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On the Investigation of Factors Effecting International Tourist Arrivals to the Cambodian Market: A Static and Dynamic Gravity Approach

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Abstract

The paper investigates factors influencing international tourist arrivals into the Cambodian market during the period of 1995 to 2015, covered 32 cross-sectional countries by adopting a static and dynamic gravity approach with respect to fixed effects (FE) and random effects (RE) and the GMM estimator of Arellano and Bond (1991). Our analysis shows that mostly economic factors such as travel cost, GDP per capita and population size are the main sources in attracting international tourist arrivals. The country specific dummy variables are found to be associated with the respects to its significant level. The empirical results demonstrate that one and two step GMM with robust standard errors produces better outcomes and improves the estimated accuracy over a static approach.

Keywords: Gravity Model, International Tourist Arrivals, Arellano and Bond (1991), GMM, Fixed and Random Effect, Cambodia

JEL Classification: C23, C50, Z30, Z32

Introduction

The tourism sector, or the so-called non-smoking industry, played an essential function in boosting and sustaining socio-economic development in the single market trend generating from modern globalization. It is considered as one of the most potential sectors which contributes to both household's welfare and national income through economic growth, employment creation, global and regional connections in every corner of the world. Recently, the total contribution of travel and tourism to GDP was estimated at almost 9.8% of GDP and is expected to rise by 3.7%, equal to 9.9% of GDP in 2015[1]. More importantly, the flow of tourism demand between the origin country and destination country is depends on tourism related activities, and policies of international cooperation relevant to socio-economic stability, low risk of internal and external violence in the country such as terrorism attacks which determine tourists behavior.

In the context of Cambodia, the tourism sector is considered as the most important factor to social and economic development. For instant, the area of the Angkor temple was listed in the world heritage in 1992, as well as the fresh opening economy into regional and international system since 1993 up to present time, it was such the main catalyst without catastrophe to encourage international tourist arrivals. Beside these, the number of tourist arrivals has increased dramatically and risen year-on-year. Statistically, it has contributed 29.9% to GDP in 2014 and expected to augment from 8.2% to 30.2% of GDP in 2015. Moreover, it is forecasted to increase by 6.5% per year equivalent to (28.0% of GDP)[2] by 2025. So far, Cambodia's government is focused strongly to develop such a growing sector, due to the facts that it is not only contributed directly and indirectly to socio-economic development and economic growth, poverty reduction but it is also promoted the country's stature and reputation in the world.

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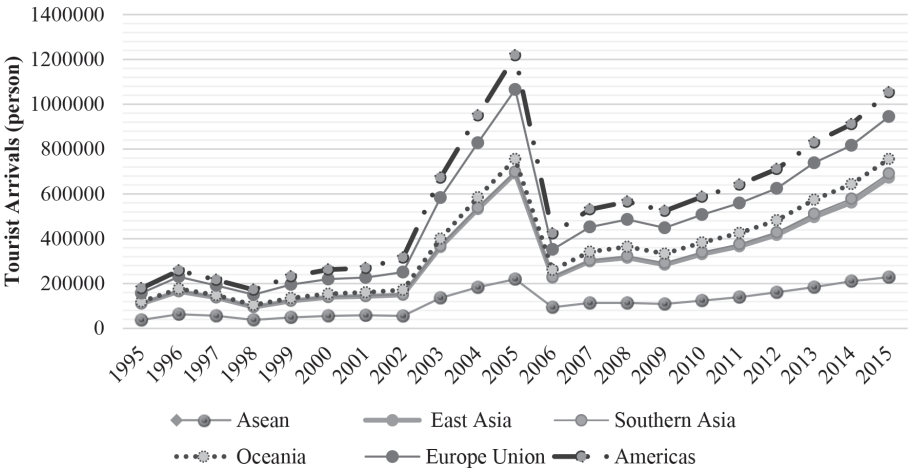
[1] WTTC Travel and Tourism Economic Impact 2015, WTTC stands for World Tourism and Travel Council

[2] WTTC Travel and Tourism Economic Impact 2015, CAMBODIA

Figure 1. Number of international tourist arrivals by 6 origin countries (1995-2015)



Series	ASEAN	East Asia	Southern Asia	Oceania	European	American
Average	115670	199343	6814	34170	121584	71006
Median	113335	192419	6050	36058	118447	77009

Source: Computer calculation, data extracted from CIEC database manager

From 1995 to 2015, most of the tourism flow is somehow attracted by ASEAN region and ASEAN partnerships such as China, Japan and Korea followed by European and American. Vietnamese tourist is ranked the number 1st for tourism industry in Cambodia since 2010, China is represented as the 2nd largest followed by Korea and Thailand. This movement was reduced since 2005 due to the global financial crisis in 2008 and 2009 as well as external violent within the neighboring country, say Thailand relevant to PREAH VIHEAR temple.

