IMPACT OF THE COVID-19 PANDEMIC ON ATTRACTING INTERNATIONAL TOURISTS TO VIETNAM: A GRAVITY MODEL AND HAUSMAN-TAYLOR ESTIMATION APPROACH

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ABSTRACT: This study will employ the gravity model in tourism, Hausman-Taylor estimation and a panel dataset from 2010 to 2021 of 27 country partners to evaluate the impacts of Covid-19 pandemic on attracting international tourists to Vietnam. The results show that, over the past years, Vietnam has attracted a significant number of international tourists. However, the COVID-19 epidemic has markedly reduced the number of international tourists during 2019-2021 to the country. The robust check using the Fixed-Effects and Random-Effects models also indicates the same conclusion. In order to attract more international tourists, Vietnam needs to focus on promoting tourism to international tourists, diversifying tourism products and ensuring security, preserving as well as protecting the environment and tourism landscape in the coming years.

Key words: Attracting International Tourists, COVID-19 Pandemic, Gravity Model in Tourism, Hausman-Taylor Estimation, Impacts

TÁC ĐỘNG CỦA DỊCH COVID-19 ĐẾN THU HÚT KHÁCH DU LỊCH QUỐC TẾ ĐẾN VIỆT NAM: MỘT CÁCH TIẾP CẬN THÔNG QUA MÔ HÌNH LỰC HẤP DẪN VÀ PHƯƠNG PHÁP ƯỚC LƯỢNG HAUSMAN-TAYLOR

TOM TẮT: Nghiên cứu này sẽ sử dụng Mô hình Lực hấp dẫn trong du lịch, phương pháp ước lượng Hausman-Taylor, bộ dữ liệu bảng giai đoạn 2010 - 2021 để đánh giá ảnh hưởng của dịch bệnh Covid-19 đến hoạt động thu hút

khách du lịch quốc tế đến Việt Nam. Kết quả cho thấy trong những năm qua Việt Nam đã thu hút được nhiều du khách du lịch quốc tế. Tuy nhiên, dịch bệnh COVID-19 đã làm giảm đáng kể lượng du khách trong giai đoạn 2019-2021. Kết quả ước lượng dùng phương pháp Fixed-Effects và Random-Effects cũng cho kết quả tương tự. Một số hàm ý chính sách cũng được đề xuất trong nghiên cứu này.

Từ khóa: Thu hút khách du lịch quốc tế, Dịch COVID-19, Mô hình Lực hấp dẫn, Phương pháp ước lượng Hausman-Taylor, Ảnh hưởng

1. INTRODUCTION

Tourism is one of the largest industries in the economy, and it also can be considered a significant source of economic growth of a country. Tourism industry includes accommodation, transportation, food and beverage, etc. All sectors play an essential role in economic development because it can generate foreign revenues, helps people in remote areas to promote their culture and custom, and also provides opportunities for countries to create better images around the world, thereby promoting tourism development. Moreover, when people travel to somewhere will have a positive impact on the local community that is increasing the employment rate, driving economic growth. Vietnam is located in the central region of Southeast Asia with a tropical monsoon climate. The country has over 3000 km length of coastline with many scenic spots and cultural landmarks with thousands of years of civilization in history. The country is an attractive destination of many international tourists. However, the COVID-19 pandemic has significantly reduced the number of international tourists and the total revenue of this industry in Vietnam's GDP over the past years. The research question is that what is the trend of international tourists to Vietnam in recent years? Has Covid-19 pandemic significantly reduce the number of international tourists to Vietnam? What are solutions to attract more international tourists to Vietnam in the coming years? This study will try to answer the above questions. The research results will have practical significance and policy implication in planning strategies and policies for Vietnam's tourism industry in the coming years.

