IJER © Serials Publications
13(7), 2016: 2897-2910
ISSN: 0972-9380

COINTEGRATION ANALYSIS OF INBOUND INTERNATIONAL TOURISM DEMAND FOR THAILAND

Anothai Harasarn* and Surachai Chancharat**

Abstract: *In this paper, the Johansen cointegration approach is employed to examine the model of inbound international tourism demand for Thailand. The purpose is to investigate the long-run and short-run relationships between tourism demand for Thailand and economic and social determinants. Furthermore, this paper fills a gap in the literature by comparing tourists from five major countries who visited Thailand as a destination country and generated high incomes to Thailand. The results of the long-run relationship revealed that the income of origin countries were positively related to the demand for Thailand's tourism, and the political crisis in Thailand in 2009 significantly affected Thailand's tourism demand from other countries, as a negative sign. Contrary to the expectation, the tourism prices have a positive relationship with the tourism demand. The short-run relationship indicated that tourists from United Kingdom had the fastest rate of adjustment and were the most loyal to Thailand's tourism. The finding of this study will be beneficial to policy planning to enhance tourism and investment and comply with the characteristic of Thailand's tourism demand, which is different and specific to each country.*

Keywords: *long-run relationship, tourism demand, tourist arrivals*

JEL Classification: *C32, C51, L83*

1. INTRODUCTION

Tourism is a business which grows rapidly and is the biggest business in the world when compared against other businesses (Tisdell, 2002). The Thai government focuses on the tourism sector because it is the source of incomes that brings currency from foreign countries and it is closely linked to other industries which lead to higher investment, employment and distribution of incomes to local. In 2011, the value of the tourism sector was accounted for 14.04 percent of the total export industry value and accounted for 8.05 percent of the Gross National Product of Thailand (Macroeconomic Strategy and Planning Office, 2015). Meanwhile, the tourism

* Faculty of Business Administration and Accountancy, Khon Kaen University and Faculty of Business Administration and Management, Ubon Ratchathani Rajabhat University, Thailand
** Corresponding Author, Faculty of Business Administration and Accountancy, Khon Kaen University, Thailand. Email: csurac@kku.ac.th.

business also contributes to the employment calculated as 7 percent of the total labor force, and distributes incomes and employment to the tourist attraction in rural areas. Incomes from foreign currency are important for compensation deficits when the export trend of Thailand decelerates according to the condition of the world economy (Ministry of Tourism and Sport, 2011). Therefore, based on the aforementioned importance of tourism, it is vital to examine the tourism industry in order to obtain information for appropriate planning of the country's tourism development. Thus, it requires a suitable analysis adopting a theoretical model which is based on an information system of the economy and society of studied countries. Such theoretical model can accurately forecast tourism demands, and it is beneficial for planning and supplying the management policy to comply with demands and to seek future potential markets (Untong & Kaosa-ard, 2011).

2. Literature Review

The literature review on inbound international tourism demand from the past until the current time when this study was conducted revealed that economists adopted an econometrics model of tourism demands to understand international tourists' behavior (Lim, 1997; Song & Li 2008). Moreover, the example of studies on countries of tourism destinations in different contexts revealed that Hong Kong and Singapore's tourists travelled to Australia (Lim & McAleer, 2001), all international tourists travelled to South Africa (Akinboade & Braimoh, 2010), France, Greece, Spain and Australia's tourists travelled to Italy (Algieri & Kanellopulou, 2009), ASEAN, United States, Japan, United Kingdom and Australia's tourists travelled to Singapore (Khan et al. 2005) and 16 countries' tourists travelled to Hong Kong (Song et al., 2003). Moreover, it was found that the important factors which influenced inbound international tourism demand included tourist incomes, price of tourism goods and services, and exchange rate. These factors affected to the different size and directions according to the studied context. For instance, Song et al. (2000) examined the tourism demand of United Kingdom from 12 arrival countries and Salman (2003) studied the tourism demand of Sweden from United States, European and Scandinavia countries found that the long-run relationship between the tourism demand and tourist incomes from arrival countries were in the positive direction. In addition, Asemota and Bala's study (2012) examined the tourism demand of Japanese tourists from 5 oriental countries revealed that income per capita of tourists was the most important factor. However, Lim and McAleer (2002) studied the tourism demand in Australia of Malaysia tourists and Tang and Jang (2009) investigated in the context of United States did not find the relationship between the tourist income and tourism demand.