Although there are numerous research studies conducting both qualitative and quantitative methods to investigate the impact of international tourism demand either in ASEAN region or other developing countries, the study related Cambodia issue alone is not yet exemplified sizably in the recent period. Accordingly, the study examines the impact of economic and

non-economic factors influencing to tourism demand for Cambodia during the period of 1995 to 2015. Static and dynamic gravity approach based on fixed effect and random effect as well as Arellano and Bond (1991) based GMM estimators will be applied.

The organization of the study is structured as follows: the 2nd section is to review some empirical studies and journals is presented and methodology is presented in the 3rd section. The 4th Section is to interpret the empirical results whereas the last section is to conclude the whole finding.

2. Literature Reviews

On the application of the gravity model, on the one hand, were found to be numerous in the context of international trade as well as migration issue. This approach was firstly developed by Jan Tinbergen (1962) and adopted by Anderson and Van Wincoop (2003), Rose (2000) and McCallum (1995) to study international trade flow. It is widely applied in the context of foreign capital flow and migration flow, Bergstrand and Egger (2007), Eichengreen and Tong (2007) and Head and Ries (2008) and Gil-Pareja et al. (2006) and Karemera et al. (2000) respectively. Still, since international tourism is considered as service flow, applying gravity model would be ideally interesting and considering such as a good contribution. Yet, based on the research conducted by Alexander C. (2014) has mentioned that the gravity model explains tourism flows better than goods trade for equivalent specifications.

On the estimation of the factors influenced to tourism demand, on the other hand, is met the maturity, there are a bunch of research but to propose static and dynamic gravity models together is not yet found numerously. Most of them used international tourism demand approach throughout time series and panel data model individually and separately. Some employed a few economic variables to estimate its impact such as GDP per capital, travel cost, exchange rate and CPI, Geoffrey I. Crouch (1994), Lim (1997), Li et al. (2005), Song and Li (2008), Chukiat et al. (2010), Asrin Karimi (2015). It is worth notified that using tourism demand model individually cannot capture the whole picture of tourist's manner or meaning that there would be existed other important factors that may influence to tourism demand such as population, distance and relative cost of living or tourism zone (world heritage or cultural

tourism) or some others non-economic factors such as crisis, as well as socio-economic political deadlock and country dummy variables as well.

Time series and panel data models are somehow applied. Ozan S. and Kadir K. (2010), examined tourism demand in Turkey using panel gravity model based on fixed and random effect estimator. Nuno C. L (2015), studied tourism demand in Portugal by employed dynamic panel data based on the system GMM estimator. Accordingly, the author verified that the dynamic model proves tourism demand is a dynamic process. Suparporn Sookmark (2011) applied dynamic panel data based on Arellano and bond (1991) to estimate the factors effecting international tourism in Thailand. The author stated that number of tourist arrivals in the preceding year (t-1) is the main factor in determining their next visit (t+1). Asrin Karimi (2015), studied tourism flow in ASEAN region, found that generalized Poisson regression model is the best one to estimate long-run international tourism demand. H. Chantha (2015) studied international tourism demand for Cambodia applying time series model, ARDL approach. Worth notice, time series model individually cannot capture the information across the country, there existed biased and lost some information based on its statistical and econometrical inferences.

Moreover, all of these factors using in regression equation are found to be negatively and positively correlated to tourism demand. Alexander C. (2014) found that the change in exchange rate, bilateral trade as the share of business is positively affected to tourism. GDP per capita and growth rate are also the crucial factors and showed the positive affected, Chantha H. (2015) and Nuno Carlos Leitão (2015). Relative low prices of tourism in term of cost of living and prices of goods and services have no effect, Roperto S. and Narae K. (2014). Financial or global crisis has significantly effect to tourism, A Kusni et al. (2013).

Shortly, most of research studies have applied economic factors such GDP growth rate and per capital, travel cost, tourism price to examine the impacts of tourism demand. Static or dynamic estimator individually is used to investigate or somehow they applied both together. Therefore, the contribution of this study is to extend gravity approach in which mostly used in context of international trade to model international tourism demand and adopt more

crucial factors as well as applying country dummy variables as new contribution to the previous related research in Cambodia.

