireland, Kuwait and South Korea and who had committed the offences in a popular shopping district in Kuala Lumpur where tourists frequented received wide

coverage in the West Asian media. This media coverage resulted in a fall in tourist arrivals from West Asia in mid-2005 (Bernama Daily Malaysian News, 11 July, 2005).

4. ECONOMETRIC METHODOLOGY

To examine whether international tourist arrivals from Malaysia's major source markets contain a unit root we employ the univariate LM unit root test with one and two structural breaks. The LM unit root test can be explained using the following data generating process (DGP):

$$y_t = \delta' Z_t + e_t, \quad e_t = \beta e_{t-1} + \varepsilon_t.$$

Here, Z_t consists of exogenous variables and ε_t is an error term with classical properties. Lee and Strazicich (2004) developed two versions of the LM unit root test with one structural break. Using the nomenclature of Perron (1989) who was the first to develop a unit root test with a structural break, Model A is known as the "crash" model, and allows for a one-time change in the intercept under the alternative hypothesis. Model A can be described by $Z_t = [1, t, D_t]'$, where $D_t = 1$ for $t \geq T_B + 1$, and zero otherwise, T_B is the date of the structural break, and δ' = (δ_1 , δ_2 , δ_3). Model C, the "crash-cum-growth" model, allows for a shift in the intercept and a change in the trend slope under the alternative hypothesis and can be described by $Z_t = [1, t, D_t, DT_t]'$, where $DT_t = t - T_B$ for $t \geq T_B + 1$, and zero otherwise.

Lee and Strazicich (2003) extended the LM unit root test with one structural break to accommodate two structural breaks. The endogenous two-break LM unit root test can be considered as follows. Model AA, as an extension of Model A, allows for two shifts in the intercept and is described by $Z_t = [1, t, D_{1t}, D_{2t}]'$ where $D_{jt} = 1$ for $t \geq T_{Bj} + 1, j = 1, 2,$ and 0 otherwise. T_{Bj} denotes the date when the breaks occur. Note that the DGP includes breaks under the null ($\beta = 1$) and alternative ($\beta < 1$) hypothesis in a consistent manner. In Model AA, depending on the value of β, we have the following null and alternative hypotheses:

$$H_0 : y_t = \mu_0 + d_1 B_{1t} + d_2 B_{2t} + y_{t-1} + v_{1t},$$

$$H_A : y_t = \mu_1 + \gamma t + d_1 D_{1t} + d_2 D_{2t} + v_{2t},$$

Here v_{1t} and v_{2t} are stationary error terms; $B_{jt} = 1$ for $t = T_{Bj} + 1, j = 1, 2,$ and 0 otherwise. Model CC, as an extension of Model C, includes two changes in the intercept and the slope and is described by $Z_t = [1, t, D_{1t}, D_{2t}, DT_{1t}, DT_{2t}]'$, where $DT_{jt} = t - T_{Bj}$ for $t \geq T_{Bj} + 1, j = 1, 2,$ and 0 otherwise. For Model CC we have the following null and alternative hypotheses:

$$H_0 : y_t = \mu_0 + d_1 B_{1t} + d_2 B_{2t} + d_3 D_{1t} + d_4 D_{2t} + y_{t-1} + v_{1t},$$

$$H_A : y_t = \mu_1 + \gamma t + d_1 D_{1t} + d_2 D_{2t} + d_3 DT_{1t} + d_4 DT_{2t} + v_{2t},$$

where v_{1t} and v_{2t} are stationary error terms; $B_{jt} = 1$ for $t = T_{Bj} + 1$, $j = 1,2$, and 0 otherwise. The LM unit root test statistic is obtained from the following regression:

$$\Delta y_t = \delta' \Delta Z_t + \phi \overline{S}_{t-1} + \mu_t$$

where $\overline{S}_t = y_t - \hat{\psi}_x - Z_t \hat{\delta}_t$, $t = 2,...,T$; $\hat{\delta}$ are coefficients in the regression of Δy_t on ΔZ_t; $\hat{\psi}_x$ is given by $y_t - Z_t \delta$; and y_1 and Z_1 represent the first observations of y_t and Z_t respectively. The LM test statistic is given by the $\overline{\tau} =$ t-statistic for testing the unit root null hypothesis that $\phi = 0$. The location of the structural break or structural breaks in the two-break case is ascertained by selecting all possible break points for the minimum t-statistic as follows:

$$Inf\tilde{\tau}\left(\overline{\lambda}_i\right) = \ln_\lambda f \; \tilde{\tau}(\lambda), \text{ where } \lambda = T_B / T \;.$$

The search is carried out over the trimming region (0.15T, 0.85T), where T is the sample size. We selected the structural breaks where the endogenous two-break LM t-test statistic is at a minimum. Critical values for the one break case are tabulated in Lee and Strazicich (2004), while critical values for the two break case are from Lee and Strazicich (2003). The maximum lag length in both the one and two break case was set equal to 12, as we use monthly data, and the lag selection criteria was the general to specific approach suggested by Hall (1994).

