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Abstract

Given the number and the frequency of external shocks encountered by Thailand in the last two decades, this study identifies the number and the location of the breaks and tests to determine whether the breaks have a transitory or a permanent effect on international tourist arrivals to Thailand for its top 10 source countries using both univariate and panel unit root tests with structural breaks. The findings suggest that break dates coincide with the Asian financial crisis, the September 11 attack, and the SARS and the bird flu outbreaks. The univariate unit root tests with structural breaks reject the null hypothesis of a nonstationarity in tourist arrivals from all countries. Furthermore, panel unit root tests with one and two structural breaks also reject the joint null hypothesis of a nonstationarity. These findings imply that external shocks have only a transitory effect on tourist arrivals and Thailand's tourism sector will return to its long-run equilibrium path.

Keywords

External, Shocks, Have, Permanent, Transitory, Effect, Thailand, Tourism, Industry

Disciplines

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RESEARCH NOTE

DO EXTERNAL SHOCKS HAVE A PERMANENT OR A TRANSITORY EFFECT ON THAILAND'S TOURISM INDUSTRY?

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Given the number and the frequency of external shocks encountered by Thailand in the last two decades, this study identifies the number and the location of the breaks and tests to determine whether the breaks have a transitory or a permanent effect on international tourist arrivals to Thailand for its top 10 source countries using both univariate and panel unit root tests with structural breaks. The findings suggest that break dates coincide with the Asian financial crisis, the September 11 attack, and the SARS and the bird flu outbreaks. The univariate unit root tests with structural breaks reject the null hypothesis of a nonstationarity in tourist arrivals from all countries. Furthermore, panel unit root tests with one and two structural breaks also reject the joint null hypothesis of a nonstationarity. These findings imply that external shocks have only a transitory effect on tourist arrivals and Thailand's tourism sector will return to its long-run equilibrium path.

Key words: External shocks; Tourism; Unit root hypothesis; Thailand

Introduction

In recent years, tourism has significantly contributed to the world economy, now accounting for over 10% of global GDP. In 2008, there were a total of 922 million international tourist arrivals with

tourism revenues reaching US\$944 billion, a growth of 1.9% and 1.8%, respectively, compared to 2007 (United Nations World Tourism Organization [UNTWO], 2008). Thailand ranks 18 out of 58 most visited countries and more importantly ranks fourth with the number of tourist arrivals at 14.5

million, behind China (54.7), Malaysia (21.0), and Hong Kong (17.2) in the large emerging Asian market (World Tourism Ranking, 2008).

Even though tourism is the fastest growing sector in the Asian region, many countries have experienced external and internal shocks leading to fluctuations in international tourist arrivals. This is especially the case for Thailand where its tourism sector has been subject to several shocks, particularly those related to the Asian financial crisis in 1997–1998, the September 11 attacks in 2001, the SARS outbreak in 2003, the Bird Flu scare in 2004, and the recent global financial crisis. Given the number and the frequency of shocks experienced by Thailand in the last two decades, this article determines the number and the location of the breaks and tests whether these breaks have a permanent or a transitory effect on the number of international tourist arrivals to Thailand from its 10 major source countries by conducting unit root tests with endogenously determined structural breaks.

The rest of the article is organized as follows. Section 2 overviews the literature review and its shortcomings. Section 3 provides an overview of the tourism sector in Thailand. Section 4 discusses the univariate and panel Lagrangian Multiplier (LM) unit root methodology. Section 5 presents the empirical findings with section 6 concluding.