3. Data and Methodology

Number of tourist arrivals from 32 origin countries during the period of 1995 to 2015, used as an explained variable, was extracted annually from ministry of tourism, storage in CEIC data manager, provided by Chiang Mai University (CMU). For the explanatory variables such as GDP per capital and growth rate, exchange rate, inflation rate and total population are imported from world development indicator (WDI), the World Bank. Geography distance and transport cost are imported from www.Distancefromto.net and US transport cost respectively. Relative cost of living index (RCL) is calculated based on Wong et al., 2006 and Relative Production Index (RPI) methodology which is equated as follows:

$\ln RCL_{ijt} = \ln\left[\frac{CPI_{it}/CPI_{jt}}{EXR_{it}/EXR_{jt}}\right]$, and $\ln RPI_{ijt} = \ln\left[\frac{GR_{it}}{GR_{jt}}\right]$, where i is referred to a destination country (Cambodia) and j is presented the origin country at time t

3.1 From Gravity Model to Cambodia's International Tourism Demand Model

An adjustment of gravity model was firstly introduced by Tinbergen (1962) to analyze the bilateral international trade derived from origin discovery of Newton's theory of the law of gravitation to analyze the attraction between two objects i and j. Therefore, this law is equated as follows:

$$F_{ij} = G\frac{m^{\beta_1}{}_i m^{\beta_2}{}_j}{d_{i,j}{}^2} \quad (1)$$

Where F_{ij} is the force of gravitational between two objects i and j, m is the object i and j, d is the distance between two objects i and j and G is universal gravitational constant. From equation (1), we can rewrite it to the linear regression equation in the panel data analysis with the natural logarithm and assuming G is equated to α_i as follows:

$$\ln(F_{i,jt}) = (G = \alpha_i) + \mu_i + \beta_1 \ln m_{it} + \beta_2 \ln m_{jt} - \gamma \ln D_{ij} + \varepsilon_{it} \qquad (2)$$

Where $F_{i,jt}$ is an explained variable, m_{it} and m_{jt} are vectors of explanatory variables (normally measured as the economic size using a proxy of GDP between two countries), α_i is a constant term, μ_i is an unobserved country specific effect and ε_{it} is a normal distributed error term assuming to be uncorrelated with μ_i. i and t is cross-section country and time dimension respectively. From equation (2), it can be written into the international tourism demand model as follows:

$$Y_{it} = f(X_{it}, Z_{it}) + \alpha_i + \varepsilon_{it} \qquad (3)$$

Where Y_{it} is quantity of tourism demand from origin country i to destination country j at time t, X_{it} is the set of explanatory variables and Z_{it} is the set of control variables. From equation (3), we can rewrite into international tourism demand for Cambodia based on the concepts of gravity model with the nature of logarithm as follows:

$$\ln TA_{it} = \alpha_i + \beta \ln GDP_{it} + \gamma \ln GDP_{jt} + \delta \ln TC_{ijt} + \theta \ln RCL_{ijt} + \vartheta \ln PO_{it} + \gamma \ln PO_{jt} + \delta \ln DS_{ijt} + \eta \ln RPI_{ijt} + \varphi_k \sum_{i=1}^{n} DV_{it} + \varepsilon_{it}, \text{ where} \qquad (4)$$

$\ln TA_{it}$ is natural logarithm of international tourism arrivals from origin country j to destination country i at time t

$\ln GDP_{jt}$ is natural logarithm of GDP per capital of origin country j and $\ln GDP_{it}$ is natural logarithm of GDP per capital of destination country i at time t

$\ln TC_{ijt}$ is natural logarithm of travel cost from origin country j to destination country i at time t

$\ln RCL_{ijt}$ is natural logarithm of relative cost of living index between origin country j and destination country i at time t

$\ln PO_{jt}$ is natural logarithm of total population of origin country j and $\ln PO_{it}$ is natural logarithm of total population of destination country i at time t

$\ln DS_{ijt}$ is natural logarithm of distance from origin country j to destination country i at time t

$\ln RPI_{ijt}$ is natural logarithm of relative production index between origin country i and destination country j at time t

$\sum_{i=1}^{n} DV_{it}$ are the set of dummy variables taking number 1 for the determined period and 0 otherwise. It is equated as follows:

$$\varphi_k \sum_{i=1}^{n} DV_{it} = \varphi_1 ASEAN_{1999\ to\ 2015} + \varphi_2 Crisis_{2008/2009} + \varphi_3 AEC_{2015} + \varphi_4 Election_{2003/\ 2008/2013} + \varphi_5 eVisa_{2010\ to\ 2015}, (n = 1, 2, 3, 4, 5) \quad (5)$$

