THAILAND'S INTERNATIONAL TOURISM DEMAND: THE ARDL APPROACH TO COINTEGRATION

PRASERT CHAITIP, CHUKIAT CHAIBOONSRI *

ABSTRACT: *This paper sought to find the short-run and long-run relationships between international tourist arrivals in Thailand and economic variables such as GDP, the price of goods and services, transportation costs, temperature of Thailand and both the exchange rate and exchange rate risk for the period from 1997(Q1)-2005(Q2). The cointegration techniques used were based on the ARDL approach to cointegration (developed by Pesaran and Pesaran (1997), Pesaran and Smith (1998) and Pesaran et al. (2001)) of Thailand's international tourism demand and error correction mechanisms were used to find the short-run relationships of Thailand's international tourism demand. This paper used the full six standard method test for unit root tests such as ADF-Test (1979), PP-Test (1987,1988), KPSS-Test (1992), DF-GLS Test (1996), the ERS Point Optimal Test and Ng and Perron (2001). The full six standard method test for unit root test have not previously been used to test unit roots for estimating tourism demand models based on ARDL approach to cointegration as well as this method for analyzing the long-run relations when the variables are of mixed-order of integration, i.e., I(0) and I(1). The long-run results indicate that growth in income (GDP) of Thailand's major tourist source markets has a positive impact on international visitor arrivals to Thailand while transportation cost and both exchange rate and exchange rate risk have a negative impact on international visitor arrivals to Thailand. The findings were consistent with economic theory and the implications of the model can be used for policy making. Finally, the temperature of Thailand mostly has a negative impact on international visitor arrivals to Thailand.*

KEY WORDS: *Thailand; Mixed order of Integration; ARDL approach; cointegration; International tourism demand*

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* *Assoc.Prof., Ph.D., Chiang Mai University, Thailand*
Ph.D. Student, Bangalore University, India, chukiat1973@yahoo.com

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1. INTRODUCTION

Tourism has emerged as a major source of foreign exchange earnings for the developing countries. It has become the key export sector and has constituted an important alternative for earning income (Narayan, 2004). In Thailand international tourism is the fastest growing industry and the earnings from international tourism in Thailand has increases substantially, rising from 220 billion baht in 1997 to 299 billion baht in 2001. Moreover, the earnings from international tourism in Thailand have risen from 323 billion baht in 2002 to 450 billion baht in 2005. While, the number of international tourist arrivals to Thailand was 7.22 million in 1997, by 2005 the number of international tourist arrivals to Thailand had increases to 13 million (source: Thailand's tourism organization). Additionally, the domestic tourism industry in Thailand is also the fastest growing industry and the earnings of the domestic tourism industry has increases substantially, rising form 180 billion baht in 1997 to 223 billion baht in 2001. Furthermore, the earnings of the domestic tourism industry in Thailand has risen from 235 billion baht to 347 billion baht in 2005. While, the number of trips by Thai visitors was 52 million in 1997, in 2005 the number of trips by Thai visitors had increases to 76 million trips (source: Thailand's tourism organization). The above data shows that both the international and domestic tourism industries are very important to Thailand's economy and had a positive impact on the Thai economy during the period 1997-2005. In the future both the international tourism industry and the domestic tourism industry will most probably continue to be important industries for Thailand, especially the international tourism industry. The tourism industry not only contributes to gross domestic product (GDP) but it also impacts positively on employment, investment and foreign exchange (The International Tourism Industry of Thailand).

This paper focuses on only the international tourism industry of Thailand for four reasons: the international tourism industry of Thailand is the fastest growing industry and the earnings from this industry are increases continuously (Parsert, Rangaswamy and Chukiat (2006)). While in 1993 Thailand was in thirteen place for the world's highest international tourism receipts (WTO (1996)), by 1996 Thailand ranked fifth in Asia after China, Hong Kong, Malaysia and Singapore (Pran (1997)); the World Tourism Organization expects annual growth during the period 1995-2020 in East Asia and the Pacific and South Asia of 6.5% and 6.2% respectively (WTO (2004)); Thailand was in the top five countries in East Asia and the Pacific where a lot of international tourists arrived during the period 1992-1993 (Pran (1997)); in 2004 Asia and the Pacific were the second top regional destination (WTO (2005)). Based on these facts, the international tourism industry will have a very important impact on the international economy of Thailand in the future.

The main source of international tourists for Thailand are Malaysia, Japan, China, Singapore, Taiwan, Korea, England, America, Germany, Australia, France, Sweden and Canada. All of these countries have been included in this research by framework of tourism economics. For a long time now, economists have tried to understand the international tourist consumer behavior through demand models. For example, Barry and O'Hagan (1972): studied the demand of British tourists going to

Ireland; Jud, G.D. and Joseph, H. (1974); studied the demand of international tourist going to Latin American; Uysal and Crompton (1984) studied the demand of international tourists going to Turkey. Summary (1987) studied the demand of international tourists going to Kenya, Kulendran, N. (1996) studied the demand of international tourists going to Australia; Lim C. and M.McAleer (2000) studied the demand of international tourist going to Australia; Durbarry (2002) studied the demand of international tourists (French) going to the UK, Span and Italy. As well as Paresh Kumar and Narayan (2004) and Resina Katafono and Aruna Gounder (2004) who studied the demand of international tourists going to Fiji. The aim of this paper is to find out the international tourist consumer behavior in coming to Thailand during the period 1997-2005 through the demand model. The consumer behavior information gathered from this research will help in developing the international tourism industry in Thailand.

2. RESEARCH AIM AND OBJECTIVE

This research has the aim and objective of seeking to know how may factors affect international tourist demand arrivals to Thailand in the long-run and short-run and to use the international tourism demand model to explain international tourist behavior in Thailand.

3. SCOPE OF THIS RESEARCH

The scope of this research is the period 1997(Q1)-2005(Q2) and mostly the data was secondary data. The countries used for analysis in International Tourism Demand in Thailand were the major countries for the international tourism industry of Thailand, namely Malaysia, Japan, China, Singapore, Taiwan, Korea, England, America, Germany, Australia, France, Sweden and Canada. Almost all of them had an influence on the income of the international tourism industry of Thailand in the same period (source: Thailand's tourism organization). The variables used in this research were economic variables, for example the numbers of international tourist arriving in Thailand, the GDP of major countries of international tourists coming to Thailand, the world price of Kerosene-Type Jet Fuel, the relative prices between Thailand and the countries of origin of international tourists coming to Thailand and the exchange rate of Thailand in relation to the exchange rates of major countries of international tourists and the temperature of Thailand.

4. THE METHODOLOGY AND RESEARCH FRAMEWORK

4.1. The concept back ground of International Tourism Demand Model

The concept of theory has been used in international tourist demand since 1950 but the estimation in international tourist demand by econometric method beginning from the first time by Artus (1972). After that a lot of research about international tourist demand function used the econometric method. The researcher studied research

such as Archer (1976), Crouch (1994), Walsh (1996), Lim (1997), Inclair (1998), Lise&Tol (2002), McAleer (2001, 2003) Resina and Aruna (2004). Growth in international tourism is closely aligned to economic variables, which at a microeconomic level influence the consumer's decision to undertake overseas travel. Empirical research on international tourism demand has overwhelmingly been based on aggregate time series data which permits estimation of income and price elasticity on inbound tourism (see Lim, 1997 and McAleer (2001, 2003)). A simple origin-destination demand model for international tourism can be written as: (equation number (1A))

$$D_t = f(Y_t \ TC_t \ P_t) \tag{1}$$

where:
D_t - is a measure of travel demand at time t
Y_t - is a measure of income of the tourist-generating or origin country at time t
TC_t - is a measure of transportation costs from the origin to destination country at t
P_t - is a measure of tourism price of goods and services at time t

