



## **Institutional Performance and Tourism Arrival Nexus in BRICS Countries: Evidence from Nonlinear ARDL Cointegration Approach**

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### **ABSTRACT**

Tourism is significantly influenced by institutional quality. The strength of institutions is also important for the growth of tourism because poor institutions may inhibit tourists from entering a region. Over the years, there have been rare studies on the association between institutional quality and tourism in BRICS Nations by using NARDL. Using the NARDL model & institutional theories, this study looks at the asymmetric effects of institutional quality on tourist arrival in the BRICS countries from 1996 to 2021. The findings suggest that a gain in institutional quality will boost Tourist arrival for the BRICS countries to examine the interrelationships among variables both long and short run and NARDL shows a positive relation between the expansion of tourism in the BRICS countries. This study examines the asymmetric effects of institutional quality and energy consumption on visitor arrival. The long-run asymmetries between institutional quality, energy use, and tourism in the BRICS countries. Furthermore, the study finds that neglecting the series' inherent nonlinearities may lead to misleading inferences. The policy argued that in order to increase investment in institutional quality and energy consumption, appropriate measures must be taken, including deregulation of economic activity, the development of The implementation of adequate regulatory frameworks and tax constructions, the development of port infrastructure, a road network, a rail system, and telecommunications facilities, the achievement of trade-related clarity trade-related adaptability and the expansion of the nation's infrastructure in to accommodate more tourists. As a result, recommendations for measures to improve tourist arrival, promote high-quality institutions, and stop environmental damage were suggested. As a result, the present study offers the BRICS countries a foundation for their policies.



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## **1. Introduction**

Tourism can reduce the poverty and enhance the government revenue in economy. In order to levy more taxes, countries aim to lower their unemployment rates through increasing employment, GDP, per capita income, and exports (Dogru, Isik, & Sirakaya-Turk, 2019; Dogru, Sirakaya-Turk, & Crouch, 2017). In 2016, tourism generated 10% of new jobs and contributed around 10.2% to the global GDP (Zhang & Liu, 2019). The tourism sector is essential to an economy's growth and development as it generates new jobs, income, and eventually tax revenue (Choi & Sirakaya, 2005; Shafiq, Bhatti, Bashir, & Nawaz, 2022). Around 1950 there have been more than 47 times as many travelers as there were in 1950, going from 25 million to 1.19 billion. By 2030, there will be 1.5 billion people on the earth. Additionally, poor countries have seen a growth in the proportion of foreign immigrants more swiftly than developed ones (31% in 1990 to 51% in 2012) (Lee & Chang, 2008).

Before deciding on a destination, travelers from all over the world take into account a variety of variables. Terrorism, tourism expenditures, energy consumption, institutional quality, exchange rate, income, transportation costs, price differential, number of visitor attractions, native customs, population, educational attainment, poverty level, productivity expansion, good governance, and terrorist attacks could be some of the most notable ones (Adedoyin, Nathaniel, & Adeleye, 2021; Kulendran & Witt, 2003). The tourism sector nonetheless causes environmental damage or the emission of greenhouse gases (Becken, 2011; Gillani & Sultana, 2020; Scott, Gössling, Hall, & Peeters, 2016). Therefore, it is crucial to put the rules, policies, and strategies into place to lessen the negative environmental effects of using conventional energy sources (Sarpong, Bein, Gyamfi, & Sarkodie, 2020).

Weak institutional quality is considered one of the biggest problems, alongside other indicators. Coordination of initiatives aimed at the growth of the tourism industry is especially important for strong administration, which standard that uses for privately owned property, the rule of law, peace and stability, the battle against corruption, effective regulation, and other factors (Angraini & Rani, 2015; Balli, Louis, & Osman, 2011) proposed a gravity model for cross-border movement in 2011. They found because while choosing a site, travelers take institutional quality (measured in perceived corruption) very significantly. According to Ugur (2014) corruption may boost the number of tourists visiting the country through two separate channels. First, participating in activities like speed dating may influence participants to neglect the formalities and procedures necessary to get permits and license. In order to help tourists, authorities who accept bribes should work harder to handle all administrative and legal procedures. Additionally, bribery functions more precisely when it is done on a piece rate. Rose-Ackerman (1997) the system of corruption progressively reduces effectiveness, and finally has a negative impact on the travel and tourist industry.

