Long-term asymmetric impacts of insecurity and corruption on development of tourism: Evidence from Nigeria

Impactos asimétricos a longo prazo da inseguridade e da corrupción no desenvolvemento do turismo: evidencia de Nixeria

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Abstract

This research evaluates the long-term asymmetric impacts of insecurity and corruption on the development of tourism in Nigeria using a non-linear ARDL (NARDL) method to analyze quarterly data for the 1996-2021 period. The cointegration test result provides an evidence of a long-term relationship among these three variables (corruption, insecurity and tourism development), along with exchange rate, income and infrastructure. The asymmetry test results reveal asymmetry between tourism development and both corruption and insecurity. The outcomes of the empirical exercise indicate that a positive shock to control of corruption (decline in corruption) fosters long-term tourism development, while a negative shock to control of corruption (increase in corruption) does not significantly explain long-term tourism development. In addition, a positive change in government expenditure on internal security (increase in internal insecurity) lowers long-term tourism development, but a negative change in government spending on internal security (decrease in internal insecurity) enhances long-term tourism development. Depreciation of the domestic currency promotes long-term tourism development. Thus, policies that reduce corruption and insecurity are recommended to promote long-term development of the tourism sector in Nigeria.

Keywords: Corruption; Insecurity; Tourism development; NARDL; Nigeria.

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Resumo

Esta investigación avalía os impactos asimétricos a longo prazo da inseguridade e a corrupción sobre o desenvolvemento do turismo en Nixeria utilizando un método ARDL non lineal (NARDL) para analizar datos trimestrais do período 1996-2021. O resultado da proba de cointegración demostra a existencia dunha relación a longo prazo entre estas tres variables (corrupción, inseguridade e desenvolvemento turístico), xunto co tipo de cambio, os ingresos e as infraestruturas. Os resultados da proba de asimetría revelan unha asimetría entre o desenvolvemento turístico e tanto a corrupción como a inseguridade. Os resultados do exercicio empírico indican que un shock positivo ao control da corrupción (diminución da corrupción) fomenta o desenvolvemento turístico a longo prazo, mentres que un shock negativo ao control da corrupción (aumento da corrupción) non explica significativamente o desenvolvemento turístico a longo prazo. Ademais, un cambio positivo no gasto público en seguridade interna (aumento da inseguridade interna) reduce o desenvolvemento do turismo a longo prazo, pero un cambio negativo no gasto público en seguridade interna (diminución da inseguridade interna) mellora o desenvolvemento do turismo a longo prazo. A depreciación da moeda nacional favorece o desenvolvemento do turismo a longo prazo. Así pois, recoméndanse políticas que reduzan a corrupción e a inseguridade para promover o desenvolvemento a longo prazo do sector turístico en Nixeria.

Palavras-chave: Corrupción; Inseguridade; Desenvolvemento turístico; NARDL; Nixeria.

JEL: D73; L83.

1. INTRODUCTION

Over the past two decades, international tourism has developed rapidly and it is one of the fastest-growing industries in the world (Habibi, 2017; Ovat, 2003). Developing the tourism sector has been identified as a way for a nation to diversify its economy, increase foreign exchange earnings, create job opportunities, boost infrastructural development, promote private investment, enhance structural transformation of rural areas, and foster sustainable economic growth and development (Ajani et al., 2018; Awode, 2022; Bankole & Odularu, 2006; Jalil et al., 2013; Mariyono, 2017; Oh, 2005; Olorunfemi & Raheem, 2008; Ovat, 2003). In 2018, tourism contributed 10.4% to global GDP, 30% to global service exports, and 10% to global jobs, with an estimated 1.4 billion tourist arrivals. The number is projected to reach 1.8 billion in 2030 (Awode, 2022; World Tourism Organization, 2019).

Nigeria is endowed with rich cultural festivals, ecotourist attractions and sites of interest across the country's six geopolitical zones, potentially making it one of the greatest tourist destinations in the world (Napoleon, 2021; Orekoya, 2018). Its festivals include the Arugungun Fish Festival in the Northwest, the Calabar Carnival in the Southsouth, and the Eyo and Ojude Oba festivals in the Southwest. Among the nation's rich ecotourist sites are the Northcentral's Borgu Game Reserve, Kainji Lake National Park, Mambilla Plateau and Zuma Rock, the Northeastern's Yankari Game Reserve, Oguta Lake in the Southeast and the Obudu Mountain Resort in the Southsouth. Other noteworthy sites include Alpha Beach, Badagry Beach, Bar Beach, Eleko Beach, Old Oyo National Park, Olumo Rock, Osun-Osogbo Sacred Grove, and Ikogosi Warm Spring in the Southwest (Jemirade, 2021; Orekoya, 2018).

Despite the enormous potential of these natural resources, Nigeria has not managed to earn substantial tourism revenues (Jemirade, 2021). More worrisome still, Nigeria lags behind relatively poorer African nations in terms of tourist arrivals and income (Andzenge, 2021; Awode, 2022; Jemirade, 2021). Recognizing the benefits of tourism, successive governments have taken steps to address prior failures and reposition the sector (Akwara et al., 2014; Awode, 2022; Jemirade, 2021). For instance, the early Nigeria Tourist Association (NTA) Decree 54 of 1976 was replaced by the Nigerian Tourist Board (NTB) Decree 54 of 1979. Then in 1989, the Department for Tourism was created within the Ministry of Trade, which became the Ministry of Trade and Tourism. Also, the federal government encouraged participation and synergy among key stakeholders such as the National Parks Commission, the Nigeria Conservative Fund, the Federal Ministry of Culture and state counterparts, and the National Tourism Development Cooperation to promote tourism. Recently, the Nigerian Immigration Service launched a 'visa on arrival' policy for short visits by African Union (AU) member-nations passport holders. These and other initiatives have sought to boost activity in the tourism sector.

Government efforts notwithstanding, little has been achieved in harnessing the sector's potential. Tourism in Nigeria is plagued by inadequate funding, an information and promotion gap, low quality personnel and entrepreneurial skills, poor infrastructures (roads, electricity and water supply), low hotel standards, poor and inconsistent policy implementation, political instability, ethno-religious conflicts, insecurity, corruption and the country's negative image abroad (Akwara et al., 2014; Andzenge, 2021; Bankole & Odularu, 2006; Buba et al., 2020; Ezenagu, 2018; Jemirade, 2021; Napoleon, 2021). All these affect the nation's capacity to earn significant revenue from tourism.