And assume that $(+ Y_t)$, $(-TC_t)$, $(- P_t)$ and explain that when income at time t is increasing then the demand for international tourism is increasing simultaneously. When the measure of transportation costs from the origin to destination country at time t is increasing then the demand for international tourism decreases. And when the measure of tourism price of goods and services is increasing then the demand for international tourism is decreasing. And the equation (1) can be expressed in log-linear (or logarithmic) form [equation number (2)].

$$\ln D_t = \alpha + \beta \ln Y_t + \gamma \ln \{F1_t \text{ or } F2_t\} + \delta \ln \{RP_t, ER_t \text{ or } RER_t\} + \\ + \phi \ln D_{t-1} + \theta \ln CP_t + u_t \tag{2}$$

where:
$\ln D_t$ - logarithm of short-term quarterly tourist arrivals (or demand) from the origin to destination country at time t
$\ln Y_t$ - logarithm of real GDP in original country at time t
$\ln F1_t$ - logarithm of real round-trip coach economy airfares in Neutral Units of construction (NUC) between original country and destination country at time t
$\ln F2_t$ - logarithm of real round-trip coach economy airfares in original country currency between original country and destination country at time t
$\ln RP_t$ - logarithm of relative prices (or CPI of destination country/CPI of original country) at time t
$\ln ER_t$ - logarithm of exchange rate (original country per destination country) at time t;
$\ln RER_t$ - logarithm of real exchange rate [or CPI (destination country) / CPI (original country)*1/ER] at time t
$\ln CP_t$ - logarithm of competitive prices [using CPI (destination country) / (other destination country)]
u_t - independently distributed random error term, with zero mean and constant variance at time t

And defined that α, β, γ, δ, ϕ, θ = parameters to be estimated; $\beta > 0$, $\gamma < 0$, $\delta < 0$, $0<\phi< 1$, $\theta > 0$ (substitutes) and $\theta < 0$(complements).

And this research or the "Thailand 's International Tourism Demand : The ARDL approach to co-integration " modified from equation (2) as well as can be written as equation (3).

$$\ln(D1_t) = \alpha + \beta\ln(GDP_t) + \gamma\ln(PO_t) + \delta\ln(RP_t) + \rho\ln(RER_t) + \theta\ln(SDR_t) + \sigma\ln(TEM) + u_t \quad (3)$$

where:

$\ln D1_t$ - logarithm of tourist arrivals (or demand) from the origin (each 13 country) to destination country (Thailand) at time t

$nGDP_t$ - logarithm of real GDP in original countries (each 13 country) at time t

$\ln PO_t$ - logarithm of price of Jet Fuel at time t

$\ln RP_t$ - logarithm of relative prices (or CPI of destination country: (Thailand) /CPI of original country: (each 13 country) at time t

$\ln RER_t$ - logarithm of real exchange rate [or CPI(Thailand)/CPI(each 7 country)*1/ER] at time t

$\ln SDR_t$ - logarithm of exchange rate risk (original country (each 13 country) per destination country(Thailand)) at time t; (First time, this variable was used in international tourism demand by Chaitip, Rangaswamy and Chaiboonsri (2006))

lnTEM - logarithm of average temperature of Thailand (Wietzelise, Richard (2002))

Dum - dummy variable was used only in ECM model (Dum = 1: high season otherwise Dum = 0: low season)

u_t - independently distributed random error term, with zero mean and constant variance at time t

And defined that α, β, γ, δ,θ,ρ = parameters to be estimated; $\beta > 0$, $\gamma < 0$, $\delta < 0$, $\theta< 0$, $\rho < 0$, $0 < \sigma < 0$.

4.2. Unit-Root Tests

This research to test the stationary in all variables were used in International Tourism Demand Model by standard test for unit root. Such as ADF-Test (1979) , PP-Test(1987,1988) , KPSS-Test (1992) , DF-GLS Test (1996), The ERS Point Optimal Test and Ng and Perron (2001) (see detail 6 standard unit root test in P. Chaitip, N. Rangaswamy and C. Chaiboonsri (2006) "Modeling International Tourism Demand in Thailand". As well as this paper presented in "Statistic and Applied statistic Academic Year Conference " during 24-26 May 2006 at Thailand).

4.3. ARDL approach to cointegration based concept on Pesaran and Pesaran (1997), Pesaran and Smith (1998) and Pesaran et al. (2001)

4.3.1. Methods for cointegration analysis

There are several methods available for conducting the cointegration test. The most widely used methods include the residual based Engle-Granger (1987), maximum likelihood based Johansen (1988,1991) and Johansen-Juselius (1990) test. The other, less commonly used techniques include: the variable addition approach to Park (1990), the residual-based procedure for testing the null of cointegration by Shin(1994) and the stochastic common trends (system) approach introduced by Stock and Watson (1988). The above methods require that the variables in the system be of equal order integration these method do not include the information on structural break in time series data and also suffer from low power. Due to these problems associated with the standard test method, the OLS based autoregressive distributed lag (ARDL) approach to cointegration has become popular in recent year (Shrestha (2006)).

4.3.2. ARDL approach to cointegration

The ARDL modelling approach developed by Pesaran and Pesaran (1997), Pesaran and Smith (1998), Persaran and Shin (1999) and Pesaran et al. (2001). The estimates obtained from the ARDL method of cointegration analysis are unbiased and efficient given that (Narayan (2004)): the method can be applied to studies that have a small sample; it estimates the long-run and short-run components of the model simultaneously, removing problem associated with omitted variables and autocorrelationl; it can distinguish dependent and explanatory variables; the method for analyzing the long-run relationship when the variables are of mixed-order of integration i.e., I(0) and I(1) (Shrestha (2006)).

The main advantage of this approach lies in the fact that it can be applied irrespective of whether the variables are I(0) or I(1) (Pesaran and Pesaran (1997, pp. 302-303). Another advantage of this approach is that the model takes sufficient number of lags to capture the data generating process on a general-to-specific modeling framework (Laurenceson and Chai 2003, p.28). Moreover, a dynamic error correction model (ECM) can be derived from ARDL through a simple linear transformation (Banerjee el al. 1993, p.51). The ECM integrates the short-run dynamics with the long-run equilibrium without losing long-run information. It is also argued that using the ARDL approach avoid problems resulting from non-stationary time series data (Laurenceson and Chai 2003, p.28). The ARDL approach to cointegration, the following simple model is considered (see equation (4)):

$$Y_t = \alpha + \beta (X_t) + \delta(Z_t) + u_t \quad (4)$$

where:

Y_t - dependent variables time series data at t-time

X_t - first independent variables time series data at t-time

Z_t - second independent variables time series data at t-time

u_t - a vector of stochastic error terms

α , β and δ - parameters

For the above equation, the error correction version of ARDL approach to cointegration model is given by(see equation (5)):

$$DY_t = \alpha + \Sigma^{p}_{i=1}\beta_i \Delta Y_{t-i} + \Sigma^{p}_{i=1}\delta_i \Delta X_{t-i} + \Sigma^{p}_{i=1}\gamma_i \Delta Z_{t-i} + \lambda_1 Y_{t-1} + \\ + \lambda_2 X_{t-1} + \lambda_3 Z_{t-1} + u_{1t} \quad (5)$$

The fist part of equation 2D with β_i, δ_i and γ_i represents the short run dynamics of model as well as where as the second part with λ_1, λ_2 and λ_3 represents the long-run relationship among in all variables. And when take natural log in to equation 2D then can be written as equation (6) and showed as fellows that.

$$D\ln(Y_t) = \alpha + \Sigma^{p}_{i=1}\beta_i \Delta\ln(Y_{t-i}) + \Sigma^{p}_{i=1}\delta_i \Delta\ln(X_{t-i}) + \Sigma^{p}_{i=1}\gamma_i \Delta\ln(Z_{t-i}) + \\ + \lambda_1 \ln(Y_{t-1}) + \lambda_2 \ln(X_{t-1}) + \lambda_3 \ln(Z_{t-1}) + u_{1t} \quad (6)$$

The null hypothesis in the equation is $\lambda_1 = \lambda_2 = \lambda_3 = 0$, which means the non-existence of the long-run relationship among in all variables.