5. DATA

The LM unit root tests with one and two breaks are applied to monthly international visitor arrivals in Malaysia from each of Malaysia's ten major markets over the period January 1995 to December 2005. The ten major tourist markets were Singapore, Thailand, Indonesia, Japan, China, Brunei, Taiwan, United Kingdom, Australia and the United States (see Table 1). In treating source markets separately we follow several recent studies (see eg. Bhattacharya and Narayan, 2005; Narayan, 2006; Smyth *et al.,* 2006) It is important to treat each source market separately given tourism demand studies suggest that different source markets may respond differently to a particular shock (see Narayan, 2004 for a survey). The above discussion of potential shocks to international tourist arrivals suggests there are some events such as tension between Malaysia and Singapore or adverse media regarding treatment of tourists from China that are likely to represent shocks to specific source markets for Malaysia. The data are unpublished and were obtained on request from Tourism Malaysia and the Department of Immigration Malaysia. All of the data were expressed in logarithms prior to analysis.

6.   RESULTS OF THE UNIT ROOT TESTS

Table 2 presents the results for the LM unit root test with one break in the intercept (Model A). The unit root null is rejected for six countries; namely, Indonesia, China, Brunei, Taiwan, United Kingdom and the United States at the 5 per cent level or better. Table 3 presents the results for the LM unit root test with a break in the intercept and slope (Model C). In Model C the unit root null is rejected for eight countries at the 1 per cent level and for a further country (Singapore) at the 10 per cent level. The only country for which the unit root null cannot be rejected at the 10 per cent level or better in Model C is Australia. Comparing Model A and Model C the unit root null is rejected in Model C, but not Model A, for Singapore, Thailand and Japan.

Insert Tables 2 and 3

Because Models A and C suggest different results, an obvious question is which model is preferable? Sen (2003) argued that Model C is preferable to Model A when the break date is treated as unknown. Further evidence from Monte Carlo simulations that are reported in Sen (2003a) show that Model C will yield more reliable estimates of the breakpoint than Model A. If, following the recommendation of Sen (2003), we focus on Model C, using the univariate LM unit root test with one structural break, the null of a unit root in international visitor arrivals is rejected for 90 per cent of Malaysia's source markets at the 10 per cent level or better.

In Model A the break in the intercept is statistically significant for Indonesia and Thailand at the 5 per cent level or better, while in Model C the break in the intercept and/or slope is statistically significant for all countries except the United Kingdom at the 10 per cent level or better. For Indonesia in Model A and Singapore, Indonesia, Taiwan and Australia in Model C the structural break occurs in 1997 or 1998, which was the period containing the Asian financial crisis, outbreak of Dengue fever in Penang and cholera in Sabah and the pall of smoke over most of Malaysia for an extended period due to burning forests in Indonesia. The structural break in Thailand and the United States occurs in October 1999 soon after the Asian financial crisis ended. For tourists from the United States this was also in the aftermath of the bombings in Kenya and Tanzania, at a time when there was perceived to be increasing anti-American sentiment in some parts of Asia and when the United States government was issuing travel advisories warning its citizens to be careful when travelling to some countries in Asia including Malaysia. The structural break in Model C for China occurs in November 2002, soon after the bombings in Bali, while the structural break in Model C for Japan occurs in January 2004, wedged between the outbreak of Avian flu and SARS in 2003 and the Asian Tsunami that occurred at the end of 2004.

Tables 4 and 5 present the results for the LM unit root test with two structural breaks. Table 4 contains the results for Model AA and Table 5 contains the results for Model CC. The null hypothesis of a unit root in international tourist arrivals to Malaysia is rejected in both models for all markets at the 5 per cent level or better. In Model AA the first and/or second break in the intercept is statistically significant for Thailand, Indonesia, Japan, Taiwan and the United States at the 10 per cent level or better. In Model CC the first and/or second break in the intercept is statistically significant for each market except Indonesia and the United Kingdom, while the first and/or second break in the slope is statistically significant for each market except Singapore and Taiwan at the 10 per cent level or better. In Model AA the statistically significant breaks for Thailand, Indonesia, China and the United States occur in the last few months of 1999 soon after the end of the Asian financial crisis, while the statistically significant breaks for Japan and Taiwan occur within a few months of the outbreak of SARS. In Model CC the first break for Indonesia and Brunei and both breaks for Singapore occur in the downturn in international tourist arrivals to Malaysia in the 1997-1998 period that contained several events. In Singapore's case both breaks occur in 1997, suggesting tensions between Malaysia and Singapore may have been an important contributing factor. Both breaks in Thailand and the first break in Japan, China, Australia and the United States occur at the end of the Asian financial crisis. The first break for the United Kingdom and the second break for Indonesia in Model CC occur around the time of 9/11 and the second break for Brunei, China and Japan occur in the months following the Bali bombings. The second break for Japan, Brunei, Australia, United Kingdom, United States and Taiwan all occur in 2003 in a period of heightened concern about avian flu and SARS in Asia. The second break for Australia that occurs in June 2003 is within a month of the suicide bomb attacks in Saudi Arabia in May 2003. Following the bombings in Saudi Arabia the Australian government released a list of high risk countries for Australian tourists that included Malaysia, despite protestations from the Malaysian government (Dutch News Digest, 16 May, 2003).