2. A BRIEF LITERATURE REVIEW

Activities to attract international tourists of a country/locality can be understood as a combination of activities aimed at attracting more and more tourists from abroad to visit their country/locality (Do Ngoc Quyen, 2013, p. 10). Attracting international tourists has been mentioned in a number of previous studies both in Vietnam and abroad. Accordingly, to attract more international tourists, the government can apply the policies such as exempting visas for foreign tourists (Le Dinh Vinh, 2008; Chi et al., 2022) or implementing marketing campaigns (Huynh Thi Bich Van, 2007), or organizing performances and art activities at famous monuments, or provide additional services for tourists … (Do Ngoc Quyen, 2013). Offering cheap tour prices due to an increase in the exchange rate (local currency depreciation) along with an increase in the per capita income of tourists are also factors that attract/motivate international tourists (Kim and Lee, 2017). In addition, other factors such as promotional efforts, external shocks etc. can also be factors affecting the travel demand of international tourists (Lim, 1999; Li *et al*., 2005; Song and Li, 2008). However, there are few (or possibly no) studies on examining the possible impacts of Covid-19 pandemic using an economic model for the case of Vietnam. To fill this research gap and to ensure the originality and significance of the research, the authors will employ a gravity model in tourism and a panel dataset of 27 country partners with the Hausman-Taylor estimation to examine the possible impacts of Covid-19 pandemic on attracting international tourists to Vietnam during 2019-2021.

3. METHODOLOGIES AND DATASET

To answer those research questions, the authors will employ the gravity model in tourism, the Hausman-Taylor estimation together with a panel dataset from 2010-2021 of 27 country partners provided by Vietnam National Administration of Tourism, the General Statistics Office of Vietnam and other prestigious agencies such as the World Bank (WB) and CEPII.

Mentioning the gravity model, developed during the sixties, gravity models use an analogy to Newton's universal law of gravitation to describe the patterns of international trade. The model considers that bilateral flows between two countries

are directly proportional to the countries' economic masses and inversely proportional to the distance between them. Gravity models have been found to fit well and have been extensively used to explain international flows of trade, migration and foreign direct investment. For example, this model has been applied to estimate the effects of economic and non-economic events on international flows of goods (Anderson & Van Wincoop, 2003; McCallum, 1995; Rose, 2000), migration (Gil-Pareja, Llorca, & Martínez, 2006; Karemera, Oguledo, & Davis, 2000) and foreign direct investment (Bergstrand & Egger, 2007; Eichengreen & Tong, 2007; Head & Ries, 2008). The basic gravity model can be expressed as the following:

$$F_{ij} = B^* \frac{(GDP_i)^{\alpha}(GDP_j)^{\lambda}}{Dist_{ij}^{\zeta}} * U_{ij} \quad (1)$$

Where F_{ij} denotes the international flow between regions i and j; GDP refers to the gross domestic product of each region i and j; $Dist_{ij}$ is the distance between region i and region j; U_{ij} is a log-normal distributed error term; and B, α, λ, and ζ are parameters to be estimated. For estimation purposes, expression (1) can be transformed using natural logarithms (Ln) to:

$$LnF_{ij} = \beta + \alpha LnGDP_i + \lambda LnGDP_j + \zeta LnDist_{ij} + \varepsilon_{ij} \quad (2)$$

Where ε_{ij} is a normal error term with $E(\varepsilon_{ij}) = 0$ and $\beta = \ln(B)$.

Since tourism can be considered as a special type of trade in services, movement of international travelers and tourists were analyzed through the gravity approach in the initial emergence of the model (Durden and Silberman, 1975; Malamud, 1973; Quandt and Baumol, 1969; Wilson, 1967; Pyers, 1966). In that case, some authors have used population instead of GDP for measuring regions' economic mass (e.g., Taplin and Qiu, 1997). However, despite the initial popularity of the gravity models in tourism demand modeling, one of the main problems of this type of specification is its lack of theoretical foundation. Furthermore, as pointed out by Sheldon and Var (1985), in its initial formulation, gravity models predict that tourism flows from region i to region j are the same as those from region j to region i a circumstance that is not common in the case of tourism flows (Morley, Rosselló and Santana-Gallego, 2014).

