UNISA ECONOMIC RESEARCH WORKING PAPER SERIES

IS TOURISM A SPUR TO ECONOMIC GROWTH IN SOUTH AFRICA? AN EMPIRICAL INVESTIGATION

Nicholas M. Odhiambo

Sheilla Nyasha

Working Paper 15/2020

October 2020

Nicholas M. Odhiambo
Department of Economics
University of South Africa
P. O. Box 392, UNISA
0003, Pretoria
South Africa
Emails: odhianm@unisa.ac.za / nmbaya99@yahoo.com

Sheilla Nyasha
Department of Economics
University of South Africa
P. O. Box 392, UNISA
0003, Pretoria
South Africa
Email: sheillanyasha@gmail.com

IS TOURISM A SPUR TO ECONOMIC GROWTH IN SOUTH AFRICA? AN EMPIRICAL INVESTIGATION

Nicholas M. Odhiambo and Sheilla Nyasha[1]

Abstract

In this study, the dynamic Granger-causality between tourism development and economic growth in South Africa was empirically examined during the period 1995-2016. The study was motivated by the growing important role of the tourism sector in economic growth and development. It was also motivated by the limelight that the South African tourism sector has been enjoying in recent years, on the one hand, and the lack of sufficient coverage of tourism-growth nexus studies in many sub-Saharan African countries, on the other hand. Unlike some previous studies that used one proxy, the current study used two tourism proxies, namely tourist arrivals and tourism revenue, to examine this link. In addition, the study used exchange rate and foreign direct investment as intermittent variables in a multivariate Granger-causality model in order to address the omission-of-variable bias. To enhance the robustness of the results, the study also used two measures of tourism revenue, namely total tourism revenue and total tourism revenue as a percentage of GDP. Using the auto-regressive distributed lag (ARDL)-bounds testing approach and the error correction model, the study found that the direction of causality between tourism development and economic growth in South Africa is sensitive to the proxy used and the time under consideration. When the tourist arrivals variable is used as a proxy for tourism development, bidirectional causality between tourism development and economic growth is found to prevail in the short run, while a unidirectional causality from economic growth to tourism development is found to dominate in the long run. However, when tourism revenue is used as a proxy, a feedback relationship is found to prevail, but only in the short run. The result is robust across the two different measures of tourism revenue. The study, therefore, recommends that short-term policy efforts should be directed at developing the tourism sector and the real sector as both sectors have been found to reinforce each other in the short run, irrespective of the tourism proxy used.

[1] Corresponding author: Sheilla Nyasha, Department of Economics, University of South Africa (UNISA). Email address: sheillanyasha@gmail.com .

1. Introduction

The relationship between tourism and economic growth has attracted a plethora of empirical literature in recent years. On the theoretical front, tourism is expected to spur economic growth through a number of channels. Firstly, an increase in tourism development is expected to lead to an increase in employment, which directly leads to an increase in economic growth (World Travel and Tourism Council "WTTC", 2019). This is largely because tourism is regarded as one of the most labour-intensive industries – implying that the more developed the sector is, the higher the employment. Secondly, the development of the tourism industry is likely to lead to an increase in the inflow of foreign exchange revenues owing to the increased number of tourist arrivals, which positively contributes towards the overall balance of payments (WTTC, 2019; Signe, 2018). Moreover, the foreign exchange earned from international tourism may be used to purchase capital goods, which could be used in the production process – thereby leading to a further increase in economic growth. In addition, tourism could also stimulate investments in new infrastructure, which may also stimulate growth (World Bank, 2011).

On the empirical front, there are four views regarding the causal relationship between tourism and economic growth. The first view, which is often referred to as the tourism-led growth (TLG) hypothesis, posits that tourism development is an important engine of economic growth and, therefore, leads to economic growth (see Nene and Taivan, 2017; Wu and Wu, 2019, among others). The second view, which is also referred to as the growth-led tourism (GLT) hypothesis, on the other hand, argues that it is economic growth that drives the development of the tourism industry both in the short run and in the long run.

Studies, of which the findings were consistent with this view, include those by Lee and Kwag (2013) and Bouzahzah and Menyari (2013), among others. In between these two extreme views, there is a third (middle ground) view, which asserts that both tourism development and economic growth drive each other (Wang and Xia, 20133; Trang et al., 2014, among others). Despite these three strands of literature, there is a fourth view, which argues that there is no Granger-causality between tourism and economic growth (see Arslanturk et al., 2011; Pisa, 2018, among others).

Although a number of studies have been conducted into the relationship between tourism development and economic growth in various countries, very few studies have been conducted in the sub-Saharan African region; and are mostly on the impact of tourism on economic growth, leaving the causality between tourism and economic growth in Africa, in general, and in South Africa, in particular, little explored (see Fayissa et al., 2008). In isolated cases where tourism-growth causality studies have been conducted on African countries, the findings have been conflicting or ambiguous at best. Moreover, the findings of some of the previous studies have been affected negatively by a number of methodological challenges. For example, some of the previous studies relied on cross-sectional data analysis, which does not account for country-specific effects; while other studies used bivariate Granger-causality models, which have been found to suffer from the omission-of-variable bias.

It is against this background that the current study aims to examine the causal relationship between tourism and economic growth, using time-series data from South Africa. Unlike some previous studies, the current study uses the error-correction model (ECM)-based autoregressive-distributed lag (ARDL) bounds testing approach, which has been found to be superior, to examine this linkage. In order to address the omission-of-variable bias, which has been found to be associated with some of the previous studies, the current study uses two intermittent variables alongside tourism and economic growth, thereby creating a multivariate Granger-causality model. In addition, the study uses two proxies of tourism development to examine this linkage. In order to enhance the robustness of the results, the study uses two measures of tourism revenue, namely total tourism revenue and tourism revenue as a percentage of GDP.