7.   GROWTH PATTERNS AND GOVERNMENT RESPONSE

In this section we examine the changing patterns in average monthly growth rates in international visitor arrivals to Malaysia from the ten major source markets. Table 6 shows average growth rates over three periods defined as prior to the first structural break, between the first and second structural break and after the second structural break where the break dates are those in Model CC in Table 5. For 50 per cent of Malaysia's ten major source markets; namely, Thailand, Japan, China, Taiwan and the United States, growth is highest in the first period, slows in the second period and slows further in the third period. Thus, the growth rate in tourist arrivals from these countries is slower after each break. For the other 50 per cent of markets the growth rate declines after either the first or second break. The Australian, Singapore and United Kingdom markets slow in period 2 – and in the case of Singapore and the United Kingdom quite dramatically – then

rebound in period 3. By contrast, the growth rate in tourist arrivals from Brunei and Indonesia increase after the first break, but then decline after the second break. For each of Malaysia's source markets with the exception of neighbouring Brunei and Singapore, the growth rate after the second structural break, which mostly coincides with 9/11, post-9/11 fear of terrorism or the avian flu or SARS health scares, has been slower than the growth rate in the period before any structural breaks. This result implies that for the majority of Malaysia's tourism markets, growth rates have slowed since the first structural break, which for most markets was associated with the two disastrous years of 1997 and 1998 and possible recovery from the downturn in these years has been delayed by the increased threat of terrorism post-9/11 and the Bali bombings and the health scares associated with the outbreak of avian flu and SARS.

Insert Table 6

The growth patterns in Table 6 suggest that following a shock, recovery is not immediate and that growth in tourist arrivals to Malaysia has generally been slower. Thus, in spite of our earlier findings that shocks to international tourist arrivals do not have permanent effects, the growth patterns in Table 6 indicate that policy makers and tourist industry stakeholders need to work together to mitigate the negative effects of slower growth in the recovery phase. The Malaysian government has taken steps in this direction following the major shocks of the last decade. In response to the Asian financial crisis, in January 1998 the National Economic Action Council (NEAC) was established as a consultative body to address the effects of the crisis (NERP, 1998). The NEAC, whilst not focusing on the tourism sector itself, had input from a tourism sub-committee representing both private and public sectors (de Sausmarez, 2003). At the peak of the Asian financial crisis the Malaysian government announced its intention to pursue then relatively untapped markets such as China, India and the Middle East that were unscathed by the crisis (New Sunday Times, 7 February, 1999). Following 9/11 and the Bali bombings Malaysia has invested heavily in promoting the country as free from terrorism. In the fallout from the bombings for tourism to Southeast Asia, speaking at a seminar on business opportunities in Malaysia in New York in October 2002, the Malaysian Minister of International Trade and Industry, Rafidah Aziz, attempted to distance Malaysia from Bali emphasising "although Bali is in Asia, the island was actually far away from Malaysia" (PR Newswire, 19 October, 2002).

The Malaysian government has also responded to perceptions that Malaysia is unsafe by indicating that it intends to introduce harsher penalties for crimes against foreign tourists (Bernama Daily Malaysian News, 22 March, 2006) and a special tourism police service to assist tourists (Bernama Daily Malaysian News, 13 April, 2006). Malaysia's response to the health scare generated by SARS and the natural disaster caused by the Asian

Tsunami were similar. Following the Asian Tsunami, Malaysia's Tourism Ministry invited media representatives and tour agents from 37 countries to assess the situation and show them that the damage was minimal (Channel News Asia, 14 January, 2005). The airlines responded by marketing flights to destinations not affected by the natural disasters. In response to the smoke pall over Kuala Lumpur in August 2005, low-cost carrier AirAsia promoted flights to smoke-free destinations such as Langkawi and East Malaysia (Dow Jones International News, 13 August, 2005).