Where $ASEAN_{1997\ to\ 2015}$ is referred to the period in which Cambodia joint ASEAN region in 1997, $Crisis_{2008/2009}$ is denoted the impact of global financial crisis in 2008 and 2009, $Election_{2008\ and\ 2013}$ is national election in 2008 and 2013, $eVisa_{2011\ to\ 2015}$ is denoted the e-Visa starting to be launched. Yet, country specific dummy variables based different regions are also included as follows:

$$\emptyset_k \sum_{i=1}^{k} DC_{it} = \emptyset_1 ASEAN\ Region + \emptyset_2 EU + \emptyset_3 East\ and\ South\ Asia + \emptyset_4 Oceanie + \emptyset_5 USA, (k = 1, 2, 3, 4, 5) \quad (6)$$

Accordingly, from equation (4), (5) and (6), the study could be rewritten the new regression equation of international tourism demand for Cambodia as follows:

$$\ln TD_{it} = \alpha_i + \beta \ln GDP_{it} + \gamma \ln GDP_{jt} + \delta \ln TC_{ijt} + \theta \ln RCL_{ijt} + \vartheta \ln PO_{it} + \gamma \ln PO_{jt} + \delta \ln DS_{ijt} + \eta \ln RPI_{ijt} + \varphi_1 ASEAN_{1999\ to\ 2015} + \varphi_2 Crisis_{2008/2009} + \varphi_3 AEC_{2015} + \varphi_4 Election_{2003/2008/2013} + \varphi_5 eVisa_{2010\ to\ 2015} + \emptyset_1 ASEAN + \emptyset_2 EU + \emptyset_3 East\ and\ South\ Asia + \emptyset_4 Oceanie + \emptyset_5 USA + \varepsilon_{it}, \quad (7)$$

Therefore, to investigate the factors which are potential in determining international tourism demand for Cambodia, the equation (7) will be estimated throughout static and dynamic models as follows:

3.2 Static and Dynamic Estimator

On the notification of Hsiao (2003, 2005), panel data sets are applied through three different methods, namely pooled OLS, fixed effect (FE) and random effect (RE) estimators. Therefore, the regression equation of static panel data is equated as follows:

$$Y_{it} = \alpha_i + \beta_1 X_{it} + \beta_2 W_{it} + v_i + \varepsilon_{it}, i = 1, \dots, N \text{ and } t = 1, \dots, T \quad (8)$$

Where $\mu_{it} = v_i + \varepsilon_{it}$ is the country specific effect

Hsiao (2003), in pooled OLS estimator, takes into account the country specific effect; accordingly panel data models based on FE and RE estimator use to eliminate those problems by considering the ideas as follows.

FE estimator is assumed that the slops are common and differ in intercept and allowed for unobservable country heterogeneity whereas in RE estimator, considered unobservable country heterogeneity effect but variation across the entities (unobserved individual effect, (α_i) are random and uncorrelated with independent variables, followed by normal distribution. Unlike FE, RE is incorporated these effects into error term which assumed to be uncorrelated with dependent variable (Hsiao, 2003). It is worth noting that, since time-invarying variables such as distance and common languages as well as religion were removed in FE estimator for which leaded to be less efficiency. Accordingly, to eliminate that issue, RE estimator takes into account.

Therefore, to select whether FE or RE estimator is appreciated, Hausman (1978) test was adopted to detect under the null hypothesis of RE is better where conversely FE is better for the alternative one. Hausman (1978) test is equated as follows:

$H = (\tilde{\beta}_{1,RE} - \hat{\beta}_{1,FE})\left[\widehat{cov}(\tilde{\beta}_{1,RE} - \hat{\beta}_{1,FE})\right]^{-1}(\tilde{\beta}_{1,RE} - \hat{\beta}_{1,w})$, where β_1 corresponds to time-varying regressor.

Static panel data model is produced bias, inconsistence and misleading inference when the existence of endogeneity in the independent variables based on the finding of Baltagi, Egger and Pfaffermayr (2003). Yet, to control such issue as well as the lagged dependent variable using as instrument value, dynamic estimator or dynamic FE estimator taking the lagged dependent variable of generalized method of moment (GMM) was proposed. Therefore, the dynamic panel data model is equated as follows:

$$Y_{it} = \sum_{j=1}^{p} \alpha_i Y_{i,t-p} + \beta_1 X_{it} + \beta_2 W_{it} + v_i + \varepsilon_{it}, i = 1, \dots, N \text{ and } t = 1, \dots, T \quad (9)$$

If indeed there presented the correlation between lagged dependent variable and country specific fixed effect (μ_{it}), then it will lead to be biased estimators in panel data model (Nickell, 1981). This bias will be disappeared only if time periods go to infinity ($T \rightarrow \infty$), (Nickell, 1981). To remove this, Arellano-Bond (1991) had suggested a GMM estimator taking into account the dynamic lagged of depended variable to be uncorrelated with error term (absence of autocorrelation).