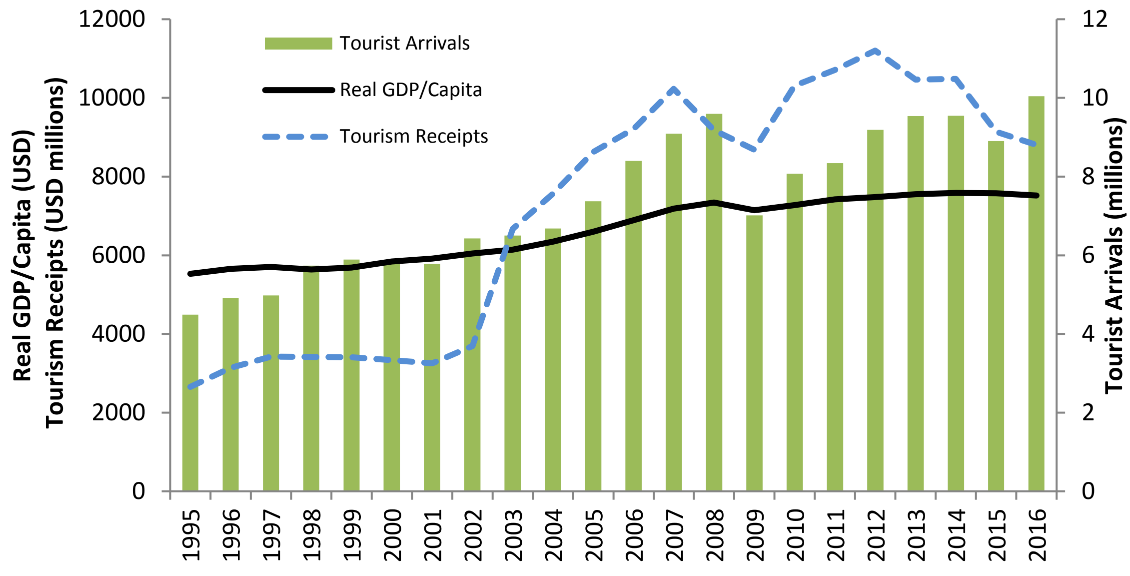
The rest of the study is organised as follows: Section 2 analyses the dynamics of tourism and economic growth in the country under study, while Section 3 reviews literature on the causal relationship between tourism development and economic growth. Section 4 presents the estimation techniques used in the empirical investigation of the direction of causality between tourism development and economic growth in South Africa. In Section 5, the results of the study are presented and analysed, and in Section 6, the conclusion of the study is proffered.

2. Tourism and economic growth dynamics in South Africa

As in many other African countries, the tourism sector in South Africa plays a significant role in job creation and economic growth. Indeed, the South African tourism sector has grown phenomenally since the 1990s. The sector is considered to have a significant potential, ranging from wildlife resources to spectacular landscapes, water bodies, beaches, a diversity of cultures, and a number of world heritage sites, among many others.

Figure 1 shows trends in tourism – measured by the number of international tourist arrivals and tourism revenue (tourism receipts) – and economic growth, proxied by real GDP per capita.

FIGURE 1: ***Trends in Tourism an Economic Growth in South Africa (1995-2016)***



Source: World Bank (2019)

As revealed in Figure 1, the number of tourist arrivals has doubled since 1995, from just over four million to 10 million in 2016 (World Bank, 2019). Tourism receipts also soared from US$2.7 billion (bn) in 1995 to a peak of US$11.2bn in 2012, before settling at US$8.8bn in 2016. Although tourism receipts trended upwards over the period under review, the most remarkable jumps were from 2002 (US$3.7bn) to 2007 (US$10.2bn) – a period that coincided with the global commodity boom – and from 2009 (US$8.7bn) to its peak in 2012 (US$11.2bn) as the tourism sector recovered from the aftermath of the global financial crisis of the 2008/2009 financial year (World Bank, 2019). From 2012 to 2016, tourism receipts fell from US$11.2bn to US$8.8bn (World Bank, 2019).

On the economic growth front, South Africa's real sector growth improved dramatically with the transition to democracy in 1994 and has been reasonably robust and stable throughout the democratic era (Department of Monitoring and Evaluation "DPME" (2013). The South African economy grew at 3.2% a year on average from 1994 to 2012. This has resulted in the transformation of the South African economy from a GDP of USD136 billion in 1994 to a GDP of USD384 billion in 2012. Ranked by the World Bank as an upper-middle-income country, South Africa is the second-largest economy in Africa, after Nigeria. In 2015, it recorded an annual real GDP growth rate of 1.3 per cent, with the real GDP figure standing at three trillion rands (R3 047 901 000 000).

South Africa has a dual economy, characterised by a sophisticated financial and industrial economy that has grown alongside an underdeveloped informal economy. According to Gumede (2008), it is this "second economy" that presents a potential and developmental challenge. South Africa's success in reforming its economic policies is mirrored by its GDP, which reflected an unprecedented 62 quarters of uninterrupted economic growth between 1993 and 2007 (Schlumberger and Weisskopf, 2014).

With South Africa's increased integration into the global market, there was no escaping the impact of the 2008-2009 global financial crisis – although the full impact was not felt, largely as a result of its prudent fiscal and monetary policies. The annual GDP dropped sharply in the period from 2007 to 2009. From 2009, there was some improvement; and by 2010, the growth rate had reached the 3 per cent level, which was maintained until 2011. Thereafter, a slight decline was experienced, which saw the GDP performing at around 2 per cent before dropping to 1.5 per cent in 2014, and further down to 1.3 per cent in 2015 (South African Reserve Bank "SARB", 2016). The mining and manufacturing sectors experienced a major slow down during the review period, recording an average growth of -0.9 per cent and 1.1 per cent respectively.

Contrary to the performance of the productive sectors, the services sector sustained positive growth rates reaching 3.0 per cent on average. While the economy continues to grow – driven largely by domestic consumption – growth is at a slower rate than previously forecasted. Real GDP grew marginally by 0.2 per cent (q/q) in the third quarter of 2016 as a result of a better-than-expected performance in the agriculture and mining sectors (SARB, 2016). During the review period, per capita GDP modestly trended upwards.

3. Literature Review

On the empirical front, there are four views regarding the causal relationship between tourism and economic growth. The first view, which is often referred to as the tourism-led growth (TLG) hypothesis, posits that tourism development is an important engine of economic growth and, therefore, leads to economic growth. These studies include, among others, those conducted by Lee and Chang (2008), Mishra et al. (2010), Katircioglu (2010), Katircioglu (2011), Tang (2011), Deng et al. (2014), Tang and Abosedra (2015), Shakouri et al. (2017), Nene and Taivan (2017), and Wu and Wu (2019).

The second view, which is referred to as the growth-led tourism (GLT) hypothesis, on the other hand, argues that it is economic growth that drives the development of the tourism industry both in the short run and in the long run. Studies, of which the findings were consistent with this view, include those conducted by, among others, He and Zheng (2011), Caglayan et al. (2012), Li et al. (2013), Ahiawodzi (2013), Jalil et al. (2013), Lee and Kwag (2013), Bouzahzah and Menyari (2013), Alhowaish (2016), Nene and Taivan (2017), and Wu and Wu (2019).

In between these two extreme views, we have a third (middle -ground) view, which asserts that both tourism development and economic growth drive each other. In other words, there is a feedback (bi-directional) causal relationship between tourism development and economic growth. These include studies conducted by Dritsakis (2004), Durbarry (2004), Kim et al. (2006), Khalil et al. (2007), Lee and Chien (2008), Chen and Chiou-Wei (2009), Katircioglu (2009), Kadir and Jusoff (2010), Lean and Tang (2010), Corrie et al. (2013), Tang (2013), Trang and Duc (2013), Wang and Xia (2013), Trang et al. (2014), and Wu and Wu (2019), among others.

