National Accounting Review

NAR, 2(4): 324–336.
DOI: 10.3934/NAR.2020019
Received: 21 August 2020
Accepted: 10 October 2020
Published: 14 October 2020

http://www.aimspress.com/journal/NAR

Research article

Vietnam's sustainable tourism and growth: a new approach to strategic policy modelling

Tran Van Hoa[1,2,*], Jo Vu[1] and Pham Quang Thao[3]

[1] College of Business, Victoria University, Level 13, 300 Flinders Street, Melbourne, VIC 3000, Australia
[2] Faculty of Business, Wollongong University, NSW 2500, Australia
[3] Vietnam Union of Science and Technology Associations, Vietnam

* **Correspondence:** Email: jimmy.tran@vu.edu.au; Tel: +61398705358.

Abstract: The paper introduces a new approach to develop a model of endogenous tourism and growth for Vietnam and, estimated by official national accounting data, provides credible inputs for strategic policy analysis. The country is a major transition high-growth ASEAN economy and a WTO member with successful opening up policies since its Doi Moi (Renovation) reform in 1987. Significantly, due to these policies and its natural, historical and cultural attractions, Vietnam has also been receiving in recent years increasing tourist inflows with substantial contribution to its national income. In spite of these developments, appropriate and rigorous studies of Vietnam's tourism and impact on growth have been very limited. The paper addresses this gap. As a significant innovative feature, the study is carried out appropriately from an economic integration growth framework, which is also the expenditure (as opposed to conventional production or income) perspective of the United Nations System of National Accounts 1993/2008. The model is a multi-simultaneous equation model of Vietnam's endogenous growth and tourism determination. It explicitly incorporates gravity theory and classical consumer demand contributors, Ironmonger-Lancaster new commodity attributes and importantly Johansen policy impact add- and sub-factors in its specification. The model is then estimated by system methods with official 1997–2017 economic and tourism data from the World Tourism Organisation and other international agencies. The research will advance the literature and the findings will provide useful new, appropriate and evidence-based causal insights on the determination and contributors of tourism to Vietnam's growth. Recommendations will be made for key stake-holders such as tourism policy-makers, academic analysts and tourism operators for strategic policy analysis and practical implementation. The approach is of the economic integration modelling class and generic, and has wide applications in the field.

Keywords: tourism; Vietnam's growth; economic integration theory; econometric modelling; strategic tourism policy; economic and trade policy

JEL Codes: C54, F15, F62, Z32, Z38

1. Introduction

Vietnam, since its epoch-making renovation policy (Doi Moi) introduced in 1987, has enjoyed deep global economic integration, achieved great economic successes, significantly alleviated poverty, and become one of the "miracle economies" and regional powers in Asia (WTO, 2019). Importantly, due to this opening up policy and the country's cultural, historical and attractive natural characteristics, Vietnam has also become a great tourist destination in South East Asia, ranking third after Indonesia and Thailand. The number of tourists to Vietnam has grown exponentially from 1.251million in 1995 to 12.922 million in 2017 (UNWTO, 2019). Tourism has become a significant contribution to its GDP, and, in the context of national policy, has become one of the government's special development priorities (WB, 2019). In spite of these developments, rigorous studies of Vietnam's tourism and its economic impact for sustainable policy analysis explicitly and appropriately from an economic integration structure or, equivalently, the expenditure framework of the United Nations System of National Accounts (SNA 1998/2003) have been very limited. The paper is a serious study to address this gap and to advance the literature. More specifically, it investigates the economic contributions and determination of tourism in Vietnam during the period 1997–2017 (where the data are available) for credible strategic data-based policy analysis.

The plan of the paper is as follows. Section 2 briefly surveys the recent trend of tourism, growth, economic integration and tourism contributing factors, and the impact of regional and global crises and domestic reforms in Vietnam. Section 3 describes an appropriate multi-equation model of endogenous growth and tourism for globally integrated Vietnam and its special innovative features. Section 4 describes the data and estimation methods and presents the empirical findings and, importantly, their statistical modelling characteristics. Major policy implications for sustainable tourism and growth for Vietnam are discussed in Section 5 and Section 6 concludes.