Consequently, it is not surprising that probably due to this lack of theoretical background in the tourism context, gravity models were neglected in the tourism literature during the eighties and the nineties. An illustration of this abandonment can be found in the fact that surveys on tourism demand modeling by Lim (1997, 1999), Li, Song, and Witt (2005) or Song and Li (2008) do not explicitly cite gravity models. In contrast, within the international trade literature, where a theoretical background is provided, gravity models are generally accepted to explain bilateral trade flows. In that case, this specification has been proved to be stable over time and across different samples of countries, specifications and methodologies, standing among the most used empirical regularities in international economic analysis (Morley, Rosselló and Santana-Gallego, 2014).

However, fueled by the success in international trade exercises, the gravity equation has reemerged within the tourism demand literature during the last decade. Indeed, Kimura and Lee (2006) show that trade in services is better predicted by gravity equations than trade in goods. Keum (2010) explores the validity of the gravity equation to explain tourism flows, presenting a general explanation about the patterns of international tourism flows. Moreover, the empirical evidence supports the gravity model in terms of applicability and robustness to the flow of trade and tourism. The gravity equation can be reformulated and applied to explain bilateral tourism movements on the basis that "the degree of interaction between two geographic areas varies directly with the degrees of concentration of persons in the two areas and inversely with the distance separating them" (Witt and Witt, 1995; p. 459). This "distance" can have physical, psychological, social and economic components. Bergstrand (1985) established some theoretical foundations for the model, deriving the gravity equation as "a reduced form from a partial equilibrium subsystem of a general equilibrium trade model with nationally differentiated products" (Bergstrand, 1985, p. 475). Doing so requires, as in the standard Heckscher-Ohlin model of trade flows, assuming identical utility and production functions across all origin-destination pairs. The initial formulation of the gravity equation including exclusively the population concentration and the distance between two geographic areas has evolved to more sophisticated

formulations of spatial models which include other explanatory variables such as origin and destination's income, price levels, substitute prices, cultural effects, etc. Prideaux (2005), combining a review of the literature with an analysis of tourist flow data, examined the structure of bilateral tourism and identified different categories of factors that may affect the overall size of tourism flows. The augmented version of the gravity model which re-emerged recently within the tourism demand literature can be expressed as:

$$\begin{aligned} \mathrm{LnN_{ij}} = \beta &+ \sum_{s=1}^{S} \alpha s \mathrm{LnZO^{S}_{i}} \\ &+ \sum_{p=1}^{P} \lambda p \mathrm{LnZD^{P}_{j}} \\ &+ \sum_{r=1}^{R} \zeta r \mathrm{LnZOD^{r}_{ij}} \quad (3) \end{aligned}$$

Where N_{ij} denotes the tourist demand, frequently measured through the number of tourist arrivals, between the origin region i and the destination region j; ZO^s is a vector of S variables determining the push force for outbound tourists from origin i (including GDP_i per capita); ZD^p is a vector of P variables determining the pull force for inbound tourists to region j (including GDP_j per capita); ZOD^r is a vector of r variables determining the costs (or attractiveness forces) for tourists from i to visiting j (including $Dist_{ij}$); and β, α_s, λ_p and ζ_r are vectors of parameters to be determined.

On the basis of a gravity model, Eilat and Einav (2004) analyzed the determinants of bilateral tourism movement across time. Their results suggest that very different factors such as price elasticities, exchange rates, destination risk, common border and common language matter for tourism. Gil-Pareja et al. (2006, 2007) define a gravity equation to analyze the role of embassies and sharing a common currency on tourism flows, respectively. Santana, Ledesma, and Pérez (2010a) and Santana, Ledesma, Pérez, and Cortés (2010b) explore the effect of different exchange rate regimes on tourism movements. Fourie and Santana (2011) use a gravity equation to estimate the impact of mega-events on international tourism, while in Fourie and Santana (2013) a gravity model is defined to study the effect of cultural affinity and ethic reunion. Durbarry (2008) uses a gravity model to understand tax implications for the tourism industry and Khadaroo and Seetanah (2008) explore the role of transport infrastructure on international tourism movements. Neumayer (2010) analyzes the impact of visa restrictions on international tourism flows by using a gravity model. More recently, Vietze

