Modeling International Tourism Demand in Cambodia: ARDL Model

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ABSTRACT

This study uses the Autoregressive Distributed Lag (ARDL) model to study the dynamic determinant factors that influence both long and short-term international tourism demand in Cambodia from 12 countries. The annual time series data (1994–2013) are used in this study. The study finds that only the international tourism demand model of Australia, Canada, Thailand, the United Kingdom, and USA are sustainable as long-term relationships between their potential key explanatory variables (RGDPPC, TP, UR, and PGR). The results suggest the lagged dependent variable has a positive impact on tourist arrival rates to Cambodia from Canada and the UK. Real GDP per capita has a positive effect on tourist arrival rates from Thailand, while the lag of RGDPPC has a significant positive impact on tourist arrival rates from Australia and Canada. The population growth rates (PGR) in Thailand and Australia have positive and negative effects on tourist arrival rates to Cambodia, respectively. The unemployment growth rate (UR) in Australia and its lag in Canada show significant positive impacts on tourist arrival rates from both countries, respectively. PGR, lag in PGR and an increasing UR are significant negative factors on tourist arrivals from the USA. Adjustment rates' returns to their respective long-term equilibria from short-term flux were 52.2% (Australia), 129.5% (Canada), 61.18% (Thailand), 116.3% (The UK), and 213% (The USA).

JEL Classification: C22, F14
Keywords: tourism demand, ARDL Model, Cambodia

1. INTRODUCTION

Known as "the kingdom of wonder", Cambodia has a unique culture combined with undefiled coastlines bordering vast natural attractions rich in cultural heritage sites, and containing fascinating and stunning ancient temples of exotic cultural and historical natures. Angkor Wat, one of the most important archaeological sites in Southeast Asia, is a considerable potential catalyst to spur tourism growth in Cambodia. Historically, tourism in Cambodia grew from 1965 but was dealt a heavy blow by the civil conflict and the genocidal policies of the Pol Pot era which devastated all tourism-related systems in the country. Cambodian tourism has become an essential sector contributing to Cambodia's economy after peace, through the Paris Peace Agreement in 1991, was restored.

The Cambodian government considers tourism a key priority sector. The tourism industry in Cambodia contributes to socio-economic development through directly and indirectly generating and increasing job opportunities, earning profit for people, encouraging exports, accelerating economic growth, boosting national income, reducing poverty, and contributing to efficiently responding to climate change. Statistically, the Cambodian tourism is the

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second largest-earning profit contributed to the national account, after the garment industry. It earned 2.5 billion US$ in 2013, up from 2.2 billion US $ in 2012 (Ministry of Tourism Annual Statistic Report, 2013). Additionally, Cambodia's tourism industry is the most productive job market for Cambodia. It directly created 1.45 million direct jobs in 2011, and this number is forecasted to rise to 1.95 million jobs by 2022. It contributed 12 percent of the Cambodian economy in 2013 (World Travel & Tourism Council, 2013).

Although, tourism in Cambodia is a main engine for stimulating economic growth, there are very limited studies on or an understanding of the determinant factors which affect international tourism demand in Cambodia. There are enormous numbers of studies on some Asian countries as well as in many Western and European countries. These have been exemplified in the papers of Muchapondwa and Pimhidzai (2011), Kibara, Odhiambo and Njuguna (2012), H.-I. et al. (n.d), Ouerfelli (2008), Asemota and Bala (2012), Dritsakis (2004), and Lyssiotou (2000).

Therefore, this paper will investigate the factors that influence tourist arrivals from 12 countries in Cambodia. These tourist arrivals are available from tourism statistic reports for a long period of Cambodia's tourism industry. Results from this research will help to develop the Cambodian tourism industry and thus Cambodia as a tourist destination.

2. LITERATURE REVIEWS

Interest in studies on the demand for tourism has risen in the decades after the Second World War among academic researchers. Published papers have used panel data sets and time series data including forecasting methods in order to explore determinant factors that affect international tourism demand as well as predict the number of tourist arrivals in destination countries; see Serra et al. (2014), Athanasopoulos et al. (2011), Tsui et al. (2014), Greenidge (2001), Wu et al. (2012), Smeral and Weber (2000), Song et al. (2003), Song et al. (2011), Teixeira and Fernandes (2012), Goh and Law (2002), Kulendran and Witt (2003), Wang (2004), Han, Durbarry and Sinchlair (2006), Wong, Song and Chon (2006), Chen and Wang (2007), Wong et al. (2007), Rodriguez, Martinez-Roget, and Pawlowska (2012), Garin-Munoz (2006) and Claveria and Torra (2014).