2. Recent trends in Vietnam's tourism and growth

The data during 1997–2017 for Vietnam's key indicators in focus namely growth (YC) and tourism in millions of short-term (overnight and same day, UNWTO, 2019) visitors (T) are given in Figure 1, and its three main economic integration determinants of growth (WTO, 2019) standardised by gross domestic product (GDP), namely openness or total merchandise trade/GDP (TY), foreign direct investment/GDP (FDIY), and services/GDP (SY) are depicted in Figure 2. From Figure 1, we note the country's high and especially fairly stable rising growth, peaking in 1997 at 8.15 per cent and having the lowest rate of 4.77 per cent in 1999 resulting probably from the impact of the regional contagious damaging Asian financial crisis (AFC) in 1997 (see also Tran, 2002). Vietnam's annual average growth for the period was fairly high at 6.39 per cent. In this figure, tourism shows an exponential growth pattern, punctuated by a small decline in 1998 due to the AFC, and especially after

the global financial crisis (GFC) in 2008 and during the recent period 2015–2017. Its annual average was 4.81m. For the relevant economic integration engines of growth, namely openness TY, FDIY and SY depicted in Figure 2, TY shows a high and rising trend especially after the GFC. It started at 76.67 per cent in 1998 and peaked at 190.29 per cent in 2017. Its annual average was 128.48 per cent. FDIY which was crucial to support the country's official FDI-lead growth during the period, shows only a low and fairly volatile pattern ranging from 3.25 per cent in 2004 and peaking at 9.66 per cent particularly after Vietnam's WTO membership in 2007. The annual average was 5.61 per cent. As a transition developing country, Vietnam had seen however a continuous moderate declining path in services (SY) with a peak at 21.17 per cent in 1997 and 13.47 per cent in 2017. The annual average was moderate at 16.39 per cent.

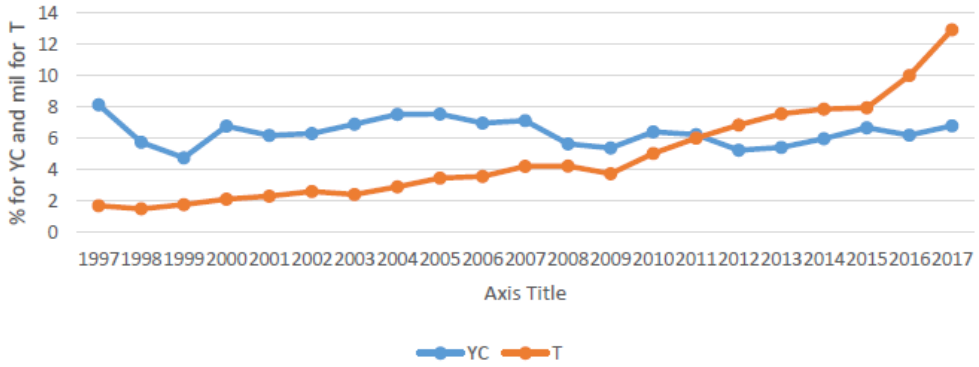

Figure 1. Vietnam's growth (%) and tourism (mil), 1997–2017. Notes: For Figures 1 and 2, YC = Vietnam's growth (%), T = Vietnam's tourism (mil), TY = openness, FDIY = FDI/GDP, and SY = services/GDP. Sources of data for Figures 1–3: ERS-USDA (2019), UNCTAD (2019), UNWTO (2019).

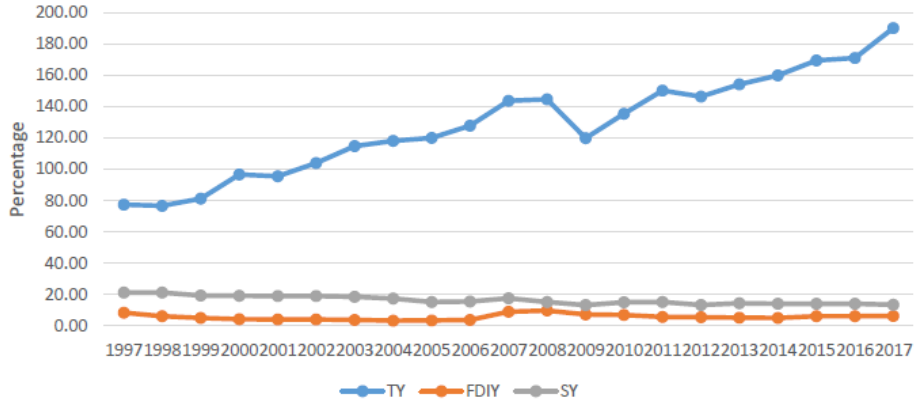

Figure 2. Vietnam's main economic integration determinants (%), 1997–2017.

Notably, even for a transition free-market with socialist-orientation economy like Vietnam (Tran, 2002), all five key indicators described above appear to be seriously affected by the GFC of 2008 but only growth and FDIY were impacted by the AFC in 1997. Significantly and collectively, Vietnam's growth and tourism appear to be characterised by a complex visual interdependent relationship that

involves not only economic integration activities but also regional and global crisis events or beneficial policy reforms such as the WTO membership in 2007 for the economy in its recent development stages.