Despite these three strands of literature, which posit that there is a causal relationship between tourism and economic growth at least in one direction, there is a fourth view which argues that there is no relationship between tourism and economic growth, and that their perceived empirical relationship could merely be mechanical. This view, though unpopular, has received support from researchers such as Oh (2005), Ozturk and Acaravci (2009), Arslanturk et al. (2011), Pisa (2018), and Wu and Wu (2019), among others.

Although support has been found in the empirical literature for all four possible causal relationships, bidirectional causality is the most popular causal relationship, while no causality is unpopular. Studies based on time-series data appear to be more popular than the panel data-based studies on the subject. Table 1 summarises the reviewed literature on the causality between tourism development and economic growth.

TABLE 1: ***A Summary of Literature Revised on Causality between Tourism Development and Economic Growth***

Author	**Region of study**	**Type of data used**	**Direction of causality**
Panel 1: Unidirectional Causality from Tourism Development to Economic Growth			
Lee and Chang, 2008	Organization for Economic Co-operation and Development, Asia and Africa	Panel	Tourism → Growth
Mishra *et al.*, 2010	India	Time-series	Tourism → Growth
Katircioglu, 2010	Singapore	Time-series	Tourism → Growth
Katircioglu, 2011	Singapore	Time-series	Tourism → Growth
Tang, 2011	Australia, Germany, Japan,	Time-series	Tourism → Growth
Deng *et al.*, 2014	China	Time-series	Tourism → Growth
Tang and Abosedra, 2015	Morocco and Tunisia	Time-series	Tourism → Growth
Shakouri *et al.*, 2017	Iran	Time-series	Tourism → Growth
Nene and Taivan, 2017	10 SSA countries	Time-series	Tourism → Growth 60% of study countries
Wu and Wu, 2019	11 Asian regions	Time-series	Tourism → Growth

Author	Region of study	Type of data used	Direction of causality
Panel 2: Unidirectional Causality from Economic Growth to Tourism Development			
He and Zheng, 2011	China	Time-series	Tourism ← Growth
Caglayan *et al*., 2012	East and South Asia, Oceania	Time-series	Tourism ← Growth
Li *et al*., 2013	Malaysia	Time-series	Tourism ← Growth
Ahiawodzi, 2013	Ghana	Time-series	Tourism ← Growth
Jalil *et al*., 2013	Pakistan	Time-series	Tourism ← Growth
Lee and Kwag, 2013	South Korea	Time-series	Tourism ← Growth
Bouzahzah and Menyari, 2013	Morocco	Time-series	Tourism ← Growth
Alhowaish, 2016	Gulf Cooperation Council (GCC) countries	Panel	Tourism ← Growth
Nene and Taivan, 2017	10 SSA countries	Time-series	Tourism ← Growth 40% of study countries
Wu and Wu, 2019	11 Asian regions	Time-series	Tourism ← Growth Cambodia, China, and Malaysia
Panel 3: Bidirectional Causality between Tourism Development and Economic Growth			
Dritsakis, 2004	Greece	Time-series	Tourism ↔ Growth
Durbarry, 2004	Mauritius	Time-series	Tourism ↔ Growth
Kim *et al*., 2006	Taiwan	Time-series	Tourism ↔ Growth
Khalil *et al*., 2007	Pakistan	Time-series	Tourism ↔ Growth
Lee and Chien, 2008	Taiwan	Time-series	Tourism ↔ Growth
Chen and Chiou-Wei, 2009	Taiwan and South Korea	Time-series	Tourism ↔ Growth
Katircioglu, 2009	Cyprus	Time-series	Tourism ↔ Growth
Kadir and Jusoff, 2010	Malaysia	Time-series	Tourism ↔ Growth
Lean and Tang, 2010	Malaysia	Time-series	Tourism ↔ Growth
Corrie *et al*., 2013	Australia	Time-series	Tourism ↔ Growth
Tang, 2013	Malaysia	Time-series	Tourism ↔ Growth
Trang and Duc, 2013;	Vietnam	Time-series	Tourism ↔ Growth

Author	Region of study	Type of data used	Direction of causality
Wang and Xia, 2013	China	Time-series	Tourism ↔ Growth
Trang *et al*., 2014	Vietnam	Time-series	Tourism ↔ Growth
Wu and Wu, 2019	11 Asian regions	Time-series	Tourism ↔ Growth Macau and Singapore
Panel 4: No Causality between Tourism Development and Economic Growth			
Oh, 2005	Korea	Time-series	Tourism ≠ Growth
Ozturk and Acaravci, 2009	Turkey	Time-series	Tourism ≠ Growth
Arslanturk *et al*., 2011	Small open economy	Time-series	Tourism ≠ Growth
Pisa, 2018	South Africa	Time-series	Tourism ≠ Growth
Wu and Wu, 2019	11 Asian regions	Time-series	Tourism ≠ Growth Japan, Thailand

4. Estimation Techniques

The ARDL-bounds-testing approach to cointegration

In this study, the ARDL bounds testing technique is used, following earlier work by Pesaran and Shin (1999), which was later extended by Pesaran *et al*. (2001) to examine the dynamic relationship between tourism development and economic growth. The ARDL approach was chosen for this study because of a number of advantages it has compared to the traditional estimation techniques such as the Full-Maximum Likelihood (FML) test and the residual-based technique (see Majid, 2008; Odhiambo, 2008).

In the ARDL approach, unbiased long-run estimates and valid t-statistics can be produced, even when some of the regressors are endogenous (Odhiambo, 2008). This technique does not impose the restrictive assumption that all the variables need to be integrated of the same order, hence it can be applied to variables that are integrated of order zero or order one or a mixture of the two. While other traditional cointegration estimation techniques are sensitive to the sample size, the ARDL bounds testing method is appropriate even when the sample size is small (see Pesaran *et al*., 2001). In addition, the ARDL approach has the ability to take a sufficient number of lags to capture the data-generating process in a general-to-specific modelling framework to obtain optimal lag length per variable. In recent years, the technique has taken centre stage as researchers have refined the precision of their estimations.

In order to address the omission-of-variable bias associated with bivariate Granger-causality model, this study has utilised two intermittent variables, namely exchange rate and foreign direct investment – thereby creating a multivariate Granger-causality model, whose function is expressed as:

Y/N = f (TOUR, EXR, FDI)……………………………………………………………….(1)

Where:

Y/N = Economic growth= real GDP per capita

TOUR = Tourism development

EXR = Exchange rate

FDI = Foreign direct investment

In an attempt to enhance the depth of the tourism-growth causality study in the country under study, two proxies of tourism development were used. In Model 1, tourism

(TOURARRIVE) is proxied by tourist arrivals, while in Model 2, tourism is proxied by tourism revenue. In order to enhance the robustness of the results, two measures of tourism revenue were used, namely total tourism revenue (TOUREV) and tourism revenue as a percentage of GDP (TOURREV/Y).

Table 2 summarises variable descriptions and proxies utilised in this study.