(2012) studies the impact of the religious affiliation on U.S. tourist arrivals, while Massidda and Etzo (2012) estimate the effect of different variables such as price differences, expenditure, cultural activities and crime rates, among others, on Italian domestic tourism (Morley, Rosselló and Santana-Gallego, 2014).Base on that theory background, in this research, a gravity model in tourism is justified as the following: $LnDKQT_{jt}$ = f($LnGDP_{VNt}$, $LnGDP_{Jt}$, $LnDistance_{vnj}$, $LnGDP_{pervnt}$, $LnGDP_{perjt}$, LnEXR, LnFDI, COVID-19, LnPolitic, LnInfrastructure, BOR) (4)

In which:

• $DKQT_{jt}$ is the number of international tourists from country j to Vietnam in year t

• GDP_{VNt} is Vietnam's nominal GDP in year t (USD)

• GDP_{jt} is the nominal GDP of country j in year t (USD)

• $Distance_{VNj}$ is the distance between Vietnam and country j in Km offered by CEPII

• GDP_{perVNt} is Vietnam's GDP per capita in year t

• GDPperjt is the GDP per capita of country j in year t

• EXR is the exchange rate between Vietnam Dong and USD

• FDI is direct investment from abroad into Vietnam in year t (implemented capital)

• COVID-19 is a binary dummy variable whose value is 1 if there exist Covid-19 epidemic in Vietnam and country j in year t and vice versa (in this research COVID-19 = 1 during 2019-2021 and 0 for the remain years).

• Politic is the variable measuring the interaction of the politic environment between Vietnam and foreign country j in year t offered by the WB.

• Infrastructure is the number of rooms of accommodations from 3-5 stars ranking in year t of Vietnam.

• BOR is a dummy variable representing the common border between Vietnam and country j. It takes the value of 1 if Vietnam and country partner j share the border and vice versa.

In this research, the authors use the Hausman-Taylor (1981) estimator for its superior than Fixed-Effects and Random-Effects estimation. The Hausman-Taylor (1981) estimator is basically a hybrid of the Fixed-Effects and the Random-Effects models and takes the following formula:

$$y_{it} = \beta_1 x'_{1it} + \beta_2 x'_{2it} + \alpha_1 z'_{1i} + \alpha_2 z'_{2i} + \varepsilon_{it} + u_i \quad (5)$$

In which, y_{it} reflects the dependent variable for country i in period/time/year t; x'_{1it} denotes variables that are time varying and uncorrelated with the error term in the Random-Effects model (u_i); x'_{2it} refers to a set of variables that are time varying and correlated with u_i; z'_{1i} represents the time invariant variables that are uncorrelated with u_i; z'_{2i} describes the time invariant variables that are correlated with u_i; β_i and α_i are the vectors of coefficients associated with the covariates; and ε_{it} is the random error. Accordingly, one of the main assumptions of the Hausman-Taylor (1981) estimator is that the explanatory variables that are correlated with u_i can be identified.