The Malaysian government has also made an effort to increase tourist numbers from China following the drop-off in 2005. In November 2005 the Malaysian government announced that it wanted to stop 'zero-dollar' tours with the principal objective of getting Chinese tourists to return to Malaysia (New Straits Times, 12 November, 2005). Other measures to increase tourists from China include introduction of online visa applications (New Straits Times, 24 December, 2005); allowing Chinese tourists to visit Malaysia for up to 15 days without a visa (Dow Jones International News, 5 April, 2006); stationing up to 30 Chinese-speaking officers at the Kuala Lumpur International Airport to assist Chinese speaking visitors and setting up additional tourist offices in China to promote Malaysia (Travel Trade Gazette Asia, 21 October, 2005).

8.   CONCLUSION

Since the 1980s the Malaysian government has heavily promoted tourism and this strategy has reaped dividends with international tourist arrivals increasing seven-fold since 1980. Tourism has become an important source of foreign exchange for Malaysia, second only to manufacturing. However, over the last decade there have been several events that represent potential shocks to international tourist arrivals in Malaysia, such as the Asian financial crisis, health scares and the threat of terrorism that have caused sharp falls in tourist numbers. This paper has considered the effect of these shocks for the sustainability of Malaysia's tourism sector through examining the time series properties of international tourist arrivals from Malaysia's main source markets. The LM unit root test with one break was able to reject the unit root null for 60 per cent of source markets using Model A and 90 per cent of source markets using Model C. The LM unit root test with two breaks was able to reject the unit root null for all source markets. This result implies that shocks to international tourist arrivals from Malaysia's ten major source markets are trend stationary with transitory shocks. Thus despite a series of major shocks over the last decade, the policy implication is that tourism is sustainable and that following shocks, international tourist arrivals from Malaysia's major source markets will revert to their long-run growth path. Our analysis suggests,

however, that following shocks the growth in tourist arrivals from Malaysia's source markets has generally slowed. Thus, while the effects of shocks are not permanent, there is still a need to mitigate the negative effects of slower growth in the aftermath of shocks.

REFERENCES

Aly, H.Y. and Strazicich, M.C. (2000) Terrorism and tourism: Is the impact permanent or transitory? Time series evidence from some MENA countries. Ohio State University, Department of Economics, Columbus, Ohio.

Anaman, K.A. and Aminah Ishmail, R. (2002) Cross border tourism from Brunei Darussalam to Eastern Malaysia: an empirical analysis, *Singapore Economic Review*, **47,** 65-87.

APEC (1999) Impact of Asian currency crisis on the tourism industry, Singapore, APEC Secretariat.

Bhattacharya, M. and Narayan, P.K. (2005) Testing for the random walk hypothesis in the case of visitor arrivals: Evidence from Indian tourism, *Applied Economics*, **37,** 1485-1490.

Cartier, C. (1998) Megadevelopment in Malaysia: from heritage landscapes to 'leisurescapes' in Melaka's tourism sector, *Singapore Journal of Tropical Geography*, **19,** 151-176.

Chik, S. (1998) Tourism rules despite setbacks – an interview with the Minister of Culture, Arts and Tourism Yb. Dato'Sabbaruddin Chik http//tourism.gov.my/magazineJan-Feb98/page_10.html

China arrivals to Malaysia plunge: Tourism Malaysia initiates new campaign and other measures to bring back the market, *Travel Trade Gazette Asia,* 21 October, 2005.

China bans tours to Singapore, Malaysia, Thailand, *Reuters,* 11 April, 2003.

Chinese bypass Malaysia, *New Straits Times,* 31 October, 2005.

Chinese tourist arrivals to the country dropped by more than half this year, *Bernama Daily Malaysian News*, 11 September, 2005.

de Sausmarez, N. (2003) Malaysia's response to the Asian financial crisis: implications for tourism and sectoral crisis management, *Journal of Travel and Tourism Marketing,* **15,** 317-231.

Din, K.H. (1982) Tourism in Malaysia – competing needs in a plural society, *Annals of Tourism Research,* **9,** 453-480.

Drop in Chinese tourists to Malaysia only temporary, says Lim, *Bernama Daily News,* 19 March, 2006.

Economics Intelligence Unit (EIU) (2005) Malaysia Tourism, 11 October, 2005.

Hall, A. (1994) Testing for a unit root in time series with pretest data based model selection, *Journal of Business and Economic Statistics,* **12,** 461-70.

Hall, C.M. (1997) *Tourism in the Pacific Rim: Developments, Impacts and Markets*, Melbourne, Addison Wesley Longman.

Haze from Indonesian fires threatens Malaysian tourism, *Dow Jones International News* 13 August, 2005.

Henderson, J.C. (2003) Managing tourism and Islam in Peninsular Malaysia, *Tourism Management*, **24,** 447-456.

Jafari, J. (1986) See the world while it lasts – the social environmental impact of tourism with special reference to Malaysia, *Annals of Tourism Research,* **13,** 129-137.