In terms of using time series model, Muchapondwa (2011) uses ARDL approach to co-integration to estimate the determinants of international tourism demand for Zimbabwe for the period 1998 to 2005. The study finds that transportation costs, changes in global income and certain specific events each have a significant impact on tourist arrivals in Zimbabwe. Dirtsakis (2004) uses co-integration analysis to investigate changes in the long-run demand for tourism to Greece by German and British Nationals. He finds the long-run relationship among macroeconomic variables (such as income in origin countries, transportation cost, exchange rates, and tourism prices in Greece) determine German and British tourism demand to Greece. Gonzalez and Moral (1995) examine international tourism demand in Spain using structural time series model. The results of these studies determined that both Spanish and Greek tourism markets are very sensitive to changes in relative prices and income of the tourists' countries of origin. Song et al. (2003) use the general-to-specific modeling approach to examine the important factors that impact upon international tourism demand to Hong Kong from 16 origin countries. The results show that the cost of tourism in Hong Kong, the economic condition of the origin countries, the cost of substitution in competing destinations and word-of-mouth effect are the most important factors influencing Hong Kong's tourism

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industry. Studies that are consistent with the above studies are Sr and Croes (2000), Habibi, Rahim, and Chin (2008), Lim and McAleer (2001), Chan et al. (2005), and Akis (1998).

Many studies have used a panel data model because of its several advantages. As reported by Hsiao (2003) and Serra, Correia, and Rodrigues (2014), it provides researchers with massive data sets, increases the degree of freedom, reduces the collinearity among explanatory variables, and improves efficiency of econometric estimation as well as in examining a number of importation economic questions that cannot be addressed by using cross-section and time series data sets. Using panel data, most recent studies have examined both economic and non-economic factors that impact international tourism demand. These factors are GDP, relative price, transportation cost, exchange rate, substitute price, crisis, natural disaster, war, diseases, and social crisis. These have been seen in the previous works of researchers such as Massida and Etzo (2012), Falk (2010), Gormus and Gocer (2010), Ouerfelli (2010), Surugiu et al. (2011), Seetanah (2011), and Hor and Thaiprasert (2014).

Massida and Etzo (2012) use dynamic panel data procedures to investigate determinants of Italian domestic tourism demand as measured by regional bilateral tourism flux. Results show differences both at the aggregate level and at the sub-sample level. However, for Italian tourists, domestic and international destinations act as substitutable goods. Hor and Thaiprasert use fixed-effect and random-effect panel data models to investigate economic and non-economic factors that impact on international tourism demand in Cambodia. The results show high GDP per capita in the origin countries for the previous financial year had a significant and positive impact on tourist arrivals from Asia, Oceania, and North America. High relative prices in Cambodia have a negative impact on tourist arrivals from ASEAN, Asia, and North America. Poor exchange rates have a negative impact on arrivals from Oceania and Europe while low transportation costs have a positive effect on tourist arrivals from Asia and Europe.

The serious study of forecasting tourism demand begins slightly more than two-quarters of a century or so ago (Chu, 2011). In this regards, there has been a large body of research dealing with forecasting tourist arrivals. The case of Thailand is documented in such studies as Song, Witt, and Li (2003), Chang, Sriboonchitta, and Wiboonponge (2009), and Webb and Chotithamwattana (2013) while Hong Kong has been investigated by Tsui et al. (2014), Song et al. (2011), Goh and Law (2002), and Wong, Song, and Chon (2006).

3. METHODOLOGY

The majority of published tourism papers use time series data, while a fast-growing number of studies utilize cross-sectional data (Song et al. 2003). Tourism demand is the quantity of tourism and demand for products that consumers are willing to purchase during a specified period under a given set of conditions. The main purpose of this study is to explore the determinant factors that influence international tourist arrivals from 12 countries for both short and long-term periods.