More importantly, GMM is the efficiency and consistency technique in removing the problem appeared in FE and RE estimator by using instrument variables to avoid the endogenous issue whereas the moment condition is the orthogonality conditions within lagged dependent variable and error terms in panel data model. The consistency of GMM estimator gives the fact that $E(\Delta\varepsilon_{it}, \Delta\varepsilon_{it-2}) = 0$ and it works poorly in short panel (meaning that, N and T is small, but works efficiency in the case of N is big and T is small), Blundell and Bond (1991). Furthermore, on the usage of moment conditions suggested by Arellano and Bond (1991) rising its number when the time periods T is increased. Thus, the estimation needs accordingly to test the over-identification restrictions by Sargan test.

4. Empirical Results and Discussion

The empirical results in the Table 1 are estimated throughout static panel data models by taking into account international tourist arrivals (TA) as a dependent variable. The diagnostic statistical tests such as Sargan, Hausman test, AR process were detected. The results indicated that international tourist arrivals to Cambodia are mostly attracted by an increasing of income per capital, population growth and the others non-economic factors such as crisis

and national election within the destination country. FE and RE indicated that GDP per capita of both destination and origin countries are significantly and positively influenced to TA where relative production index (RPI) and relative cost of living (RCL) are negatively affected and significant at 5%. Distance (DS) between both countries is positively correlated but not significant. With the respect to dummy variables using as binary option are found to be either negative or positive and significant or insignificant. Crisis and eVisa is negatively affected to TA whereas as a member of ASEAN and national election is positively associated but not significant.

Table 1: Empirical results from static gravity models with and without robust standard error

Variables	**Static Estimator without Robust Standard Error**		**Static Estimator with Robust Standard Error**	
	FE	**RE**	**FE**	**RE**
Constant	68.2093** (2.06)	84.8416*** (2.76)	68.2093*** (3.67)	84.8416*** (2.76)
Explanatory Variables				
$lnGDP_{it}$	3.9969*** (5.21)	4.0212*** (5.24)	3.9969*** (7.12)	4.0212*** (6.59)
$lnGDP_{jt}$	0.4322*** (2.35)	0.7109*** (5.55)	0.4322 (1.39)	0.7109*** (4.61)
$lnPO_{it}$	-7.1514*** (-3.32)	-7.2054*** (-3.39)	-7.1514*** (-5.67)	-7.2054*** (-6.41)
$lnPO_{jt}$	1.5176 (2.18)**	0.8302*** (7.83)	1.5176 (1.23)	0.8302*** (7.00)
$lnRPI_{ijt}$	-0.04158 (-1.36)	-0.0364 (-1.20)	-0.0416*** (-2.20)	-0.0364 (-1.92)
$lnRCL_{ijt}$	-0.0487* (-1.62)	-0.0470** (-1.70)	-0.0487 (-1.16)	-0.0470** (-1.28)
$lnTC_{ijt}$	0.4789*** (3.82)	0.4686*** (3.71)	0.4789*** (3.12)	0.4686*** (2.91)
$lnDS_{ijt}$	0.2575 (0.23)	-0.6166 (-1.43)	0.2575 (0.83)	-0.6166 (-1.61)
$ASEAN_{1997\ to\ 2015}$	0.1026 (0.94)	0.0088 (0.81)	0.1026 (0.98)	0.0088 (0.87)

Table 1: Empirical results from static gravity models with and without robust standard error (cont.)