4.3.3. ARDL model testing procedure of Thailand's international tourism demand model

In this paper is looking for a lon-run relationship among $\ln(D1_t)$, $\ln(GDP_t)$, $\ln(PO_t)$, $\ln(RP_t)$, $\ln(RER_t)$, (SDR_t) and $\ln(TEM_t)$. From above variables can be written as equation 4D based on ARDL approach to cointegration of Thailand's international tourism demand (see equation (7)).

$$D\ln(D1)_{ij,t} = \alpha_{0D1} + \Sigma^{p}_{p=1} b_{pD1} \Delta\ln(D1)_{ij,t-p} + \Sigma^{p}_{p=1} c_{pD1} \Delta\ln(GDP)_{ij,t-p} + \Sigma^{p}_{p=1} d_{pD1} \\ \Delta\ln(PO)_{ij,t-p} + \Sigma^{p}_{p=1} e_{pD1} \Delta\ln(RP)_{ij,t-p} + \Sigma^{p}_{p=1} f_{pD1} \Delta\ln(RER)_{ij,t-p} + \Sigma^{p}_{p=1} g_{pD1} \\ \Delta(SDR)_{ij,t-p} + \Sigma^{p}_{p=1} h_{pD1} \Delta\ln(TEM)_{ij,t-p} + \lambda_{1D1}\ln(D1)_{ij,t-1} + \lambda_{2D1}\ln(GDP)_{ij,t-1} + \\ \lambda_{3D1}\ln(PO)_{ij,t-1} + \lambda_{4D1}\ln(RP)_{ij,t-1} + \lambda_{5D1}\ln(RER)_{ij,t-1} + \lambda_{6D1}(SDR)_{ij,t-1} \\ + \lambda_{7D1}\ln(TEM)_{ij,t-1} + u_{1t} \quad (7)$$

The ARDL approach to cointegration must uses F-test for testing the existence of long-run relationship among above the variables. As well as the null hypothesis for no cointegration among the variables in equation (7) is :

- H_0 : $\lambda_{1D1} = \lambda_{2D1} = \lambda_{3D1} = \lambda_{4D1} = \lambda_{5D1} = \lambda_{6D1} = \lambda_{7D1} = 0$

against the alternative hypothesis

- H_1 : $\lambda_{1D1} \neq \lambda_{2D1} \neq \lambda_{3D1} \neq \lambda_{4D1} \neq \lambda_{5D1} \neq \lambda_{6D1} \neq \lambda_{7D1} \neq 0$

This can also be denoted as follows: $F(D1_t \mid GDP_t, PO_t, RP_t, RER_t, SDR_t, TEM_t)$.

The asymptotic distributions of the F-statistics are non-standard under null hypothesis of no cointegration relationship between the among variables, irrespective of whether the variables are purely I(0) or I(1), mutually cointegrated. The sets of asymptotic critical value are provided by Pesaran and Pesaran(1997). The first set assumes that all variables are I(0) while the second set assumes that all variables are I(1). And can define null hypothesis as well as define a against the alternative hypothesis is: H_0 : cointegration or long-run relationship to be not found among the variables; H_1: cointegration or long-run relationship to be found among the variables.

- If the computed F-statistics is greater than the upper bound critical value, then reject the null hypothesis and conclude that cointegration or long-run relationship to be found among the variables.
- If the computed F-statistics is less than the lower bound critical value, then accept the null hypothesis and conclude that cointegration or long-run relationship to be not found among the variables.
- If the computed F-statistics falls with the lower and upper bound critical value, then result is inconclusive; the error correction term will be a useful way of establishing cointegration(Kremers, et al.(1992) and Bannerjee, et al.(1998)).

The conclusion of step for ARDL approach to cointegration as well as this approach consists of two steps (Pesaran et al, 2001): in first step is to examine the existence of long-run relationship among all variables in equation under estimation; the second step is to estimate the long-run and short-run coefficients of the same equation. Perception: all variable previously defined and the order of lags in ARDL model are selected by either the Akaike Information Criterion (AIC) or the Schwartz Bayesian Criterion (SBC) before the selected model is estimated by the OLS technique (Narayan, et al. (2004)); SBC is known as the parsimonious model: selecting the smallest possible lag length (Pesaran and Smith (1998), Shrestha (2006)); AIC is known for selecting the maximum relevant lag length(Pesaran and Smith (1998), Marashdeh (2005) and Shrestha (2006)).

5. THE RESULTS OF THE RESEARCH

5.1. The results of the Unit-Root Test

This paper determines the order of integration of the variables by 6 standard method tests for unit root. Namely ADF-Test (1979), PP-Test(1987,1988), KPSS-Test (1992), DF-GLS Test (1996), The ERS Point Optimal Test and Ng and Perron (2001). And if both variables are integrated of the same order and the variables are integrated of I(0) and I(1) than apply the ARDL approach to cointegration for the long-run relationship between the dependent variable with the independent variables (Pesaran and Pesaran (1997), Pesaran and Smith (1998) and Pesaran et al.(2001)). And after that can use the ECM model for estimating the short-run relationship between the dependent variables with the independent variables. The results of unit root test based on the 6 standard method tests are shown in table 1 and table 2. All variables were used in the international tourism demand model of Thailand were both integrated of order (d) and integrated of order (0).

And when first differencing or second differencing in all variables (excepted the variables have integrated of order (0) or I(0)) were used in this model as well as the order of integrated in all variables changed. The results of unit root test based on 6 methods after first differencing or second differencing showed in table3 and table 4. After first differencing or second differencing in all variables were used in international tourism demand model of Thailand were both integrated of order (1) and integrated of order (2).

5.2. The results of the analysis of Thailand 's International Tourism Demand

5.2.1. The results of cointegration test of Thailand 's International Tourism Demand as in long-run based on ARDL approach to cointegration

The calculated F-statistics are reported in table 1 as well as this table presented the value of F-statistics for testing the existence of a long-run relationship among variables of Thailand's international tourism demand model. And the critical value bounds of the F-statistics with intercept and no trend (k = 4, k = 5, and k = 6) from Pesaran and Shin (2001).

Table 1. F-statistics for testing the existence of a long-run relationship among variables and Critical value bounds of the F-statistics with intercept and no trend (k= 4, k=5 and k=6) from Pesaran and Shin (2001)

Source countries for Thailand's tourists	F-statistics	5% Critical value		The number of k
		I(0) lower bound	I(1) upper bound	k
Malaysia	7.97**	2.87	4.00	6
Japan	37.26**	2.85	4.04	4
China	3.01	2.65	3.80	5
Singapore	6.72**	2.65	3.80	5
Taiwan	3.34	2.87	4.00	6
Korea	22.95**	2.87	4.00	6
England	74.87**	2.87	4.00	6
America	21.52**	2.65	3.80	5
German	23.27**	2.65	3.80	5
Australia	12.45**	2.65	3.80	5
France	14.70**	2.65	3.80	5
Sweden	18.35**	2.65	3.80	5
Canada	31.31**	2.65	3.80	5

*Source: From computed , * = Sig. at 90% , ** = Sig. at 95%.*

For all of Thailand 's source countries –Malaysia, Japan, Singapore, Korea, England, America, German, Australia, France, Sweden and Canada- F-statistics is higher than the upper bound critical value at the 5 % level. This implies that the null hypothesis of no cointegration can not be accepted and that there is indeed a cointegration relationship among the variables in all models. Excepted both China and Taiwan are lower than the upper bound critical value at the 5 % level. This case has not a problem both China and Taiwan as well as these country have long-run relationship among their variables during 1997(Q1)-2005(Q2). Because both China and Taiwan have the coefficient of the error correction model(ECM) of the selected ARDL approach to cointegration is negative and highly significant at 1 % level. This confirms the existence of a stable long-run relationship and points to a long-run cointegration relationship between variables (Bannerjee *et al.* (1998), Hazem Marashdeh(2005), Bazoumana Ouattara (2004)). And the all variables of both China and Taiwan have been tested by 6 standard unit root test before estimated by ARDL approach to

cointegration. The results of this method has not a problem for cointegration test base on ARDL approach to cointegration (Narayan (2004).