Literature Review

There have been a number of studies that examine the effect of shocks on the tourism industry, although none in the case of Thailand. Aly and Strazicich (2004) use a univariate LM unit root test of Lee and Strazicich (1999) with two structural breaks using annual data to conclude that terrorist attacks have a transitory effect on annual tourist visits in Egypt and Israel. Huang and Min (2002) study the impact of the 1999 earthquake in Taiwan on the number of visitor arrivals to Taiwan. Using monthly data over the period of 1979–2000, the study concluded that the damage that might occur from the natural disaster to the tourism sector make take several years to be repaired. Using annual data from 1980 to 1999, Bhattacharya and Narayan (2005) test to determine tourist arrivals to India from its 10 major source markets. They apply the Augmented Dickey Fuller (ADF) and Im, Pesaran,

and Shin's (2003) panel unit root test to conclude that visitor arrivals to India only have a temporary effect following a shock. Narayan (2005) used annual data on visitor arrivals in Fiji from 1970 to 2002 using a suite of unit root tests without structural breaks¹ plus Sens' (2003) unit root test with one structural break. He finds that the 1987 political coup in Fiji had only a transitory effect on visitor arrivals from Australia, New Zealand, and the US.

Three different panel unit root tests were applied by Narayan and Prasad (2008) using data from January 1991 to September 2003 on visitor arrivals from 20 countries to Australia. The panel unit root tests included tests without structural breaks (the seemingly unrelated regression test, and the multivariate ADF test) and Im, Lee, and Tieslau's (2002) panel test with structural breaks. Dividing the countries into three panels, the full sample of 20 countries, the eight Asian countries, and the last panel of only the G7 countries, they found that shocks to visitor arrivals to Australia only have a transitory effect. Lastly, Lean and Smyth (2009) examined the impact of the Asian crisis, Avian Flu, and the terrorism threats on tourist arrivals to Malaysia using unpublished monthly data from January 1995 to December 2005. They applied the LM unit root tests with one and two breaks to each of Malaysia's 10 major markets and concluded that the effect of shocks to international tourist arrivals from Malaysia's 10 major source markets have a stationary trend with transitory shocks.

All of the above studies have limitations, which this study overcomes. Aly and Strazicich (2004) and Lean and Smyth (2009) applied univariate unit root tests with structural breaks in their estimations, while Narayan (2005) used a suite of univariate unit root tests with and without structural breaks. These three studies failed to conduct panel unit root tests. Given the strong criticism of the univariate unit root tests is that it lacks power in small samples, it becomes important to carry out panel tests. On the other hand, Narayan and Prasad (2008) applied panel unit root tests only with and without structural breaks but they failed to consider univariate unit root tests. It is also important to conduct univariate unit root tests as different source markets may respond differently to a particular shock.

Lastly, even though Bhattacharya and Narayan

(2005) conducted both univariate and panel unit root tests, they failed to take into account structural breaks in their estimation. It is well known that if potential structural breaks are not allowed for in testing for unit roots in time series, the tests may be biased towards a mistaken nonrejection of the non-stationarity hypothesis (Perron, 1989, 1997).

To fill these gaps, this study conducts both the LM univariate and panel unit root tests with endogenously determined structural breaks, thus making three contributions: (i) this is the first study of its kind in Thailand; (ii) conducts unit root tests in both univariate and panel setting while allowing for structural breaks; and (iii) for the first time in the tourism literature, determines both the number and the location of the breaks in each country. This approach differs from other studies as the location of the breaks, the optimal number of the breaks, and the number of lagged augmentation terms are jointly and endogenously determined for each source country. Even though some of the above studies have applied LM univariate tests, none have undertaken this approach. The procedure undertaken in this study is the one recommended by the authors of LM unit root tests (Lee & Strazicich, 2003, 2004) in many of their articles.

Therefore, the investigation in Thailand's case has two objectives. Firstly, to identify the number and the location of the breaks in international tourist arrivals to Thailand from its top 10 source countries, and secondly to test whether these breaks have a transitory or a permanent effect on Thailand's international tourist arrivals. To achieve these two objectives, this article conducts the univariate LM unit root test proposed by Lee and Strazicich (2003/04) and panel LM unit root test proposed by Im, Lee, and Tieslau (2005) with endogenously determined structural breaks.