Khalifah, Z. and Tahir, S. (1997) Malaysia: tourism in perspective. In F. Go and C.L. Jenkins (Eds.) *Tourism and Economic Development in Asia and Australasia* London, Cassel.

Lee, J., and Strazicich, M.C. (2003) Minimum Lagrange multiplier unit root test with two structural breaks, *Review of Economics and Statistics*, **85**, 1082-89.

Lee, J., and Strazicich, M.C. (2004) Minimum LM unit root test with one structural break, Manuscript, Department of Economics, Appalachian State University.

Leiper, N. and Hing, N. (1998) Trends in Asia-Pacific tourism in 1997-98: from optimism to uncertainty, *International Journal of Contemporary Hospitality Management,* **10,** 245-251.

Lumsdaine, R. and Papell, D. (1997) Multiple trend breaks and the unit root hypothesis, *Review of Economics and Statistics,* **79**, 212-18.

Malaysia allocates 1.8 billion ringgit for upgrading tourism products, *Xinhua News Agency*, 10 May, 2006.

Malaysia: Australia's travel warnings could hurt tourism, *Dow Jones International News,* 24 June, 2005.

Malaysia escapes but not unscathed, *Asia Times Online,* 4 January, 2005.

Malaysia hotel occupancy rate down to 30 per cent on SARS, *Reuters News,* 8 April, 2003.

Malaysia moves to revive tourism industry after tsunami disaster, *Channel News Asia,* 14 January, 2005.

Malaysia second most visited, *New Straits Times* 24 December, 2005.

Malaysia, Thailand protest against tourism warnings, *Dutch News Digest* 16 May.

Malaysia Travel Agents: Waive Visas for Chinese Tourists, Dow Jones International News, 5 April, 2006.

McNulty, S. (1998) Malaysians gear up for the big marketing push, *Asia Travel Trade* October.

Move to win back tourists from China, *New Straits Times*, 12 November, 2005.

Musa, G. (2000) Tourism in Malaysia. In C.M. Hall and S. Page (Eds.) *Tourism in South and Southeast Asia: Issues and Cases* Oxford: Butterworth-Heinemann.

Narayan, P.K., (2004) Fiji's tourism exports: an ARDL approach to cointegration, *Tourism Economics*, **10**, 193-206

Narayan, P.K. (2005) Testing the unit root hypothesis when the alternative is a trend break stationary process: an application to tourist arrivals in Fiji, *Tourism Economics*, **11,** 351-364.

Narayan, P.K. (2005a) Did Rabuka's military coups have a permanent effect or a transitory effect on tourist expenditure in Fiji: evidence from Volgesang's structural break test, *Tourism Management*, **26,** 509-515.

Narayan, P.K. (2005b) The structure of tourist expenditure in Fiji: Evidence from unit root structural break tests, *Applied Economics,* **37,** 1157-1161.

Narayan, P.K. (2006) Examining the behavior of visitor arrivals to Australia from 28 different countries. Griffith University, School of Accounting, Finance and Economics.

National Economic Recovery Plan (NERP) (1998) *Agenda and Action,* National Economic Action Council, Economic Planning Unit, Prime Minister's Department, August.

Oppermann, M. (1992) International tourism and regional development in Malaysia, *Tijdschrift Voor Econonomische En Sociale,* **83,** 226-233.

Paradise lost, *Far Eastern Economic Review,* 23 July, 1998

Perron, P. (1989) The great crash, the oil price shock and the unit root hypothesis, *Econometrica,* **57**, 1361-1401.

Pine, R., Chan, A. and Leung, P. (1998) The current and future impact of Asia's economic downturn on the region's hospitality industry, *International Journal of Contemporary Hospitality Management,* **10,** 252-256.

Prideaux, B. (1999) Tourism perspectives of the Asian financial crisis: lessons for the future, *Current Issues in Tourism,* **2,** 279-293.

Rafidah: any impact of Bali blast on tourism business is only temporary, *PR Newswire*, 19 October, 2002.

Sahb, M. (2005) Showcasing maritime heritage artefacts for the benefit of the tourist industry in Malaysia, *International Journal of Nautical Archaeology,* **34,** 211-215.

Sarkissian, M. (1998) Tradition, tourism and the cultural show: Malaysia's diversity on display, *Journal of Musicological Research,* **17,** 87-112.

Sen, A. (2003) On unit-root tests when the alternative is a trend-break stationary process, *Journal of Business and Economics Statistics*, **21**, 174-84.

Sen, A. (2003a) Some aspects of the unit root testing methodology with application to real per capita GDP, Manuscript, Xavier University, Cincinnati, OH,

Serial rapist causes decline in tourist arrivals, *Bernama Daily Malaysian News,* 11 July, 2005.

Smith, R.A. (1992) Conflicting trends of beach resort development – a Malaysian case, *Coastal Management,* **20,** 167-187.