The estimation of international tourism demand to Cambodia from 12 countries of origin is presented in the simple demand function below:

$$Q_{jt} = f(RGDPPC_{jt}, TP_{jt}, UR_{jt}, PGR_{jt},)$$

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Or

$$\ln Q_{jt} = \alpha_0 + \alpha_1 \ln RGDPPC_{jt} + \alpha_2 \ln TP_{jt} + \alpha_3 \ln UR_{jt} + \alpha_4 \ln PGR_{jt} + \varepsilon_{jt} \quad (1)$$

Where,

$\ln Q_{jt}$ = logarithm of a number of tourist arrivals to Cambodia from country of origin *j* during year *t*, where *t* is the period of 1994–2013.
$\ln TP_{jt}$ = logarithm of tourism price level, using CPI Cambodia over CPI in the origin country *j* at time *t* adjusted for differences in exchange rates between the currencies of the origin and destination countries.
$\ln UR_{jt}$ = logarithm of unemployment rate country of origin *j* at time *t*.
$\ln PGR_{jt}$ = logarithm of population growth rate country of origin *j* at time *t*.
α_1 to α_4 = the parameter of independent variables
α_0 = the intercept
ε_{jt} = error term

Tourism demand is inherently a dynamic process. Tourists make decisions about destinations choice with time leads according to Song, Wong and Chon (2003). Therefore, the Autoregressive Distributed Lag (ARDL) approach to the co-integration model proposed by Pesaran, Shin, and Smith (2001) is employed in this study. The proposed model will reflect dynamic features.

The equation (1) is the static model, which does not consider the dynamic feature of tourists' decision processes. Thus, the dynamic estimation of international tourism demand for Cambodia by the ARDL model can be written as

$$\ln Q_{jt} = \beta_0 + \beta_1 \ln Q_{j,t-1} + \beta_2 \ln RGDPPC_{j,t} + \beta_3 \ln RGDPPC_{j,t-1} + \beta_4 \ln TP_{j,t} + \beta_5 \ln TP_{j,t-1} + \beta_6 \ln UR_{j,t} + \beta_7 \ln UR_{j,t-1} + \beta_8 \ln PGR_{jt} + \beta_9 \ln PGR_{j,t-1} + \varepsilon_{j,t} \quad (2)$$

Where, β_1 to β_9 are the long-run dynamic coefficient and time t–1 is the previous period. There are several advantages to using this dynamic model. First, the ARDL model does not impose the restrictions that all data series under consideration have the same order of integrations and are applicable irrespective of whether the regressors are I(0) or I(1) or mix order of co-integration (Pesaran, 1997). Secondly, it is not sensitive to the size of the sample, thus making small sample properties of the ARDL approach superior to multivariate co-integration, and very appropriate in the analysis of models based on sample datasets. Third, even where some of the model regressors are endogenous, the bounds testing approach generally provides unbiased long-run estimates and valid t-statistics (Pesaran et al, 2001), (Alhassan & Fiador, 2014), (Odhiambo, 2008) and (Amusa et al, 2009). Although the ARDL model does not require any order of integration since the procedure is suitable for either I (0) or I (1) or mixed integration, however the presence of I(2) would make the ARDL employed unsuitable for such series (Pesaran,1996,1997).

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So, in order to make sure the series are free of I (2), the study employs the Augmented Dickey-Fuller (1979) test as follows:

3.1 UIT ROOT TEST

The unit root test, in time series analysis, provides important information to choose an appropriate technique for investigating the independent variables. Let Y_t is a time series. In the case that time series data is stationary; it needs to have three features such as:

- Mean is constant: $E(Y_t) = \mu$
- Variance is constant: $Var(Y_t) = E(Y_t - \mu)^2 = \sigma^2$
- Covariance is constant: $Y_k = E[(Y_t - \mu)(Y_{t-k} - \mu)] = \gamma_k$

When time series data is constant in mean, variance, and covariance in which they are remain the same and does not vary over time, it is called stationary. In contrast, if it does not comply to these conditions, it is non-stationary. Augmented Dickey Fuller (ADF) is employed to test whether the time series is stationary in this study. The regression of ADF test is:

$$\Delta Y_t = \beta_1 + \beta_t + \delta Y_{t-1} + \sum_{i=1}^{m} \theta_i \Delta Y_{t-i} + U_t$$

Where, Δ is represented for differential. β_1 is the intercept term and β_t is time trend. First difference I (1) is equal to $\Delta Y_{t-1} = Y_{t-1} - Y_{t-2}$. ADF corrects for higher order serial correlation by adding lagged differenced term $\sum_{i=1}^{m} \theta_i \Delta Y_{t-i}$ in right-hand side of equation.