4. RESULTS AND DISCUSSION

4.1. An Analysis of International Tourists to Vietnam

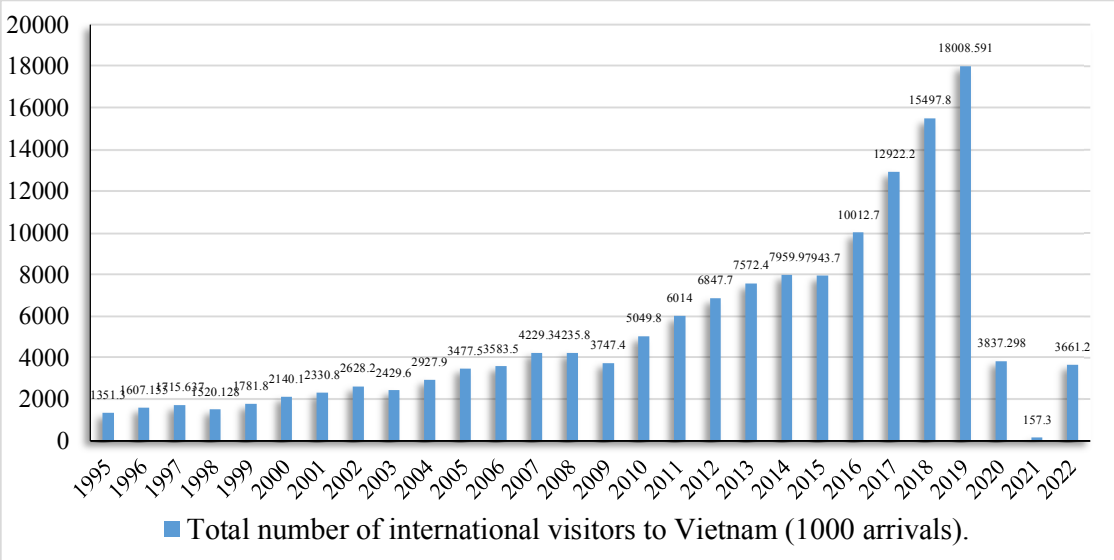

Figure 1. Number of International Visitors to Vietnam in the period 1995-2022.

Source: General Statistics Office of Vietnam, 2023.

Figure 1 above depicts the number of international tourist arrivals to Vietnam in the period 1995-2022. In the period 1995-2019, the number of international tourist arrivals to Vietnam increased steadily. Specifically, it increased from 1,351,300 in 1995 to a peak of 18,008,591 in 2019. This is the period before the COVID-19 epidemic occurred. The average growth rate of the number of international tourist arrivals to Vietnam during this period is around 12.04% per year. During the COVID-19 period, the end of 2019, the

two years of 2020, 2021 and the first quarter of 2022, international tourist arrivals to Vietnam decreased from 18,008,591 in 2019 to 3,837,298 in 2020 and bottomed out in 2021 with 157,300. From the second quarter of 2022 when the epidemic was under control with the vaccination campaign covering whole Vietnam and the decision to loosen domestic circulation and some countries in green zone, the number of international tourists to Vietnam has improved and recovered slowly to reach 3,661,200 arrivals in 2022. In the first three months of 2023, according to a report by the Vietnam National Administration of Tourism, the number of international tourist arrivals to Vietnam reached 2,699,556, an increase of 12.07% over the same period in 2022. It can be said that this is a good signal for Vietnam in attracting international visitors back to the hospitable S-shaped country.

4.2. Estimation Results and Discussion

Table 1. Estimation Results Using the Hausman-Taylor Estimation.

Explanatory variables	**Dependent Variable (LnDKQT)**	
Time varying exogenous	**Coefficient**	**P-value**
LnEXR	11.007*	0.001
COVID-19	-0.385**	0.025
LnPolitic	0.754*	0.006
LnInfastructure	0.538*	0.005
Time varying endogenous		
$LnGDP_{vnt}$	-286.967*	0.000
$LnGDP_{jt}$	13.395	0.436
$LnGDP_{pervnt}$	13.857*	0.000
$LnGDP_{perjt}$	-0.401*	0.001
LnFDI	0.623*	0.000
Time invariant exogenous		
$LnDistance_{vnj}$	0.625	0.267
BOR	0.080	0.576
Cons	4667.651*	0.000

*Notes: *, ** indicate significance at the levels of 1% and 5% respectively.*

For the first group of variables, the coefficient of the exchange rate (LnEXR) variable is positive and statistically significant at 1% level indicating that the higher the exchange rate is, the more international tourists come to Vietnam. This is completely consistent with the authors' expectation. When the Vietnamese dong tends to be depreciated (the exchange rate increases), international tourists will come to visit Vietnam more. Visitors can experience more services when converting USD to Vietnamese Dong.