The World Bank's World Development Indicators (WDI) for Nigeria during the 1996-2020 period indicate unsteady, fluctuating tourism receipts as measured (in US$) by aggregate tourism receipts (expenditures by international tourists, expenses to national carriers for international transport, pre-payments on goods and/or services received by the host nation,

and receipts from same-day tourists), revenue from passenger transport items (international tourists' expenditure on international transportation services rendered by host-nation's carriers, payments for passenger services performed within an economy by non-resident carriers, passenger fares, package tour payments), and travel items receipts (international tourist expenditure in the destination country, goods or services purchased by or for tourists or provided without quid pro quo for tourists to use or give away, including pre-payment on goods and services received in the host nation and payments by same-day visitors) (Figure 1). This instability has negative consequences on sector development and the economy as a whole.

Figure 1. Tourism receipts for Nigeria (1996–2020)
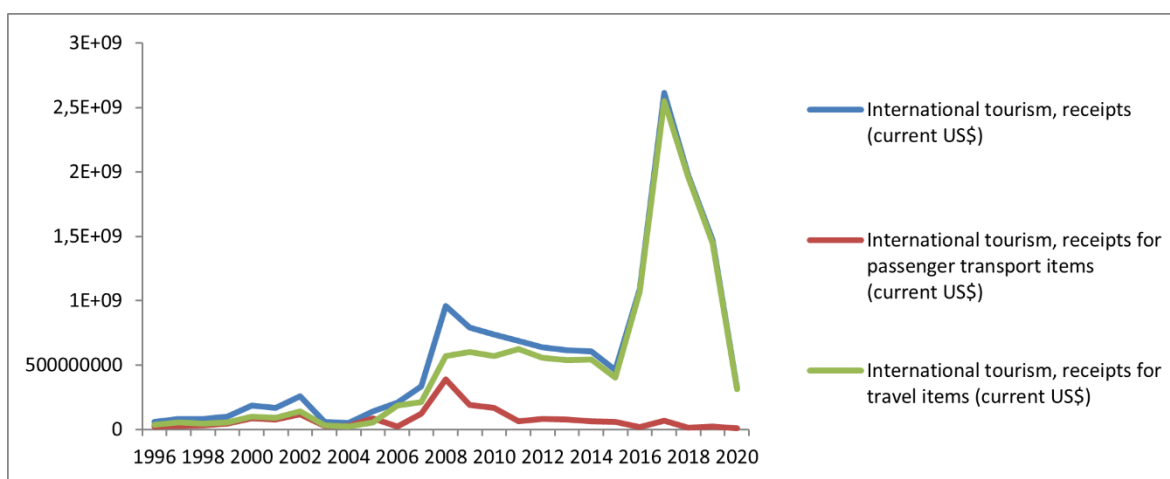
Source: Author's computations based on WDI data.

Nigeria and other African countries are among those who benefit least from international tourism. They also face insecurity and corruption challenges which can hinder development of the tourism industry (Jemirade, 2021; Jimoh & Gold, 2019; Sifolo, 2016). Corruption is considered an obstacle to tourism development because it increases the costs to tourists, who are asked to pay bribes to obtain visitor permits, speed-up visa application processing, facilitate access to restricted sites and activities that require government approval, or who are obliged to spend more hours or days than intended for their visit or holiday (Poprawe, 2015; Xu et al., 2023; Yap & Saha, 2013). Authors have expressed concern about increasing corruption and its devastating impact on different sectors of Nigeria's economy (Abu et al., 2023; Abu & Karim, 2021; Abu, Obi, et al., 2024; Abu, Karim, et al., 2022). In fact, Andzenge (2021) blamed corruption for underdeveloped tourism in Nigeria, because funds allocated to promote it have been embezzled or cchronically mismanaged over time by public officials (Jemirade, 2021).

Insecurity stemming from terrorism, violent attacks, bombings, kidnappings, abductions, and (ritual) killings has also been on the rise in Nigeria. Insurgents (Boko-Haram) have been ravaging the Northeast, resulting in killings, property destruction and displacement of people. Similarly, cattle rustling, kidnappings and abductions have increased in the Nothwest and are gradually spreading to other parts of the nation. The Southeast is under siege by the Indigenous People of Biafra (IPOB), and cult activities across the Southern region make it relatively unsafe. Ritual killings and herder-farmer conflicts are also observed from time to time across the country.

Daily reporting of such activities (crimes) in the media raises fear and feelings of insecurity in the population, which tends to dissuade potential tourists (Garofalo, 1979; Tang & Tan, 2015). Researchers claim that potential visitors are likely to postpone or cancel travel if the destination is perceived as insecure or unsafe, or opt for destinations with greater guarantees

of personal safety or security (Brunt et al., 2000; Kővári & Zimányi, 2010; Pizam, 1999; Ryan, 1993; Sönmez & Graefe, 1998; Tang & Tan, 2015). Rising insecurity may have impacted the tourism sector negatively because prospective tourists or visitors feel Nigeria is unsafe (Awode, 2022; Buba et al., 2020; Ezenagu, 2018; Jemirade, 2021).

Despite the high insecurity and corruption and the relatively underdeveloped tourism sector, only a few empirical studies have considered a relation between corruption and tourism or insecurity and tourism in Nigeria (Awode, 2022; Riti et al., 2017; Osinubi et al., 2021). Research exploring the joint influence of corruption and insecurity on tourism development in Nigeria is even more scarce. Riti et al. (2017) used Autoregressive Distributed Lag (ARDL) to look at the impact of insecurity on Nigerian tourism. They found that rising insecurity deterred foreign tourists intending to visit Nigeria. Using a similar method (i.e., ARDL), Alola et al. (2019) reported that insurgency had a negative influence on Nigeria's tourism receipts. Awode (2022) applied the Fully Modified Ordinary Least Squares (FMOLS) method and found a significant positive influence of greater security on tourism in Nigeria. Other ARDL-based research by Osinubi et al. (2021) suggested that reducing corruption boosted tourism activity in Nigeria.

We believe that we can improve upon the commendable efforts of these authors. The ARDL and FMOLS techniques they used estimate only linear relation(s) between or among variables, but recent revelations imply that non-linear relations often occur between dependent variable(s) and regressors (Shin et al., 2014). Whereas most research on the demand for tourism and its drivers have been explored within a linear framework, volatility and structural changes cannot be ascertained via linear models (Meo et al., 2018; Po & Huang, 2008). Moreover, since the demand for tourism is influenced by asymmetries, ignoring non-linearity in economic relations can lead to inaccurate inferences (Meo et al., 2018; Smeral, 2012).