The data during the period 1997–2017 for Vietnam's major potential determinants of tourism (and probably growth through an indirect complex nation-wide interdependent transmission mechanism) as postulated by gravity, classical and new consumer demand theories in our model (see Section 3 below) are given in Figure 3. These determinants include the source destination demand conditions or growth (YCA) in this case in Asia and Oceania (where the majority of Vietnam's tourists come from, see UNWTO, 2019), the costs of living or inflation (change in the consumer price index) in Vietnam (CPIC), Vietnam's change in real exchange rates (RXRC), and the supply of tourism accommodation in the country and measured as the number of hotel rooms (RM in '000, secondary axis). While these determinants represent conceptually only some major illustrative representative characteristics for tourism determination in Vietnam, some interesting observations can be made. First, the country had invested strongly and continuously in the hotel accommodation industry to meet the growing demand during the study period with an annual average of 201,300 units (RM). Second, for the other three determinants (YCA, CPIC and RXRC), while YCA was subject moderately to volatility during the Asian financial crisis of 1997, RXRC and CPIC fluctuated strongly after the country's WTO membership in 2007, and during the GFC and the post-GFC periods. A declining trend is however observed for these three determinants during the recent years 2012 to 2017. The annual average for these determinants during 1997–2017 was 4.37 per cent for YCA, 4.01 per cent for RXRC and 6.73 per cent for CPIC respectively.

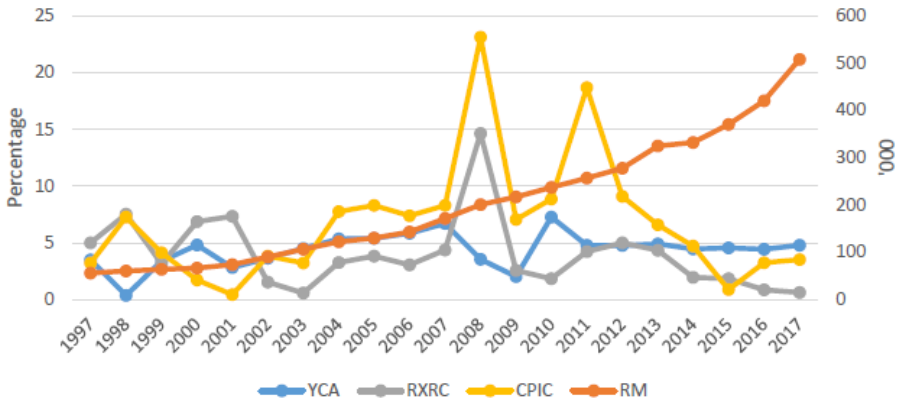

Figure 3. Vietnam's tourism determinants, 1997–2017. Note: YCA = Vietnam's trade partner growth, RXRC = change in real exchange rates, CPIC = inflation rate, and RM = number of hotel rooms in '000.

3. A new model of Vietnam's tourism and growth

To rigorously explore the causal relationship between growth and tourism, economic integration growth contributors (TY, FDIY and SY), and also key testable tourism determinants (YCA, RXRC, and CPIC) and, importantly, major crisis events or reforms for Vietnam in an economic integration structure, an econometric model is developed as follows. Following Tran (2004, 2007; Tran and Limskul, 2013; Tran and Vu, 2018; Tran et al., 2018; Tran, 2019; Tran and Vu, 2020), we consider, for convenience and without loss of generality, a simple model of two simultaneous (circular causality)

implicit or arbitrary functions for income (Y) and tourism (T) and their key testable determinant variables in an economic integration growth framework, (1) and (2). In this model, the underlying theoretical assumptions and testable hypotheses are as follows. First, Vietnam's income (Y) is determined principally not by conventional production or income factors but by economic integration engines of growth, namely, trade openness (O) (WTO, 2019), FDI (see also Tang et al. 2007 for the possible relationship between FDI and tourism), services (F), and additionally by Vietnam's tourism (T), economic policy (W), and shocks or reforms (S) (Johansen, 1982; Tran, 2004). Second, tourism is simultaneously determined by both Vietnam's and its tourism source's economic demand conditions such as their GDP (i.e., Y and YT respectively) (also known as the gravity factors, Frankel and Romer, 1999), Vietnam's cost of living or inflation (I), its real exchange rate (RXR) (Gerakis, 1965), FDI (Tang et al., 2007), W and other non-economic factors S. This model incorporates, in one important structural specification aspect, not only economic factors but also geographic or demographic attributes (Frankel and Romer, 1999, Johansen, 1982) or demographic dynamics (Kydland, 2006). Thus for simplicity and importantly in implicit (function-free) functional form, the two functions for Y and T can be written for a sample N as:

$$Y_t = F1\ (a, O_t, FDI_t, F_t, T_t, W_t, S_t), \qquad t=1,\ldots,N \tag{1}$$

$$T_t = F2\ (b, Y_t, YT_t, I_t, RXR_t, FDI_t, W_t, S_t) \quad t=1,\ldots,N \tag{2}$$

where F1 and F2 are two implicit functions linking simultaneously income and tourists to their theoretically plausible and empirically testable causal determinants (variables), and a and b are two vectors of parameters. In this model, Y may be defined as GNP (gross national product), per capita income (Easterly, 2007) or more popularly by convention real GDP which is adopted in this study. T is defined as short-term arrivals (overnight tourists and same day excursionists), O = exports or imports or, more conventionally, openness (exports plus imports/GDP). FDI denotes foreign direct investment, F for services, and S is a vector representing shocks or policy reforms. YT is the tourism source country's income representing its general economic or demand condition or supply of tourists. W denotes other economic (fiscal, monetary, trade and tourism policy—see Sala-i-Martin, 1991), and S represents non-economic variables (e.g., country size or population, policy reforms and external shocks —see Johansen, 1982; Blake and Sinclair, 2003; Tran, 2005; and Smeral, 2009 for justification) relevant to Vietnam's growth and tourism policy. Importantly for our feasible empirical study especially for developing or transition economies where data are often limited, in addition to the official time-series data for Y, YT, O, FDI, F, and T, and identification of relevant influencing national and global events in S, continuous or discrete data for W must be available and consistent with published time-series data from national statistical offices in a standard Kuznets-type accounting framework (e.g., System of National Accounts, SNA93/08), or the accounting system of Stone (1988), or the recent World Bank tables.

As (1) and (2) are in implicit form they assume importantly flexibility or no specific *a priori* functional form, and therefore are not statistically estimable. Since our purpose is ultimately to derive elasticities for their economic variables, we use planar approximations (thus ignoring higher-order differentials) and invariant transformations (e.g. see Allen 1960; and derivation in Tran, 1992; and previous related studies cited above) for (1) and (2) to write more explicitly in stochastic form and in terms of the rates of change for the continuous economic variables (denoted by *y, yt, o, fdi, f, t, w, i,*

rxr, and w) and binary S of all the included econometrically exogenous and endogenous variables as (for t=1,…,N).

$$y_t = a1 + a2o_t + a3fdi_t + a4s_t + a5t_t + a6w_t + a7S_t + u_{1t} \quad (3)$$

$$t_t = b1 + b2y_t + b3yt_t + b4i_t + b5rxr_t + b6fdi_t + b7w_t + b8S_t + u_{2t} \quad (4)$$

In (3)–(4), y is growth (the rate of change in real GDP) and the equations are linear and interdependent or simultaneous, while a1 and b1 are constant terms, a2–a6 and b2–b7 are the elasticities (see Tran, 1992), and a7 and b8 are impact parameters. The u's are other unknown factors outside the model (Frankel and Romer, 1999), or the usual disturbances with standard statistical properties.

The main features of the model can be described as follows. As specified in (1) and (2) and as testable hypotheses, the model in its implicit form can deal with any possible complex nonlinear functional relationship between growth and tourism without requiring arbitrary and restrictive extraneous information about their relationship, and explicitly, in a causal economic integration growth framework. In its transformed form for empirical implementation given in (3)–(4), circular and instantaneous causality in the sense of Granger (1969) or Engle-Granger (1987) and within the economic integration framework exists, or is regarded in our study as a testable hypothesis. A system estimation method such as the 3SLS (three-stage least-squares) is therefore econometrically appropriate. In their exact or non-stochastic forms (in which all disturbances are idealistically zero), these estimated equations form the basic structure of a time-series data-based class of the computable general equilibrium/global trade analysis project (CGE/GTAP)) models of the Johansen class, in which all elasticities and impact parameters are not assumed (calibrated) to be given or known *a priori* and the impact of endogenous or endogenised variables (say T) on Y is dependent on the exogenous variables and calculated system-wise, using such iterative procedures as the Gauss-Euler algorithm with a known sparse matrix of elasticities. In econometric studies, the impact is usually carried out by reduced-form analysis.

Significantly, it should be noted that, in the model's estimation construct (3)–(4) with the variables in the form of the rate of change or, equivalently, log-differences (for small changes), the resulting parameter estimates are the elasticities (see above and Tran, 1992) that may be regarded as short-run causality in the sense of Granger (1969) when the variables are integrated of degree 0 or they may be regarded as long-run causality or co-integration in the sense of Engle-Granger (1987) when the variables are integrated of degree 1. Other important properties of the approach are given for example in Tran et al. (2018). It can be verified that our so-called flexible (or function-free) growth and tourism Equations (3)–(4) in the model above are econometrically identified in the sense of mathematical consistency. The three-stage least-squares estimation method with relevant instrumental variables (see Table 1) is suitable and adopted.