5.2.2. The results of the analysis of Thailand 's International Tourism Demand as in long-run based on ARDL approach to cointegration

The empirical results of the long-run tourism demand model for Thailand 's thirteen international main tourist source countries, obtained by normalizing on visitor arrivals, are presented on table 2.

Table 2. Results of the Long-Run relationship in Thailand 's international tourism demand base on ARDL approach (Pesaran and Pesaran (1997), Pesaran and Smith (1998) and Pesaran et al.(2001)).[the numbers of international tourist arrivals is the dependent variable(1997(Q1)) to 2005(Q2)]

Country	Con.	ln(GDP_t)	ln(PO_t)	ln(RP_t)	ln(RER_t)	ln(SDR_t)	ln(TEM)	ARDL Model
Malaysia	-0.28 (-0.07)	1.50*** (4.52)	-0.18*** (-3.11)	3.22 (1.20)	-1.05*** (-2.52)	-0.43* (-1.80)	-1.74*** (-2.71)	ARDL (0,0,1,0,0,0,0)
Japan	47.99* (2.37)	-10.65** (-2.85)	1.08** (3.26)	-	-	-4.89** (-2.98)	29.93** (2.53)	ARDL (4,4,4,4,4,4)
China	24.58*** (5.13)	-0.13 (-1.56)	-0.10 (-0.69)	-	0.19 (0.46)	-0.44 (-1.22)	-3.46* (-2.63)	ARDL (0,0,1,0,0,0)
Singapore	-2.73 (-0.51)	1.68*** (3.23)	-0.26** (-1.95)	-	-0.96** (-2.44)	-0.07 (-1.26)	-1.66*** (-3.44)	ARDL (1,0,1,1,0,0)
Taiwan	-4.80 (-0.24)	0.17 (0.11)	-0.03 (-0.12)	-2.69 (-1.23)	-4.02*** (-4.44)	-5.76*** (-2.98)	3.94*** (2.51)	ARDL (0,1,1,0,0,0,0)
Korea	2.52*** (2.37)	0.04 (0.84)	0.01 (0.43)	-0.58* (-1.72)	0.05 (0.51)	- 17.00*** (-3.64)	-0.03*** (-2.81)	ARDL (0,0,0,1,0,1,0)
England	15.21*** (9.22)	1.22*** (6.19)	-0.16*** (-3.32)	-1.79** (-2.00)	-0.84*** (-4.75)	-0.01 (-1.35)	-4.42*** (-11.00)	ARDL (0,1,0,0,0,1,1)
America	15.50*** (4.18)	0.95*** (2.33)	-0.01 (-0.20)	-	-0.51** (-2.23)	-0.01 (-0.59)	-4.69*** (-7.00)	ARDL (0,0,0,0,1,1)
German	47.67*** (4.48)	-0.08 (-0.05)	-0.06 (-0.55)	-	-0.25* (-1.73)	0.14*** (2.65)	-11.32*** (-12.00)	ARDL (0,0,1,0,1,1)
Australia	-20.43 (-0.82)	0.28 (0.19)	0.10 (0.31)	-	-0.08 (-0.06)	0.008 (0.04)	7.99 (1.04)	ARDL (1,0,0,0,0,1)
France	0.67 (0.16)	0.59 (0.99)	0.05 (0.56)	-	0.01 (0.46)	-0.07 (-1.58)	1.33*** (3.23)	ARDL (2,0,0,0,0,2)
Sweden	31.79** (2.16)	2.80*** (2.51)	-0.29 (-1.24)	-	-0.37 (-0.51)	1.20* (1.71)	-17.79*** (-10.53)	ARDL (0,1,1,1,0,1,1)
Canada	27.04*** (6.82)	1.24** (2.00)	-0.18 (-1.69)	-	-0.75 (-1.49)	0.01 (0.26)	-8.63*** (-10.72)	ARDL (0,0,0,0,1,0,1)

* = Sig. at 90% , ** = Sig. at 95% , ***= Sig. at 99% , Source : from computed

All variables appear with both the correct sign and incorrect sign. Clearly, incomes of origin countries, travel costs, own price, exchange and temperature of Thailand are influential in determining international visitor arrivals to Thailand. The results of all variables were used in this research impact on the international visitor arrivals to Thailand during 1997(Q1) - 2005(Q2) showed that.

In Malaysia as in long-run base on ARDL approach to cointegration suggested that ln(PO_t), ln(RER_t), ln(SDR_t) and ln(TEM_t) have negative impact on international

tourist arrival to Thailand excepted ln(GDP_t) has positive impact on international tourist arrivals to Thailand. The empirical results imply that in long-run when ln(PO_t), increasing 1 % then the number of Malaysian tourists arriving in Thailand decreasing 0.18 %, ln(RER_t) increasing 1% then the number of Malaysian tourists arriving in Thailand decreasing 1.05%, ln(SDR_t) increasing 1% then the number of Malaysian tourists arriving in Thailand decreasing 0.43% and when ln(TEM_t) increasing 1% then the number of Malaysian tourists arriving in Thailand decreasing 1.74%. Otherwise when ln(GDP_t) increasing 1% then the number of Malaysian tourists arriving in Thailand increasing 1.50%.

In Japan as in long-run base on ARDL approach to cointegration suggested that Constant term, ln(PO_t) and ln(TEM_t) have positive impact on international tourist arrival to Thailand excepted ln(GDP_t) and ln(SDR_t) have negative impact on international tourist arrivals to Thailand. The empirical results imply that in long-run when defined all variables were used in demand model equal to 0 and other all variables were not used in this model increasing 1% then the number of Japanese tourists arriving in Thailand increasing 47.99%., ln(PO_t) increasing 1% then the number of Japanese tourists arriving in Thailand increasing 1.08%, ln(TEM_t) increasing 1% then the number of Japanese tourists arriving in Thailand increasing 29.93%. Otherwise when ln(GDP_t) increasing 1% then the number of Japanese tourists arriving in Thailand decreasing 1.50% and when ln(SDR_t) increasing 1% then the number of Japanese tourists arriving in Thailand decreasing 4.89%.

In Chinese as in long-run base on ARDL approach to cointegration suggested that Constant term has positive impact on international tourist arrival to Thailand. And ln(TEM_t) has negative impact on international tourist arrivals to Thailand. The empirical results imply that in long-run when defined all variables were used in demand model equal to 0 and other all variables were not used in this model increasing 1% then the number of Chinese tourists arriving in Thailand increasing 24.58%. Otherwise when ln(TEM_t) increasing 1% then the number of Chinese tourists arriving in Thailand decreasing 3.46%.