To our knowledge, none of the existing research on the determinants of tourism demand in Nigeria have studied these dynamics within an asymmetric framework. In this study, we deployed non-linear ARDL (NARDL) to uncover how negative and positive changes in (or shocks to) regressors (such as corruption and insecurity) impact the dependent variable (tourism development). In addition, using large number observations in the present research (relative to the ones employed by prior studies on Nigeria) might lead to better results generation.

The remainder of the study is organized as follows: Section Two reviews studies on the corruption-tourism and insecurity-tourism nexuses, while Section Three describes the theoretical underpinning and the model. The fourth section contains the methodology, and the results are discussed in the fifth section. Section Six concludes the study.

2. REVIEW OF STUDIES ON TOURISM, INSECURITY AND CORRUPTION NEXUS

Although studies on the corruption-tourism or insecurity-tourism nexus abound, empirical research on separate or combined influence of insecurity and corruption on Nigeria's tourism development is scarce. The few existing studies for Nigeria have explored either one dynamic or the other, but not both. Some studies have looked for a negative influence on tourism from insecurity in the form of bombings, crimes, violent attacks and terrorism, at the country-specific level (Alola et al., 2019; Buigut & Amendah, 2016; Chi, 2015; Choyakh, 2009; Fletcher & Morakabati, 2008; Habibi, 2017; Hanon & Wang, 2020; Khan & Rasheed, 2016; Mariyono, 2017; Omer & Yeşiltaş, 2020; Parida et al., 2016; Riti et al., 2017) and multi-country level (Altindag, 2014; Buigut, 2015; Fourie et al., 2020; Jimoh & Gold, 2019; Joshi et al., 2017; Saha et al., 2017;

Santana-Gallego & Fourie, 2020; Tang & Tan, 2015; Yang et al., 2010). Most report that tourism activity or development declines with rising insecurity.

Other studies on the influence of corruption on the tourism industry in individual country (Chulaphan & Barahona, 2021; Osinubi et al., 2021) or a group of nations (Das & DiRienzo, 2010; Jimoh & Gold, 2019; Poprawe, 2015; Xu et al., 2023) have established that decreased corruption promotes tourism development. Table 1 presents a summary of the relevant literature.

Table 1. Empirical literature on the tourism, corruption and insecurity

Corruption and tourism			
Author(s)	**Country(ies)/Period**	**Method/Model**	**Major Findings**
Xu et al. (2023)	30 African countries (1996-2020)	FE and PCSE	Worsening corruption reduces tourism development
Osinubi et al. (2021)	Nigeria (2002Q1 to 2018Q4)	ARDL	Corruption hurts tourism development
Chulaphan and Barahona (2021)	31 countries (2010-2017)	ARDL and GLS	Corruption has a negative impact on tourism
Jimoh and Gold (2019)	ECOWAS (2000-2015)	Pooled OLS, FE and RE	Reducing corruption fosters tourism growth
Fourie et al. (2020)	171 countries (1995-2016)	Panel FE	Declining corruption enhances tourism growth
Poprawe (2015)	Over 100 countries (1995-2010)	FE and GMM	Reducing corruption boosts tourism sector growth
Yap and Saha (2013)	139 countries (1999-2009)	Panel FE	Corruption slows down tourism development
Das and DiRienzo (2010)	119 countries (From 2006)	OLS	Less corruption promotes tourism competitiveness across nations
Insecurity and tourism			
Author(s)	**Country(ies)/Period**	**Method/Model**	**Major Findings**
Santana-Gallego and Fourie (2020)	187 countries (1995-2017)	PPML	Insecurity hinders the growth of the tourism sector
Jimoh and Gold (2019)	ECOWAS (2000-2015)	Pooled OLS, FE and RE	Higher security fosters the growth of tourism
Fourie et al. (2020)	171 countries (1995-2016)	Panel FE	Insecurity (terrorism and crime) hinders the growth of tourism

Awode (2022)	Nigeria (2022)	FMOLS	Greater security boosts tourism activity
Alola et al. (2019)	Nigeria (2005M1-2016M12)	ARDL	Insecurity (terror attacks) has an adverse effect on tourism receipts
Riti et al. (2017)	Nigeria (1996-2014)	ARDL/VECM	Insecurity hurts tourism
Mariyono (2017)	Indonesia (2002-2011)	Panel regression	Greater security boosts tourism
Habibi (2017)	Malaysia (2000-2012)	GMM	The absence of violence and terrorism encourage tourism
Buigut and Amendah (2016)	Kenya (2010-2013)	System-GMM	Insecurity (terrorism) deters tourists and lowers tourism revenue
Parida et al. (2016)	Indian (1995-2011)	IV-2SLS	Rising insecurity (crime) constitutes a barrier to tourism growth
Khan and Rasheed (2016)	Pakistan (1972-2013)	ARDL	Terrorism has adversely affected tourism
Altindag (2014)	35 European nations (1996- 2003)	Panel regression	Decreased security (rising crime) deters tourists and lowers revenue from tourism
Pizam and Fleischer (2002)	Israel (1991-2001)	Least Squares regression	Terrorism causes greater decline in tourism

Note: PPML: Poisson Pseudo Maximum Likelihood; ARDL: Autoregressive Distributed Lag; FE: Fixed Effects; GMM: Generalized Method of Moments; PCSE: Panel Corrected Standard Errors; RE: Random Effects; OLS: Ordinary Least Squares; FMOLS: Fully Modified OLS; IV: Instumental Variable; 2SLS: Two Stage Least Squares; GLS: Generalized Least Squares (GLS).

The present study contains three features that set it apart from the existing research on Nigeria. Most prominently, it is the first empirical research to explore the influence of both insecurity and corruption on the development of tourism in Nigeria. Also, our study uses a non-linear ARDL method to explore long-term positive and negative (asymmetric) impacts of insecurity and corruption on tourism development. Finally, the expanded study period and the use of quarterly data for the entire 1996-2021 period has allowed for substantial more observations.