Table 1. Vietnam's tourism and impact on growth. 3SLS Estimates. 1997–2017.

Variables	Growth		Tourism
Const	1.128**		−155.046
Trade/GDP	0.024	Vietnam Growth	−9.898
FDI/GDP	−0.003	Partner Growth	8.220**
Services/GDP	0.016	FDI/GDP	0.025
Tourism	0.025*	Real Exchange	−0.888
Inflation	−0.064*	Inflation	0.972*
Post-AFC 1999	−1.513**	Population	145.831
Iraq War /SARS 2003	1.730**	Hotel Rooms	−0.042
GFC 2008/2009	−0.669	AFC 1998	−1.865
Post GFC 2010	−0.605	Post AFC 2000	20.646
Euro Crisis 2012	−0.358	Iraq War /SARS 2003	−10.968
Recovery 2015	0.0445	GFC 2008/2009	3.026
		Post GFC 2010	17.541
RSQ	0.713		0.759
DW Statistics	2.031		2.790
PP p-value	0.108		0.056

Notes: AFC = Asian Financial Crisis, GFC = Global Financial Crisis, RSQ = R-squared, ** = Significant at the 5 per cent level, * = Significant at the 10 per cent level, PP p-value = Phillips-Perron p-value of the unit root test on the residuals. Software used for estimation = TSP-Oxmetrics 6.

4. Empirical implementation and substantive findings

4.1. Data

Data sources–In addition to the key economic and tourism variables mentioned in Section 2 earlier, W in the tourism Equation (4) includes conventional demand—theoretically Vietnam's cost of living, international trade real exchange rates, FDI (Tang et al., 2007), and the supply of hotel accommodation. Data for the estimation were obtained from the UNWTO (2019), ADB (2019), UNCTAD (2019) and USDA-ERS (2019) databases. All economic and trade data are in real values or equivalent. In our study, all original data are obtained or derived as annual, and then transformed to their ratios (when appropriate). The ratio variables include merchandise trade, FDI and services. Other non-ratio variables include population (a gravity factor proxy for time-series models, Frankel and Romer, 1999), inflation, real exchange rates, and qualitative variables representing the occurrence of the economic, financial and other major crises, policy shift or reforms over the period 1997 to 2017.

Variables definition and data processing—The qualitative binary variables reflect, in a conventional manner, the major domestic, regional and global event dates, with the assumption of long-term non-decaying effects on growth and tourism. All non-binary variables are then converted to their percentage rates of change. The use of this percentage measurement (which is equivalent to log-difference for small changes) is a main feature of our policy modelling and impact approach, as it deals with empirical implementation of the implicit functions (1) and (2) and avoids the problems of restrictive and potentially unsuitable *a priori* known functional forms (see above), and also of logarithmic transformations for negative data (such as budget (fiscal) deficits, and real interest rates

or current account deficits). In addition, in the model, we assume a unidirectional direction of comprehensive trade to growth in a "causal" context. That is, the model deals with Vietnam's trade (in goods, FDI, and services) and their causal impact on Vietnam's growth and not vice versa. Major reforms and crises and economic variables that have been identified or assumed as exogenous or acceptable instrumental variables, affecting simultaneously Vietnam's growth and tourism, are listed in the empirical findings table in the next section.

The p-values for the Phillips-Perron unit root test for all variables in the model are given as: Vietnam's growth = 0.169, Asia and Oceania's growth = 0.152, Vietnam's tourism = 0.272, openness = 0.124, FDI/GDP = 0.161, services/GDP = 167, RXR = 0.149, Vietnam's inflation = 0.243, hotel rooms = 0.438, and population = 0.230. Showing all variables used in the estimation are stationary at the 5% significance level. The empirical findings are thus not spurious.

4.2. The estimated model and modelling performance

To provide insights into Vietnam's tourism, and with the various key contributing factors to endogenous growth and tourism (the instrumental variables), the model (3)–(4) has been appropriately estimated, as mentioned earlier, by the 3SLS using the available official data for the period 1997–2017. The basic findings on the parameter estimates (elasticities for economic, trade, tourism and demographic variables and impact parameters for event variables) are reported in Table 1 below. As mentioned above, the model is identified according to the order identification tests, and all included (non-binary) variables have been found to be statistically stationary according to the usual unit root tests. The modelling performance of the estimated equations for Vietnam's growth and tourism has also been measured, importantly, by the Friedman (1953)-Kydland (2006) data-model compatibility or simply "empirical fit" criterion (Figures 4 and 5) which, unlike many other empirical models in related studies, show excellent fits. More specifically, the estimated model emulates very well the volatile peaks, troughs and the turning points of both growth and tourism in Vietnam over the whole sample period and especially over the deeply turbulent period of the global financial crisis 2008–2009 and the so-called euro crisis in the early 2010s.