In Singapore as in long-run base on ARDL approach to cointegration suggested that ln(PO_t), ln(RER_t) and ln(TEM_t) have negative impact on international tourist arrival to Thailand excepted ln(GDP_t) has positive impact on international tourist arrivals to Thailand. The empirical results imply that in long-run when ln(PO_t) increasing 1 % then the number of Singaporean tourists arriving in Thailand decreasing 0.26 %, ln(RER_t) increasing 1% then the number of Singaporean tourists arriving in Thailand decreasing 0.96 % and when ln(TEM_t) increasing 1% then the number of Singaporean tourists arriving in Thailand decreasing 1.66%. Otherwise when ln(GDP_t) increasing 1 % then the number of Singaporean tourists arriving in Thailand increasing 1.68%.

In Taiwan as in long-run base on ARDL approach to cointegration suggested that both ln(RER_t) and ln(SDR_t) have negative impact on international tourist arrival to Thailand excepted ln(TEM_t) has positive impact on international tourist arrivals to Thailand. The empirical results imply that in long-run when ln(RER_t) increasing 1 % then the number of Taiwan's tourists arriving in Thailand decreasing 4.02%, ln(SDR_t) increasing 1% then the number of Taiwan 's tourists arriving in Thailand decreasing

5.76%. Otherwise when ln(TEM_t) increasing 1% then the number of Taiwan 's tourists arriving in Thailand increasing 3.94%.

In Korea as in long-run base on ARDL approach to cointegration suggested that ln(RP_t), ln(SDR_t) and ln(TEM_t) have negative impact on international tourist arrival to Thailand excepted Constant term has positive impact on international tourist arrivals to Thailand. The empirical results imply that in long-run when ln(RP_t) increasing 1 % then the number of Korea's tourists arriving in Thailand decreasing 0.58 %, ln(SDR_t) increasing 1% then the number of Korea's tourists arriving in Thailand decreasing 17.00% and when ln(TEM_t) increasing 1 % then the number of Korea's tourists arriving in Thailand decreasing 0.03%. Otherwise when defined all variables were used in demand model equal to 0 and other all variables were not used in this model increasing 1% then the number of Korea 's tourists arriving in Thailand increasing 2.52%.

In England as in long-run base on ARDL approach to cointegration suggested that ln(PO_t), ln(RP_t), ln(RER_t) and ln(TEM_t) have negative impact on international tourist arrival to Thailand excepted both Constant term and ln(GDP_t) have positive impact on international tourist arrivals to Thailand. The empirical results imply that in long-run when ln(PO_t), increasing 1 % then the number of England 's tourists arriving in Thailand decreasing 0.16%, ln(RP_t) increasing 1% then the number of England 's tourists arriving in Thailand decreasing 1.79%, ln(RER_t) increasing 1% then the number of England 's tourists arriving in Thailand decreasing 0.84% and when ln(TEM_t) increasing 1% then the number of England 's tourists arriving in Thailand decreasing 4.42%. Otherwise when defined all variables were used in demand model equal to 0 and other all variables were not used in this model increasing 1% then the number of England 's tourists arriving in Thailand increasing 15.21%. As well as when ln(GDP_t) increasing 1% then the number of England 's tourists arriving in Thailand increasing 1.22%.

In America as in long-run base on ARDL approach to cointegration suggested that Constant term and ln(GDP_t) have positive impact on international tourist arrival to Thailand excepted ln(RER_t) and ln(TEM_t) have negative impact on international tourist arrivals to Thailand. The empirical results imply that in long-run when defined all variables were used in demand model equal to 0 and other all variables were not used in this model increasing 1 % then the number of American tourists arriving in Thailand increasing 15.50 %, ln(GDP_t) increasing 1% then the number of American tourists arriving in Thailand increasing 0.95 %. Otherwise when ln(RER_t) increasing 1 % then the number of American tourists arriving in Thailand decreasing 0.51 % as well as when ln(TEM_t) increasing 1% then the number of American tourists arriving in Thailand decreasing 4.69 %.

In Germany as in long-run base on ARDL approach to cointegration suggested that both Constant term and ln(SDR_t) have positive impact on international tourist arrival to Thailand excepted both ln(RER_t) and ln(TEM_t) have negative impact on international tourist arrivals to Thailand. The empirical results imply that in long-run when defined all variables were used in demand model equal to 0 and other all variables were not used in this model increasing 1% then the number of German's tourists arriving in Thailand increasing 47.67%, ln(SDR_t) increasing 1% then the

number of German's tourists arriving in Thailand increasing 0.14%. Otherwise when $\ln(RER_t)$ increasing 1% then the number of German 's tourists arriving in Thailand decreasing 0.25% and when $\ln(TEM_t)$ increasing 1% then the number of German 's tourists arriving in Thailand decreasing 11.32%.

In France as in long-run base on ARDL approach to cointegration suggested that only one variables is $\ln(TEM_t)$ has negative impact on international tourist arrival to Thailand. The empirical results imply that in long-run when $\ln(TEM_t)$ increasing 1% then the number of France's tourists arriving in Thailand decreasing 1.33%.

In Sweden as in long-run base on ARDL approach to cointegration suggested that Constant term, $\ln(GDP_t)$ and $\ln(SDR_t)$ have positive impact on international tourist arrival to Thailand excepted $\ln(TEM_t)$ has negative impact on international tourist arrivals to Thailand. The empirical results imply that in long-run when defined all variables were used in demand model equal to 0 and other all variables were not used in this model increasing 1 % then the number of Sweden's tourists arriving in Thailand increasing 31.79 %, $\ln(GDP_t)$ increasing 1% then the number of Sweden's tourists arriving in Thailand increasing 2.80 % and $\ln(SDR_t)$ increasing 1 % then the number of Sweden 's tourists arriving in Thailand increasing 1.20 %. Otherwise when $\ln(TEM_t)$ increasing 1 % then the number of Sweden's tourists arriving in Thailand decreasing 17.79 %.

In Canada as in long-run base on ARDL approach to cointegration suggested that Constant term and $\ln(GDP_t)$ have positive impact on international tourist arrival to Thailand excepted $\ln(TEM_t)$ has negative impact on international tourist arrivals to Thailand. The empirical results imply that in long-run when defined all variables were used in demand model equal to 0 and other all variables were not used in this model increasing 1 % then the number of Canada's tourists arriving in Thailand increasing 27.04%, $\ln(GDP_t)$ increasing 1% then the number of Canada's tourists arriving in Thailand increasing 1.24%. Otherwise when $\ln(TEM_t)$ increasing 1% then the number of Canada's tourists arriving in Thailand decreasing 8.63%.

5.2.3. The results of the analysis of Thailand 's International Tourism Demand as in short-run (ECM) selected based on ARDL approach to cointegration

The results of the error correction model for each of the 13 countries (Malaysia, Japan, China, Singapore, Taiwan, Korea, England, America, German, Australia, France, Sweden and Canada) is presented in both table 3 and table 4 (results of the short-run relationship in Thailand 's international tourism demand based on the ECM model was selected by ARDL approach to cointegration and this approach was developed by Pesaran and Pesaran (1997), Pesaran and Smith (1998) and Pesaran et al.(2001)). The empirical results in the short-run indicate that growth in income of the origin countries has positive impact on international visitors arriving in Thailand. The results imply that in short-run when $\ln(GDP_t)$ in Malaysia, Japan, China, Singapore, Taiwan, Korea, England, America, German, Australia, France, Sweden and Canada increasing 1 % then the number of Malaysia's tourists arriving in Thailand increasing 2.78 %, the number of Japan's tourists arriving in Thailand increasing 9.23 %, the number of Singapore's tourists arriving in Thailand increasing 2.33 %, the number of

Taiwan 's tourists arriving in Thailand increasing 3.23 %, the number of Korea 's tourists arriving in Thailand increasing 0.17 %, the number of America's tourists arriving in Thailand increasing 8.32 %, the number of Australia 's tourists arriving in Thailand increasing 6.63 %, the number of Sweden's tourists arriving in Thailand increasing 0.99 % and the number of Canada 's tourists arriving in Thailand increasing 3.24 %.