3. THEORETICAL FRAMEWORK AND MODEL SPECIFICATION

To model the impacts of corruption and insecurity on tourism development, this research relies on the theories and hypotheses of prior studies. For instance, the 'grease-the-wheels' and 'sand-the-wheels' hypotheses (Dreher & Gassebner, 2013; Méon & Sekkat, 2005) have been extended to the study of the corruption–tourism development nexus (Poprawe, 2015; Xu et al., 2023; Yap & Saha, 2013).

According to the first hypothesis, international tourists may be required to 'grease the wheels' by paying bribes (act of corruption) to government officials (such as immigration personnel) in the destination-country to make it easier for them to obtain a visa or collect visitors' permits without delays (Xu et al., 2023). Tourists may also offer bribes to facilitate access to better hotel rooms, restricted sites and activities requiring government approvals, or to spend more hours or days than originally intended for their visit or holiday (Poprawe, 2015; Yap & Saha, 2013). In this way, corruption could actually boost the inflow of tourists, leading to higher tourism receipts or revenues and development.

The 'sand-the-wheels' hypothesis argues that offering or paying bribes to obtain visitors' permits, speed up visa processing, gain access to better hotel rooms or other services increases the costs of visiting the destination-country. This deters international tourists, causing them to look in countries with less corruption. Thus, high corruption would lower the volume of inbound tourists and associated revenues. The claim that corrupt nations attract little foreign direct investment (FDI) inflow to their tourism industry is consistent with this line of thought (Fan et al., 2009; Poprawe, 2015). Together, these arguments imply that tourism development ($TOUR$) can be affected positively or negatively by corruption (COR).

Insecurity (INS) in the destination-country may also influence tourism, as potential tourists prioritize personal safety when deciding whether to travel to a destination country (Altindag, 2014). Accordingly, individuals are highly likely to visit countries they consider secure and safe. Inversely, potential tourists are deterred from visiting countries they perceive as unsafe or risky, or where the likelihood of insecurity is high. Crime and related activities tend to reduce the number of incoming tourists and associated receipts (Altindag, 2014; Awode, 2022; Feridun, 2011; Fleischer & Buccola, 2002; Pizam, 1999; Pizam & Fleischer, 2002; Smyth et al., 2009). Thus, rising insecurity hinders tourism development.

Additionally, the income level ($GDPCG$) of the destination-country can dictate the amount of tourists it can attract and the revenues that can be generated (Leitão, 2009; Saha & Yap, 2013; Tang & Tan, 2015; Yang et al., 2010; Yap & Saha, 2013). Income level signifies the minimum cost for tourists who visit the destination-country. Income level is also used to measure economic wellbeing and performance, including the capacity of the destination-country's government to maintain existing tourism infrastructures while investing in and building new ones (Saha & Yap, 2013; Yap & Saha, 2013). Hence, rising income or GDP growth promotes tourism development.

Infrastructure development ($INFR$) is also critical to tourism development. Better infrastructure raises investment productivity and attracts FDI to a country (Asiedu, 2002; 2004). The higher economic growth rates that accompany increased FDI inflow result in development of the tourism industry (Adeola & Evans, 2020; Xu et al., 2023; Zhang & Zhang, 2016). Similarly, a nation's exchange rate (EXC) can impact its tourism receipts (Jayaraman et al., 2011; Kusni et al., 2013; Saha et al., 2017). The exchange rate determines relative prices of tourism between a traveler's home country and the destination-country (Lim, 2006; Saha et al., 2017). If Nigeria's domestic currency (Naira) is weaker compared to other countries' currencies, foreign tourists will spend less to visit the country. Thus, depreciation of domestic

currency will raise the number of incoming tourists and tourism revenue in a country, resulting in the sector's development.

Based on the above discussion, we developed a tourism development ($TOUR$) model that has corruption (COR), insecurity ($LINS$), income ($GDPCG$), infrastructure ($INFR$), and exchange rate ($LEXC$) as regressors as follows:

$$LTOUR_t = \alpha_0 + \alpha_1 COR_t + \alpha_2 LINS_t + \alpha_3 GDPCG_t + \alpha_4 INFR_t + \alpha_5 LEXC_t + \varepsilon_t \qquad (1)$$

where L is the logarithm included to give the series identical scale and reduce skewness.

4. METHODOLOGY

4.1. Data and variable measurement

To achieve the main research objective, yearly data from 1996 to 2021 were used. However, given the short data span for corruption and insecurity, Gandolfo's interpolation procedure (1981) was applied to convert yearly data to quarterly data. This resulted in a larger number of observations (i.e., 1997:1-2020:4, n=96). The starting year (1996) and ending year (2021) were removed during interpolation. This procedure has been applied in other research involving short-span data (Abu, Obi, et al., 2019; Abu & Karim, 2021; Abu, David, et al., 2022; Abu, Karim, et al., 2022; Baharumshah & Rashid, 1999; Baharumshah et al., 2006). Data generated in this way do not produce biased estimates based on the cointegration approach (Smith, 1998; Tang, 2008). All data (except those for insecurity and corruption) were collected from the World Bank's Development Indicators database. The data on insecurity and corruption were gathered from Nigeria's Central Bank and the World Bank's Governance Indicators databases, respectively.

In related research (Aktaş et al., 2014; Algieri, 2006; Alola et al., 2019; Altindag, 2014; Jimoh & Gold, 2019; Joshi et al., 2017; Lim, 1997; Saha & Yap, 2013; Xu et al., 2023; Yap & Saha, 2013), tourism receipts served as a proxy for tourism development. Tourism receipts refer to expenditures made by international tourists, including payments to national carriers for international transport. These may also comprise pre-payments on goods and/or services received in the host nation, and receipts from same-day tourists in current US$.

Corruption is captured by the World Bank's 'Control of Corruption' governance indicators. Values closer to -2.5 imply less control of corruption (high corruption), and those nearer to +2.5 signify greater control of corruption (less corruption). For interpreting results, a positive corruption coefficient implies that greater control of corruption (or reducing corruption) has a positive effect on tourism development, while a negative sign would indicate a negative effect from increased corruption. Control of corruption has been used as an indicator in similar studies (Xu et al., 2023; Yap & Saha, 2013). To capture insecurity, government expenditure on internal security was used as a proxy, which is consistent with existing literature (Abu, David, et al., 2022; Adenike, 2021; Riti et al., 2017; Udoh et al., 2019). Higher government expenditure on internal security suggests greater insecurity, and in Nigeria increased security allocations are indeed commensurate with increased insecurity (and terrorism) (Riti et al., 2017). For interpreting the results, a negative coefficient of the insecurity variable indicates that greater internal insecurity (less internal security) impacts tourism development adversely, and a positive coefficient would indicate a positive impact from greater internal security.