Furthermore, The studies of Greece's tourism demand from German and United Kingdom's tourists (Dritsakis, 2004), the international tourism demand for Portugal from France, German, Netherland, Spain and United Kingdom (Danial & Ramos, 2002) and the tourism demand for Malaysia from Thailand, Indonesia and Singapore tourists (Nanthakumar et al., 2013) demonstrated consistent results that the tourism

demand had the positive relationship with incomes of tourist arrivals, but the tourism prices and an exchange rate were related negatively. Meanwhile, Katafono and Gounder (2004) examined tourism demand of all tourists who travelled to Fiji revealed that the tourist incomes had a positive relationship with the tourism demand, but unexpectedly, tourism prices showed a positive relationship with the tourism demand. Furthermore, Salleh et al. (2008) examined the tourism demand for Malaysia from seven Asia countries and Sanchez Carrera et al. (2008) investigated tourists' tourism demand for Mexico found that the tourism demand had a positive relationship with the exchange rate. In addition, it was found that the event of crisis impacted tourism demand. For example, Song and Lin (2010) examined tourists from Asia countries who travelled in Asia countries found that financial and economic crises had negative influences on tourism, both in country and abroad. The result of this study complied with the study of Habibi and Rahim (2009) which studied the tourism demand for Malaysia from 10 countries. This study revealed that the SARS epidemic in 2002 had an opposite relationship with the tourism demand. Meanwhile, Katafono and Gounder (2004) conducted a study in Fiji and found that the unrest, such as the rebel was an obstruction to the tourism demand, but the cyclone did not have a significant effect on tourism demand.

However, there were only a few studies examining the context of Thailand as a destination country. Among a few of them, Harasarn and Chancharat (2014) studied the relationship between the economic factor (tourist incomes) of origin countries and the tourism demand for Thailand adopting Engle and Granger's model (1987). This study, however, had some limitations; it applied only a univariate cointegration test with only two variables. It is also vital to examine factors which affect international tourist demand arrivals to Thailand, both short-run and long-run by using an appropriate model of tourism demand to reduce limitations of the previous studies. In addition, it is interesting to examine behavior of consumers from specific origin countries who generate numerous incomes to Thailand are China, Japan, Malaysia, Germany and United Kingdom and compare each individual country. Such comparative information will give more accurate forecast are compared to studies which used the overall number of tourists; also, it will provide different flexibility and better details (Untong & Kampukka, 2010). Tourists from different markets have different tourism behavior and response to price and income differently. An econometrics model will help to explain the basic structure of the specific origin country's tourism demand. Moreover, it can explain the relationship of economic variables in the past and at the current time, which impact the tourism demand.

In this study, the cointegration model is adopted for the analysis of multivariate time series since when time passed, the time series economic data will be non stationary. If the model using ordinary least square (OLS), it will lead to a spurious regression problem, which problem can be resolved by the cointegration model. The results of this study will be beneficial to policy planning to enhance tourism and investment and comply with the characteristic of Thailand's tourism demand, which is different

and specific to each country. Moreover, appropriate concepts and technique for testing will be developed in order to obtain a suitable model to forecast tourism demands, which will in turn lead to proper planning of supply in the future. As such, an appropriate technique for testing factors which can be used to determine tourism demands are different and specific to the context of study must be used.

3. METHODOLOGY

3.1. Data and variables

This study used the annual data from 1981 to 2014, all of which were secondary data of the studied countries, including China, Japan, Malaysia, Germany and United Kingdom. These countries were important because they generated incomes to Thailand continuously in the last decade (Department of Tourism, 2015). These countries were classified as origin countries and Thailand was as a destination country. All variables were recommended from the literature review of tourism demand, and they were adjusted in a logarithm form. The following are the details of each variable.

Tourism demand: The number of tourist arrivals, which served as a proxy for tourism demand, was a dependent variable. The secondary data were derived from the Tourism Statistic Report organized by the Department of Tourism, Thailand.

3.2. Independent variables

Income: The gross national income per capita (GNI per capita) of each country in real terms served as a proxy variable for income. The secondary data were derived from the International Financial Statistics (IMF).

Tourism prices: Tourism prices refer to price comparisons between Thailand and the countries of origin of international tourists travelling to Thailand. They were calculated based on consumer price index (CPI) of all goods and services of destination countries divided by the CPI of the country of origin. All of the data on CPI were collected from the International Financial Statistics (IMF)

Exchange rate: Exchange rate refers to the currency exchange rate of Thailand compared with the currency exchange rates of the countries of origin. The data on currency exchange rates between the destination country and the origin countries were collected from the Bank of Thailand (BOT).

Dummy: The objective of creating a dummy variable in the model is to measure the effects of events. Dummies were specially constructed: a value of "1" refers to when the occurring of events and "0" otherwise. In this study, the dummy was the Thai political crisis of 2009.

The relation is calculated using this formula, $T = f(Y, P, EX, DM)$, where T is international tourist arrivals from each origin country, Y is a function of income per capita, P is tourism prices, EX is exchange rate between the origin and destination

country, and *DM* is a dummy variable for Thailand's political crisis.