TABLE 2: ***Variable Description***

Symbol	**Description**	**Measure/Proxy**
Y/N	Economic Growth	Per capita real GDP at market prices based on constant 2010 U.S. dollars.
TOUR	Tourism Development	**TOURARRIVE** and **TOURREV and TOURREV/Y**
TOURARRIVE	Tourist Arrivals	The number of international tourist arrivals
TOURREV	Total Tourism Revenue	International tourism receipts in current US$
TOURREV/Y	Tourism Revenue as percentage of GDP	International tourism receipts in current US$ as a percentage of GDP at market prices in current US$
EXR	Exchange Rate	Real effective exchange rate index (2010 = 100)
FDI	Foreign Direct Investment	Annual percentage growth rate of GDP at market prices based on constant 2010 U.S. dollars.

Following Pesaran *et al*. (2001), the generic cointegration model for this study is expressed in the form of a set of four cointegration equations as follows (see Odhiambo, 2016):

$$\Delta Y/N_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} \Delta Y/N_{t-i} + \sum_{i=0}^{n} \alpha_{2i} \Delta TOUR_{t-i} + \sum_{i=0}^{n} \alpha_{3i} \Delta EXR_{t-i}$$
$$+ \sum_{i=0}^{n} \alpha_{4i} \Delta FDI_{t-i} + \alpha_4 Y/N_{t-1} + \alpha_5 TOUR_{t-1} + \alpha_6 EXR_{t-1}$$
$$+ \alpha_7 FDI_{t-1} + \mu_{1t} \dots\dots\dots\dots (2)$$

$$\Delta TOUR_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i} \Delta TOUR_{t-i} + \sum_{i=0}^{n} \beta_{2i} \Delta Y/N_{t-i} + \sum_{i=0}^{n} \beta_{3i} \Delta EXR_{t-i}$$
$$+ \sum_{i=0}^{n} \beta_{4i} \Delta FDI_{t-i} + \beta_5 TOUR_{t-1} + \beta_6 Y/N_{t-1} + \beta_7 EXR_{t-1}$$
$$+ \beta_8 FDI_{t-1} + \mu_{2t} \dots\dots\dots\dots (3)$$

$$\Delta EXR_t = \pi_0 + \sum_{i=1}^{n} \pi_{1i} \Delta EXR_{t-i} + \sum_{i=0}^{n} \pi_{2i} \Delta Y/N_{t-i} + \sum_{i=0}^{n} \pi_{3i} \Delta TOUR_{t-i}$$
$$+ \sum_{i=0}^{n} \pi_{4i} \Delta FDI_{t-i} + \pi_5 EXR_{t-1} + \pi_6 Y/N_{t-1} + \pi_7 TOUR_{t-1}$$
$$+ \pi_8 FDI_{t-1} + \mu_{3t} \dots\dots\dots\dots (4)$$

$$\Delta FDI_t = \Omega_0 + \sum_{i=1}^{n} \Omega_{1i} \Delta FDI_{t-i} + \sum_{i=0}^{n} \Omega_{2i} \Delta Y/N_{t-i} + \sum_{i=0}^{n} \Omega_{3i} \Delta TOUR_{t-i}$$

$$+ \sum_{i=0}^{n} \Omega_{4i} \Delta EXR_{t-i} + \Omega_5 FDI_{t-1} + \Omega_6 Y/N_{t-1} + \Omega_7 TOUR_{t-1}$$

$$+ \Omega_8 FDI_{t-1} + \mu_{4t} \dots \dots \dots \dots (5)$$

Where:

Y/N = Economic growth= real GDP per capita

TOUR = Tourism development (measured by tourist arrivals – TOURARRIVE; total tourism revenue – TOURREV; and tourism revenue as percentage of GDP – TOURREV/Y)

EXR = Exchange rate

FDI = Foreign direct investment

$a_{0,}$ β_0, π_0 and Ω_0 = respective constants;

$a_1 – a_4$, $\beta_1 – \beta_4$, $\pi_1 – \pi_4$, and $\Omega_1 – \Omega_4$ = respective short-run coefficients;

$a_5 – a_8$, $\beta_5 – \beta_8$, $\pi_5 – \pi_8$, and $\Omega_5 – \Omega_8$ = respective long-run coefficients

Δ = difference operator;

n = lag length;

t = time period; and

μ_{it} = white-noise error terms.

The generic ECM-based Granger-causality model specification is given as (see Nyasha and Odhiambo, 2015):

$$\Delta Y/N_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} \Delta Y/N_{t-i} + \sum_{i=1}^{n} \alpha_{2i} \Delta TOUR_{t-i} + \sum_{i=1}^{n} \alpha_{3i} \Delta EXR_{t-i} + \sum_{i=1}^{n} \alpha_{4i} \Delta FDI_{t-i} + \delta_1 ECM_{t-1} + \mu_{1t} \ldots \ldots (6)$$

$$\Delta \mathrm{TOUR}_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i} \Delta \mathrm{TOUR}_{t-i} + \sum_{i=0}^{n} \beta_{2i} \Delta \mathrm{Y/N}_{t-i} + \sum_{i=0}^{n} \beta_{3i} \Delta \mathrm{EXR}_{t-i} + \sum_{i=0}^{n} \beta_{4i} \Delta \mathrm{FDI}_{t-i} + \delta_2 ECM_{t-1} + \mu_{2t} \ldots \ldots (7)$$

$$\Delta EXR_t = \pi_0 + \sum_{i=1}^{n} \pi_{1i} \Delta EXR_{t-i} + \sum_{i=0}^{n} \pi_{2i} \Delta Y/N_{t-i} + \sum_{i=0}^{n} \pi_{3i} \Delta TOUR_{t-i} + \sum_{i=0}^{n} \pi_{4i} \Delta FDI_{t-i} + \delta_3 ECM_{t-1} + \mu_{3t} \ldots \ldots (8)$$

$$\Delta FDI_t = \Omega_0 + \sum_{i=1}^{n} \Omega_{1i} \Delta FDI_{t-i} + \sum_{i=0}^{n} \Omega_{2i} \Delta Y/N_{t-i} + \sum_{i=0}^{n} \Omega_{3i} \Delta TOUR_{t-i} + \sum_{i=0}^{n} \Omega_{4i} \Delta EXR_{t-i} + \delta_4 \, ECM_{t-1} + \mu_{4t} \ldots \ldots \ldots (9)$$

Where:

ECM = error-correction term;

$\delta_1 - \delta_4$ = respective coefficients for the error-correction terms;
μ_{it} = mutually uncorrelated white-noise residuals; and

All other variables and characters are as described in equations 2-5.

Data Source

Annual time-series data from 1995 to 2016 were used in this study. The data were sourced from the World Bank's World DataBank (World Bank, 2019).

5. Results

Unit Root Tests

Although the ARDL method does not require all variables to be of the same order of integration, it cannot be applied when the variables are integrated of order two [I(2)] or higher. Consequently, it is recommended that a unit root test be conducted to check whether all the variables are integrated of order one [I(1)] and/or below. In this study, ADF, Dickey-

Fuller generalised least squares (DF-GLS) and the Phillips-Perron (PP) unit root tests were employed. The results are summarised in Table 3[2].