In prior research, non-linearity and momentary structural breakdowns were not considered for selected variables in BRICS countries for both long and short run. Economic non-linearity has received a lot of research (Shahbaz, Zeshan, & Afza, 2012). Several studies demonstrate the nonlinear behavior of economic factors. If we give this notion a larger meaning, we may say that if a set of variables has a nonlinear structure, then its functional link may also have nonlinear properties (Muhtaseb & Daoud, 2017). From a methodological perspective, we are also taking the idea of symmetry into account. The linear relationship between the independent and dependent variables is the foundation of the majority of panel data/econometric models. The dependent variable will be affected by a 1% variation in the independent variable, in other words. However, it was chosen to investigate the connection between visitor arrivals, energy use, and institutional quality in a non-linear framework because the majority of panel data do not exhibit a linear trend.

To overcome these challenges, we conduct our study using a non-linear ARDL model. The remaining sections of this article are organized as follows: As Section 1 provide introduction and

sections 2 provides a brief review of the relevant literature, while Section 3 provides an explanation of the data and methodology. In Section 4, we present concluding observations.

The Novelty in this current study is to investigate the relationship between institutional quality, energy consumption, and tourist expenditure and the concept of tourism sustainable development in BRICS economies by using NARDL method to analyze the short- and long-term impact of this study for tourism as there is a lot of studies have done but no study is done with these variables to analyses the effect of institutional performance on tourism.

## **2. Literature Review**

The literature has often emphasized the connection between tourism and energy use, institutional quality, tourist expenditure (Dogan, Seker, & Bulbul, 2017; Lee & Brahmaresne, 2013). Actually, there is a link between energy consumption and tourism (Azam, Alam, & Hafeez, 2018). Every step of the travel process, including transportation and lodging, involves a connection between the two, which may be made directly (by using fossil fuels) or indirectly (by using electricity). Additionally, tourism is unaffected by poor institutions (Balli, Balli, & Louis, 2016). Raising institutional quality is so essential for the foreign. This is completely in line with a study done by Ali, Yaseen, Anwar, Makhdom, and Khan (2021) which discovered that a high institutional quality is a key factor for tourists when picking a destination. The amount of foreign travel has increased dramatically in recent decades. This backs with a UN forecast that the tourist sector will expand by \$1 trillion. The expansion of tourism, which has been a substantial source of revenue in most developing economies, would be extremely beneficial to the BRICS countries (BRICS countries, inclusive). The influence of energy consumption on the nation's environment must be carefully examined when considering the desire for tourism (Henama, Mangope, & Strydom, 2019). Additionally, due to growing concerns about environmental risks, research practitioners have recently concentrated more on energy consumption in connection to tourist arrival and tourist demand (Fazal, Gillani, Amjad, & Haider, 2020; Liu, Sohail, Khan, & Majeed, 2022). It takes a huge amount of energy to fulfil the demand that travelers will perceive more enjoyable (Bekun, Adedoyin, Etokakpan, & Gyamfi, 2022).

Many developing countries, particularly those in the BRICS, South Africa and India consider tourism as a potent economic development tool. The preponderance of operations in the tourist industry are focused on supplying goods and services like housing, dining, and transportation because there are so many people working in the field (United Nations World Tourism Organization (Richardson, 2010). The business sector is mostly in charge of tourism. Nevertheless, even without creation and implementation of government policies and measures, the goal of sustainable and inclusive economic growth cannot be met. Greatest monetary permeability, or the loss of tourist dollars as a consequence of importing items and services from other nations, can substantially undermine tourism and harm a nation on an economic, social, environmental, and cultural level. International tourist arrival are connected to the unpredictability of economic policy and the things that make it (Alola, Uzuner, & Akadiri, 2021), Additional barriers to the expansion of Nigeria's tourism industry include corruption and escalation (Alola, Olugbade, Avci, & Öztüren, 2019).