3.3. Cointegration and Johansen's test

Before running the cointegration analysis, all variables were tested stationary khown as "unit root test" by Augmented Dickey Fuller test (ADF test), Dickey Fuller test statistic using a generalized least squares (DF-GLS test) and Phillips and Perron test (PP test). These tests were appropriate with the annual time series data. When the variables were tested and found that they have the attribute of the non stationary, the relationship could not be estimated by an ordinary least square because the result from the estimation will show spurious relation problems. Granger (1986) found that the test by the cointegration could eliminate this problem. However, the cointegration test with the Engle and Granger (1987) has some limitations because it can apply only with two variables. However, the Johansen's approach can reduce this limitation because it could test the system of equation with two variables or more. From the results of unit root tests, the variables for the Johansen's test must have the same integration order and have integration order of I(1) only.

The Johansen's approach is a means for testing inform of multivariate cointegration based on the model, namely, vector auto regression model (VAR) and error correction mechanism which A_t is defined by an unrestricted VAR system:

$$A_t = \pi_1 A_{t-1} + \ldots + \pi_n A_{t-n} + \varepsilon_t \tag{1}$$

The system of equations (1) can be reparameterized in the error correction form as:

$$\Delta A_t = \Pi_1 \Delta A_{t-1} + \ldots + \Pi_i \Delta A_{t-i} + \pi A_{t-k} + u_t \tag{2}$$

$$\Pi_i = -(I - \pi_1 - \ldots - \pi_i) \text{ and } \pi_n = -(I - \pi_1 - \ldots - \pi_n)$$

The above equation (2) is known as a vector error correction model (VECM)

A_i is the matrix of variables in the model was studied

ε_t and u_t are the matrix of error value

t is the amount of lag which use in the VAR model and $t = 1,\ldots, T$

i is the amount of lag which use in the ECM model and $i = 1,\ldots, k\text{-}1$

The required condition for estimateing the cointegration by Johansen–Juselius (1990) is that the matrix of πA_{t-k} must have an integration order of I(0) which will lead to the cointegrating relations among the variables in the matrix A_t. The Johansen's test can be evaluated by using the rank of the matrix π which indicates the amount of cointegrating vector and the integration order of the matrix πA_{t-k} by Likelihood ratio test (LR test). The statistic test that the Johansen's test used to calculate the amount of the cointegration vector is the Maximal Eigenvalue test which can be calculated by the following equation.

$$\Lambda(r, r+1) = -2\ln(Q) = -T\ln(1-\lambda_{r+1}) \tag{3}$$

The hypotheses of the Maximal Eigenvalue test are as follows.

H_0 = the estimating model has the amount of cointegration vector maximum as r

H_1 = the estimating model has the amount of cointegration vector as $r + 1$

When the amount of the cointegration vector is obtained, the matrix can be calculated using the following formula.

$$\pi = \alpha\beta' \tag{4}$$

π = matrix of coefficient that is equal as $n \times n$

α = adjustment matrix that is equal as $r \times r$

β = cointegrating matrix that is equal as $n \times r$

The calculated matrix π is called "Unnormalized cointegration coefficient" which is normalized and led to get the coefficient indicating the long-run relationship equilibrium. Afterwards, adjustments from the short-run to long-run equilibrium were analyzed using the error correction mechanism (ECM). The coefficient of error correction term must be less than 0 and represent the speed of adjustment for equilibrium.

4. RESULT AND DISCUSSION

Prior to the conduction of the cointegration analysis, it was important to run the unit root test to examine the order of integration of all variables. Therefore, this study used the unit root test of the ADF test (1979), the DF-GLS test (1996) and PP test (1988) to evaluate the stationary process of the time series data. When the result of the unit root test shows that variables have the same integration order, it means that Johansen and Juselius with the maximum likelihood test (1988, 1990) can be used to obtain the number of cointegration vectors for the long-run relationship between dependent and independent variables, and the ECM model can be used for estimating the short-run relationship. The results of the unit root test based on the 3 standard method tests are shown in table 1.

The unit root test for all variables show that they have the same order at an integration of order 1 [I(1)]. Therefore, this data set can be used for investigation by the Johansen's procedure. This procedure is the test inform of multivariate cointegration which is based on the model called vector autoregressive model (VAR). This model must find the lag length in the VAR model before evaluating the cointegration test by considering from the lag length with the Akaike info criterion (AIC) as the minimum. Afterwards, the hypotheses were tested by testing the null hypothesis (H_0) that the VAR model has the maximum cointegration vector equals to r and the alternative hypothesis (H_1) that the VAR model the cointegration vector is greater than or equal to r+1 by using the Max-Eigen statistic. The results are shown in table 2.