[2] A summary of the descriptive statistics of all variables used in this study are reported in Appendix 1.

TABLE 3: ***Stationarity Tests of all Variables***

Panel A: Augmented Dickey-Fuller (ADF)				
Variable	**Stationarity of all Variables in Levels**		**Stationarity of all Variables in First Difference**	
	Without Trend	With Trend	Without Trend	With Trend
Y/N	-0.915	-0.722	-3.593**	-3.783**
TOURARRIVE	-1.666	-3.256	-5.341***	-5.174***
TOURREV	-1.363	-0.568	-3.326**	3.461**
TOURREV/Y	-2.641	-2.035	-3.826***	-3.862**
EXR	-1.575	-2.916	-3.984***	-3.862**
FDI	-2.473	-2.316	-5.437***	-5.841***
Panel B: Dickey-Fuller generalised least squares (DF-GLS)				
Variable	**Stationarity of all Variables in Levels**		**Stationarity of all Variables in First Difference**	
	Without Trend	With Trend	Without Trend	With Trend
Y/N	-0.631	-1.920	-2.686***	-2.981**
TOURARRIVE	-0.810	-2.918	-5.352***	-5.614***
TOURREV	-0.920	-1.000	-3.422***	-3.658**
TOURREV/Y	-1.510	-1.824	-3.517***	-4.052***
EXR	-1.283	-3.033	-3.904***	-3.992***
FDI	-3.104	-3.016	-5.217***	-5.876***
Panel C: Phillips-Perron (PP)				
Variable	**Stationarity of all Variables in Levels**		**Stationarity of all Variables in First Difference**	
	Without Trend	With Trend	Without Trend	With Trend
Y/N	-0.889	-1.245	-2.950**	-3.566**
TOURARRIVE	-0.932	-2.284	-6.566***	-6.136***
TOURREV	-1.361	-0.843	-3.323**	-3.461**
TOURREV/Y	-2.641	-2.035	-3.827***	-3.845**
EXR	-1.710	-2.614	-4.101***	-3.925**
FDI	-3.083	-3.131	-6.803***	-6.631***

Note: *** and ** denote stationarity at 1% and 5% significance levels.

As reported in Table 3, the results of the unit root tests indicate that all the variables are integrated of order one, irrespective of the unit root test employed. The results, therefore, confirm the validity and suitability of using the ARDL approach.

Cointegration Tests

Following the confirmation that all the variables in the study are integrated or order one or less, the study proceeded to test for cointegration among the variables. The results of the cointegration test carried out in this study are summarised in Table 4.

TABLE 4: ***Bounds F-test for Cointegration***

Dependent Variable	**Function**	**F-statistic**	**Cointegration Status**
Model 1			
Y/N	F(Y/N|TOURARRIVE, EXR, FDI)	0.258	Not cointegrated
TOURARRIVE	F(TOURARRIVE|Y/N, EXR, FDI)	4.497**	Cointegrated
EXR	F(EXR|Y/N, TOURARRIVE, FDI)	5.716***	Cointegrated
FDI	F(FDI|Y/N, TOURARRIVE, EXR)	3.596	Not cointegrated
Model 2A			
Y/N	F(Y/N|TOUREV, EXR, FDI)	1.354	Not cointegrated
TOURREV	F(TOUREV|Y/N, EXR, FDI)	3.371	Not cointegrated
EXR	F(EXR|Y/N, TOUREV, FDI)	3.791*	Cointegrated
FDI	F(FDI|Y/N, TOUREV, EXR)	4.281*	Cointegrated
Model 2B			
Y/N	F(Y/N|TOUREV/Y, EXR, FDI)	0.921	Not cointegrated
TOURREV/Y	F(TOUREV/Y|Y/N, EXR, FDI)	1.947	Not cointegrated
EXR	F(EXR|Y/N, TOUREV/Y, FDI)	4.632**	Cointegrated
FDI	F(FDI|Y/N, TOUREV/Y, EXR)	3.852*	Cointegrated
Asymptotic Critical Values			

Pesaran *et al*. (2001), p.300 Table CI(iii) Case III	1%		5%		10%	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
	4.29	5.61	3.23	4.35	2.72	3.77

Note: *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively

The cointegration results, as displayed in Table 4, confirm the presence of cointegration in each model, as there is at least one cointegration vector in each model. Having ascertained the presence of a stable long-run relationship among the variables in each model, the ECM-based Granger-causality approach was used to examine the causality among the variables used in this study. It should, however, be emphasised that the long-run causality is only estimated for the functions that tested positive for cointegration (Odhiambo, 2014; Odhiambo and Nyasha, 2019). This implies that only equations that were found to be cointegrated will be estimated with an error-correction term (see also Odhiambo, 2010; Morley, 2006; Narayan and Smyth, 2006). Based on the Granger-causality model used in this study, the long-run causality is determined by the t-statistics on the coefficients of the lagged error-correction terms, while the short-run causality is determined by the corresponding F-statistics (see also Narayan and Smyth, 2006; Oh and Lee, 2004).

ECM-Based Granger-Causality Test

Table 5 presents the ECM-based Granger-causality results for the two models used in this study.

TABLE 5: ***Results of Granger-Causality Tests***
a) Model 1

Dependent Variable	**F-statistics [probability]**				$\boldsymbol{ECT_{t-1}}$ **[t-statistics]**
	$\Delta \boldsymbol{Y/N_t}$	$\Delta \boldsymbol{TOURARRIVE_t}$	$\Delta \boldsymbol{EXR_t}$	$\Delta \boldsymbol{FDI_t}$	
$\Delta \boldsymbol{Y/N_t}$	-	12.568*** [0.003]	0.797 [0.386]	0.335 [0.999]	-
$\Delta \boldsymbol{TOURARRIVE_t}$	7.141*** [0.007]	-	2.575 [0.133]	3.323* [0.091]	-0.942*** [-7.669]
$\Delta \boldsymbol{EXR_t}$	0.545 [0.982]	0.851 [0.373]	-	7.712** [0.016]	-0.353** [-2.170]
$\Delta \boldsymbol{FDI_t}$	4.304* [0.056]	1.817 [0.198]	6.673** [0.021]	-	-

Note: *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively

As revealed by the Granger-causality results for Model 1 displayed in Table 5a, the study found bidirectional Granger-causality between tourism (TOURARRIVE) and economic growth (Y/N) when tourism is proxied by international tourist arrivals in South Africa – lending support to the feedback hypothesis, where tourism and economic growth propel each other. However, these results hold only in the short run. Consistent with these results are previous studies by Trang et al. (2014) and Wu and Wu (2019), among others. In the long run, Granger-causality was found to be unidirectional, running from economic growth to tourism – lending support to the growth-led tourism development. This outcome also has support in the literature (see Nene and Taivan, 2017).