The time series data can be stationary or non-stationary by setting up the null hypothesis for ADF as:

$$H_0: \delta = 0 \ (There\ is\ unit\ root)$$

$$H_1: \delta < 0 \ (There\ is\ no\ unit\ root)$$

To reject or accept the null hypothesis, the critical value of t-statistics is used to make the decision.

3.2 THE ARDL BOUND TESTING APPROACH

If all variables are marked to be stationary, ARDL model is employed to estimate the long- and short-term relationship. The short-term effect could be estimated by inferring the sizes of coefficients of the differenced variables. The long-term effect could be found by estimating the lagged explanatory variables. The ARDL model could be written as:

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$$
\begin{aligned}
&\Delta lnQ_{i,t} \\
&= c_0 + \sum_{i=1}^{m} c_{1i,j} \Delta\, lnQ_{t-i,j} + \sum_{i=1}^{n} c_{2i,j}\, \Delta lnRGDPPC_{t-i,j} + \sum_{i=1}^{o} c_{3i,j}\, \Delta lnTP_{t-i,j} \\
&+ \sum_{i=1}^{p} c_{4i,j}\, \Delta lnUR_{t-i,j} + \sum_{i=1}^{q} c_{5i,j}\, \Delta lnPGR_{t-i,j} + \gamma_1 lnQ_{t-1,j} + \gamma_2 lnRGDPPC_{t-1,j} \\
&+ \gamma_3 lnTP_{t-1,j} + \gamma_4 lnUR_{t-1,j} + \gamma_5 lnPGR_{t-1,j} \\
&+ \mu_t \qquad (4)
\end{aligned}
$$

Where Δ is the difference operator, t is time (1994–2013), i is number of lag, and j is country of origin, and μ_t is the white noise error term. The coefficient from γ_1 to γ_5 depicts the long-term relationship between the variables, while the coefficient c_1 to c_5 with the summation signs represents the short-term dynamics of the variables. The level of association among variables in the model can be structured based on the F-statistic by imposing restrictions on the estimated long-run coefficients of one period lagged level of the variables equal to zero, stated below as:

$$Null\ Hypothesis\ H_0: \gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = \gamma_5 = 0, No\ level\ relationship$$

$$Alternative\ Hypothesis\ H_0: \gamma_1 \neq \gamma_2 \neq \gamma_3 \neq \gamma_4 \neq \gamma_5 \neq 0, Level\ relationship$$

The resulting F-statistic computed is compared with simulated critical values from Pesaran et al. (1999), whence we can draw three conclusions. First, if the F-statistic value is higher than the upper-bound critical value, null hypothesis of no-level relationship is rejected. This implies that international tourist arrival rates and its determinant factors have a long-term relationship. Secondly, if the F-statistics value is lower than the lower-bound critical value, null hypothesis of no-level relationship is accepted. Third, if the F-statistic value falls within the lower and upper bound critical values, then it is considered inconclusive.

When there is evidence of long-run relationships among variables, an Error Correction Model (ECM) is used to estimate the short-term effect adjustment speed of explained variable to explanatory variables within the bounds testing approach. Therefore, the model could be written as:

$$
\begin{aligned}
\Delta lnQ_{i,t} = c_0 &+ \sum_{i=1}^{m} \omega_{1i,j} \Delta\, lnQ_{t-i,j} + \sum_{i=1}^{n} \omega_{2i,j}\, \Delta lnRGDPPC_{t-i,j} + \sum_{i=1}^{o} \omega_{3i,j}\, \Delta lnTP_{t-i,j} \\
&+ \sum_{i=1}^{p} \omega_{4i,j}\, \Delta lnUR_{t-i,j} + \sum_{i=1}^{q} \omega_{5i,j}\, \Delta lnPGR_{t-i,j} + \lambda ECT_{t-1,j} \\
&+ \nu_t \qquad (4)
\end{aligned}
$$