Table 1
Results of unit root testing for all variables

Variable	*ADF*	*DF-GLS*	*PP*	*Conclusion*
		China		
LNT	I(1)***	I(1)***	I(1)***	I(1)
LNY	I(1)***	I(1)***	I(1)***	I(1)
LNP	I(1)**	I(1)**	I(2)***	I(1)
LNEX	I(1)***	I(1)***	I(1)***	I(1)
		Japan		
LNT	I(1)***	I(1)***	I(1)**	I(1)
LNY	I(1)***	I(1)**	I(1)***	I(1)
LNP	I(1)***	I(1)***	I(1)***	I(1)
LNEX	I(1)***	I(1)***	I(1)***	I(1)
		Malaysia		
LNT	I(1)***	I(0)*	I(1)**	I(1)
LNY	I(1)***	I(1)***	I(1)***	I(1)
LNP	I(2)**	I(1)***	I(1)***	I(1)
LNEX	I(1)***	I(1)***	I(1)***	I(1)
		Germany		
LNT	I(1)***	I(1)***	I(1)***	I(1)
LNY	I(1)**	I(1)**	I(1)**	I(1)
LNP	I(1)***	I(1)**	I(1)***	I(1)
LNEX	I(1)***	I(1)***	I(1)**	I(1)
		United States		
LNT	I(1)***	I(1)***	I(1)***	I(1)
LNY	I(1)**	I(1)***	I(1)**	I(1)
LNP	I(1)**	I(1)***	I(1)**	I(1)
LNEX	I(1)***	I(1)***	I(1)***	I(1)

Note: *LNT* is the natural logarithm of tourist demand, *LNY* is the natural logarithm of income, *LNP* is the natural logarithm of tourism price, and *LNEX* is the natural logarithm of exchange rate. I(0), I(1) and I(2) denote intergration of order 0, 1 and 2, respectively. ***, ** and * denote significance at 1%, 5% and 10%, respectively.

Table 2
Results of cointegration tests

Country	H_0	*Lag*	*Eigenvalue*	*Max-Eigen statistic*	*95% Critical value*	*Prob.*
China	r = 0	1	0.7030	38.8534	33.8769	0.0117
Japan	r = 0	2	0.7341	41.0722	33.8769	0.0058
Malaysia	r = 0	2	0.7553	43.6377	33.8769	0.0025
Germany	r = 0	1	0.6927	37.7578	33.8769	0.0163
United Kingdom	r = 0	1	0.8184	54.5896	33.8769	0.0001

The results showed that the obtained Max-Eigen statistic is greater than the critical value at 95%. As such, the null hypothesis which indicates that r = 0 (no integration vector), was rejected, and the alternative hypothesis indicating that r = 1 is confirmed. However, the null hypothesis of r = 1 (integration vector =1) was confirmed because of the obtained Max-Eigen statistic was lower than the critical value at 95%. Therefore,

Table 3
Results of the long-run relationship for international tourism demand
Dependent variable is *LNT*

country	*LNY*	*LNP*	*LNEX*	*DM*
China	1.0058	-3.9540	0.4912	-0.3522
Japan	0.4143	0.1268	0.8393	-0.0543
Malaysia	0.5281	5.0563	0.5333	-0.3655
Germany	1.0678	1.2377	-0.1118	-0.2248
United Kingdom	1.2898	1.9436	-0.0402	-0.6912

as seen the cointegration analysis of all countries showed the cointegration vector = 1, it can be concluded that all variables in the test of all countries have the long-run relationship equilibrium (see table 3).

The estimation of the coefficients indicated the long-run elasticity which is related to the conformity independent variables. The income coefficient of tourists from origin countries has a positive relationship with the demand for Thailand's tourism in the long-run in all countries. It can be explained that when the tourist income increases by 1%, the number of tourists from China, Japan, Malaysia and United Kingdom increases 1.00, 0.41, 0.53, 1.07 and 1.29 %, respectively. On the contrary, the dummy variables for the 2009 Thai political crisis showed a negative relationship. When the dummy variables increase 1%, the number of tourists from these countries decreases 0.35, 0.05, 0.36, 0.22 and 0.69%, respectively. The results of this study regarding the relationship between these two variables conform to the economic theory. That is, economic factors influence the tourism demand. The countries which have stable economy with high per capita income contribute to increasing travelling for business operation, conference, education and recreation. The amount of the tourism product purchasing can increase according to high potential and power purchasing. Meanwhile, the safety factors, such as political unrest and coup have impact on the tourist's fear of insecurity resulting in lower tourism demand.