Smyth, R., Nielsen, I. and Mishra, V. (2006) "I've Been to Bali Too (And I Will Be Going Back): Are Shocks to Bali's Tourist Arrivals Permanent or Transitory?" Asian Business and Economics Research Unit, Faculty of Business and Economics, Monash University, Discussion Paper No. 24.

Soon, T. (1998) Reflections of 1997 – from prosperity to austerity, *The Star* http:/thestar.com.My/archives/yearend1997/31yrn9.html.

Stiffer penalties for crimes against foreign tourists proposed, *Bernama Daily Malaysian News*, 22 March, 2006.

Tan, A.Y.F., McMahon, C. and Miller, J. (2002) Modeling tourist flows to Indonesia and Malaysia, *Journal of Travel and Tourism Marketing,* **13,** 63-84.

Teo, P. (2003) The limits of imagineering: a case study of Penang, *International Journal of Urban and Regional Research,* **27,** 545-563.

Terrorism in Bali: Safety fears may reduce travel to Asia – tourism operators worry about a 'ripple effect' from the attack in Bali, *Asia Wall Street Journal,* 15 October, 2002.

Tourist arrivals up in last three months, *Sunday Times,* 7 February, 1999.

Tourists assured Malaysia gives priority to their safety, *Bernama Daily Malaysian News,* 13 April 2006.

Volgesang, T.J. (1997) Wald-type tests for detecting breaks in the trend function of a dynamic time series, *Econometric Theory,* **13,** 818-849.

Weiler, B. and Ham, S. (2001) Tour guide training: lessons for Malaysia about what works and what's needed. In C. Nyland, W. Smith, R. Smyth and M. Vicziany, (Eds) *Malaysian Business in the New Era* Cheltenham, UK and Lyme, US: Edward Elgar.

Wong, P.P. (1990) Coastal resources management – tourism in Peninsular Malaysia, *ASEAN Economic Bulletin,* **7,** 213-221.

World Tourism Organisation lists Malaysia as one of the thirty up-and-coming world destinations for travel and tourism, *M2 Presswire* 6 February, 2006.

World Travel and Tourism Council (2000) *Malaysia: The Impact of Travel and Tourism on Jobs and the Economy* London: WTTC.

World Travel and Tourism Council (2004) *Travel and Tourism – Forging Ahead* London, WTTC.

Zivot, E. and Andrews, D. (1992) Further evidence of the great crash, the oil-price shock and the unit-root hypothesis, *Journal of Business and Economic Statistics,* **10**, 251-70.

Table 1: Top Ten Tourist Source Markets 1995, 2000, 2005 (000's)

Market	1995	2000	2005
Singapore	4,357	5,240	9,634
Thailand	530	940	1,900
Indonesia	234	545	963
Japan	331	456	340
China	103	425	352
Brunei	190	195	486
Taiwan	294	213	172
United Kingdom	164	238	240
Australia	136	237	265
United States	98	184	151

Source: Tourism Malaysia and Department of Immigration Malaysia

Table 2: LM Unit Root Test with One Break (Model A)

	TB	k	S_{t-1}	1	B_t
Singapore	03/02	6	-0.2605	-0.0331	0.2825
			(-2.8976)	(-1.3107)	(1.1347)
Thailand	01/01	5	-0.3038	-0.1221	0.6450[**]
			(-2.8200)	(-2.2329)	(2.1236)
Indonesia	01/97	1	-0.2527[**]	0.0883	-1.2669[***]
			(-3.8349)	(2.7290)	(-4.0114)
Japan	01/02	12	-0.5294	-0.0409	0.0034
			(-3.0790)	(-1.2147)	(0.0098)
China	06/00	0	-0.3708[***]	0.0433	-0.4020
			(-5.4606)	(1.2142)	(-0.9930)
Brunei	05/03	4	-0.5936[***]	-0.2151	0.0132
			(-5.3791)	(-4.2427)	(0.0392)
Taiwan	03/03	0	-0.4403[***]	0.0199	-0.4814
			(-6.0813)	(0.6683)	(-1.3429)
United Kingdom	10/02	0	-0.5158[***]	-0.0611	-0.4730
			(-6.7477)	(-2.0886)	(-1.4986)
Australia	08/00	2	-0.2067	-0.0450	-0.5297
			(-2.7039)	(-1.2773)	(-1.6419)
United States	07/99	0	-0.5459[***]	-0.0805	0.2019
			(-7.0130)	(-2.9047)	(0.7044)

Notes: The maximum lag length was 12. The lag length (k) was selected using the general to specific criteria recommended by Hall (1994). TB is the date of the structural break; S_{t-1} is the LM test statistic; 1 is the constant; B_t is the dummy variable for the structural break in the intercept; Figures in parentheses are t-values. Critical values for the LM test statistic at 10%, 5% and 1% significant levels = -3.211, -3.566, -4.239 from Lee and Strazicich (2004). Critical values for the other coefficients are based on the standard t distribution = 1.645, 1.96, 2.576. [*] ([**]) [***] denote statistical significance at the 10%, 5% and 1% levels respectively.