Given the growing importance of tourism to Thailand's economy, the issue of whether tourist arrivals are best characterized as transitory or as permanent has important policy implications. Shocks contribute to volatility in the number of international tourist arrivals and subsequently lead to instability in foreign exchange in terms of tourism revenue. If tourist arrivals are characterized by a unit root process, it implies that effects of shocks will have a permanent effect and tourist arrivals will not return to their stable long-run growth path.

However, if international tourist arrivals are characterized as a stationary process, this implies that following a shock, tourist arrivals will return to their long-run trend path and the impact of the shock on varied tourist numbers will only be transitory. In such cases, the Thai government can implement policies that will help promote tourism in these particular difficult times such as increased advertising and offering holiday packages with accommodation, airline ticket, and sightseeing, all at one low price. On the other hand, if shocks are considered to have a permanent effect, the government might consider adopting to mitigate measures that help the sector or reduce dependence on the tourism sector by diversifying towards other sectors, especially if frequent shocks on the economy are expected.

Thailand's Tourism Industry

Thailand relies heavily on its exports of primary and manufacturing products. Nevertheless, for the last two decades tourism has been the fastest growing industry generating foreign exchange earnings, employment opportunities, and spill-over effects to the rest of the economy. Thailand's tourism industry has grown by over 600%, an increase in tourist arrivals from 1.86 million in 1980 to 14.5 million in 2008. Tourism revenues also increased from US\$868 million in 1980 to US\$7.1 billion in 2000 and increasing further to US\$14.9 billion in 2008 (Mintel International Group Limited, 2009; Song, Witt, & Li, 2003). The sector currently accounts for 5.5% of employment and 6.5% of Thailand's GDP. However, if both direct and indirect impacts of the industry are considered, the latter's contribution increases to 15% of GDP (Mintel International Group Limited, 2009).

According to World Trade Organization figures, the number one source country with respect to international tourist arrivals to Thailand has always been Malaysia. Thailand has seen a substantial growth in tourist arrivals from Malaysia over the last two decades with the number now exceeding the 1.5 million mark. Malaysia, Japan, and Korea make up the top three source countries, with Japan and Korea registering over 1 million tourists in recent years. These are followed by China, UK, US, Singapore, and Germany with half 0.5–1 million

international visitors to Thailand per annum. Lastly, Taiwan and Hong Kong make relatively smaller contributions.

Average annual growth rate of tourist arrivals to Thailand from selected top five source countries (Malaysia, Japan, Korea, China, and US) is illustrated in Figure 1. An inspection of the figure indicates a significant level of fluctuations over the last 2 decades. The annual growth rates of tourist arrivals to Thailand from Malaysia, Japan, Korea, and China declined from -1%, 14%, 7%, and 21% in 1996 to -2.5%, 4%, -14%, and -0.9%, respectively, in 1997 (Fig. 1). This decline could be associated with the period of financial crisis that happened during the period of 1997–1998. In contrast, tourist arrivals from US increased from 8% in 1996 to 14% in 1997. Figure 1 also indicates a decline in tourist arrivals to Thailand in 2003 from Japan (15%), Korea (1%), China (23%), and US (7%).

Additionally, Figure 2 presents the average annual growth rate of tourist arrivals to Thailand from the other top five source countries (UK, HK, Singapore, Germany, and Taiwan). As can be seen from this figure, there is a significant level of fluctuations over the past few decades. For example, the annual growth rates of tourist arrivals to Thailand from HK, Singapore, and Germany declined from

14.6%, 1.5%, and -3.3% in 1996 to -12.8%, -7.1%, and -0.34%, respectively, in 1997 (Fig. 2). This decline could be associated with the period of financial crisis that happened during the period of 1997–1998. In contrast, tourist arrivals from UK increased from 4.6% in 1996 to 27.0% in 1997. Figure 2 also shows a decline in tourist arrivals to Thailand in 2003 from these five countries. The volatility in the growth patterns of tourist arrivals to Thailand demonstrates the need of subjecting these fluctuations to a rigorous econometric investigation.