Variables	Static Estimator without Robust Standard Error		Static Estimator with Robust Standard Error	
	FE	**RE**	**FE**	**RE**
$Crisis_{2008/2009}$	-0.1715 (-1.38)	-0.173 (-1.39)	-0.1715*** (-2.07)	-0.173 (-2.12)
$Election_{2008\ and\ 2013}$	0.1559** (1.93)	0.1559** (1.91)	0.1559*** (2.33)	0.1559** (2.35)
$eVisa_{2011\text{-}2015}$	-1.5709*** (-12.35)	-1.5702*** (-12.24)	-1.5709*** (-11.89)	-1.5702*** (-11.80)
Country Dummy Variables				
ASEAN Region	----	0.8134 (0.69)	----	0.8134 (0.72)
East and South Asia	----	0.3305 (0.37)	----	0.3305 (0.44)
EU	0.2350 (0.42)	0.2866 (0.51)	----	0.2866 (1.45)
Oceania	----	1.6295** (1.91)	----	1.6295** (4.39)
USA	----	0.7541*** (0.87)	----	0.7541*** (2.58)
R square (R_2)	0.3671	0.3671	0.3671	0.6335
F-statistic	46.85*** [0.0000]	46.85*** [0.0000]	-----	728539.77*** [0.0000]
Breush-Pagan Test[a]	-----	2286.48*** [0.0000]	-----	2286.48*** [0.0000]
Hausman Test	23.31** [0.0381]	23.31** [0.0381]	-----	-----
Sigma_e	1.8933	0.8109	1.8933	0.81086
Sigma_u	0.5354	0.5354	0.5354	0.5354
Rho	0.92595	0.6964	0.92595	0.6964

Note: The notification sign of *, ** and *** denote the significant level of 10%, 5% and 1% respectively. The value inside the parenthesis () and [] is referred to z-statistic for RE and t-statistic for FE and p-value respectively. RE and FE models are estimated using with and without robust standard errors.

Source: Computer calculation

More importantly, taking into consideration the country specific dummy variables of five different regions, namely ASEAN, East and South Asia, EU, USA and Oceania indicated that these variables explained well in RE estimator and conversely due to multicollinearity, FE could not estimate its coefficients. The diagnostic tests indicated that Breush-Pagan LM test for RE can be rejected the null hypothesis at 5% level of significant whereas Hausman test for FE is appreciated and rejected the null hypothesis at 5% level with the statistical value of 23.31. With the respect to R square (R^2) statistic, RE with robust standard error is explained better rather than other three models did.

The empirical results from dynamic panel data based on GMM estimator both one and two step system, employed GDP, GDP per capital, crisis and election as instrument variables are demonstrated in the Table 2. For five different regions, TA is mostly attracted by income of the origin country, travel cost, production index and the others non-economic factors as demonstrated as similar as the static models. The uncertainty of national election during the period of 2008 and 2013 is crucially and positively affected. The diagnostic tests indicated that Wald chi-squares of all models can be rejected the null hypothesis at 1% level of significant, meaning that the sample observations were fitted perfectly to the models. The country specific dummy variables based on five different regions are removed due to multicolinearity problem. Sargan test for over restriction of GMM without robust standard error is 399.4379 and 29.2557 and rejected the null hypothesis at 1% level for one and two step system respectively. Arellano and Bond test for autocorrelation with the AR(1) is -2.816 and -2.7853 with 1% level of significant for two step GMM without robust standard error and one step GMM with robust standard error respectively and AR(2) process is -2.4456 and -2.6285 with 1% level of significant for two step GMM without robust standard error and one step GMM with robust standard error respectively as well. Based on these four different models demonstrated that the lagged depended variable is positively associated and significant at 1% level and GDP per capital of the origin and destination country, population growth rate (PO) of the origin country and travel cost (TC) are positively impacted and significant at 1% level whereas oppositely population growth rate of the destination country and relative production index (RPI) are negatively impacted and significant at 1%. Most

of dummy variables are better explained the movement of tourist arrivals to Cambodian market.

Table 2: Empirical results from dynamic gravity models with and without robust standard error

Variables	Dynamic Estimator based GMM without Robust Standard Error		Dynamic Estimator based GMM with Robust Standard Error	
	One Step System	Two Step System	One Step System	Two Step System
Constant term (c)	105.2886*** (3.39)	65.1977** (1.79)	106.6571*** (3.48)	65.1977 (0.16)
Explanatory Variables				
$lnTA_{it-1}$	0.2794*** (7.36)	0.2746*** (25.94)	0.3058*** (6.28)	0.2746 (0.20)
$lnTA_{it-2}$	-----	-----	-0.0493 (-1.10)	-----
$lnGDP_{it}$	5.1537*** (8.66)	4.8697*** (18.95)	5.0825*** (7.61)	4.8697 (0.72)
$lnGDP_{jt}$	0.3901 (1.57)	0.0812 (0.20)	0.3039 (0.89)	0.081 (0.01)
$lnPO_{it}$	-10.6085*** (-5.46)	-10.8667*** (-10.61)	-9.9417*** (-4.79)	-10.8667 (-0.56)
$lnPO_{jt}$	2.2453** (1.71)	5.0747** (1.76)	1.6261 (1.42)	5.0747 (0.33)
$lnRPI_{ijt}$	-0.0789*** (-4.04)	-0.0782*** (-9.26)	-0.0818*** (-4.23)	-0.0782 (-0.30)
$lnRCL_{ijt}$	-0.0302 (-1.02)	-0.0739** (-1.21)	-0.0118 (-0.41)	-0.0739 (-0.03)
$lnTC_{ijt}$	0.0399 (0.51)	0.0507** (1.66)	0.0452 (0.79)	0.0507 (0.08)

Table 2: Empirical results from dynamic gravity models with and without robust standard error (cont.)