Table 3. Results of the Short-Run relationship in Thailand's International Tourism Demand of Thailand based on error correction variable selected by ARDL approach to cointegration

Variables	Malaysia	Japan	China	Singapore	Taiwan	Korea	England
C	-0.21*** (-3.64)	0.02 (0.26)	-0.39** (-2.47)	-0.01 (-0.42)	0.05 (0.56)	0.04 (1.28)	-0.04** (-1.98)
$\Delta\ln(GDP_t)$	2.87*** (4.21)	9.23*** (2.52)	0.09 (1.46)a	2.33*** (3.53)	3.23*** (2.76)	0.17** (2.39)	0.28 (0.57)
$\Delta\ln(PO_t)$	-0.24 (-1.44)a	-0.16 (-0.91)b	0.80** (2.41)	0.03 (0.19)a	0.90*** (2.97)	-0.01 (-0.37)	-0.12** (-2.07)
$\Delta\ln(RP_t)$	-0.74 (-0.22)	-	-	-	-5.36 (-1.01)	-0.55 (-1.02)	-0.28 (-0.23)
$\Delta\ln(RER_t)$	-0.60 (-1.06)	-	-0.15 (-0.32)a	-0.05 (-0.11)a	-3.93* (-1.94)	-0.15* (-1.76)	-0.43* (-1.90)
$\Delta\ln(SDR_t)$	-0.43*** (-3.00)	0.96*** (3.31)b	0.15 (0.42)b	-0.09** (-2.07)	-4.53 (-1.64)	-13.17** (-2.09)	-0.01* (-1.69)
$\Delta\ln(TEM_t)$	3.57*** (3.75)	-0.75 (-0.34)a	5.51** (2.20)	-1.69*** (-3.11)	4.02*** (2.75)	0.59*** (2.97)	-2.58*** (-6.94)
DUM	0.46*** (4.52)	-0.01 (-0.05)	0.07** (2.40)	0.03 (0.62)	0.06 (0.59)	0.09*** (4.56)	0.08 (1.61)
EC_{t-1}	-0.90*** (-4.85)	-0.07*** (-2.38)	-1.08*** (-3.85)	-1.45*** (-8.57)	-1.17*** (-5.31)	-0.48*** (-2.89)	-0.68*** (-3.81)
R^2	0.80	0.78	0.72	0.86	0.72	0.81	0.94
R^{-2}	0.73	0.71	0.62	0.82	0.61	0.73	0.92
DW.	2.10	1.63	1.77	1.85	1.80	1.89	2.03
F-statistics	11.58***	11.31***	6.90***	21.24***	6.39***	10.45***	39.39***
J-B(Normal) (Prob.)	0.21 (0.90)	1.61 (0.44)	19.77 (0.00)	6.73 (0.03)	0.25 (0.88)	0.31 (0.85)	0.12 (0.94)
$C^2_{auto\ (2)}$	0.65	0.18	0.12	0.38	0.25	0.61	0.14
$c^2_{white\ (15),\ (13)}$	0.90	0.15	0.27	0.18	0.11	0.42	0.36
$c^2_{RESET\ (2)}$	0.59	0.14	0.00	0.01	0.32	0.00	0.01
Chow forecast test	0.47^N	0.32^N	0.14^N	0.06^S	0.01^S	0.00^S	0.47^N

*a=lag 1 period , b = lag 2 period , * = Sig. at 90% , ** = Sig. at 95% , ***= Sig. at 99%, Source : from computed; N = No structure changed , S = Structure changed.*

The empirical results in the short-run indicate that an increasing in the world price of jet fuel has negative impact on the number of international visitors arriving to Thailand (excepted for China and Taiwan). The results imply that in the short-run when the world price of jet fuel increasing 1% then the number of England's tourists

arriving to Thailand decreasing 0.12%, the number of America 's tourists arriving to Thailand decreasing 0.23%, the number of German's tourists arriving to Thailand decreasing 0.04 % and the number of Canada's tourists arriving to Thailand decreasing 0.29 %. Otherwise in the short-run indicate that an increasing in the world price of jet fuel has positive impact on the number of international visitors arriving to Thailand. The results imply that in the short-run when the world price of jet fuel increasing 1% then the number of China 's tourists arriving in Thailand increasing 0.80% as well as the number of Taiwan's tourist arriving to Thailand increasing 0.90%.

Table 4. Results of the Short-Run relationship in Thailand 's International Tourism Demand of Thailand based on error correction variable selected by ARDL approach to cointegration

Variables	America	German	Australia	France	Sweden	Canada
C	-0.33*** (-4.15)	-0.14*** (-2.94)	-0.03 (-0.53)	-0.16*** (-4.22)	-058*** (-2.65)	-0.22*** (-4.23)
$\Delta\ln(GDP_t)$	8.32*** (3.22)	0.86 (0.24)	6.63* (1.69)	0.09 (1.07)a	0.99*** (3.58)a	3.24* (1.70)
$\Delta\ln(PO_t)$	-0.23** (-2.19)a	-0.04*** (-3.35)	0.05 (0.33)a	0.17 (1.25)	-0.25 (-1.24)	-0.29** (-2.27)
$\Delta\ln(RP_t)$	-	-	-	-	-	-
$\Delta\ln(RER_t)$	-0.24 (-1.08)a	0.41*** (-2.43)b	0.31 (0.49)	0.004 (0.09)	0.29 (0.56)	-0.10 (-0.26)
$\Delta\ln(SDR_t)$	-0.03** (-2.36)b	-0.05** (-1.91)	-0.002 (-0.09)b	-0.03 (-0.78)	-0.48 (-1.52)	0.007 (0.22)
$\Delta\ln(TEM_t)$	2.08** (2.46)a	-6.51*** (-20.34)	-0.52* (-1.75)a	-1.50*** (-8.63)a	-2.06 (-1.48)	-3.92*** (-9.00)
DUM	0.42*** (2.77)	0.27*** (4.16)	-0.06 (-1.09)	0.35*** (8.08)	1.22*** (2.88)	0.39*** (4.87)
EC_{t-1}	-0.53*** (-3.17)	-0.56*** (-4.53)	-0.11*** (-3.59)	-1.07*** (-16.39)	-0.23** (-1.97)	-0.29* (-1.78)
R^2	0.87	0.97	0.50	0.94	0.97	0.95
R^{-2}	0.82	0.95	0.30	0.93	0.96	0.94
DW.	2.29	2.05	1.72	1.73	2.33	1.82
F-statistics	17.98***	82.84***	2.35**	50.43***	93.92***	59.03***
J-B(Normal) (Prob.)	1.59 (0.45)	3.92 (0.14)	2.90 (0.23)	0.49 (0.78)	2.79 (0.24)	0.98 (0.61)
$c^2_{auto\,(2)}$	0.38	0.24	0.34	0.29	0.29	0.99
$c^2_{white\,(15),(13)}$	0.77	0.79	0.41	0.01	0.77	0.82
$c^2_{RESET\,(2)}$	0.03	0.00	0.01	0.07	0.00	0.04
Chow forecast test	0.00^S	0.76^N	0.00^S	0.00^S	0.88^N	0.04^S

*a=lag 1 period , b = lag 2 period , * = Sig. at 90% , ** = Sig. at 95% , ***= Sig. at 99%*
Source : from computed , N = No structure changed , S = Structure changed.