The tourism sector is also extremely prone to crime and terrorists. Individuals are hesitant to travel to countries with high crime rates; hence there is a limited availability for tourism in those nations. These actions not only endanger a nation's stability, but they also damage the country's reputation among visitors. Corruption, like terrorists, can have a negative impact on the country's tourism demand (Lau & Hazari, 2011). If bribes and other corrupt activities are involved, the country's cultural and social landscape may suffer (Das & Dirienzo, 2010). Separate charges may have varying effects on tourists' decision to return to the nation time and time again. Narcotic crimes, according to Mansfeld and Pizam (2006) are detrimental to traveler desire. Theft does not, however, significantly affect the number of tourists visiting a

nation. According to McElroy (2006) the Caribbean islands' narco-economy poses a serious threat to the expansion of the tourism industry because of murder, terrorism, and corruption. He gave several explanations, one of which was that as security costs rise; tour companies must raise their fee, which discourages travelers from visiting a site. Yap and Saha (2013) assert that countries that suffer with terrorism and corruption frequently have a large number of tourists.

Adiyia, Stoffelen, Jennes, Vanneste, and Ahebwa (2015) saw a 17% increase in tourists between 1999 and 2009, notwithstanding the nation's significant concentrations of terrorism and corruption. Parallel to the way it was ranked as one of the most corrupt nations, India has experienced a 7.9% annual surge in the number of foreign tourists. However, people tend to travel less in nations with lower rates of terrorism and corruption. As a result, each and every year these nations' tourism businesses discreetly grow. As illustrate, because of its relatively low levels of nepotism and terrorists, Switzerland is regarded as the safest country in the world. The country's tourism industry, however, only experienced a 1.2% annual growth between 1999 to 2009. Domestic conflict and terrorist actions by some foreign forces in the host countries regularly put tourists' security in question. Visitors from rich nations are less prone than those from poor nations to be victim of terrorist acts, according to realistic tourism research (Baker & Coulter, 2007; Thompson, 2011). Additionally, fewer international tourists often travel to nations where terrorist attacks on tourist attractions are still common (Pizam & Fleischer, 2002). Neumayer (2004) came to similar conclusions when he found that an increase in terrorist activity results in an 8.8% drop in tourism.

The national tourism business is reportedly being affected by corruption in the governmental sector. According to Smith and Duffy (2003) corrupt governments have the strength, influence, and financial capacity to obstruct efforts to grow the travel and tourism industry. The corrupt governments routinely abuse their position of authority to sway the distribution of resources in a way that may lead to financial compensation in the form of kickbacks. Additionally, they attract illegitimate overseas capital in the form of dining establishments and transportation businesses to the tourism industry in order to support criminals like drug dealers and corrupt officials.

In order to protect the health and safety for visitors, Lew, Hall, and Williams (2014) suggested that government agencies involved in policymaking play a crucial role in developing legislation involving infrastructure development, local culture, consumer protection, and the environment. Nevertheless, unscrupulous governments frequently implement unfavorable policy frameworks to impede the expansion of the industry there (Gillani, Shafiq, & Ahmad, 2019). More advanced countries than underdeveloped ones gain from the decrease in dishonesty. Even though they may decide to visit nations with high levels of corruption, they do not travel to nations with unstable political systems. The number of travelers travelling to the Middle East, Asia Pacific, and Africa increased by 9.5, 6.9, and 4.4%, correspondingly, between 2000 and 2004. But American and European countries only experienced yearly growth rates of 0.5 and 2.7%, respectively (Keller & Koch, 1989).

The study will demonstrate how EC influences tourism demand in BRICS countries together with other factors (such as criminal activity and corruption). The value of utilizing linear models has been thoroughly discussed in earlier literature. Furthermore, because most independent variables have structural discontinuities, linear models are unable to identify both long-term and short-term asymmetries (Song, Dwyer, Li, & Cao, 2012). This study will look at how crime, corruption, and energy consumption impact international tourism in BRICS countries in order to analyze short-run and long-run asymmetries and NARDL.

In this current study, three different kinds of policy frameworks can be used to explore asymmetries inside the collection. This investigation will also make use of the recently added non-linear ARDL cointegration model by Shin, Yu, and Greenwood-Nimmo (2014). By distinguishing positive and negative partial sums, the non-linear autoregressive distributive lag

(NARDL) model may distinguish between short- and long-term asymmetries in the variables of interest.