Variables		Dynamic Estimator based GMM without Robust Standard Error		Dynamic Estimator based GMM with Robust Standard Error	
		One Step System	Two Step System	One Step System	Two Step System
Dummy Variables					
$ASEAN_{1997\ to\ 2015}$		0.1553** (1.93)	0.1658*** (3.61)	0.1013 (1.59)	0.1658 (0.06)
$Crisis_{2008/2009}$		-0.2206*** (-3.02)	-0.2101*** (-8.18)	-0.2614*** (-9.30)	-0.2101 (-0.21)
$Election_{2008\ and\ 2013}$		0.2526*** (5.67)	0.2246*** (8.92)	0.2559*** (3.76)	0.2246 (0.53)
$eVisa_{2011\text{-}2015}$		-1.4458*** (-18.89)	-1.3928*** (-22.89)	-1.3697*** (-9.30)	-1.3928 (-2.26)
Number of Instrument		202	202	201	202
Wald Chi2		1171.83*** [0.0000]	9379.31 [0.0000]	1065.55*** [0.0000]	198.34*** [0.0000]
Sargan Test		399.4379*** [0.0000]	29.2557*** [0.0000]	-----	-----
Arellano-bond Test	AR(1)	-0.3995 [0.6895]	-2.816*** [0.0049]	-2.7853*** [0.0053]	-0.3995 [0.6895]
	AR(2)	-0.3269 [0.7437]	-2.4456*** [0.0145]	-2.0285*** [0.0425]	-.03269 [0.7437]

Note: The notification sign of *, ** and *** denote the significant level of 10%, 5% and 1% respectively. The value inside the parenthesis is referred to z-statistic and in the square parenthesis () and [] is indicated the t-statistic and p-value respectively. GMM estimators: Instrument variables GDPi, GDPj, RPIi, RCLj, FC and Election, Crisis. Sargan is a test of over-identifying restrictions in GMM estimation. Arellano–Bond test for analyzing the autocorrelation existence of second order (p-value) based AR(2).

Source: Computer calculation

Shortly, in accordance to the above empirical results obtained from static and dynamic models indicated that dynamic estimator seems to be well performance rather than those of static did. Thus, it produced the better results in dynamic process for the sample observations.

5. Conclusion and Policy Implication

International tourist arrivals to the Cambodian market was determined by vital economic and non-economic factors. Panel data with 32 cross-sections and covering 22 years (1995 – 2015) are used to estimate its impact and the dynamic correlation through static and dynamic estimators based on the gravity model approach which was developed from international trade flows. Primarily, a static gravity model extending to international tourism demand one is estimated using FE and RE estimators. Subsequently, dynamic estimators are proposed by adding the lagged dependent variable as the dynamic regressor. The results from both static and dynamic estimators indicated that international tourist arrivals into Cambodia are empirically determined by population, distance, exchange rate, economic growth and per capital GDP as well as the tourism flow of the previous year. It is likely indicated that tourists who come to visit in Cambodia in the current period are considered as the catalyst to attract other tourists to come and visit. Simply, if one country has been going to another countries, others will follow. Population size, income per capita of both countries, tourism price and cost of living and the development of a marketing strategy of the destination country are also main factors to be considered.

By understanding those influencing factors, Cambodia's government should first maintain the stability of price and cost of living since they are very crucial for encouraging tourism attention as recently Cambodia improved from lower income country to lower middle income one. Secondly, adopting marketing related policies during the main national events such as Khmer New Year or Water Festival should be considered. Therefore, the economic policy implication toward the tourism sector is principally robust with regards to market diversification vis-a-vis income per capital of origin tourist, cost of living and the rising of population but the effect is not uniform across all countries.