The tourism price has a negative relationship to the tourism demand in the case of China. The tourist arrivals from China have high sensitivity to price: the increasing of tourism price by 1% can decrease Chinese tourists' decision to travel to Thailand by 3.95%. On the contrary, in the case of Japan, Malaysia, German and United Kingdom, a positive relationship was found. The increasing of tourism price of 1% can lead to the enlargement of the tourism demand of 0.12, 5.05, 1.24 and 1.94%, respectively. These results indicate that the increasing of tourism price in the long-run does not affect the reduction of Thailand's tourism demand from these countries. There may be other factors that stimulate demand for decision to travel in Thailand such as tourists from the United Kingdom, German and Japan. Most of these tourists are considered "high budget tourists" who may not be sensitive to the economic problem and may have enough saving for distant tourism. Moreover, it may be influenced by other factors such as the astonishment of tourist attractions in Thailand, both nature and culture, which are interesting, prominent, attractive and inexpensive when compared

to price and worthiness. In the case of Malaysia which is the neighbor country of Thailand, the encouraging geographic tourism demand and personal mobility are major factors which enhance the tourism demand and affect tourists' decision to travel in Thailand. This country is close to Thailand. The transportation to and from Thailand is convenient; the tourists can use different routes to travel to Thailand. Also, the flexibility of international rules on travelling among Asian countries can reduce obstruct and limitation of tourism for preparation to ASEAN Economics Community (AEC).

In the case of China, Japan and Malaysia, the exchange rate has a positive relationship with the tourism demand; the increasing of 1% of the exchange rate between the destination country and the origin country affected the enlargement of the tourism demand by 0.49, 0.83 and 0.53%, respectively. When the Thai baht currency weakens, tourist arrivals view that their currency strengthens so that when traveling to Thailand, their expenses will reduce. As such, they decide to travel to Thailand more. On the contrary, for German and United Kingdom, a negative relationship was found. The increasing of 1% of the exchange rate between the destination country and the origin country lower their tourism demand by only 0.11 and 0.04%, respectively. The exchange rate has minimal influence on the demand for Thailand's tourism since these two countries are European countries which have highly stable currency values.

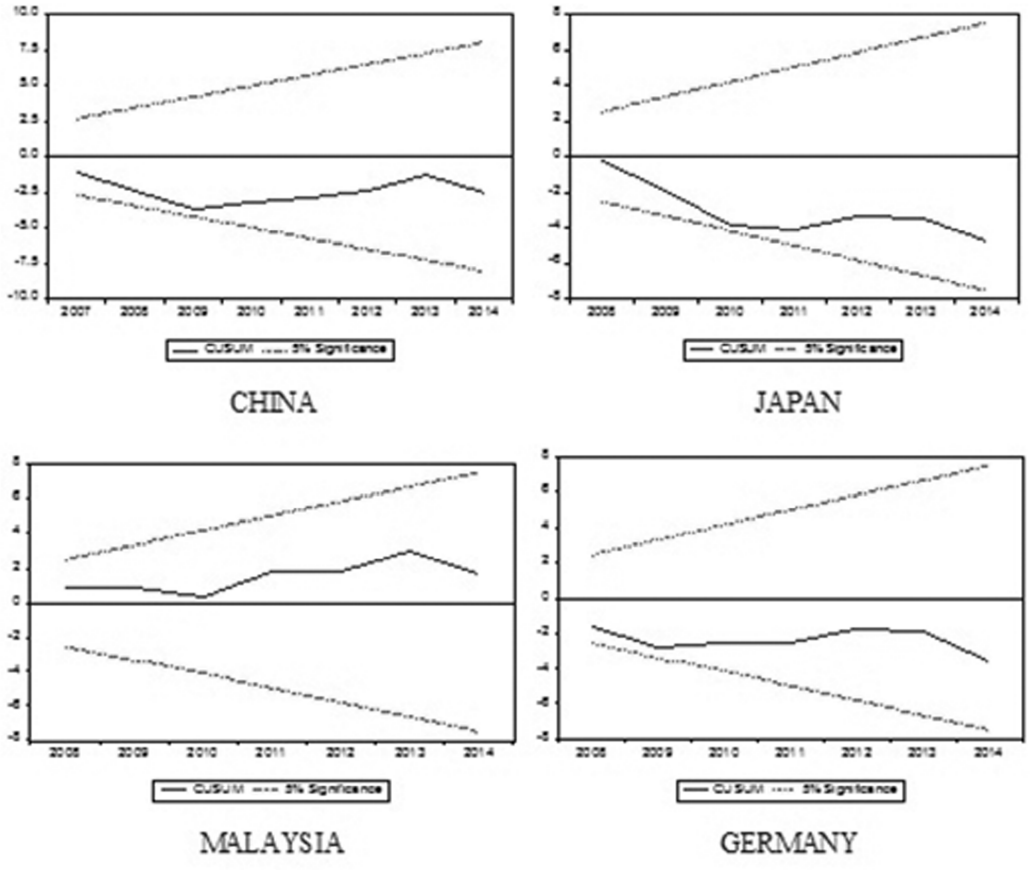
Table 4
Results of the short-run relationship for international tourism demand based on error correction model Dependent variable is *D(LNT)*