Methodology

Originally, the ADF and the Phillip-Perron tests were widely used to test for stationarity. Perron (1989) shows that in the presence of a structural break, the standard ADF tests are biased towards the nonrejection of the null hypothesis. In Perron’s procedure, dating of the potential break is assumed to be known a priori in accordance with the underlying asymptotic distribution theory. Perron uses a modified Dickey-Fuller unit root test that includes dummy variables to account for one known structural break. The break point of the trend function is fixed (exogenous) and chosen independently of the data. However, Perron’s known assumption of the

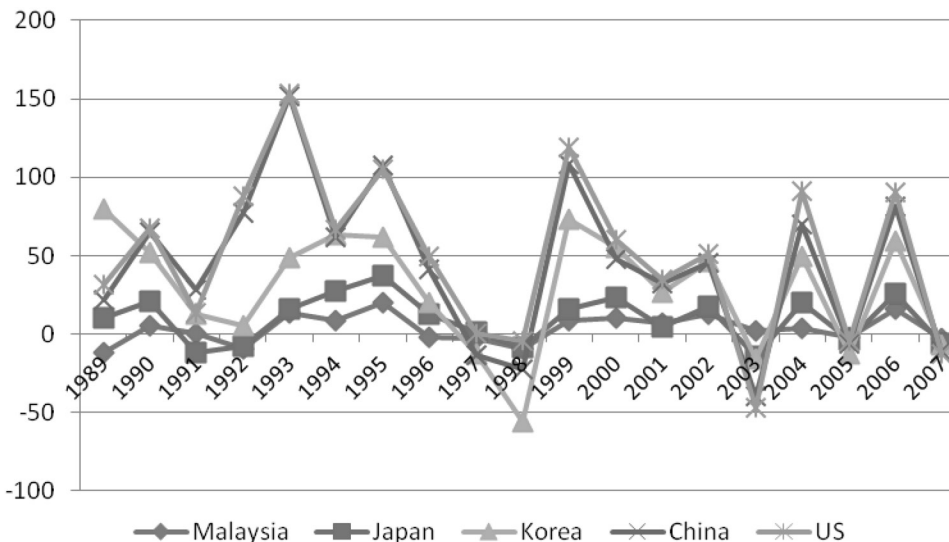


Figure 1. Average growth rates of tourist arrivals to Thailand from Malaysia, Japan, Korea, China, and US, 1988–2007. Source: World Trade Organization (various years).