The speed of adjustment is measured by estimating the coefficient of adjustment λ. The coefficient is normally statistically negative sign. Essentially, the speed of adjustment provides useful information about long-term equilibrium which converges to short term. This implies if the model faces any shock information, when it is back to its equilibrium state. Several diagnostics tests are performed to ensure the quality of fit of the model. These tests examine the serial correlation, normality, and heteroscedasticity. Furthermore, stability tests are applied to check the stability of the coefficient of the regression, as suggested by Pesaran and Pesaran (1997).

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4. DATA

Time series data of various variables for the period of 1994 to 2013 are employed in this research paper. The number of tourist arrivals to Cambodia from 12 countries such as Australia, Canada, France, Germany, Italy, Japan, Malaysia, Switzerland, Thailand, the UK, the USA, and Vietnam are endowed as the dependent variables. The number of tourist arrivals is used as a proxy for the international tourism demand. Real GDP per capita in constant term (RGPPC), tourism price (TP), unemployment rate (UR) and population growth rate (PGR) are employed as explanatory variables. Tourism price (TP) is measured by using CPI in Cambodia over CPI in the country of origin of the tourist group, adjusted for the differences in exchange rate between the currencies of the country of origin and Cambodia. The data are obtained from the CEIC database, the World Development Index, and the Ministry of tourism of Cambodia's annual report.

5. RESULTS AND DISCUSSION

According to the ADF unit root test for all variables of each international tourism demand model for all 12 countries dos not show unit root problem. None of the series are integrated of I (2) i.e., variables are stationary at their levels and first difference is as reported in table 1. Therefore, ARDL bounds testing approach using general-specific procedure can be applied to study the existence of long-term relationships between international tourism demand to Cambodia and its potential explanatory variables over the study period of 1994–2013. The appropriate lag selection is needed for applying this approach. It is pinpointed by Lutkepohl (2005) that AIC has superior power properties for small sample data sets. Due to the small sample data set, we decide to apply lag of no more than one in this study.

Table1: Results of Unit Root Test Using ADF Augmented Dickey-Fuller Test

Variables	Aus	Fr	Jap	Mal	Thai	Viet	USA	Ger	UK	Swit	Ita	Can
lnQ	I(1)	I(0)	I(0)	I(1)	I(0)	I(1)	I(1)	I(1)	I(1)	I(1)	I(0)	I(0)
lnRGDPPC	I(0)	I(0)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)
lnTP	I(1)	I(1)	I(1)	I(1)	I(0)	I(1)	I(1)	I(1)	I(1)	I(0)	I(0)	I(1)
lnUR	I(1)	I(0)	I(1)	I(1)	I(1)	I(0)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)
lnPGR	I(0)	I(1)	I(1)	I(0)	I(1)	I(0)	I(1)	I(1)	I(1)	I(1)	I(0)	I(0)

Note: Aus = Australia, Fr = France, Jap = Japan, Mal = Malaysia, Thai = Thailand, Viet = Vietnam, Ger = Germany, Swit = Switzerland, Ita = Italy, Can = Canada

The ARDL F-statistic is used to analyze the existence of cointegration among each factor of the international tourism demand model of 12 countries and their potential independent variables over the period 1994–2013. Results of computed F-statistics and the critical values suggested by Pesaran et .al (1999) at 5% and 10% levels of significance are demonstrated in table 2. The model passes through several main diagnostic tests such as serial correlation (Breuch, 1978; Godfrey, 1978), heteroscedasticity (White, 1980), normal distribution (Jarque and Bera, 1980), and stability tests.