Income was measured by GDP per capita in this study, as has been adopted in the literature (Adeola & Evans, 2019; Adeola et al., 2017; Das & DiRienzo, 2010; Luo et al., 2017; Raza & Shah,

2017; Xu et al., 2023). In addition, toeing the path of Asiedu (2002, 2004), Adeola et al. (2017), and Idowu and Bello (2010), infrastructure development was measured by access to telecommunications (proxied by the number of mobile phone subscriptions per 100 persons). Finally, the exchange rate variable expresses the exchange rate of the local currency (Nigerian Naira) to the US dollar, as in Algieri (2006), Saha and Yap (2013), Yap and Saha (2013), Aktaş et al. (2014), and Saha et al. (2017).

4.2. Stationarity and multicollinearity tests

The data employed were subjected to the unit root test to determine if they were stationary, because series must be stationary or devoid of unit root to be included in a regression exercise. Hence, the Augmented Dickey–Fuller (ADF) unit root test (Dickey & Fuller, 1979), and the Philips–Perron (PP) unit root test (Philips & Perron, 1988) were applied to check the stationarity of the variables. These two commonly used tests were chosen for complementarity (Hossain & Hasanuzzaman, 2013). The non-linear ARDL used in this research requires the dependent variable to be integrated to order one (1), while the order of integration of the explanatory variables should be zero (0) and/or 1, but not 2 (Cheah et al. 2017; Ibrahim, 2015). A multicollinearity test was also carried out on the variables via the Variance Inflation Factors (VIF) approach. A VIF value of 10 or above suggests a problem of multicollinearity.

4.3. Non-linear ARDL

While most empirical research uses linear estimation techniques, the notion of non-linearity between time series and/or economic variables has been gaining ground and with it the use of econometrics such as non-linear ARDL (Abu, Karim, et al., 2022; Shin et al., 2014). Cointegrated positive and negative components of time series indicate hidden cointegration, which implies a case of non-linear cointegration (Granger & Yoon, 2002; Katrakilidis & Trachanas, 2012). Non-linear ARDL (NARDL) is well suited to this research because it recognizes hidden cointegration and can estimate both short- and long-run asymmetries (Meo et al., 2018; Zangina & Hassan, 2020).

Therefore, to explore the asymmetric influence of corruption and insecurity on tourism development, the NARDL cointegration approach (Shin et al., 2014) which is the asymmetric or non-linear extension of the linear ARDL method (Pesaran & Shin, 1999; Pesaran et al., 2001), was adopted in this research. Compared to other cointegration methods such as the residual-based technique (Engle & Granger, 1987) and the maximum likelihood method (Johansen, 1988; 1991; Johansen & Juselius, 1990), NARDL has several advantages. It can detect the presence of cointegration between series integrated to order one [I(1)], or a mixture of I(1) and order zero [I(0)]; it is more appropriate for analyzing small samples; it allows variables to possess different lags; and it uses a single-equation model to estimate short- and long-run parameters simultaneously. The Equation capturing the non-linear (asymmetric) cointegrating or long-term relationship among corruption (COR), insecurity ($LINS$) and tourism development ($LTOUR$) including the control variables such as income ($GDPCG$), infrastructure ($INFR$) and exchange rate ($LEXC$) is expressed as:

$$LTOUR_t = \alpha_0 + \beta^+ COR_t^+ + \beta^- COR_t^- + \sigma^+ LINS_t^+ + \sigma^- LINS_t^- + \alpha_1 GDPCG_t + \alpha_2 INFR_t + \alpha_3 LEXC_t + u_t$$

(2)

where L denotes the logarithm introduced to reduce skewness and convert the absolute values of the variables to identical scale. All variables are as defined earlier. β^+, β^-, σ^+, σ^-, α_0, α_1, α_2, and α_3 denote long-term coefficients. COR_t and $LINS_t$ refer to $k \times 1$ vectors of regressors, decomposed as:

$$COR_t = COR_0 + COR_t^+ + COR_t^- \tag{3}$$

And

$$LINS_t = LINS_0 + LINS_t^+ + LINS_t^- \tag{4}$$

COR_t^+ and COR_t^- refer to the partial sums which correspond to both positive and negative changes (shocks) in COR_t, and are generated by calculating:

$$COR_t^+ = \sum_{i=1}^{t} \Delta COR_i^+ = \sum_{i=1}^{t} \max(\Delta COR_i, 0) \tag{5}$$

$$COR_t^- = \sum_{i=1}^{t} \Delta COR_i^- = \sum_{i=1}^{t} \min(\Delta COR_i, 0) \tag{6}$$

Similarly, $LINS_t^+$ and $LINS_t^-$ denote partial sums that correspond to both positive and negative changes (shocks) in $LINS_t$, and are generated by calculating:

$$LINS_t^+ = \sum_{i=1}^{t} \Delta LINS_i^+ = \sum_{i=1}^{t} \max(\Delta LINS_i, 0) \tag{7}$$

$$LINS_t^- = \sum_{i=1}^{t} \Delta LINS_i^- = \sum_{i=1}^{t} \min(\Delta LINS_i, 0) \tag{8}$$

In line with Shin et al. (2014), the non-linear form of Model 1, NARDL (p, q) that portrays asymmetric relation amongst tourism development, corruption and insecurity (including the control variables such as income, infrasrucuture and exchange rate) is expressed as:

$$
\begin{aligned}
\Delta LTOUR_t = {} & \alpha_1 + \rho LTOUR_{t-1} + \theta^+ COR_{t-1}^+ + \theta^- COR_{t-1}^- + \Upsilon^+ LINS_{t-1}^+ + \Upsilon^- LINS_{t-1}^- + \alpha_2 GDPCG_t + \alpha_3 INFR_t \\
& + \alpha_4 LEXC_t + \sum_{i=1}^{p-1} \varphi_i \Delta LTOUR_{t-i} + \sum_{i=0}^{q-1} (\pi_i^+ \Delta COR_{t-i}^+ + \pi_i^- \Delta COR_{t-i}^- + \phi_i^+ \Delta LINS_{t-i}^+ \\
& + \phi_i^- \Delta LINS_{t-i}^- + \delta_{1i} \Delta GDPCG_t + \delta_{2i} \Delta INFR_t + \delta_{3i} \Delta LEXC_t) + \varepsilon_t
\end{aligned}
\tag{9}
$$

where $\theta^+ = -\rho\beta^+$ and $\theta^- = -\rho\beta^-$; $\Upsilon^+ = -\rho\sigma^+$ and $\Upsilon^- = -\rho\sigma^-$. p and q represent lag orders.