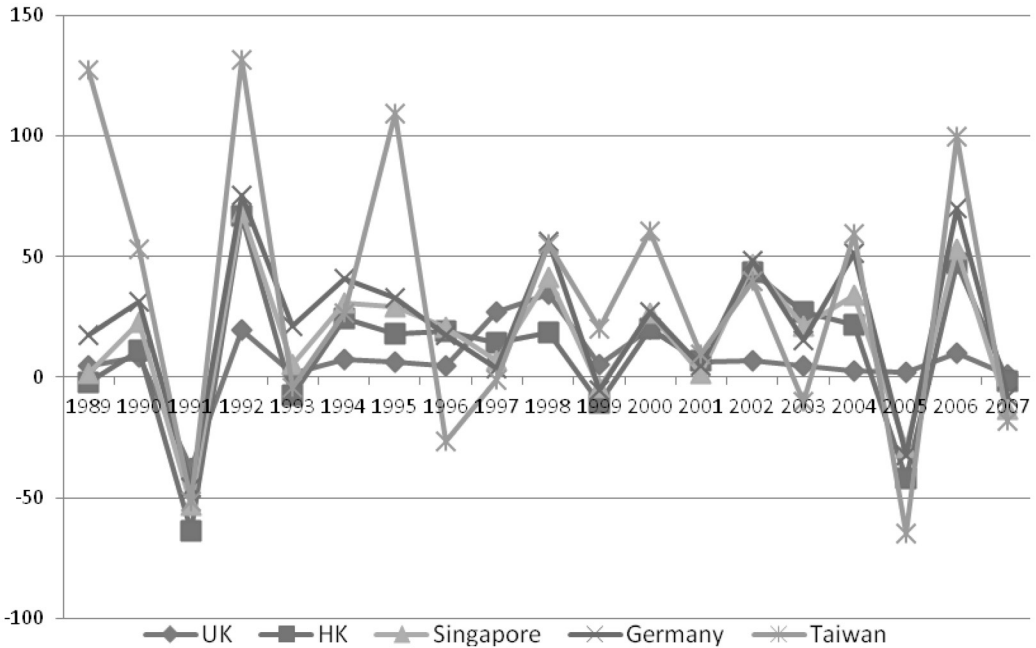


Figure 2. Average growth rates of tourist arrivals to Thailand from UK, HK, Singapore, Germany, and Taiwan, 1988–2007. Source: World Trade Organization (various years).

break date is criticized by many, most notably by Christiano (1992) as “data mining.” Christiano (1992) argues that the data-based procedures are typically used to determine the most likely location of the break and this approach invalidates the distribution theory underlying conventional testing. Since then, the most important contributions in this direction are those of Banerjee, Lumsdaine, and Stock (1992), Zivot and Andrews (1992), Perron (1997), and Lumsdaine and Papell (1998), among many others. These studies have shown any bias in the usual unit root tests can be reduced by endogenously determining the time of the structural breaks.

However, these endogenous tests were criticized for their treatment of breaks under the null hypothesis. Given breaks are absent under the null hypothesis of unit root, there may be tendency for these tests to suggest evidence of stationary with breaks (Lee & Strazicich, 2003). The minimum LM unit root test with one and two structural breaks proposed by Lee and Strazicich (2003/04) overcomes this problem and is the only test that is consistent with Perron’s (1989) study. Lee and Strazicich’s minimum LM break unit root test endogenously de-

termines structural breaks from the data where the breaks are allowed under both the null and the alternative hypothesis. Further to this, it avoids the problems of bias and spurious rejections associated with the traditional ADF tests.

For robustness, panel unit root tests with one and two breaks proposed by Im et al. (2005) are also applied to test whether or not international tourist arrivals to Thailand are jointly stationary. The LM panel unit root test with structural breaks also has many advantages over other panel tests; it allows for a structural break under both the null and the alternative hypothesis; panel LM t -statistics allow for the presence of heterogeneous intercepts, deterministic trends, and persistence parameters across panel members; and the test allows for heterogeneous structural breaks that vary for different countries and are endogenously determined from the data.

Univariate LM Unit Root Test

Following Lee and Strazicich (2003), the LM unit root test can be obtained from the regression:

$y_i = \delta'Z_t + X_{it} X_{it} = \beta X_{i,t-1} + \varepsilon_{it}$, where Z_t consists of exogenous variables and ε_{it} is an error term that follows the classical properties. Equivalent to Perron's (1989) models, Lee and Strazicich (2003) developed a LM unit root test to accommodate for two endogenous structural breaks with two shifts in the intercept and the slope and is described as $[1, t, D_{1t}, D_{2t}, DT_{1t}, DT_{2t}]'$ where $DT_{jt} = t - T_{Bj}$ for $t > T_{Bj} + 1$, $j = 1, 2$, and 0 otherwise. Here, T_{Bj} represents the break date. The term D_{jt} is an indicator dummy variable for a mean shift occurring at time T_{Bj} while T is the corresponding trend shift variable. The null hypothesis of a unit root is tested against the alternative hypothesis of trend stationarity as follows:

$$H_0: y_t = u_0 + d_1 B_{1t} + d_2 B_{2t} + d_3 D_{1t} + d_4 D_{2t} + y_{t-1} + v_{1t}$$

$$H_A: y_t = u_1 + \gamma_t + d_1 D_{1t} + d_2 D_{2t} + d_3 DT_{1t} + d_4 DT_{2t} + v_{2t}$$

where v_{1t} and v_{2t} are stationary errors terms; $T_{jt} = 1$ for $t = T_{Bj} + 1$, $j = 1, 2$, and 0 otherwise.