Variable	*China*	*Japan*	*Malaysia*	*Germany*	*United Kingdom*
Constant	0.1843**	0.0229	0.0942***	0.0435**	0.1102
D(*LNT*(-1))	0.3345	0.1732	-0.4799*	0.4190**	0.1228
D(*LNT*(-2))	-	0.2941**	0.2993*	-	-
D(*LNY*(-1))	-0.5143	-0.0143	-0.1473	0.0668	-1.4187
D(*LNY*(-2))	-	-0.2936	-0.5091	-	-
D(*LNP*(-1))	0.5928	0.5387	0.1035	-0.8678	-1.4011
D(*LNP*(-2))	-	0.0769	0.5333	-	-
D(*LNEX*(-1))	-0.3655	-0.0788	0.8318	0.0616	0.1583
D(*LNEX*(-2))	-	0.1986	0.0995	-	-
D(*DM*(-1))	0.1276	0.0241	-0.0704	0.0196	0.3610
D(*DM*(-2))	-	-0.0062	-0.0563	-	-
ECM(-1)	-0.4062**	-0.6692***	-0.3888**	-0.2460**	-1.2993***
R^2	0.4561	0.8049	0.3831	0.3735	0.5976
DW	2.1413	1.9911	1.8878	2.1318	1.8907
F-statistics	4.3471**	7.1292***	3.0725**	2.5689*	6.1891***
J-B(Normal)	2.7242	1.7924	0.7707	0.0884	29.4217
(Prob.)	(0.2561)	(0.4081)	(0.6802)	(0.9567)	(0.0000)
serial correlation	1.1008	0.4448	0.8589	0.6702	0.2312
test (Prob.)	(0.3045)	(0.6482)	(0.4412)	(0.4210)	(0.6349)
Heteroscedasticity	1.4777	0.4654	1.3748	0.7518	3.1473
(Prob.)	(0.2166)	(0.9250)	(0.2726)	(0.6708)	(0.2129)

Note: ***, ** and * denote significance at 1%, 5% and 10%, respectively. Values in parentheses indicate *t* values associated with the corresponding estimated coefficients.

The results of the short-run relationship for international tourism demand based on the error correction model of the selected countries are presented in table 4. The coefficients of the error correction terms have negative signs in of all the countries. In the case of China, Japan, Malaysia, German and United Kingdom, the coefficient values are 0.4062, 0.6692, 0.3888, 0.2460 and 1.2993, respectively, which indicate the speed of adjustment from the short-run to the long-run equilibrium or the speed of adjustment to equilibrium after the shock incidents. It was found that the deviation from equilibrium of the shock incidents in the previous year and returning to the long-run equilibrium in the year of study are 40.62, 66.92, 38.88, 24.60 and 129.93% respectively. The results of the speed of adjustment indicate that the fastest adjustment capacity is United Kingdom, which reflects the highest loyalty of this country to Thailand as a destination country. Meanwhile, the speed of adjustment of German is the lowest, which can be explained that the crisis or shock incidents had high and long impact on the demand for Thailand's tourism.

This paper applied various diagnostic tests, including the Breusch-Godfrey serial correlation Lagrange Multiplier tests for autocorrelation, the Breusch-Pagan-Godfrey



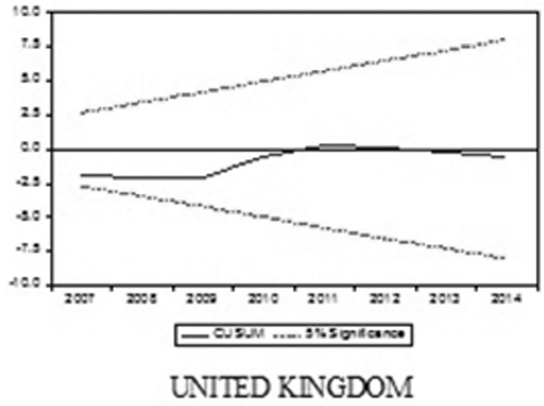


Figure 1: CUSUM plots of coefficient stability for the ECM model

test for heteroscedasticity and the Jarque-Bera test for normality. The models of all countries met the requirements of the tests, except the Jarque-Bera test in United Kingdom as shown in table 4. However, the overall of the total diagnostic tests indicate that the error correction models are correctly specified. The residuals of all models did not have problems of autocorrelation, heteroscedasticity and non-normality. Moreover, the result of the stability test using the CUSUM plots, reveal that the recursive estimation of the model for all countries are stable in the coefficients over the sample period because the line appears in the band of the cumulative sum (CUSUM) test, as show in figure 1. The straight lines represent critical bounds at the 5% significant level.