The empirical results in the short-run indicate that an increasing the real value of exchange between the country of origin (Taiwan, Korea, England) has negative impact on the number of international visitors arriving to Thailand. The results imply

that in the short-run when the real value of exchange between the country of origin increasing 1% then the number of Taiwan's tourists arriving to Thailand decreasing 3.93 %, the number of Korea's tourists arriving to Thailand decreasing 0.15%, the number of England's tourists arriving to Thailand decreasing 0.43%. Otherwise the empirical results in short-run indicate that an increase the real value of exchange between the Thailand with the German has positive impact on the number of German's tourists arriving to Thailand. The results imply that in the short-run when lags two period of the real value of exchange between Thailand with German increasing 1% then the number of German's increasing 0.41%.

The empirical results in the short-run indicate that an increase the value of exchange risk between the country of origin (Malaysia, Singapore, Korea, England, German and America) has negative impact on the number of international visitors arriving to Thailand. The results imply that in the short-run when the value of exchange risk between the country of origin increasing 1% then the number of Malaysia's tourists arriving to Thailand decreasing 0.43%, the number of Singapore's tourists arriving to Thailand decreasing 0.09%, the number of Korea's tourists arriving to Thailand decreasing 13.17%, the number of England's tourists arriving to Thailand decreasing 0.01%, the number of German's tourists arriving to Thailand decreasing 0.05%. As well as when lags two period of the value of exchange risk between Thailand with America increasing 1% then the number of America's arriving to Thailand decreasing 0.03%.

Otherwise the empirical results in short-run indicate that an increase the value of exchange risk between the Thailand with the Japan has positive impact on the number of Japan's tourists arriving to Thailand. The results imply that in the short-run when lags two period of the value of exchange risk between Thailand with Japan increasing 1% then the number of Japan's tourists increasing 0.96%. The empirical results in the short-run indicate that an increase the temperature of Thailand (excepted Malaysia, China, Taiwan, Korea and America) has negative impact on the number of international visitors arriving to Thailand. The results imply that in the short-run when the temperature of Thailand increasing 1% then the number of Singapore's tourists arriving to Thailand decreasing 1.69%, the number of England's tourists arriving to Thailand decreasing 2.58 %, the number of German's tourists arriving to Thailand decreasing 6.51% and the number of Canada's tourists arriving to Thailand decreasing 3.92%. As well as when lags one period of temperature of Thailand increasing 1% then the number of Australia's tourists arriving to Thailand decreasing 0.52% and the number of France's tourists arriving to Thailand decreasing 1.50%. Otherwise the empirical results in short-run indicate that an increase the temperature of Thailand has positive impact on the number of international visitors arriving to Thailand. The results imply that in the short-run when the temperature of Thailand increasing 1% then the number of Malaysia's tourists arriving to Thailand increasing 3.57 %, the number of China's tourists arriving to Thailand increasing 5.51%, the number of Taiwan's tourists arriving to Thailand increasing 4.02%, the number of Korea's tourists arriving to Thailand increasing 0.59%. As well as when lags one period of temperature of Thailand increasing 1% then the number of America's tourists arriving to Thailand increasing 2.08 %.

The empirical results in the short-run indicate that increase other variables were not used in ECM model (defined that this the variables as constant term of ECM model) has negative impact on the number of international visitors arriving to Thailand. The results imply that in the short-run when other variables were not used in ECM model increasing 1 % (while the variables were used in this model to be constant value) then the number of Malaysia's tourists arriving to Thailand decreasing 0.21%, the number of China's tourists arriving to Thailand decreasing 0.39%, the number of England's tourists arriving to Thailand decreasing 0.04%, the number of America's tourists arriving to Thailand decreasing 0.33%, the number of German's tourists arriving to Thailand decreasing 0.14 %, the number of France's tourists arriving to Thailand decreasing 0.16%, the number of Sweden's tourists arriving to Thailand decreasing 0.58 % and the number of Canada's tourists arriving to Thailand decreasing 0.22%.

Finally, as excepted, Dum tend to have a significant positive effect on international visitor arrivals to Thailand. The empirical results in short-run indicate that in high season of Thailand has positive impact on international visitor arrival to Thailand. The results imply that when Thailand has a during of high season then median of number of Malaysia's tourists arrivals to Thailand increase around 58.40% when comparison with low season of Thailand, median of the number of China's tourists arrivals to Thailand increase around 7.25% when comparison with low season of Thailand, median of the number of Korea's tourists arrivals to Thailand increase around 9.41% when comparison with low season of Thailand, median of the number of America's tourists arrivals to Thailand increase around 52.19% when comparison with low season of Thailand, median of the number of German's tourists arrivals to Thailand increase around 30.99% when comparison with low season of Thailand, median of the number of France's tourists arrivals to Thailand increase around 41.90 % when comparison with low season of Thailand, median of the number of Sweden's tourists arrivals to Thailand increase around 238.71 % when comparison with low season of Thailand and median of the number of Canada's tourists arrivals to Thailand increase around 47.69 % when comparison with low season of Thailand (Gujarati (2003), p.321).

Granger (1986) notes that the existence of a significant error correction term is evidence of causality in at least one direction. The lagged error correction term EC_{t-1} is negative and significant at the 1 % level for all countries (excepted both Sweden and Canada are significant at the 5 % and 10 % respectively). The coefficients of -0.90, -0.07, -1.80, -1.45, -1.17, -0.48, -0.68, -0.53, -0.56, -0.11, -1.07, -0.23, -0.29 for Malaysia, Japan, China, Singapore, Taiwan, Korea, England, America, German, Australia, France, Sweden and Canada, respectively, indicate a moderate rate of convergence to equilibrium. The value of adjust R^{-2} of ECM model is very high value as well as the value most of them are more than 70 %(excepted the ECM model of China, Taiwan and Australia). The value of F-statistic showed that every ECM model are fit for be a short-run model of Thailand's international tourism demand model by statistics significant at 1 % (excepted the ECM model of Australia).

Furthermore this paper applied a number of diagnostic test to the error correction model. The models passed the Jarque-Bera normality test, suggesting that

the errors of them are normally distributed expect the model for China not pass this test because the data were used in this model are very small size. Hence, it should not be used with the Jarque-Bera statistics test for the normality of error term of this model (Gujarati(2003), Parsert, Rangaswamy and Chukiat (2006)). There is no evidence of autocorrelation in the disturbance of the error term (see value of L.M-test in same tables). The White-test suggested that the error is homoskedastic and independent of the regressors (excepted ECM model of France). The RESET test indicates that the models are correctly specified (excepted ECM model of Malaysia, Japan and Taiwan). While the Chow-forecast-test indicates that both ECM models have structure changed and ECM model have not structure changed.

6. THE CONCLUSIONS OF RESEARCH AND POLICY RECOMMENDATIONS

This paper was motivated by the need for empirical analysis of international tourist behavior arriving in Thailand and an analysis of the determinants of Thailand's international tourism demand from its thirteen main source markets, Malaysia, Japan, China, Singapore, Taiwan, Korea, England, America, German, Australia, France, Sweden and Canada. In this article, six standard unit root test were used test for all variables. Namely, ADF-Test (1979), PP-Test (1987,1988), KPSS-Test (1992), DF-GLS Test (1996), The ERS Point Optimal Test and Ng and Perron Test (2001). And in this paper the bounds testing approach to cointegration base on ARDL approach to cointegration which this method was developed by Pesaran ansd Shin, 1995, 1999; Pesaran *et al,* 1996, Pesaran (1997), Pesaran and Smith (1998) and Pesaran *et al*.(2001). Although this method suggested that no need to pre-testing of unit root test of variables (Pesaran *et al*. (2001), Narayan (2004)). However, Ouattara (2004a), Chaudhry and Choudhary (2005) argues that in the presence of I(2) variables the computed F-statistics provided by Pesaran *et al.* (2001) are no more valid because they are based on the assumption that the variables are I(0) or I(1).