Lee and Strazicich (2003) use the following regression to obtain the LM unit root test statistic:

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

where $\bar{S}_t = y_t - \hat{y}_t - Z_t - \hat{\delta}_t$, $t = 2, \dots, T$, $\hat{\delta}$ the coefficients in the regression of Δy on ΔZ_t , \hat{y} is given by $y_t - Z_t$, $\hat{\delta}$, and y_t and Z_t , respectively. The LM test statistic is given by: $\bar{\tau} = t$ -statistic testing the null hypothesis. The augmented terms, $\Delta \bar{S}_{t-j}$, $j = 1, \dots, k$, terms are included to correct for serial correlation. The value of k is determined by the general to specific search procedure.² To endogenously determine the location of the break (T_B), the LM unit root searches for all possible break points for the minimum (the most negative) unit root t -test statistic as follows:

$$\inf \bar{\tau}(\hat{\lambda}) = \inf_{\lambda} \bar{\tau}(\lambda); \text{ where } \lambda = T_B/T$$

The critical values for the one break test are tabulated in Lee and Strazicich (2004) and the critical values of the two breaks case are tabulated in Lee and Strazicich (2003). Conducting both the two breaks and the one break LM tests will allow the location of the break(s), the optimal number of the break(s), and the number of lagged augmentation

terms to be jointly and endogenously determined for each source country.

Panel LM Unit Root Test

Consider a model that tests for stationarity of tourist arrivals:

$$TA_{it} = \delta' X_{it} + u_{it} \quad u_{it} = \phi_i u_{i,t-1} + \varepsilon_{it}$$

where i represents the cross-section of countries ($i = 1, \dots, N$), t represents the time period ($t = 1, \dots, T$), u_{it} the error term, X_{it} is a vector of exogenous variables, and δ'_i is the corresponding parameter vector. The test for the unit root null is based on the parameter ϕ_i , while ε_{it} is a zero mean error term that allows for heterogeneous variance structure across cross-sectional units but assumes no cross-correlations. The parameter ϕ_i allows for heterogeneous measures of persistence.

Two structural breaks are incorporated in the model by specifying X_{it} as $[1, t, D_{1it}, D_{2it}, T_{1it}, T_{2it}]'$ where D_{it} are dummy variables that capture the first and second structural breaks, respectively. $D_{1it} = 1$ if $t > TB1$, zero otherwise; $D_{2it} = 1$ if $t > TB2$, zero otherwise, and $T_{1it} = t - TB1$ if $t > TB1$, zero otherwise; $T_{2it} = t - TB2$ if $t > TB2$, zero otherwise.

In panel framework, following Im et al. (2005), the null hypothesis is given by $H_0: \phi_i = 0$ for all i (implying a unit root for all countries), versus the alternative for $H_1: \phi_i < 0$ for $i = 1, 2, \dots, N_1$ and to $\phi_i = 0$ for $i = N_1 + 1, N_1 + 2, \dots, N$ (implying that one or more of the countries rejects the unit root null). The panel LM test statistic is obtained by averaging the optimal univariate LM unit root t -test statistic estimated for each country. This is denoted as:

$$LM_i^\tau: \overline{LM}_{NT} = \frac{1}{N} \sum_{i=1}^N LM_i^\tau.$$

Im et al. (2005) then construct a standardized panel LM unit root test statistic by letting $E(L_\tau)$ and $V(L_\tau)$ denote the expected value and variance of LM_i^τ respectively under the null hypothesis, and then compute the following:

$$\psi LM = \frac{\sqrt{N}[\overline{LM}_{NT} - E(L_\tau)]}{\sqrt{V(L_\tau)}}$$

numerical values for $E(L_\tau)$ and $V(L_\tau)$ are provided by Im et al. (2005). The asymptotic distribution of

this test is unaffected by the presence of a structural break and is standard normal.