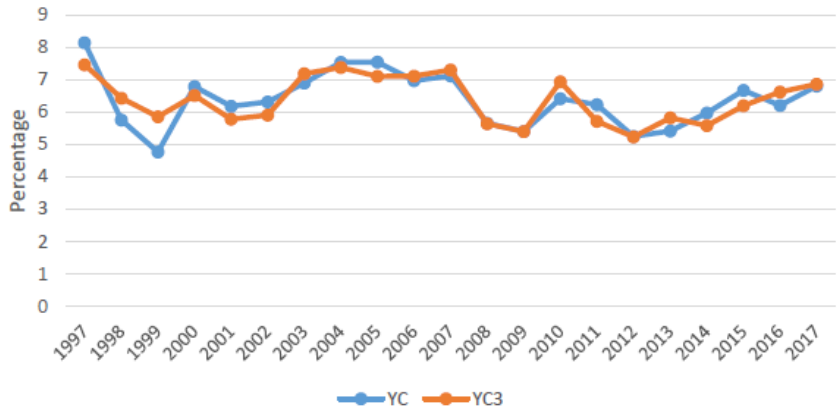

Figure 4. Friedman-Kydland modelling performance, Vietnam's growth (%), 1997–2017. Notes to Figures 4–5: YC and YC3 = Vietnam's growth and its 3SLS estimate, T and T3 = Vietnam's tourism and its 3SLS estimate.

Figure 5. Friedman-Kydland modelling performance, Vietnam's tourism (%), 1997–2017.

In addition, modelling performance is measured by their empirical statistical characteristics, using Theil-MSE decomposition, and given in Table 2. Other standard diagnostic tests available for OLS estimation and residuals are not appropriate for 3SLS residuals. As assessed by these various modelling diagnostics reported in Figures 3 and 4 and Table 2, the estimated model first performs very well in emulating the trend and volatile movements of Vietnam's growth and tourism data over the whole sample period 1997–2017. Second, the Theil-MSE findings show the closeness of data in the form of the model's first two moments bias (m_b), variance (m_s), and especially the high covariance (m_c) of 0.926 and 0.963 for the growth and tourism equations respectively. The model's residuals have also been tested for evidence of unit roots, with a Phillips-Perron p-value of 0.108 for growth and 0.056 for tourism establishing statistical stationarity and modelling credibility. In addition, in the estimated model, the values for R^2 (0.713 for growth and 0.759 for tourism) and DW (2.031 for growth and 2.790 for tourism) appear acceptable and show no first-order autocorrelation problem.

Table 2. Modelling performance—THEIL-MSE decomposition.

	Growth		Tourism	
	Actual	3SLS	Actual	3SLS
Mean	6.388	6.388	11.145	11.145
St. Dev.	0.848	0.726	12.701	11.506
Corr. Coef.		0.894		0.871
RMSE		0.444		6.094
Mean Error		0.000		0.000
m_b		0.000		0.000
m_s		0.074		0.037
m_c		0.926		0.963

Note: $m_b+m_s+m_c = 1$. See Pindyck and Rubinfeld (1998).

The discussions of the findings and policy implications for Vietnam's growth and tourism determination are based on these empirical findings, and given in Section 5.

5. General findings and major policy implications

As mentioned earlier, the literature of tourism and its impact and contribution to economic growth since the early 1960s has been extensive with diverse empirical and simulation findings (see Song et al. 2012 for a review). However, in recent years, fast rising globalisation and widespread economic integration through for example free trade agreements (WTO 2019) has focussed the sources of growth on international trade (or openness), FDI flows, and services (in which tourism is the major component), rather than on the traditional production perspective of the economy as adopted by a large number of studies. This requires new directions in fundamental research and policy analysis that better reflect these global developments.

This paper makes use of this contemporary focus to develop a new approach to address these developments, the so-called economic integration or United Nations System of National Accounts (SNA 98/03) expenditure approach (Tran, 2004; Tran, 2007; Tran and Limskul, 2013; Tran and Vu, 2018; Tran et al., 2018; Tran, 2019; Tran and Vu, 2020). The objective was to provide substantive evidence for credible and appropriate policy analysis in the specific case of Vietnam's tourism, and its impact on the country's growth. The findings by 3SLS estimation using official 1997–2017 data of the model (3)–(4) with reported results in Table 1 and their modelling characteristics (Figures 3 and 4 and Table 2), show interesting credible results and insights for the impact of globalisation, tourism and regional and global crises on Vietnam's growth, and, importantly, the major contributing factors to Vietnam's tourism.