The findings suggest that there exists a long-term relationship between international tourist arrivals from Australia, USA, and the United Kingdom and their potential independent variables (RGDPPC, TP, UR, and PGR) at significant level 5%, while Canada has the existence of long-term relationship at 10%. Tourist arrivals from Thailand are represented by

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a long-term relationship with only two variables, RGDPPC and PGR at a significant level (10%). However, tourist arrivals from France, Malaysia, Japan, Vietnam, Germany, Switzerland and Italy do not function as long-term relationships. It clearly confirms that the model of tourist arrivals to Cambodia from Australia, USA, the United Kingdom, Canada and Thailand deserve a further step for testing the long- and short-term effects through the Error Correction Model (ECM), while the model of tourist arrivals in Cambodia from France Malaysia, Japan, Vietnam, Germany, Switzerland, and Italy cannot be studied in terms of their short-run and long-run effects through the ARDL and ECM models.

5.1 LONG-AND SHORT-RUN EFFECTS

Table 3 indicates the results of the long-term international tourist arrival coefficient to Cambodia from Australia, Canada, Thailand, the United Kingdom and the USA. For tourist arrivals to Cambodia from Australia, in the long-term, the previous year of tourist's income has a significant positive effect. The model therefore predicts that, in the long run, when the average Australian tourist's income increases by 1 percent then the number of tourists from Australia arriving in Cambodia will increase by 11.51 percent. Higher tourism prices (TP) in Cambodia and slow population growth rate in Australia discourage tourists from visiting, and have a significant negative effect on tourist arrivals from Australian. The expected sign of the unemployment rate has a significant positive effect on tourist arrivals to Cambodia from Australia, in line with the unemployment growth rate movement's trend over the study period. The decreased unemployment rate in Australia increases the average Australian tourist's travels abroad.

The lagged dependent variable has a significant positive effect on international tourist arrivals to Cambodia from Canada and UK. The results suggest that the word-of-mouth effect is very important for these countries in creating tourism demand for Cambodia. The number and repeats of visits should be given due attention by the Cambodian tourism industry. The lagged real GDP per capita has a significant positive effect on tourist arrivals to Cambodia from Canada in the long run. This model suggests that when the average Canadian tourist's income in the previous year increased by 1% the number of tourist arrivals from Canada to Cambodia will increase by 8.7%. The unemployment growth rate in the previous year has a significant positive impact on Canadian tourist arrivals to Cambodia. This is correctly found to be due to the unemployment rate in Canada decreasing year-on-year.

For the tourist arrivals to Cambodia from Thailand, in the long run, the growing of the average Thai tourist's income (RDPPC) and the Thai population's growth rate (PGR) have a statistically significant positive effect. The model suggests that when the average Thai tourist's income and the Thai population growth rate increase by 1% then the number of tourists from Thailand to Cambodia will increase by 7.66% and 0.91%, respectively.

For tourist arrivals to Cambodia from the USA, slow population growth rate in both current and previous years have statistically significant negative impact. The unemployment growth rate has a significant negative effect on tourist arrivals to Cambodia from the USA, which is unlikely to Australia and Canada. This suggests that tourists from these countries are highly sensitive to the unemployment rate and the trend of the unemployment rate in their home countries determine their overseas travels.

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Furthermore, we have applied the Error Correction Model to explore short-term dynamic relationships, with the results shown in Table 4. The outcomes prove that the estimated of lagged error correction term (ECT (-1)) of the international tourism demand model for five countries (Australia, Canada, Thailand, the UK, and the USA) is negative and statistically significant at 10%. This suggests that the speed of adjustment from short term towards long-term equilibrium path.

The lagged error correction term of the international tourism demand models for Australia, Canada, Thailand, the UK, and the USA are -0.522., -1.295, - 0.618, -1.163, -2.13, respectively. This indicates that deviation from long-term international tourism demand to Cambodia from these countries is adjusted by 52.2 % for Australia, 129.5% for Canada, 61.18% for Thailand, 116.3% for UK and 213% for USA in the current year. In other words adjustment rates' returns to their respective long-term equilibria from flux caused in the previous year were Australia (52.2%), Canada (129.5%), Thailand (61.18%), the UK (116.3%) and the USA (213%). The statistical significance and negative impact displayed by the Error Correction coefficient are further confirmation of the relationship between long-term international tourist arrivals to Cambodia from these countries and their key independent variables. The short- and long-run dynamic models for the five-countries pass all diagnostic tests as shown in the table.