5. CONCLUSION

This paper focuses on the test of the long-run and short-run relationships between inbound international tourism demand for Thailand and its economic determinants and social factors in Thailand by Johansen's cointegration approach. The results of the long-run relationship indicate that the income variable of tourist arrivals has the positive relationship with the demand for Thailand's tourism of all countries. On the contrary, the dummy variable of the Thai political crisis has the negative relationship with Demand for Thailand's tourism of all countries. These results are consistent with the economics theory. However, the unexpected result is that the increasing tourism price led to the enlargement of the tourism demand. This could be explained that the price increasing in the long-run does not deter to the high budget tourists.

Moreover, the results reveal that the variables which have the negative effects to the demand for Thailand's tourism are relative price, exchange rate and the dummy of the political crisis in Thailand, which are the controlled factors within the country. The estimation shows that the majority of the relative price is high price elasticity. The tourism is categorized as luxury or superior goods and the small change of price can

substantially affect tourism decisions. Therefore, the government and the business sector should focus on the policy monitoring of the tourism products and services and adjust strategies compliant with the difference of the price elasticity in each market of each country. In addition, the exchange rate is another important variable to tourism decision in aboard. Therefore, the relevant authorities should carefully formulate policy in order for the stability and equilibrium of the Thai baht currency. When the Thai baht currency is too strong, it impacts the total export and tourism industry. Moreover, to maintain the circumstance of tourism is to enhance the image of Thailand, of which peace and security is the important issue since if tourists are not confident with the security of travelling, this low level of confidence will hinder the tourism demand. In addition, the formulation market positioning and strategies of the tourism should focus on countries which are loyal to Thailand's tourism and should sustain and maintain good relationships with them; these include United Kingdom, which are indicated by the result of the error correction term that possess the highest loyalty to Thailand's tourism.

ACKNOWLEDGMENTS

The authors acknowledge financial support from the National Research University development project (MIE-2554-Ph.D-05), Khon Kaen University. Any errors are our own.

References

Akinboade, O. A., & Braimoh, L. A. (2010). International tourism and economic development in South Africa: A Granger Causality Test. *International Journal of Tourism Research, 12*, 149-163. doi: 10.1002/jtr.743

Algieri, B., & Kanellopoulou, S. (2009). Determinants of demand for exports of tourism: An unobserved component model. *Tourism and Hospitality Research*, *9*(1), 9-19. doi: 10.1057/thr.2008.39

Asemota, O. J., & Bala. D. A. (2012). Modeling tourism demand in Japan using cointegration and error correction model. *International Review of Business Research Papers*, *8*(2), 29-43.

Bank of Thailand. The statistic of international exchange rates. (2015). Bank of Thailand. Retrieved from http://www2.bot.or.th/statistics/BOTWEBSTAT.aspx?reportID=123&language=TH

Danial, A. C. M., & Ramos, F. F. R. (2002). Modelling inbound international tourism demand to Portugal. *International Journal of Tourism Research*, *4*(3), 193-209. doi: 10.1002/jtr.376

Dickey, D. A., & 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. doi: 10.1080/01621459.1979.10482531

Dritsakis, N. (2004). Cointegration analysis of German and British tourism demand for Greece. *Tourism Management*, *25*(1), 111-119. doi: 10.1016/S0261-5177(03)00061-X

Department of Tourism. (2015). Thailand tourism statistics (2014). Department of Tourism. Retrieved from http://www.tourism.go.th/home/details/11/222/24095

Elliott, G., Thomas, J. R., & James, H. S. (1996). Efficient tests for an autoregressive unit root. *Econometrica*, *64*(4), 813-836. doi: 10.3386/t0130

Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: Representation, estimation and testing. *Econometrica*, *55*, 81-111. doi: 10.2307/1913236

Granger, C.W.J. (1986). Developments in the study of cointegrated economic variables. *Oxford bulletin of economics and statistics*, *48*(3), 213-228. doi: 10.1111/j.1468-0084.1986.mp48003002.x

Habibi, F., & Rahim, K. A. (2009). A bound test approach to cointegration of tourism demand. *American Journal of Appied Sciences*, 6(11), 1924-1931. doi: 10.3844/ajassp.2009.1924.1931

Harasarn, A., & Chancharat, S. (2014). International tourism and economic growth in Thailand: Cointegration and the Granger causality. *Journal of Environmental Management and Tourism*, *2*(10), 237-248. doi:10.14505/jemt.v5.2(10).06