Empirical Findings

Data for tourist arrivals to Thailand from its top 10 source countries was collected from World Trade Organization, yearbook of tourism statistics from 1988 to 2007. The source countries are Malaysia, Japan, Korea, China, UK, US, Singapore, Germany, Taiwan, and Hong Kong. The selection of period of the study is dictated by data availability.

The univariate unit root test determines both the number and location of structural breaks in each country, and at the same time determines the optimal number of lagged augmentation terms. The Lee and Strazicich (2003) two-break minimum LM unit root test with two endogenously determined structural breaks is firstly conducted. If both the breaks are significant at least the 10% level, the results are reported. However, if only one break is significant, the procedure is repeated using the Lee and Strazicich (2004) one-break minimum LM unit root test. If no break is significant, then the no-break LM unit root test of Schmidt and Phillips

(1992) is employed. (In this study, the no-break test was not required.) This way the location of the breaks, the optimal number of the breaks, and the number of lagged augmentation terms are jointly and endogenously determined for each source country.

Table 1 presents the results for LM unit root tests on tourist arrivals to Thailand. The univariate LM unit root test statistics appear in the second column of the table. Column 3 shows the optimal number of breaks and the optimal number of lag length is given in the fourth column. The last column gives the significant break dates. Table 1 indicates that the times of the structural breaks coincide with the shocks mentioned in the introduction. These include the breaks for China, Hong Kong, Japan, Korea, and Singapore in the second half of the 1990s, which coincides with the Asian financial crisis. This is in line with the annual growth patterns of tourist arrivals to Thailand as shown in Figures 1 and 2, where growth rates of tourist arrivals to Thailand from Japan, Korea, and China declined from 14%, 7%, and 21% in 1996 to 4%, -14%, and -0.9%, respectively, in 1997.

Our empirical findings with regards to the struc-

Table 1
LM Univariate and Panel Unit Root Test on International Tourist Arrivals to Thailand

Source Country	Test Statistic	Optimal No. of Breaks	Optimal Lag Length (\hat{k})	Break Location(s) ($T\hat{B}$)
Malaysia	-3.6137*	1	2	2002**
Japan	-9.949**	2	4	1998**, 2001**
Korea	-8.1940**	2	2	1996**, 2001**
China	-6.8899**	2	4	1994**, 1999**
UK	-5.0851**	1	4	1996**
US	-7.6903**	2	2	1996**, 2002**
Singapore	-9.7895**	2	2	1996**, 2001**
Germany	-6.1963*	2	4	1995**, 2001**
Taiwan	-6.5731**	2	3	1994**, 2003**
Hong Kong	-9.8964**	2	4	1996**, 2004**
Panel test, one break	-11.662**			
Panel test, two breaks	-27.537**			

$T\hat{B}$ is the date of the structural break; \hat{k} is the lag length (maximum used here = 4). The 1%, 5%, and 10% critical values for the minimum LM test with one and two breaks are given in Lee and Strazicich (2004, 2003). The 1%, 5%, and 10% critical values for the minimum LM test with no break are -3.63, -3.06, and -2.77. The 1%, 5%, and 10% critical values for the minimum panel LM unit root test are -2.326, -1.645, and -1.282, respectively.

*Significant at the 5% level.