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Appendices

Appendix I: Selected origin countries arrival to Cambodia using in the estimated regression

Regions	Countries
ASEAN	Brunei, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam
East and Southern Asia	China, Hong Kong, Taiwan, Japan, Korea, India, Sri Lanka
European Union	Denmark, Finland, Norway, UK, Austria, Belgium, France, Germany, Netherlands, Switzerland, Italy, Spain
American	USA and Canada
Oceania	Australia and New Zealand

Appendix II: The hypothesized signs of all the variables using the static and dynamic panel data model

Variable	Description	Expected sign
Dependent and Independent variables		
TA_{ijt}	Number of international tourist arrivals from origin countries to Cambodia	----
TA_{ijt-1}	Lagged dependent variable using as endogenous regressor in dynamic regression	+
GDP_{it}	Real gross domestic product (GDP) per capital of destination country i	+
GDP_{jt}	Real gross domestic product (GDP) per capital of origin country j	+
TC_{ijt}	Travel cost from origin country j to destination country i	+/–
RCL_{ijt}	Relative cost of living index between origin country j and destination country i	+/–
PO_{jt}	Total population of origin country j	+
PO_{jt}	Total population of destination country i	+
RPI_{ijt}	Relative production index between origin country i and destination country j	+/–
DS_{ijt}	Distance in kilometers between the capital cities of origin and destination	+/–
Dummy variables		
ASEAN membership	Selected since Cambodia became one of the member of ASEAN region and takes the value 1 in the determined period and 0 otherwise	+
GCrisis	It is representing the influencing of the global economic crisis takes 1 during the crisis period 2008-2009 and 0 otherwise	–
e-Visa	Taking the year since Cambodia started to launch e-visa in 2011 and takes the value 1 in the determined period and 0 otherwise	+

Appendix II: The hypothesized signs of all the variables using the static and dynamic panel data model (cont.)

Variable	Description	Expected sign
Election	Dummy Variable started between three different mandates of national election and takes the value 1 in the determined period and 0 otherwise	+/−
Country Specific Region Dummy Variables		
ASEAN	Number of country in ASEAN takes the value 1 in the determined country of those who is in the region and 0 otherwise	+/−
East and South Asia	Number of country in East and South Asia takes the value 1 in the determined country of those who is in the region and 0 otherwise	+/−
EU	Number of country in EU takes the value 1 in the determined country of those who is in the region and 0 otherwise	+/−
Oceania	Number of country in Oceania takes the value 1 in the determined country of those who is in the region and 0 otherwise	+/−
USA	Number of country in USA takes the value 1 in the determined country of those who is in the region and 0 otherwise	+/−

Note: Signs (+) and (−) correspond to the expected positive and negative effects on the impact on the magnitude of international tourism flow capturing from both theoretical framework and empirical research publications.

Appendix II: Pearson's correlation coefficient of all variables

Series	LnTA	LnGDPi	LnGDPj	LnPOi	LnPOj
LnTA	1.0000				
LnGDPi	0.2644	1.0000			
LnGDPj	0.1048	0.0559	1.0000		
LnPOi	0.2621	0.9871	0.0574	1.0000	
LnPOj	0.5006	0.0354	-0.4411	0.0296	1.0000
LnRPI(ij)	0.0128	0.1058	0.5234	0.1225	-0.2377
LnRCL(ij)	-0.1029	-0.0087	-0.6703	-0.0142	0.2136
LnFC	0.2496	0.9405	0.0489	0.9006	0.0300
LnDS	-0.0004	-0.0427	0.7357	0.7357	-0.0392

Note: Pearson's correlation (r) indicated perfect and imperfect correlation between one variable to others one whereas $-1 < r < +1$. From above table indicated that Poi is correlated with GDPi and it is correlated with FC. DS is correlated with GDPi and Poi while POi did with FC. Thus, in estimated regression, correlation's variables will be dropped to avoid the problem of multicollinearity which leads to be inconsistency and bias results and leads to higher t-statistic.

Appendix II: Pearson's correlation coefficient of all variables (Cont.)

Series	LnRPI(ij)	LnRCL(ij)	LnFC	LnDS
LnTA				
LnGDPi				
LnGDPj				
LnPOi				
LnPOj				
LnRPI(ij)	1.0000			
LnRCL(ij)	-0.3777	1.0000		
LnFC	0.0877	-0.0085	1.0000	
LnDS	-0.0705	0.4448	-0.0486	1.0000

Note: Pearson's correlation (r) indicated perfect and imperfect correlation between one variable to others one whereas $-1 < r < +1$. From above table indicated that Poi is correlated with GDPi and it is correlated with FC. DS is correlated with GDPi and Poi while POi did with FC. Thus, in estimated regression, correlation's variables will be dropped to avoid the problem of multicollinearity which leads to be inconsistency and bias results and leads to higher t-statistic.