International Monetary Fund. (2015). World Economic Outlook (WEO) database. *International Monetary Fund*. Retrieved from http://www.imf.org/external/pubs/ft/weo/2015/01/weodata/index.aspx

Johansen, S. (1988). Statistic analysis of cointegrating vectors. *Journal of Economic Dynamics and Control*, *12*(2/3), 231-254. doi:10.1016/0165-1889(88)90041-3

Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration with applications to the demand for money. *Oxford Bulletin of Economics and Statistics*, *52*(2), 169-210. doi: 10.1111/j.1468-0084.1990.mp52002003.x

Katafono, R., & Gounder, A. (2004) *Modelling tourism demand in Fiji*. Working Paper Economics Department Reserve Bank of Fiji. Suva Fiji.

Khan, H., Toh, R. S., & Chua, L. (2005). Tourism and trade: Cointegration and Granger causality tests. *Journal of Travel Research*, *44*, 171-176. doi: 10.1177/0047287505276607

Lim, C. (1997). Review of international tourism demand models. *Annals of Tourism Research*, *24*(4), 835-849. doi: 10.1016/S0160-7383(97)00049-2

Lim, C., & McAleer, M. (2001). Cointegration analysis of quarterly tourism demand by Hong Kong and Singapore for Australia. *Applied Economics*, *33*(12), 1599-1619. doi: 10.1080/00036840010014012

Lim, C., & McAleer, M. (2002). A cointegration analysis of annual tourism demand by Malaysia for Australia. *Mathematics and Computers in Simulation*, *59*, 197–205. doi: 10.1016/S0378-4754(01)00408-6

Macroeconomic Strategy and Planing Office. (2015). Thailand economic indicator in the fourth quarter Outlook for the year 2013 and 2014. Macroeconomic Strategy and Planing Office, Bangkok. Retrieved from http://www.nesdb.go.th/Portals/0/eco_datas/economic/eco_state/4_56/PressThaiQ4-2013.pdf

Ministry of Tourism and sport. (2011). *National Tourism Development Plan (2012-2016)*. Ministry of Tourism and sport.

Nanthakumar, L., Han, S. H., & Kogid, M. (2013). Demand for Indonesia, Singapore and Thailand tourist to Malaysia seasonal unit root and multivariate analysis. *International Journal of economics and Empirical Research*, *1*(2), 15-23.

Phillips, P., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, *75*(2), 335-346. doi: 10.1093/biomet/75.2.335

Salman, A. K. (2003). Estimating tourist demand through cointegration analysis: Swedish data. *Current Issues in Tourism*, *6*(4), 323-339. doi: 10.1080/13683500308667959

Salleh, N. H. M. Othman, R. & Ramachandran, S. (2007). Malaysia' s tourism demand from selected countries: the ARDL Approach to cointegration. *International Journal of Economics and Management*, *1*(3), 345-363.

Sanchez Carrera, E. J., Brida, J. G., & Risso, W. A. (2007). Tourism's impact on long-run Mexican economic growth. *Economics Bulletin*, *23*(21), 1-8. doi: 10.2139/ssrn.1076225

Song, H., Romilly, P., & Liu, X. (2000). An empirical study of outbound tourism demand in the UK. *Applied Economics*, *32*(5), 611-624. doi: 10.1080/000368400322516

Song, H., Wong, K. K. F., & Chon, K. K. S. (2003). Modelling and forecasting the demand for Hong Kong tourism. *International Journal of Hospitality Management*, *22*(4), 435-451. doi: 10.1016/S0278-4319(03)00047-1

Song, H., & Li, G. (2008). Tourism demand modelling and forcasting: A review of recent Research. *Tourism Management*, *29*(2), 203-220. doi: 10.1016/j.tourman.2007.07.016

Song, H., & Lin, S. (2010). Impacts of the financial and economic crisis on tourism in Asia. *Journal of Travel Research, 49*(1), 16-30. doi: 10.1177/0047287509353190

Tang, C. H., & Jang, S. (2009). The Tourism-economy causality in the United State: A sub-industry level examination. *Tourism Management*. *30*(4), 553-558. DOI: 10.1016/ j.tourman.2008.09.009

Tisdell, C. (2002) *Economics and tourism development: Structural features of tourism and economic influences on its vulnerability*. Working paper No.17, The School of Economics, University of Queensland, Australia.

Untong, A., & Kampukka, P. (2010). Time series data characteristics checking for forecasting tourism demand in Thailand. *Journal of Humanities and Social Sciences*, *1*(1), 60-85.

Untong, A., & Kaosa-ard, M. (2011). An analysis of Thailand's long-run tourism demand. *Thammasat Economic Journal, 29*(2), 1-34.