It should be noted that, as these findings are from an endogenous and simultaneous multi-equation economic integration econometric study with acceptable empirical fit (see above), these time-series data-based findings represent another perspective of macro-economic modelling and official real-life data, and, as expected, may not be consistent with expectations or with other findings from alternative approaches such as input-output analysis, CGE simulation, Granger short-term causality, Engle-Granger long-term co-integration, or regression analysis (see details of these approaches in Song et al. 2012).

The main findings are as follows. First, to the principal research question of whether tourism contributes to growth in Vietnam during the turbulent period 1997–2017 that is marked by major domestic reforms and regional (the Asian financial crisis of 1997/98) and global crises (the GFC in 2008 and the euro crisis in the early 2010s), the findings show that the answer is in the affirmative (elasticity = 0.025) but statistically weak (at the 10% significance level). This supports not only the government of Vietnam's development priority on tourism but also the casual observations of the official international data (UNWTO, 2019). Second, to the important question of what determines significantly Vietnam's tourism, the findings show that it is the income or economic conditions of the main source countries for Vietnam's tourism, namely, Asia and Oceania (UNWTO, 2019) (elasticity = 8.220). Third, the thesis that growth is determined simply by economic integration or globalisation (via enhanced merchandise trade, FDI and services) is only supported weakly in our empirical study. This finding may be due to the characteristics of the Vietnamese economy (namely, being socialist with not full open market features), the deep country-wise simultaneous transmission mechanism of globalisation and growth and other activities, or simply the short available data sample we used. Importantly and additionally, Vietnam's rising costs of living do not apparently deter its tourism but they affect its growth. In addition, the supply of hotel rooms and rising real exchange rates in Vietnam have negative impact on its tourism. However, domestic reforms and regional and global crises do have impact (although weakly) on Vietnam's growth and especially tourism.

Several important implications can be derived from the findings. First, the study appears to lend empirical support to Vietnam's priority policy to promote tourism (WB, 2019) by either appropriate tourism development, tourism labour supply and management support, or infrastructure and partnership investment. Second, this policy is crucial for sustainable tourism in Vietnam amid rising globalisation as international tourism is globally and regionally competitive especially for major developing economies in Asia in recent years. This policy will also have the outcome of increasing tourism with positive impact first on the economy and second, on its official eco-social development programs. However, as our study's findings also indicate, the real impact on Vietnam's tourism and economy involves many factors lying outside the country's control. These include importantly the source countries' income in Asia and Oceania (where the majority of Vietnam's tourism come from) and especially regional or global shocks that are highly relevant but have been overlooked in numerous major related contemporary studies. The cases of recent US-China trade-disputes that induced trade and therefore income decline in Asia and Oceania, and the previous damaging SARS and MERS emergence and the current global COVID-19 outbreak are specific examples of these important influencing factors. Importantly, the competitiveness of tourism attraction by other regional and global tourism destinations may be another major issue for consideration in strategic sustainable policy formulation.

6. Conclusion

The paper addresses two important contemporary issues in Asia, namely, tourism determination in Vietnam and its contribution to the country's economic growth amid the lack of rigorous studies taking into account the structure of modern economic integration theory appropriately for globally integrated economies. The new approach introduced in the paper is thus particularly consistent with contemporary global economic and trade policy developments and modelling methodological advances. It is highly relevant to studying what motivated growing tourism to Vietnam, and whether it has had any significant impact on its economy during the volatile period 1997–2017 where the country and region had experienced great shocks and reforms. The study has provided a number of interesting and useful results for practical and sustainable tourism policy analysis in Vietnam. The findings and policy implications are also supported by rigorous economic-theoretic considerations and robust advanced econometric modelling analysis. Finally, the approach adopted is in the so-called economic integration class of econometric modelling and generic, and has wide applications in related fields of impact research and policy analysis.

Conflict of interest

All authors declare no conflicts of interest in this paper.

References

ADB (2019) Available from: https://www.adb.org/publications/series/key-indicators-for-asia-and-the-pacific.

Allen RGD (1960) *Mathematical Analysis for Economists,* London: Macmillan.

Blake AT, Sinclair MT (2003) Tourism Crisis Management: US Response to September 11. *Ann Tourism Res* 30: 813–832.

Easterly W (2007) Was Development Assistance A Mistake? *Am Econ Rev* 97: 328–332.

Engle RF, Granger CWJ (1987) Co-integration and Error Correction: Representation, Estimation and Testing. *Econometrica* 55: 251–276.

ERS-USDA (2019) International Macroeconomic Data Set. Available from: https://www.ers.usda.gov/data-products/international-macroeconomic-data-set/.