Table 3: LM Unit Root Test with One Break (Model C)

	TB	k	S_{t-1}	1	B_t	D_t
Singapore	12/97	6	-0.3471*	0.2200	1.5612***	-0.2016***
			(-4.2987)	(2.9491)	(6.8188)	(-2.6317)
Thailand	10/99	0	-0.8277***	-0.1626	0.6762**	0.1290**
			(-9.6176)	(-4.0196)	(2.3480)	(2.5027)
Indonesia	12/98	0	-0.5803***	-0.0060	0.5314*	0.1300**
			(-7.3174)	(-0.1415)	(1.7786)	(2.3254)
Japan	01/04	0	-0.5173***	0.0006	-0.5507	0.1469*
			(-6.7605)	(0.0190)	(-1.5866)	(1.7444)
China	11/02	6	-0.6968***	0.1373	1.1618***	-0.5590***
			(-5.9644)	(3.1363)	(2.9708)	(-4.8343)
Brunei	10/00	4	-0.6520***	-0.2039	0.0146	0.1275**
			(-5.5481)	(-3.7669)	(0.0443)	(2.0908)
Taiwan	08/97	0	-0.4481***	0.1212	0.0771	-0.1401*
			(-6.1500)	(1.9527)	(0.2282)	(-1.9518)
United Kingdom	11/02	0	-0.5332***	0.0381	-0.3722	-0.0075
			(-6.9008)	(1.1756)	(-1.1764)	(-0.1222)
Australia	02/97	12	-0.4725	0.3399	1.1577***	-0.3626***
			(-4.0556)	(2.8947)	(3.4155)	(-2.8819)
United States	10/99	0	-0.6169***	0.0206	1.0051***	-0.2011***
			(-7.6442)	(0.5775)	(3.6495)	(-3.6668)

Critical values

Location of break, λ	0.1	0.2	0.3	0.4	0.5
1% significant level	-5.11	-5.07	-5.15	-5.05	-5.11
5% significant level	-4.50	-4.47	-4.45	-4.50	-4.51
10% significant level	-4.21	-4.20	-4.18	-4.18	-4.17

Notes: The maximum lag length was 12. The lag length (k) was selected using the general to specific criteria recommended by Hall (1994). TB is the date of the structural break; S_{t-1} is the LM test statistic; 1 is the constant; B_t is the dummy variable for the structural break in the intercept; D_t is the dummy variable for the structural break in the slope Figures in parentheses are t-values. The critical values, from Lee and Strazicich (2003), are symmetric around λ and (1-λ). Critical values for other coefficients are based on the standard t distribution = 1.645, 1.96, 2.576.* (**) *** denote statistical significance at the 10%, 5% and 1% levels respectively. * (**) *** denote statistical significance at the 10%, 5% and 1% levels respectively.

Table 4: LM Unit Root Test with Two Breaks (Model AA)

	TB$_1$	TB$_2$	k	S$_{t-1}$	1	B$_{t1}$	B$_{t2}$
Singapore	10/96	07/99	6	-0.5650**	-0.0094	-0.2709	0.3858
				-4.3360	-0.4224	-1.0692	1.5558
Thailand	04/97	10/99	0	-0.7483***	-0.2670	-0.3547	0.5363*
				-8.7132	-6.5296	-1.1824	1.7880
Indonesia	10/99	04/00	0	-0.5728***	-0.0369	0.7113**	0.6639**
				-7.1395	-1.3592	2.3365	2.1779
Japan	05/99	03/03	0	-0.5823***	-0.0281	0.5179	-0.6570*
				-7.2226	-0.9450	1.5386	-1.8643
China	10/99	12/02	0	-0.4490***	-0.0396	0.9880**	-0.4967
				-6.0632	-1.1180	2.5205	-1.2663
Brunei	03/00	09/03	4	-0.8233***	-0.2950	0.4712	-0.0527
				-6.0655	-5.2001	1.4509	-0.1596
Taiwan	02/03	04/03	0	-0.4849***	0.0265	-1.0993***	0.3543
				-6.3752	0.9044	-3.2197	1.0511
United Kingdom	10/02	06/03	0	-0.5538***	-0.0174	-0.4060	0.0798
				-6.9740	-0.6255	-1.2885	0.2520
Australia	07/99	10/03	0	-0.7982***	-0.1418	0.4318	0.4700
				-9.1838	-4.5817	1.4012	1.5231
United States	12/99	05/01	0	-0.6426***	-0.1249	0.6102**	-0.4059
				-7.7540	-4.2001	2.1780	-1.4579