Table2: F-Statistics Bounds Testing Result for Level Relationship

Country of Origin	F-statistics	Critical Value		Number of K	Diagnostic Tests			
		Lower bound I(0)	Upper bound I(1)	k	Test A	Test B	Test C	Test D
Australia	4.02**	2.86	4.01	4	0.153	0.854	0.333	Stable
France	1.02	2.86	4.01	4	0.977	0.955	0.736	Stable
Japan	1.15	3.23	4.35	3	0.081	0.572	0.492	Stable
Malaysia	1.85	2.86	4.01	2	0.057	0.458	0.724	Stable
Thailand	3.63*	2.45	3.52	4	0.151	0.611	0.754	Stable
Vietnam	0.53	2.86	4.01	4	0.570	0.641	0.907	Stable
USA	7.57**	2.86	4.01	4	0.196	0.765	0.777	Stable
Germany	1.58	2.86	4.01	4	0.093	0.337	0.482	Stable
UK	6.24**	2.86	4.01	4	0.152	0.301	0.505	Stable
Switzerland	1.68	3.23	4.35	3	0.098	0.827	0.778	Stable
Italy	2.83	2.86	4.01	4	0.058	0.920	0.621	Stable
Canada	3.82*	2.45	3.52	4	0.995	0.424	0.793	Stable

Note: "***", "**", "*"denote levels of statistical significance at 1%, 5%, 10%, respectively. Test A, Test B, Test C, and Test D are the tests for serial correlation (Breuch, 1978; Godfrey, 1978), heteroscedasticity (White, 1980), normal distribution (Jarque and Bera, 1980), and stability (Brown et.al, 1975). The values at the column of Test A to Test C are the p-value. P-value of these tests is greater than 0.05 which leads to a rejection of the hypothesis.

Table3: The Results of Long-Term Dynamic Effect of International Tourism Demand from the Country of Origin (Dependent Variable,lnQ)

Country	Australia	Canada	Thailand	UK	USA
Constant	-140.88*** (0.0000)	-91.40*** (0.0035)	-49.434*** (0.0000)	1.583 (0.258)	11.88*** (0.0000)

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Ln Q(-1)	-	0.402** (0.055)	-	0.858*** (0.0000)	-
Lnrgdppc	-	-	7.66*** (0.0000)	-	-
Lnrgdppc(-1)	11.51*** (0.0000)	8.70*** (0.0034)	-	-	-
lntp	-3.13*** (0.0007)	-	-	-	-
Lntp(-1)	-	-	-	-	-
LnPGR	-	-	0.91*** (0.0011)	-	-2.55** (0.013)
LnPGR(-1)	-0.90** (0.026)	-	-	-	-2.57*** (0.007)
LnUR	3.60*** (0.0023)	-	-	-	-0.65** (0.0116)
LnUR(-1)	-	3.097*** (0.009)	-	-	-
Adjusted R^2	0.9205	0.8659	0.7862	0.6869	0.9476
Test A	0.4956	0.5296	0.5047	0.9967	0.0657
Test B	0.6449	0.2504	0.4396	0.4757	0.7168
Test C	0.1330	0.2815	0.8139	0.1000	0.5749
Test D	Stable	Stable	Stable	Stable	Stable

Note: "***", "**", "*"denote levels of statistical significance at 1%, 5%, 10%, respectively. Test A, Test B, Test C, and Test D are the tests for serial correlation (Breuch, 1978; Godfrey, 1978), heteroscedasticity (White, 1980), normal distribution (Jarque and Bera, 1980), and stability (Brown et.al, 1975). The values at the column of Test A to Test C are the p-value. P-value of these tests is greater than 0.05 which leads to a rejection the hypothesis.