The results from Model 1 further show that there is: (i) short-run unidirectional Granger-causality from economic growth to foreign direct investment (FDI); (ii) short-run unidirectional Granger-causality from FDI to tourism arrivals; (iii) short-run bidirectional causality between FDI and exchange rate; (iv) long-run unidirectional Granger-causality from FDI to exchange rate; and (v) no causality between exchange rate and tourist arrivals, and between exchange rate and economic growth.

b) Model 2A

Dependent Variable	**F-statistics [probability]**				ECT_{t-1} **[t-statistics]**
	$\Delta Y/N_t$	$\Delta TOURREV_t$	ΔEXR_t	ΔFDI_t	
$\Delta Y/N_t$	-	7.543** [0.016]	0.325 [0.557]	0.018 [0.895]	-
$\Delta TOURREV_t$	3.891* [0.069]	-	3.440* [0.085]	6.715*** [0.006]	-
ΔEXR_t	5.195** [0.039]	7.225*** [0.004]	-	1.921 [0.187]	-0.826*** [-5.979]
ΔFDI_t	5.235** [0.038]	5.613** [0.033]	0.385 [0.545]	-	-0.729*** [-4.5205]

Note: *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively

c) Model 2B

Dependent Variable	F-statistics [probability]				ECT_{t-1} [t-statistics]
	$\Delta Y/N_t$	$\Delta TOURREV/Y_t$	ΔEXR_t	ΔFDI_t	
$\Delta Y/N_t$	-	9.163*** [0.014]	8.584*** [0.017]	4.395* [0.066]	-
$\Delta TOURREV/Y_t$	3.309* [0.094]	-	4.917** [0.047]	0.706 [0.417]	-
ΔEXR_t	3.490* [0.086]	6.334** [0.027]	-	0.307 [0.590]	-0.458** [-2.239]
ΔFDI_t	9.849*** [0.005]	4.539* [0.066]	0.350 [0.570]	-	0.742*** [-4.5798]

Note: *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively

The results from Model 2A reveal the presence of bidirectional Granger-causality between tourism, proxied by tourism and economic growth (Y/N) when tourism is proxied by tourism revenue (TOURREV). However, these results apply only in the short run – also lending support to the feedback hypothesis, just as in Model 1, where tourism development and economic growth Granger-cause each other; and are consistent with the results of some previous studies (see Trang et al., 2014; Wu and Wu, 2019). These results apply irrespective of whether tourism revenue is measured by total tourism revenue (Model 2A) or total tourism revenue as a percentage of GDP (Model 2B).

Other results show that, for Model 2A, there is: (i) short-run and long-run unidirectional Granger-causality from economic growth to exchange rate, and from economic growth to FDI; (ii) short-run bidirectional Granger-causality between tourism revenue and exchange rate; (iii) long-run unidirectional Granger-causality from tourism revenue to exchange rate; (iv) short-run bidirectional Granger-causality between tourism revenue and FDI; (v) long-run unidirectional Granger-causality from tourism revenue to FDI; and (vi) no Granger-causality between FDI and exchange rate.

For Model 2B, there is: (i) short-run bidirectional causality between exchange rate and economic growth; FDI and economic growth; and exchange rate and tourism revenue/GDP; (ii) long-run unidirectional Granger-causality from economic growth to exchange rate; economic growth to FDI; tourism revenue/GDP to exchange rate; and from tourism revenue/GDP to FDI; and (iii) no Granger-causality between FDI and exchange rate.

Overall, the findings of the study show that in South Africa, the Granger-causality between tourism and economic growth is not as obvious as usually anticipated and cannot be predetermined with certainty. It has been found to vary depending on the proxy used and the time under consideration. When the tourist arrivals variable is used as a proxy for tourism development, there is short-run bidirectional causality between tourism and economic growth in South Africa in the short run and a long-run unidirectional causality from economic growth to tourism development. However, when total tourism revenue and total tourism revenue as a percentage of GDP are used to measure tourism development, only short-run bidirectional causality between tourism and economic growth is found to prevail in South Africa.

The results of the diagnostic tests performed on serial correlation, functional form, normality and heteroscedasticity show that, on the whole, the models used in this study passed the relevant diagnostic tests (see Appendix 2).

6. Conclusion

In this study, the causality between tourism development and economic growth in South Africa has been investigated empirically, covering the period from 1995 to 2016. The study was motivated by the growing important role of tourism in the growth and development of economies, and the limelight the South African tourism sector has been enjoying of late, on the one hand, and the lack of sufficient coverage of tourism-growth nexus studies in South Africa. In addition, uncovering what could drive economic growth in South Africa is vital as the economy tries to recover from its current low level of economic growth. Exchange rate and FDI are the two intermittent variables added to the study to address the variable-omission-bias, giving rise to a multivariate Granger-causality model. Two proxies of tourism development – tourist arrivals and tourism revenue – were used in an attempt to enhance the rigour of the study. Using the ARDL bounds testing approach, the study found that the direction of causality between tourism development and economic growth in South Africa is sensitive to the tourism proxy used and the time under consideration. When the tourist arrivals variable is used as a proxy for tourism development, there is short-run bidirectional causality between tourism and economic growth in South Africa in the short run, and a long-run unidirectional causality from economic growth to tourism development. However, when tourism revenue is used as a proxy, only short-run bidirectional causality between tourism and economic growth is found to prevail in South Africa. This applies, irrespective of whether tourism revenue is estimated by total tourism revenue or tourism revenue as a percentage of GDP. Overall, the results show that a feedback relationship between tourism development and economic growth tends to dominate, at least in the short run, and that the conventional hypothesis of tourism-led growth may not necessarily hold in South Africa. The study, therefore, recommends that short-term policy efforts be directed at developing both the tourism sector and the real sector as both sectors have been found to reinforce each other in the short run, irrespective of the tourism proxy used. However, in the long run, policies geared towards inclusive and accelerated growth should be enhanced in order to boost inward tourism as the findings of the study show that real sector growth spurs international tourist arrivals in South Africa in the long run.

7. Declaration of interest statement

No conflict of interest.

References

Ahiawodzi, A. K. 2013. "Tourism earnings and economic growth in Ghana." *British Journal of Economics, Finance and Management Sciences*, 7(2), 187-202.

Alhowaish, A. 2016. "Is Tourism Development a Sustainable Economic Growth Strategy in the Long Run? Evidence from GCC Countries." *Sustainability*, *8*(7), 605. https://doi.org/10.3390/su8070605

Arslanturk, Y., Balcilar, M., and Ozdemir, Z. A. 2011. "Time-varying linkages between tourism receipts and economic growth in a small open economy." *Economic Modelling*, 28(1), 664-671. https://doi.org/10.1016/j.econmod.2010.06.003

Bouzahzah M, Menyari Y 2013. "International tourism and economic growth: The case of Morocco and Tunisia." *The Journal of North African Studies* 18: 592-607.