The values of p and q were selected using the Akaike information criterion (AIC) and the value of q can be different for each variable. Certain steps were taken to implement the non-linear ARDL method. First, NARDL(p, q) Model 9 was estimated via conventional Ordinary Least Squares (OLS). Next, a non-linear (asymmetric) cointegration test was conducted to check for long-term relations among $LTOUR_t$, COR_t^+, COR_t^-, $LINS_t^+$, $LINS_t^-$, $GDPCG_t$, $INFR_t$ and $LEXC_t$. The null hypothesis of no cointegration among the variables, captured by: $\rho = \theta^+ = \theta^- = \Upsilon^+ = \Upsilon^- = \alpha_2 = \alpha_3 = \alpha_4 = 0$ in Model 9, was tested by applying the Pesaran et al.

(2001) bounds test based on the modified F-test. The F-statistic generated was compared to upper [I(1)] and lower [I(0)] critical bounds values. Once cointegration was ascertained, long-term and short-term asymmetric relation tests were explored using the standard Wald test. The long-run asymmetry test was validated by testing the following null hypotheses:

$$-\theta^+/\rho = -\theta^-/\rho, \text{ for corruption}$$

and

$$-\Upsilon^+/\rho = -\Upsilon^-/\rho, \text{ for insecurity.}$$

Similarly, the short-run asymmetry test was conducted by testing these null hypotheses:

$$\sum_{i=0}^{q} \pi_i^+ = \sum_{i=0}^{q} \pi_i^- \text{ , for corruption}$$

and

$$\sum_{i=0}^{q} \phi_i^+ = \sum_{i=0}^{q} \phi_i^- \text{ , for insecurity}$$

If the short-term (or long-term) coefficient of the positive partial sum of corruption (COR_t^+) varies from the negative partial sum of corruption (COR_t^-), then, it is established that corruption (COR) has an asymmetric short-run (or long-run) influence on tourism development ($LTOUR$). Likewise, if the short-term (or long-term) coefficient of the positive partial sum of insecurity ($LINS_t^+$) varies from the negative partial sum of insecurity ($LINS_t^-$), then an asymmetric short-run (or long-run) impact of insecurity ($LINS$) on $LTOUR$ is confirmed.

4.4. Diagnostic and stability tests

After model estimation, the results were subjected to diagnostic and stability tests to check the reliability or validity of the estimates. We used the Breusch-Godfrey (BG) serial correlation test to determine if the residuals were correlated, and the Breusch-Pagan-Godfrey (BPG) heteroscedasticity test to ascertain whether the residuals were homoscedastic. Tests for the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMQ) were also applied to check the stability of the model and parameters.

5. DISCUSSION OF RESULTS

5.1. Results of unit root and multicollinearity tests

The unit root test results (Table 2) signify that all the variables had a unit root at level but became stationary after the first differencing. Thus, they were integrated to I(1), thereby justifying application of the NARDL estimation method. A multicollinearity test was also conducted on the variables using the variance inflation factors (VIF) approach, and the results are reported in Table 2. The centered VIF values for the variables ranged from 1.4910 to 5.1676. Individual VIF value was less than 10, indicating that multicollinearity was not a problem.

Table 2. Results of unit root stationarity and multicollinearity tests

Variable	ADF		PP		CENTERED VIF
	Level	1st diff.	Level	1st diff.	
$LTOUR$	-1.8102	-3.8209***	-1.7715	-2.9844**	-
$LINS$	-0.7380	-3.2735**	-1.8049	-2.8266*	2.1291
COR	-1.7868	-4.3461***	-1.4702	-4.3617***	1.4910
$GDPCG$	-1.9853	-3.6656***	-1.8602	-5.9698***	1.5758
$INFR$	-0.7033	-2.8394*	-0.6956	-3.7971***	5.1676
$LEXC$	-2.5727	-6.5250***	-2.4871	-6.6161***	2.4047

Note: *, **, and *** imply a rejection of the null hypothesis of unit root (non-stationarity) at 10%, 5% and 1%, respectively. L is logarithm.

3.2. Results of cointegration and asymmetry tests

The outcome of the bounds test provides evidence that tourism, insecurity and corruption (along with income, exchange rate and infrastructure) have a cointegrating relation. The derived value of the computed F-statistic (7.0569) was larger than the upper critical bound value of 3.90 (Table 3, Panel A), indicating a long-term relationship among the variables.

Also, the outcome of the asymmetric test showed long-term asymmetry between the corruption-tourism and insecurity-tourism pairs (Table 3, Panel B). The calculated F-statistic of 16.5746 and a probability of 0.0000 imply asymmetry between corruption and tourism, and the computed F-statistic of 8.2783 with a probability of 0.0006 indicate asymmetry between insecurity and tourism.

Moreover, the long-run coefficient of a positive shock to control of corruption (COR^+) was positive and significant, while the coefficient of a negative shock to control of corruption (COR^-) was positive and insignificant. Finally, the long-run coefficient of a positive shock to insecurity ($LINS^+$) was negative and significant, but the coefficient of a negative shock to insecurity ($LINS^-$) was positive and significant. These results supply evidence of long-run asymmetry between corruption and tourism development, as well as between insecurity and tourism development.