**Significant at the 1% level.

tural break in the number of international tourist arrivals to Thailand from Hong Kong, Malaysia, and Taiwan that happened during the 2002–2004 period coincides with the SARS and the bird flu outbreaks. These breaks are firstly consistent with Figures 1 and 2, which indicate considerable fluctuations and a drop in tourist arrivals during early 2000; and secondly are in line with the study of Untong, Piboonrunroj, and Kaosa-ard (2006). The study states that the number of arrivals to Thailand during this period declined by 190,000 (around 9.6%). Lastly, for the case of US, the second break of 2002 coincides with the September 11 attack.

Table 1 indicates that the unit root null hypothesis is rejected at least at the 5% significance level for international tourist arrivals to Thailand from all countries. This result suggests that following a shock, tourist arrivals revert to trend, implying that shocks only have a transitory effect from all the 10 major source countries.

However, it is well known that univariate unit root tests have low power when the sample size is small (Shiller & Perron, 1985). While there are a large number of observations in this study, the actual time span of the data is relatively short. The advantage of the panel tests is that they add the cross-section dimension and increase the amount of information for every time period. As a result, we apply the panel LM unit root test with one and two structural breaks to the full panel of 10 countries. The results reported at the bottom of Table 1 show that the test statistics with one and two breaks are smaller than the critical value at the 1% level of significance, indicating the rejection of the joint null hypothesis of nonstationarity.

These results (using both univariate and panel techniques with structural breaks) imply that tourist arrivals are a stationary process and shocks only have a short life and therefore Thailand's tourism sector will return to its long-run trend path.

Conclusion

The objectives of the study were to identify the number and time of the structural breaks and to test whether shocks to international tourist arrivals to Thailand from its 10 major source countries have a permanent or a transitory effect. The main contribution of this article is that it not only examines

stationarity in both univariate and panel setting with endogenously determined structural breaks but also determines both the number and the location of the breaks.

Both univariate and panel LM unit root tests with structural breaks were conducted for tourist arrivals to Thailand from its major sources from 1988 to 2007. Results from univariate LM unit root tests with structural breaks lead to two findings: the time of the structural breaks coincide with the Asian financial crisis, the September 11 attack, and the SARS and bird flu outbreaks. The other finding of the rejection of unit root null hypothesis implies that shocks to tourist arrivals from its major sources are transitory. Moreover, using panel unit root tests with one and two structural breaks, the joint null hypothesis of nonstationarity is rejected, once again implying that shocks only have a transitory effect on the number of international tourist arrivals to Thailand.

All these findings suggest that in spite of a number of shocks, international visitor arrivals remain trend reverting and thus Thailand's tourism sector is viable in the long run. Our finding is plausible despite the negative effects of the shocks on Thailand's tourism sector. It has shown resilience and has recovered quite strongly in a short period of time. Furthermore, it is predicted that the tourism industry will grow in the future (Intel International Group Limited, 2009).

Given that the world tourism industry, including that of Thailand, is likely to face more shocks in years to come, is there a lesson that we can learn from this exercise? It is our view that those who are involved in the industry, including the government, the tourism operators, and policy makers, should take advantage of the recovery time and implement feasible, adequate policies and strategies in dealing with such shocks in order to minimize the temporary damage in the short run. Government in Thailand as well as other various tourism authorities in the country should take earlier steps towards promoting positively the tourism industry via investing in tourism infrastructure, such as the health care services and the financial sector services, among others. In other words, the government as well as the tourism authority in Thailand needs to take all the necessary precautionary measures to create positive attitudes towards the tourism industry in

the country. These steps are important and can be implemented or taken into account during the recovery time from such shocks.

Notes

¹These tests include the Augmented Dickey Fuller (ADF), Philips-Perron, and the Kwiatkoeski, Phillips, Schmidt, and Shin (1992) tests.

²General to specific procedure begins with the maximum number of lagged first differenced terms and then examines the last term to see if it is significantly different from zero. If insignificant, the maximum lagged term is dropped and then estimated again and so on, until the maximum is found or $k = 0$.

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