Caglayan, E., Sak, N., and Karymshakov, K. 2012. "Relationship between tourism and economic growth: A panel Granger causality approach." *Asian Economic and Financial Review*, 2(5), 591-602.

Chen, C. F., and Chiou-Wei, S. Z. 2009. "Tourism expansion, tourism uncertainty and economic growth: New evidence from Taiwan and Korea." *Tourism Management*, 30(6), 812-818. https://doi.org/10.1016/j.tourman.2008.12.013

Corrie, K., Stoeckl, N., and Chaiechi, T. 2013. "Tourism and economic growth in Australia: An empirical investigation of causal links." *Tourism Economics*, 19(6), 1317-1344. https://doi.org/10.5367/te.2013.0241

Deng, T., Ma, M., and Shao, S. 2014. "Has international tourism promoted economic growth in China? A panel threshold regression approach." *Tourism Economics*, 20(4), 911-917. https://doi.org/10.5367/te.2013.0308

Department of Monitoring and Evaluation. 2013. Economic Transformation. [Online] Available from <https://www.dpme.gov.za/publications/20%20Years%20Review/20%20Year%20Review%20Documents/20YR%20Chapter%204%20Economic%20Transformation.pdf> [Accessed 29 March 2020].

Dritsakis, N. 2004. "Tourism as a long-run economic growth factor: An empirical investigation for Greece using causality analysis." *Tourism Economics*, 10(3), 305-316. https://doi.org/10.5367/0000000041895094

Durbarry, R. 2004. "Tourism and economic growth: The case of Mauritius." *Tourism Economics*, 10(4), 389-401. https://doi.org/10.5367/ 0000000042430962

He, L. H., and Zheng, X. G. 2011. "Empirical analysis on the relationship between tourism development and economic growth in Sichuan." *Journal of Agricultural Science*, 3(1), 212-217.

Jalil, A., Mahmood, T., and Idrees, M. 2013. "Tourism–growth nexus in Pakistan: Evidence from ARDL bounds tests." *Economic Modelling*, 35, 185-191. https://doi.org/10.1016/j.econmod.2013.06.034

Kadir, N., and Jusoff, K. 2010. "The cointegration and causality tests for tourism and trade in Malaysia." *International Research Journal of Finance and Economics*, 2(1), 138-143.

Katircioglu, S. 2009. "Tourism, trade and growth: The case of Cyprus." *Applied Economics*, 41(21), 2741-2750. https://doi.org/10.1080/ 00036840701335512

Katircioglu, S. 2010. "Testing the tourism-led growth hypothesis for Singapore: An empirical investigation from bounds test to cointegration and Granger causality tests." *Tourism Economics*, 16(4), 1095-1101. https://doi.org/10.5367/te.2010.0012

Katircioglu, S. 2011. "Tourism and growth in Singapore. New extension from bounds test to level relationship and conditional Granger causality tests." *Singapore Economic Review*, 56(3), 441-453. https://doi.org/10.1142/S0217590811004365

Khalil, S., Mehmood, K. K., and Waliullah, K. 2007. "Role of tourism in economic growth: Empirical evidence from Pakistan economy." *The Pakistan Development Review*, 46(4), 985-995. https://doi.org/10.30541/v46i4IIpp

Kim, H. J., Chen, M. H., and Jang, S. C. 2006. "Tourism expansion and economic development: The case of Taiwan." *Tourism Management*, 27(5), 925-933. https://doi.org/10.1016/j.tourman.2005.05.011

Lean, H. H., and Tang, C. F. 2010. "Is the tourism-led growth hypothesis stable for Malaysia? A note." *International Journal of Tourism Research*, 12(4), 375-378.

Lee, C. C., and Chang, C. P. 2008. "Tourism development and economic growth: Closer look to panels." *Tourism Management*, 29(1), 180-192. https://doi.org/10.1016/j.tourman.2007.02.013

Lee, C. C., and Chien, M. S. 2008. "Structural breaks, tourism development, and economic growth: Evidence from Taiwan." *Mathematics and Computers in Simulation*, 77(4), 358–368. https://doi.org/10.1016/j.matcom.2007.03.004

Lee, J. W., and Kwag, M. 2013. "Green growth and sustainability: The role of tourism, travel and hospitality service industry in Korea." *Journal of Distribution Science*, 11(7), 15-22. https://doi.org/10.13106/jds.2013.

Li, C. C., Mahmood, R., Abdullah, H., and Chuan, O. S. 2013. "Economic growth, tourism and selected macroeconomic variables: A triangular causal relationship in Malaysia." *The Journal of Applied Economic Research*, 7(2), 85-120.

Majid, MSA. 2008. "Does financial development matter for economic growth in Malaysia? An ARDL bound testing approach." *Journal of Economic Cooperation*, 29(1): 61-82.

Mishra, P. K., Rout, H. B., and Mohapatra, S. S. 2010. "Causality between tourism and economic growth: Empirical evidence from India." *European Journal of Social Sciences*, 18(4), 518-527.

Morley, B. 2006. "Causality Between Economic Growth and Migration: An ARDL Bounds Testing Approach". *Economics Letters* 90: 72-76.

Narayan, P.K., Smyth, R. 2006. "Higher Education, Real Income and Real Investment in China: Evidence from Granger Causality Tests". *Education Economics* 14: 107-125.

Nene, G. and Taivan, A. 2017. "Causality between tourism and economic growth: Evidence from sub-Saharan Africa." *Journal of Developing Areas*, 51(2), 1-15.

Nyasha, S. and Odhiambo, NM (2015), "Do banks and stock markets spur economic growth? Kenya's experience", *International Journal of Sustainable Economy* 7 (1), 54-65.

Odhiambo and Nyasha, 2019. “Does bank-based financial development spur economic growth? Empirical evidence from the Democratic Republic of Congo.” *Int. J. Sustainable Economy*, 11(4), 378-393.

Odhiambo, NM (2016), “Coal consumption and economic growth in South Africa: An empirical investigation”, *Energy & Environment* 27 (2), 215-226.

Odhiambo, NM (2014), “Energy dependence in developing countries: does the level of income matter?”, *Atlantic Economic Journal* 42 (1), 65-77.

Odhiambo, NM. 2008. “Financial depth, savings and economic growth in Kenya: A dynamic causal linkage.” *Economic Modelling*, 25: 704-713.

Oh, C. O. 2005. “The contribution of tourism development to economic growth in the Korean economy.” *Tourism Management*, 26(1), 39–44. https://doi.org/10.1016/j.tourman.2003.09.014

Oh, W. and Lee, K. 2004. “Energy Consumption and Economic Growth in Korea: Testing the Causality Relation”. *Journal of Policy Modeling* 26: 973-981.

Pesaran, MH. and Shin, Y. 1999. “An autoregressive distributed lag modelling approach to cointegration analysis.” Chapter 11 in S. Strom (ed), *Econometrics and economic theory in the 20th century: The Ragnar Frisch Centennial Symposium*. Cambridge: Cambridge University Press.