Table 3. Results of cointegration and asymmetry tests

Panel A: Cointegration test result				
Function		=		f($LTOUR$/
$COR^+, COR^-, LINS^+, LINS^-, GDPCG, INFR, LEXC$)				
	Critical values bounds			
F-stat. =7.0569***			I(0)	I(1)
		10%	1.92	2.89
		5%	2.17	3.21
		1%	2.73	3.90
Panel B: Asymmetry test results (long-run)				
Corruption and tourism			Insecurity and tourism	
Wald test			Wald test	
	Result			Result
F-statistic	16.5746***[0.0000]		F-statistic	8.2783***[0.0006]

Note: ***implies statistical significance at 1 % L is logarithm Values in brackets denote probability values

5.3. Results of NARDL model estimation

According to the NARDL results (Table 4), the optimal lag length selected by the AIC was: 3,0,0,1,0,4,0,1. The results revealed that a positive shock to control of corruption (reducing corruption) promoted long-term tourism development, but a negative shock (increasing corruption) did not influence long-term tourism development significantly. Increasing control of corruption by one unit enhanced tourism development by 0.11% at the 1% level over the long-term, keeping other variables constant. In addition, a negative shock to expenditure on internal security (lower internal insecurity or greater internal security) raised long-term tourism development, while a positive shock to expenditure on internal security (greater internal insecurity) reduced long-term tourism development. Raising internal insecurity by 1% lowered long-term tourism development by 1.51% at the 5% level, but lowering insecurity by 1% raised long-term tourism development by 4.88% at the 1% level, holding other variables constant. Furthermore, the exchange rate was positively connected to long-term tourism development and the influence was significant. Depreciation of the domestic currency by 1% raised long-term tourism development by 0.57% at the 1% level, keeping other variables constant. However, income and infrastructure seemed insignificant in dictating the long-term behaviour of tourism.

Table 4. Results of NARDL model estimation (Dependent variable $LTOUR$)

Long-run model		Short -run model	
Regressor	Coefficient	Regressor	Coefficient
C	6.9715*** (0.2328) [29.9438]	$\Delta LTOUR_{-1}$	0.3591*** (0.0893) [4.0175]
COR^+	10.9614*** (2.0543) [5.3357]	$\Delta LTOUR_{-2}$	0.1900** (0.0840) [2.2625]
COR^-	0.7037 (2.1703) [0.3242]	$\Delta LINS^-$	0.3528*** (0.0966) [3.6514]
$LINS^+$	-1.5108** (0.5897) [-2.5739]	$\Delta GDPCG$	0.1598*** (0.0172) [9.2604]
$LINS^-$	4.8753*** (1.5366) [3.1727]	$\Delta GDPCG_{-1}$	-0.0097 (0.0250) [-0.3883]
$GDPCG$	-0.0069 (0.0464) [-0.1491]	$\Delta GDPCG_{-2}$	0.0240 (0.0222) [1.0780]
$INFR$	-0.0139 (0.0253) [-0.5498]	$\Delta GDPCG_{-3}$	0.0607*** (0.0189) [3.1981]
$LEXC$	0.5687*** (0.2115) [2.6879]	$\Delta LEXC$	0.0898 (0.0810) [1.1088]
		ECT_{-1}	-0.2023*** (0.0241) [-8.3837]
R²	0.8470		

Note: ***, **, and * indicate statistical significance at 1%, 5% and 10%, respectively L is logarithm Values in parenthesis and brackets are standard errors and t-statistics, respectively

The short-term results (though not the focus of this research) signify that a 1% decrease in insecurity raised short-term tourism development by 0.35% at the 1% level, holding other

variables constant. Also, raising income by 1% led to a 0.16% increase in short-term tourism development at the 1% level, keeping other variables constant. The error correction coefficient was negative and significant at 0.20, suggesting that 20% of the deviation from equilibrium was corrected in the fourth quarter of the year.

Some implications can be drawn from these findings. First, the supportive role of less (or higher control of) corruption on long-term tourism development lends credence to the research of Osinubi et al. (2021) on Nigeria, Jimoh and Gold (2019) for the ECOWAS region, and others such as Das and DiRienzo (2010), Yap and Saha (2013), Poprawe (2015), Chulaphan and Barahona (2021), and Xu et al. (2023). Thus, reducing corruption implies, for example, that incoming or potential tourists would not have to pay bribes to obtain visitor's permit or facilitate visa processing to visit Nigeria. The lower costs to prospective visitors to Nigeria will lead to higher inflow of tourists and tourism receipts, and development of the sector.

The negative influence of rising insecurity on long-term tourism development lends credence to the research of Riti et al. (2017), Alola et al. (2019) and Awode (2022), who found an adverse impact of insecurity on tourism development in Nigeria, and that of Jimoh and Gold (2019) for the ECOWAS region. Other studies that have uncovered a negative impact of insecurity and related activities on tourism include Pizam and Fleischer (2002), Altindag (2014), Buigut and Amendah (2016), Parida et al. (2016), Saha et al. (2017), Habibi (2017), Joshi et al. (2017), Mariyono (2017), Fourie et al. (2020), and Santana-Gallego and Fourie (2020). Thus, higher uncertainty about individual safety as a result of increased insecurity from terrorism, violent attacks, bombings, killings, kidnappings and similar activities discourages prospective tourists from travelling to (or visiting) Nigeria, leading to lower receipts and a decline in the sector's development.

The positive relation between long-term tourism development and the exchange rate coincides with findings by Zhang et al. (2009), Yang et al. (2010), Yap and Saha (2013), Saha and Yap (2013), Altindag (2014), and Saha et al. (2017). Thus, as Nigeria's domestic currency depreciates, it lowers travel costs for tourists willing to visit the country. This would lead to higher inflows of international travellers or tourists, more tourism receipts, and greater long-term tourism development.

The insignificant influence of infrastructure on long-term tourism development supports the findings of Phakdisoth and Kim's (2007) in Laos, and Awode (2022) in Nigeria. Similarly, Riti et al. (2017) reported an insignificant and negative long-term impact of infrastructure on tourism in Nigeria. This may be connected to poor government funding of infrastructures (roads, communications, electricity, etc.) over time. The already inadequate funds have also been misappropriated or embezzled by corrupt government officials (Riti et al., 2017). The insignificant impact of income on long-term tourism development corroborates the research of Hanon and Wang (2020), who found income to be insignificant and negatively related to tourism in Syria, and similar outcomes elsewhere (Leitão, 2009; Yang et al., 2010). These findings demonstrate Nigeria's poor economic performance and the incapacity of its government to invest in and build tourism infrastructures or maintain existing ones.

5.4. Results of diagnostic and stability tests

The results were subjected to conventional post-estimation (diagnostic) tests such as the Breusch-Godfrey (BG) serial correlation test and the Breusch-Pagan-Godfrey (BPG) heteroscedasticity test, to ascertain their validity. Table 5 shows that the chi-square (χ^2) and probability value (ρ-value) for the BG serial correlation test were 6.2953 and 0.1782, respectively. Also, the χ^2 and ρ-value for the BPG heteroscedasticity test were 13.6916 and

0.6217, respectively. Therefore, the results are devoid of serial correlation and heteroscedasticity problems and can be considered reliable.