Table4: The Results of Short-Term Dynamic Effects of International Tourism Demand from the Country of Origin (Dependent Variable, ΔlnQ)

Variables	Australia	Canada	Thailand	UK	USA
Constant	0.106 (0.520)	-0.129 (0.474)	0.118 (0.369)	0.125 (0.359)	-0.072** (0.021)
ΔlnQ(-1)	-	0.303 (0.277)	-	0.150 (0.573)	-
ΔlnRGDPPC	-	-	4.591 (0.123)	-	-
ΔlnRGDPPC (-1)	3.981 (0.598)	17.636 (0.129)	-	-	-

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ΔlnTP	-1.994** (0.054)	-	-	-	-
ΔlnTP(-1)		-	-	-	-
ΔlnUR	1.802 (0.162)	-	-		-1.00*** (0.008)
ΔlnUR(-1)	-	3.482 (0.116)	-	-	
ΔlnPGR	-	-	0.987** (0.047)	-	-4.05*** (0.0009)
ΔlnPGR(-1)	0.059 (0.818)			-	-3.18*** (0.003)
ECT(-1)	-0.522* (0.090)	-1.295** (0.041)	-0.618** (0.022)	-1.163* (0.090)	-2.13*** (0.0006)
Adjusted R^2	0.2233	0.1575	0.2025	0.0775	0.6884
Test A	0.4822	0.7223	0.0900	0.2700	0.5262
Test B	0.1030	0.6621	0.6997	0.8526	0.3130
Test C	0.7581	0.5769	0.5809	0.7750	0.5500
Test D	Stable	Stable	Stable	Stable	Stable

Note: "***", "**", "*"denote levels statistical significance at 1%, 5%, 10%, respectively. Test A, Test B, Test C, and Test D are the tests for serial correlation (Breuch, 1978; Godfrey, 1978), heteroscedasticity (White, 1980), normal distribution (Jarque and Bera, 1980), and stability (Brown et.al, 1975). The values at the column of Test A to Test C are the p-value. P-value of these tests is greater than 0.05 which leads to a rejection the hypothesis.

6. CONCLUSION

This study measures determinant factors influencing international tourism demand from 12 countries (Australia, Canada, France, Germany, Italy, Japan, Malaysia, Switzerland, Thailand, UK, USA, and Vietnam) to Cambodia over a period of 20 years (1994–2013). The Autoregressive Distributed Lag Model or the ARDL bounds testing approach is employed to test the existence for long-term relationships for factors modeling international tourism demand for 12 countries. The Error correction Model is also used to examine short-term dynamic relationships.

The empirical results indicate that there exists a long-term relationship only between international tourist arrivals to Cambodia from Australia, the USA, the UK, Canada, and Thailand at different level of statistical significance and their potential independent variables (RGDPPC, TP, UR, and PGR).

RGDPPC in the previous year has significant and positive impact on tourist arrivals to Cambodia from Australia. However, higher tourism prices in Cambodia and slow population

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growth rates in Australia have a statistically significant negative impact. The downward trend of unemployment growth rate in Australia increases the number of tourists to Cambodia.

The lagged dependent variable has a statistically significant positive effect on international tourist arrivals to Cambodia from Canada and the UK. The results suggest that the word-of-mouth effect is very important in creating tourism demand to Cambodia from these countries. The numbers of and repeats of visits should be given due attention by the Cambodian tourism industry. The lagged real GDP per capital has a significant positive impact on tourist arrivals from Canada in the long run. However, the unemployment growth rate in previous years has positive effect on tourist arrival rate to Cambodia from Canada.

The growth of tourist's incomes and population growth rates has positive impacts on international tourist arrivals to Cambodia from Thailand.

The decreased population growth rates in both current and previous years have a statistically significant negative impact on tourist arrivals to Cambodia from the USA. The unemployment growth rate has a significant negative effect on tourist arrivals to Cambodia from the USA. This suggests that tourists from these countries are highly sensitive to the unemployment rate, and the trends of unemployment rates may determine their overseas travel.

In the case of the short-term dynamic model measured by the Error Correction Model, the results show the lagged error correction term of the international tourism demand models for Australia, Canada, Thailand, the UK, and the USA are -0.522., -1.295, - 0.618, -1.163, -2.13, respectively. This indicates that deviation from expected international tourism demand to Cambodia from these countries is corrected by 52.2 % for Australia, 129.5% for Canada, 61.18% for Thailand, 116.3% for the UK and 213% for the USA, from the previous year. Furthermore, The short- and long-run dynamic models for the five-countries pass all diagnostic tests i.e., LM test for serial correlation, normality test of residual term, Breusch-Godfrey heteroscedasticity and stability test using the cumulative sum of the recursive residuals (CUSUM).

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