Frankel JA, Romer D (1999) Does Trade Cause Growth? *Am Econ Rev* 89: 379–399.

Friedman M (1953) *Essays in Positive Economics,* Chicago: University of Chicago Press.

Gerakis AS (1965) Effects of Exchange-Rate Devaluation and Revaluation on Receipts from Tourism. *Int Monetary Fund Staff Pap* 12: 365–384.

Granger CWJ (1969) Investigating Causal Relations by Econometric Models and Cross-Spectral Methods. *Econometrica* 37: 424–438.

Guthrie HW (1961) Demand for Tourists' Goods and Services in a World Market. Papers and Proceedings of the Regional Science Association 7: 159–175.

Ironmonger DS (1972) *New Commodities and Consumer Behaviour,* University of Cambridge, Department of Applied Economics Monograph No. 20, Cambridge: Cambridge University Press.

Johansen L (1982) Econometric Models and Economic Planning and Policy: Some Trends and Problems, In M. Hazewinkle and A. H. G. Rinnooy Kan (eds.), *Current Developments in the Interface: Economics, Econometrics, Mathematics,* Boston: Reidel, 91–122.

Kydland FE (2006) Quantitative Aggregate Economics. *Am Econ Rev* 96: 1373–1383.

Lancaster KJ (1966) A New Approach to Consumer Theory. *J Political Econ* 84: 132–157.

Morley CI (2009) Dynamics in the Specification of Tourism Demand Models. *Tourism Econ* 15: 23–39.

Pindyck RS, Rubinfeld DL (1998) *Econometric Models and Economic Forecasts*, Sydney: McGraw-Hill.

Sala-I-Martin X (1991) Comment, In Blanchard, O. J. and S. Fischer (eds.), *NBER Macroeconomic Annual 1991*, Cambridge, MA: MIT Press, 368–378.

Smeral E (2009) The Impact of the Financial and Economic Crisis on European Tourism. *J Travel Res* 48: 3–13.

Song H, Dwyer L, Li G, et al. (2012) Tourism Economics Research: A Review and Assessment. *Ann Tourism Res* 39: 1663–1682.

Stone R (1988) Progress in Balancing the National Accounts, In Ironmonger, D. S., Perkins, J. O. N. and Tran, V. H. (eds.), *National Income and Economic Progress: Essays in Honour of Colin Clark,* London: Macmillan.

Tang S, Selvanathan EA, Selvanathan S (2007) The Relationship between Foreign Direct Investment and Tourism: Empirical Evidence from China. *Tourism Econ* 13: 25–39.

Tran VH (1992) Modelling Output Growth: A New Approach. *Econ Lett* 38: 279–284.

Tran VH (2002) *Economic Crisis Management*, Mass.: Edward Elgar.

Tran VH (2004) Korea's Trade, Growth of Trade and the World Economy in Post-crisis ASEAN+3 Free Trade Agreement: An Econometric and Policy Analysis. *J Korean Econ* 5: 73–108.

Tran VH (2005) Modelling the Impact of China's WTO Membership on Its Investment and Growth: A New Flexible Keynesian Approach (with Comment), In G.S. Heiduk and Karyiu Wong (eds), *WTO and World Trade*, New York: Physica-Verlag.

Tran VH (2007) Causal Empirics and Political Economy of Official Development Assistance and Development in Asia: The Case of Vietnam. *J Korean Econ* 8: 91–119.

Tran VH (2019) Economic Impact of Tourism on IORA Countries: The Case of India and Mauritius. *J Indian Ocean Rim Stud* 2: 1–18.

Tran VH, Limskul K (2013) Economic Impact of CO_2 Emissions on Thailand's Growth and Climate Change Mitigation Policy: A Modelling Analysis. *Econ Modell* 33: 351–358.

Tran VH, Vu J (2018) Economic Impact of Vietnam's Tourism on Australia: An Econometric Study. *Int J Manage Appl Sci* 4: 41–49.

Tran VH, Turner L, Vu J (2018) Economic Impact of Chinese Tourism on Australia: A New Approach. *Tourism Econ* 24: 677–689.

Tran VH, Vu J (2020) Contribution of Chinese and Indian Tourism to Australia: A Comparative Econometric Study. *Arch Bus Res* 8: 107–120.

UNCTAD (2019) Data Center. Available from: http://unctadstat.unctad.org/EN/.

UNWTO (2019) Data Bases. Available from: www.unwto.org/.

World Bank (2019) Taking Stock. Available from: http://documents.worldbank.org/curated/en/821801561652657954/.

WTO (2019) Regional Trade Agreements. Available from: https://www.wto.org/english/tratop_e/region_e/region_e.htm.

AIMS Press