Notes: The maximum lag length was 12. The lag length (k) was selected using the general to specific criteria recommended by Hall (1994). TB$_1$ and TB$_2$ are the dates of the structural breaks; S$_{t-1}$ is the LM test statistic; 1 is the constant; B$_{t1}$ and B$_{t2}$ are the dummy variables for the structural breaks in the intercept. Figures in parentheses are t-values. Critical values for the LM test statistic at 10%, 5% and 1% significant levels = -3.504, -3.842, -4.545 from Lee and Strazicich (2004). Critical values for the other coefficients are based on the standard t distribution = 1.645, 1.96, 2.576.* (**) *** denote statistical significance at the 10%, 5% and 1% levels respectively.

Table 5: LM Unit Root Test with Two Breaks (Model CC)

	TB_1	TB_2	k	S_{t-1}	1	B_{t1}	B_{t2}	D_{t1}	D_{t2}
Singapore	01/97	12/97	7	-0.6308**	0.0068	-0.4503**	1.6051***	0.1238	-0.1066
				-5.9493	0.1507	-2.0741	7.4111	1.3497	-1.3133
Thailand	07/99	06/01	0	-0.9489***	-0.2329	0.1265	-0.8951***	0.3216***	0.0647
				-10.6234	-5.4904	0.4490	-3.2149	4.3467	0.9153
Indonesia	09/98	07/01	0	-0.7385***	0.0483	0.0154	-0.3036	0.1462**	-0.1284*
				-8.5546	1.1214	0.0525	-1.0412	2.1904	-1.9571
Japan	05/99	01/03	0	-0.7071***	0.0190	0.4089	-1.2108***	0.0634	0.2191***
				-8.2685	0.4409	1.2792	-3.7567	0.9740	2.8577
China	09/99	11/02	12	-1.5278***	0.1673	-0.7630**	1.7859***	0.6144***	-1.6060***
				-7.7351	3.0153	-2.0254	4.4202	5.6963	-7.5269
Brunei	11/98	02/03	4	-0.8895***	-0.2881	-1.5265***	-0.1550	0.7577***	-0.2986***
				-6.9755	-4.5046	-4.6227	-0.4675	6.0514	-3.5032
Taiwan	01/03	07/03	0	-0.5568***	0.0771	-1.0247***	-0.0796	-0.0863	-0.0093
				-6.9446	2.2517	-2.9137	-0.2449	-0.5565	-0.0582
UK	12/01	06/03	0	-0.6325***	-0.0422	0.4993	0.1746	-0.1056	0.2851***
				-7.6034	-1.2482	1.5816	0.5585	-1.2943	2.8988
Australia	08/99	06/03	0	-0.9242***	-0.3246	-0.8239***	0.8612***	0.8143***	-0.4697***
				-10.3624	-6.5635	-2.7898	2.9351	8.2740	-5.5497
US	10/99	08/03	0	-0.6704***	0.0225	0.9974***	0.3079	-0.1954***	0.0164
				-7.9385	0.6297	3.5991	1.1022	-3.2921	0.2406

Critical values for the LM test

λ_2		0.4			0.6			0.8	
λ_1	1%	5%	10%	1%	5%	10%	1%	5%	10%
0.2	-6.16	-5.59	-5.27	-6.41	-5.74	-5.32	-6.33	-5.71	-5.33
0.4	-	-	-	-6.45	-5.67	-5.31	-6.42	-5.65	-5.32
0.6	-	-	-	-	-	-	-6.32	-5.73	-5.32

Notes: The maximum lag length was 12. The lag length (k) was selected using the general to specific criteria recommended by Hall (1994). TB_1 and TB_2 are the dates of the structural breaks; S_{t-1} is the LM test statistic; 1 is the constant; B_{t1} and B_{t2} are the dummy variables for the structural breaks in the intercept; D_{t1} and D_{t2} are the dummy variables for the structural breaks in the slope Figures in parentheses are t-values. λ_j denotes the location of breaks. *(**) *** denote statistical significance at the 10%, 5% and 1% levels respectively.

Table 6: Average Monthly Growth Rates in Visitors Arrival to Malaysia

Market	P1	P2	P3
Singapore	5.89	-1.50	6.89
Thailand	15.91	9.68	2.50
Indonesia	9.49	11.94	3.07
Japan	14.00	5.99	4.75
China	13.46	12.19	10.37
Brunei	4.54	14.48	10.27
Taiwan	7.64	7.59	6.93
United Kingdom	10.17	0.25	7.00
Australia	9.88	7.60	8.42
United States	8.55	5.82	4.00

Note: P1 is the period before the first break, P2 is the period between the first and second break and P3 is the period after the third breakwhere the breaks are based on Model CC.