Table 5. Results of diagnostic tests

| Test Statistic	Results
Serial Correlation: χ^2	6.2953 [0.1782]
Heteroscedasticity: χ^2	13.6916 [0.6217]

Note: Values in brackets are probability values

The stability of the estimated coefficients and model was evaluated by the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMQ) tests. The results of these tests, shown in Figure 2 and Figure 3, imply that both the model and the coefficients estimated are stable because the plots remain within the lower and upper boundaries. Hence, the findings can guide policy formulation.

Figure 2. Plots of CUSUM
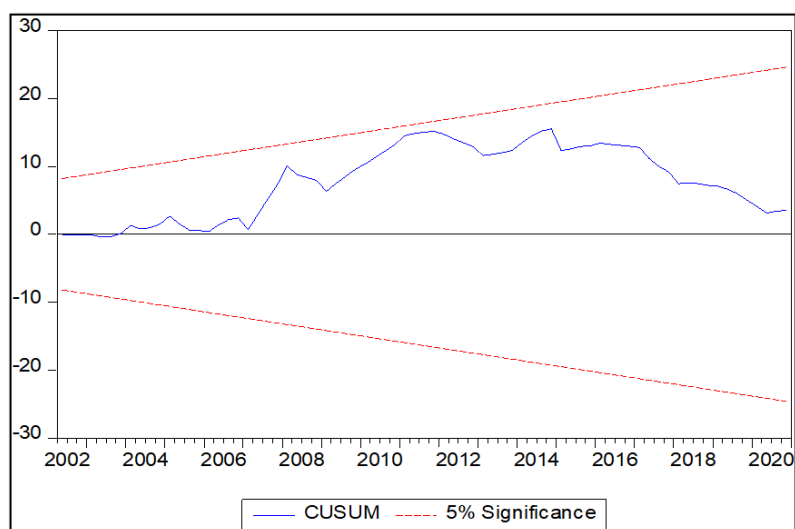
Figure 3. Plots of CUSUMQ
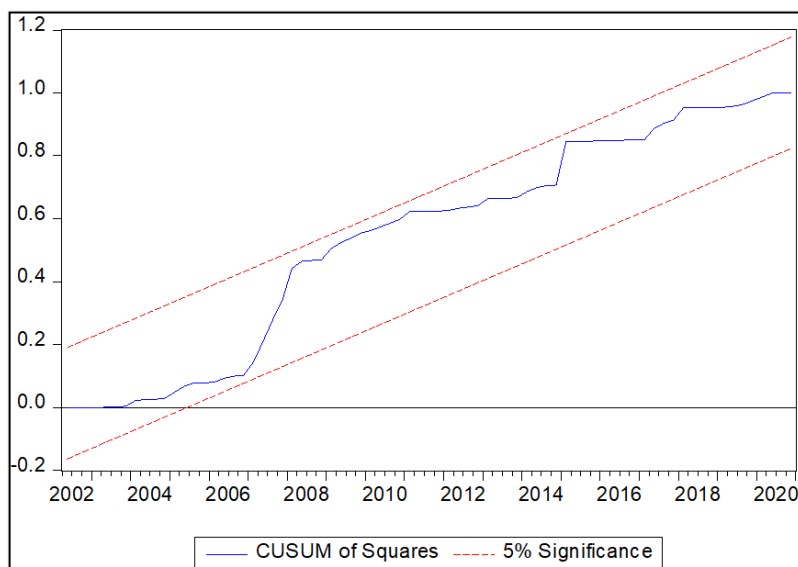
6. CONCLUSION

This study concentrates primarily on exploring long-term asymmetric impacts of insecurity and corruption on Nigeria's tourism development, based on application of the NARDL method to quarterly data from 1996 to 2021. The cointegration test result provides an evidence of long-term relation among corruption, insecurity and tourism development, alongside income, infrastructure and the exchange rate. The asymmetry test results imply long-run non-linear relationship between tourism and corruption, as well as between tourism and insecurity. The coefficient of the positive shock to control of corruption was positive and significant, while the coefficient of a negative shock to control of corruption was insignificant over the long-run. The coefficient of the positive shock to insecurity was also significant and negative, but the coefficient of the negative shock to insecurity was significant and positive in the long-run. The estimation results suggest that a decline in corruption aids long-term tourism development, while rising insecurity would inhibit long-term tourism development. Also, depreciation of the domestic currency seems to enhance long-term tourism development. Thus, policies that reduce corruption and insecurity will stimulate long-term tourism development in Nigeria.

In light of these findings, government should strengthen the fight against corruption through appropriate and adequate funding of the agencies and institutions tasked with tackling graft, by establishing an efficient judiciary system and by increasing international collaboration. As corruption diminishes, the costs of travelling and visiting Nigeria will decrease, leading to more tourist arrivals and increased revenue from tourism activities. Also, there is a need for greater government commitment to reduce the high insecurity the nation is facing. This can be achieved through increased funding of the military, police and other national security forces, and higher investment in intelligence gathering, which appears to be absent in the ongoing war against non-state actors and perpetrators of crimes. The feeling of safety that accompanies greater security will encourage prospective tourists to visit Nigeria, and the sector will develop. Further, although depreciation appears to boost tourism activities, recommending further devaluation or depreciation of the domestic currency would only worsen the already precarious situation in Nigeria and negatively impact citizens well-being. But pursuing a policy of a stable exchange rate can raise confidence in the Nigerian economy, attract foreign tourists and investors, and consequently promote tourism development. Measures to raise investment in infrastructure and income level can also assist the fight against corruption and insecurity, to promote tourism development in Nigeria in the long run.

While this research has uncovered the long-term asymmetric impacts of insecurity and corruption on tourism development in Nigeria, it has some limitations that future studies can address. First, the present study uses only one measure of insecurity (i.e., expenditure on internal security). Future research could use different proxies for insecurity (such as the number of persons killed by violence, kidnapping, insurgent activity, bombings, etc.) to see how each impacts tourism. Similarly, this research employs a single measurement for corruption (i.e., the control of corruption). Future studies should incorporate other corruption measurements such as the Transparency International Corruption Perception Index (CPI) and the ICRG Control of Corruption. Finally, future research should involve the use of additional estimation techniques, such as threshold NARDL, to see the level above (or below) which corruption and insecurity can promote or hurt tourism development in Nigeria.

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