Therefore, the implementation of unit root test in ARDL procedure might still be necessary in order to ensure that none of the variables is integrated of order 2 or beyond. Consequently this paper must be used six standard unit root test for all variables before uses ARDL approach to cointegration. This method was used to investigate long-run equilibrium relationships between the number of international tourists arriving in Thailand with economics variables and temperature of Thailand. The economic variables such as the GDP of major countries of international tourists arriving to Thailand, the world price of kerosene-type jet fuel, the relative price of Thailand with the countries of international tourism and exchange rate of Thailand compared with the countries of international tourists. The existence of cointegration allowed for the application of error correction models to depict the short-run elasticities

The conclusion of the research and policy recommendations has There are sixth important conclusions and recommendations that emerge from the empirical analysis of the research. First, a 1% increase in income (GDP) in the long-run in main source markets, Malaysia, Singapore, England, America, Sweden and Canada

(excepted Japan) leads to an increase in international visitor travelling to Thailand by 1.50%, 1.68%, 1.22%, 0.95%, 2.80% and 1.24%, respectively. This result is consistent with economic theory and the this result was similar with the results of previous empirical studies of tourist demand (Lim & McAleer (2003), Kafono & Gounder (2004), Narayan (2004), Parsert, Rangaswamy and Chukiat (2006). The long-run result for Thailand's international tourism demand implies that Thailand received increased international visitors with a growth in income (GDP) in major markets during that period. If this can be generalized for future years, then it argues well for the continued development of the Thai tourism industry.

Secondly, a 1% increase in transportation costs (price of jet fuel) in the long-run in mostly major source markets such as Malaysia, Singapore and England (excepted Japan) leads to decreased international tourist arrivals from those countries in Thailand of 0.18%, 0.26% and 0.16% respectively. This result is consistent with economic theory and this result was similar with the results of previous empirical studies of tourism demand (Lim & McAleer (2001), Narayan (2004), Parsert, Rangaswamy and Chukiat (2006). If a generalization can be made for future years, then it suggests that the Thai government should increase support for international low cost airlines or reduce the cost for international airlines arriving in Thailand because the Thai government cannot control the price of jet fuel in future.

Thirdly, in the long-run the exchange rate is an important determiner of international tourist's behavior and a 1% increase in the value of the exchange rate of Thailand against the currency of the major tourist markets of Malaysia, Singapore, Taiwan, England, America and German leads to a decrease in international visitor arrivals from theses countries to Thailand of 1.05%, 0.96%, 4.02%, 0.84%, 0.51% and 0.25% respectively. This results is consistent with economic theory and it suggests that the Reserve bank of Thailand should be careful when using any policy that impacts on Thai currency because when the Thai currency is very strong, it not only negatively impacts on export goods and services (Anderson and Garcia (1989), Pick (1990), Chukiat (2003)) but it also decreases international visitor arrivals to Thailand (Lim & McAleer (2003), Parsert, Rangaswamy and Chukiat (2006)).

Fourthly, in the long-run the exchange rate risk is an important determiner of international tourist's behavior and a 1% increase in the exchange rate risk of Thailand compared with the currency of the major tourist markets of Malaysia, Japan, Taiwan and Korea (excepted both German and Sweden) leads to a decrease in international visitor arrivals from theses countries to Thailand of 0.43%, 4.89%, 5.76% and 17.00% respectively. This results is consistent with economic theory and it suggests that the Reserve bank of Thailand should be careful when using any policy that impacts on Thai exchange risk because when the Thai exchange rate risk so much, it not only negatively impacts on export goods and services (Anderson and Garcia (1989), Pick (1990), Chukiat (2003)) but it also decreases international visitor arrivals to Thailand (Lim & McAleer (2003), Parsert, Rangaswamy and Chukiat (2006)).

Fifthly, a 1% increase in relative price in the long-run in between Thailand with both Korea and England lead to decreased international tourist arrivals from those countries in Thailand of 0.58% and 1.796% respectively. This result is consistent with economic theory and this result was similar with the results of previous empirical

studies of tourism demand (Lim & McAleer (2001), Narayan (2004), Parsert, Rangaswamy and Chukiat (2006). If a generalization can be made for future years, then it suggests that the Thai government should be careful when using any policy that impacts on the price-index of Thailand because when the price-index of Thailand increase then, it not only negative impacts on the consumer behavior of Thai's people but it also decreases international visitor arrivals in Thailand (but not much because impact on only two countries are both Korea and England).

Finally, in the long-run the temperature of Thailand is an important determiner of international tourist's behavior and a 1% increase (meaning that weather is very hot increase 1%) in the temperature of Thailand leads to a decrease in international visitor arrivals from Malaysia, China, Singapore, Korea, England, America, German, Sweden and Canada to Thailand(excepted Japan, Taiwan and France) of 1.74%, 3.46%, 1.66%, 0.03%, 4.42%, 4.69%, 11.32%, 17.79% and 8.63% respectively. it suggests that the department of environment in Thailand's government should be careful when using any policy that impacts on the weather of Thailand because when the weather of Thailand has a high temperature then , it not only negatively impacts on the people of Thailand but it also decreases international visitor arrivals to Thailand (Wietzelise and Richard(2002)).

Appendix A. The table results of research

Table 5. Results of Unit Root Test based on 6 method tests for all variables

Variables	Malaysia	Japan	China	Singapore	Taiwan	Korea	England
D1	I(d)	I(0)	I(d)	I(d)	I(0)	I(d)	I(d)
GDP	I(0)	I(d)	I(d)	I(d)	I(d)	I(d)	I(d)
PO	I(d)	I(d)	I(d)	I(d)	I(d)	I(d)	I(d)
RP	I(d)	-	I(d)	I(d)	I(d)	I(d)	I(d)
RER	I(d)	-	I(0)	I(0)	I(0)	I(d)	I(d)
SDR	I(d)	I(d)	I(d)	I(0)	I(0)	I(0)	I(d)
TEM	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)

Form: computed

Table 6. Results of Unit Root Test base on 6 method tests for all variables

Variables	America	German	Australia	France	Sweden	Canada
D1	I(d)	I(d)	I(d)	I(d)	I(0)	I(d)
GDP	I(d)	I(d)	I(d)	I(d)	I(d)	I(d)
PO	I(d)	I(d)	I(d)	I(d)	I(d)	I(d)
RP	I(d)	I(d)	I(d)	I(d)	-	I(d)
RER	I(d)	I(d)	I(d)	I(d)	I(d)	I(d)
SDR	I(d)	I(d)	I(0)	I(d)	I(0)	I(d)
TEM	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)

Form: computed

Table 7. Results of Unit Root Test base on 6 method tests for all variables after first or second differencing

Variables	Malaysia	Japan	China	Singapore	Taiwan	Korea	England
D1	I(1)	I(0)	I(1)	I(1)	I(0)	I(1)	I(1)
GDP	I(0)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)
PO	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)
RP	I(1)	-	I(2)	I(2)	I(1)	I(1)	I(1)
RER	I(1)	-	I(0)	I(0)	I(0)	I(1)	I(1)
SDR	I(1)	I(1)	I(1)	I(0)	I(0)	I(0)	I(1)
TEM	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)

Form: computed

Table 8. Results of Unit Root Test base on 6 method tests for all variables after first or second differencing

Variables	America	German	Australia	France	Sweden	Canada
D1	I(1)	I(1)	I(1)	I(1)	I(0)	I(1)
GDP	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)
PO	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)
RP	I(2)	I(2)	I(2)	I(2)	-	I(2)
RER	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)
SDR	I(1)	I(1)	I(0)	I(1)	I(0)	I(1)
TEM	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)

Form: computed

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