The coefficient of the COVID-19 variable is negative and statistically significant at the 5% level. This means, the COVID-19 pandemic has had a negative effect to the number of international tourists to Vietnam. The Covid-19 pandemic has reduced about 46.22% of the number of international tourist arrivals to Vietnam during 2019-2021.

The coefficients of LnPolitic and LnInfastructure variables are positive and also statistically significant at 1% level. Those mean the improvement of infrastructure and politic stability between Vietnam and country partners are two factors inducing the international tourists to Vietnam.

The coefficient of LnFDI is positive and statistically significant at 1% level. This means, the investment of foreign investors in accommodations and restaurants has helped Vietnam attracting more international tourists.

The coefficients of $LnGDP_{vnt}$, $LnGDP_{pervnt}$ and $LnGDP_{perjt}$ are statistically significant. However, the impacts of those factors are not as the author's expectations.

The coefficients of $LnGDP_{jt}$, $LnDistance_{vnj}$, and BOR variables are not statistically significant. So, we don't have evidence to conclude that those variables impact on attracting international tourists to Vietnam.

To have a robust check, the authors run the FE and RE models. The estimated results are summarized in Table 2 and Table 3 below:

Table 2. The Estimated Results Using the Fixed-Effects Estimation Technique.

Explanatory variables	Dependent Variable (LnDKQT)	
	Coefficient	**P-Value**
$LnGDP_{vnt}$	-286.713*	0.000
$LnGDP_{jt}$	-0.237	0.406
$LnDistance_{vnj}$	-	-
$LnGDP_{pervnt}$	309.023*	0.006
$LnGDP_{perjt}$	-1.117*	0.001
LnEXR	10.913*	0.000
LnFDI	13.770*	0.000
COVID-19	-0.384**	0.026
LnPolitic	0.781*	0.006
LnInfastructure	0.539*	0.005
BOR	-	-
Cons	4480.221*	0.000

*Notes: *, ** indicate significance at the levels of 1% and 5% respectively.*

Table 3. The Estimated Results Using the Random-Effects Estimation Technique.

Explanatory variables	Dependent Variable (LnDKQT)	
	Coefficient	**P-Value**
$LnGDP_{vnt}$	-281.397*	0.000
$LnGDP_{jt}$	0.657*	0.000
$LnDistance_{vnj}$	-0.642*	0.005
$LnGDP_{pervnt}$	301.800*	0.006
$LnGDP_{perjt}$	-0.610*	0.007

Explanatory variables	Dependent Variable (LnDKQT)	
	Coefficient	P-Value
LnEXR	13.395*	0.000
LnFDI	13.857*	0.000
COVID-19	-0.401**	0.024
LnPolitic	0.623**	0.012
LnInfastructure	0.625*	0.002
BOR	0.080	0.887
Cons	4535.544*	0.000

*Notes: *, ** indicate significance at the levels of 1% and 5% respectively.*

The coefficient of the Covid-19 dummy variable is negative and statistically significant at 5% level in both FE and RE models.

5. CONCLUSION

Tourism has become an important sector in Vietnam's economy. Over the past years, Vietnam has attracted a significant number of international tourists with an average growth rate of around 12.04% per year. However, the COVID-19 epidemic has significantly reduced the number of international tourists to Vietnam during 2019-2021. To attract more international tourists to the country in the post of COVID-19 pandemic, Vietnam should focus on: (1) Promoting Vietnam's tourism to international tourists; (2) Diversifying tourism products; (3) Ensuring security, preserving and protecting the environment and tourist landscape; and (4) Limiting the impact of the COVID-19 epidemic. Thus, the development of tourism needs to be associated with cultural development to effectively promote the tourism potential of Vietnam. Vietnam tourism needs synchronous investment and especially needs to have its own identity.

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