Pesaran, MH., Shin, Y. and Smith, R. 2001. “Bound testing approaches to the analysis of level relationships.” *Journal of Applied Econometrics*, 16: 289-326.

Pesaran, MH., Shin, Y. and Smith, RJ. 1996. Testing for the existence of a long-run relationship. *DAE Working Paper No. 9622*.

Pisa, N. 2018. “Causal relationship between air transport, tourism and economic growth: Joinpoint regression and Granger causality analysis.” *EuroEconomica*, 2(37), 164-176.

Schlumberger, C. E. and Weisskopf, N. 2014. *Two Case Studies: Mexico and South Africa: Ready for Takeoff? The Potential for Low-Cost Carriers in Developing Countries*. World Bank Group, Washington DC, 32-58.

Shakouri, B. Yazdi, SK., Nategian, N. and Shikhrezaei, N. 2017. “The Relation between International Tourism and Economic Growth.” *Journal of Tourism and Hospitality*, 6(4), 2-7. DOI: 10.4172/2167-0269.1000295

Signe, L. (2018). Africa's Tourism Potential: Trends, Drivers, Opportunities, and Strategies. *Africa’s Growth Initiative, Brookings*.

South African Reserve Bank (SARB). 2016. Online statistical query (historical macroeconomic timeseries information). [Online] Available from <https://www.resbank.co.za/Research/Statistics/Pages/OnlineDownloadFacility.aspx> [Accessed 08 February 2020].

Tang CF, Abosedra S. 2015. "Does tourism expansion effectively spur economic growth in Morocco and Tunisia? Evidence from time series and panel data." *Journal of Policy Research in Tourism, Leisure and Events* 8: 127-145.

Tang, C. F. 2011. "Is the tourism-led growth hypothesis valid for Malaysia? A view from disaggregated tourism markets." *International Journal of Tourism Research*, 13(1), 97–101. https://doi.org/10.1002/jtr.807

Tang, C. F. 2013. "Temporal Granger causality and the dynamic relationship between real tourism receipts, real income, real exchange rates in Malaysia." *International Journal of Tourism Research,* 15(3), 272–284. https://doi.org/10.1002/jtr.1869

Trang, N. H. M., and Duc, N. H. C. 2013. "The contribution of tourism to economic growth in Thua Thien Hue Province, Vietnam*." Middle East Journal of Business*, 8(1), 70–77.

Trang, N. H. M., Duc, N. H. C., and Dung, N. T. 2014. "Research note: Empirical assessment of the tourism-led growth hypothesis: The case of Vietnam." *Tourism Economics*, 20(4), 885–892. https://doi.org/10.5367/te.2013.0307

Wang, B., and Xia, M. 2013. "A study on the relationship between tourism industry and regional economic growth – A case study of Jiangsu Gaochun district." *Modern Economy*, 4, 482–488. https://doi.org/10.4236/me.2013.47052

World Bank. 2011. Africa Region Tourism Strategy: Transformation through Tourism-Harnessing. The World Bank.

World Bank, 2019. Financial Structure Data Base. [Online] Available from <https://www.worldbank.org/en/publication/gfdr/data/financial-structure-database> [Accessed 15 June 2019].

World Travel and Tourism Council "WTTC". 2019. Travel and Tourism Economic Impact 2019. WTTC, London, U.K.

Wu, T and Wu, H. 2019. "Tourism and economic growth in Asia: A bootstrap multivariate panel Granger causality." *International Journal of Tourism Research*, 21:87-96. DOI: 10.1002/jtr.2243

APPENDIX 1: ***Descriptive Statistics***

	Y/N	TOURARRIVE	TOURREV	TOURREV/Y	EXR	FDI
Mean	6639.5	7.4	7164.4	2.8	94.9	1.5
Median	6746.8	7.2	8656.5	2.9	98.2	1.0
Maximum	7583.6	10.0	11202.0	3.8	122.1	6.0
Minimum	5528.3	4.5	2654.0	1.7	70.4	0.2
Std. Dev.	788.1	1.8	3165.4	0.5	14.3	1.3
Skewness	-0.1	0.0	-0.3	-0.3	0.0	1.8
Kurtosis	1.3	1.6	1.4	2.9	2.2	6.5
Jarque-Bera	2.6	1.7	2.7	0.3	0.6	23.2
Probability	0.3	0.4	0.3	0.9	0.7	0.0
Sum	146069.9	162.4	157617.0	62.6	2088.9	33.3
Sum Sq. Dev.	13043192.0	64.6	210000000.0	5.0	4322.9	37.9
Observations	22	22	22	22	22	22

APPENDIX 2: ***ARDL – Vector Error Correction Model (VECM) Diagnostic Tests***

LM Test Statistic	**Results Statistic [Probability]**			
Model 1				
Dependent variable	Δ***Y/N$_t$***	Δ***TOURARRIVE$_t$***	Δ***EXR$_t$***	Δ***FDI$_t$***
Serial Correlation: CHSQ(1	0.021 [0.886]	0.649 [0.421]	0.554 [0.456]	0.299 [0.584]
Functional Form: CHSQ(1)	0.011 [0.916]	2.163 [0.339]	0.117 [0.198]	0.634 [0.426]
Normality: CHSQ (2)	1.723 [0.422]	1.923 [0.382]	1.741 [0.419]	1.507 [0.471]
Heteroscedasticity: CHSQ (1)	0.081 [0.776]	0.364 [0.546]	0.080 [0.778]	1.552 [0.213]
Model 2A				
Dependent variable	Δ***Y/N$_t$***	Δ***TOURREV$_t$***	Δ***EXR$_t$***	Δ***FDI$_t$***
Serial Correlation: CHSQ(1	0.007 [0.933]	0.082 [0.774]	0.438 [0.508]	2.483 [0.115]
Functional Form: CHSQ(1)	1.044 [0.307]	0.006 [0.938]	1.722 [0.189]	0.365 [0.546]
Normality: CHSQ (2)	0.425 [0.808]	0.016 [0.992]	1.606 [0.448]	1.275 [0.529]
Heteroscedasticity: CHSQ (1)	0.187 [0.665]	0.802 [0.371]	2.582 [0.108]	0.044 [0.834]
Model 2B				
Dependent variable	Δ***Y/N$_t$***	Δ***TOURREV/Y$_t$***	Δ***EXR$_t$***	Δ***FDI$_t$***
Serial Correlation: CHSQ(1	0.672 [0.412]	1.215 [0.270]	0.114 [0.735]	0.393 [0.531]
Functional Form: CHSQ(1)	0.758 [0.384]	1.353 [0.245]	0.117 [0.198]	0.007 [0.934]
Normality: CHSQ (2)	1.418 [0.492]	0.291 [0.865]	1.138 [0.566]	0.107 [0.948]
Heteroscedasticity: CHSQ (1)	0.097 [0.756]	1.465 [0.226]	1.705 [0.192]	0.345 [0.557]