### 3. Methodology

Utilizing data from the BRICS countries, the current analysis was carried out. The use of both independent and dependent variables is made in the current investigation. Only tourism is a dependent variable, and the only independent variables are energy use, institutional quality, and tourist spending. For the 25-year period from 1996 to 2021, annual data on each of these five parameters have been gathered for the BRICS countries. The World Development Indicators and World Bank both hold databases from which the information was culled (WDI). The "number of visitor arrivals" in a country is used to tally the number of tourists. In the table below, each of these variables is presented along with a description of each measurement unit and its source.

**Table 1**  
**Explanation of Variables**

Variables	Measure of variables
TA (Tourist Arrival)	Number Of Visitor Arrivals/Per year
TE (Tourist expenditure)	Tourist Expense /Per Year
IQ (institutional quality)	PCA of (Internal Conflict, External Conflict Corruption, Socio Economic Conditions, Investment Profile) Per Year Data
EC (Energy Consumption)	Energy In Term of Electricity/Per Year

The current study examines the asymmetric correlations between the variables since both positive and negative changes in the independent variables do not cause a consistent change in the demand for tourism. The current study uses a non-linear "autoregressive distributed lag" (ARDL model by Shin et al. (2014) to analyze their asymmetric relationship. The enduring connections between independent factors and tourist arrival have been evaluated using the following linear equation. The non-linear ARDL technique utilizes to investigate components' asymmetrical effects on carbon emissions.

The following goals are achieved by using this assessment method: It makes it possible to incorporate cointegration and nonlinear asymmetry into a single equation. The deconstructed variables' positive and negative variations on the dependent variable are examined by the NARDL model. The model can be used to tiny sample sizes. Due to the fact that the variables do not have to be integrated in a specific order, it is adaptable. It is fundamentally a dynamical error correcting representation that produces reliable.

The variables that we represent as functions of TA are listed below.

$$TA = f(TE, EC, IQ) \tag{1}$$

Where EC, IQ, TE and TA represent energy consumption, institutional quality, tourist expenditure and tourist arrival respectively. The unit root tests are used in the study. NARDL is applied after the F-bound test. When explanatory variables undergo logarithmic transformation with both positive and negative variations, Equations (2) could be stated as follows:

$$\ln TA_t = \alpha_t + \delta_t + \beta^+ \ln TE_t^+ + \beta^- \ln TE_t^- + \beta^+ \ln EC_t^+ + \beta^- \ln EC_t^- + \beta^+ \ln IQ_t^+ + \beta^- \ln IQ_t^- + \mu_t \tag{2}$$

Here  $u$  is the  $\epsilon_t$  with time step  $t$ ,  $\alpha$  is indeed the intercept,  $\beta$ s are really the constant coefficient, the estimated coefficient and the pattern consequences are both. The framework of Eq. (3) known as NARDLs can be stated as follows:

$$\Delta \ln TA_t = \mu + \ln TA_{t-1} + \theta^+ \ln TE_{t-1}^+ + \theta^- \ln TE_{t-1}^- + \vartheta^+ \ln EC_{t-1}^+ + \vartheta^- \ln EC_{t-1}^- + \omega^+ \ln IQ_{t-1}^+ + \omega^- \ln IQ_{t-1}^- + \sum_{j=0}^{n1} \Delta \ln TA_{t-j} + \sum_{j=0}^{n2} (\theta_j^+ \Delta \ln TE_{t-j}^+ + \theta_j^- \Delta \ln TE_{t-j}^-) + \sum_{j=0}^{n3} (\vartheta_j^+ \Delta \ln EC_{t-j}^+ + \vartheta_j^- \Delta \ln EC_{t-j}^-) + \sum_{j=0}^{n4} (\omega_j^+ \Delta \ln IQ_{t-j}^+ + \omega_j^- \Delta \ln IQ_{t-j}^-) + \epsilon_t \tag{3}$$

The short-run NARDL elasticities could be determined that used an error-correcting method by utilizing the following formula.

$$\Delta \ln TA_t = \mu + \sum_{j=0}^{n1} \Delta \ln TA_{t-j} + \sum_{j=0}^{n2} (\theta_j^+ \Delta \ln TE_{t-j}^+ + \theta_j^- \Delta \ln TE_{t-j}^-) + \sum_{j=0}^{n3} (\vartheta_j^+ \Delta \ln EC_{t-j}^+ + \vartheta_j^- \Delta \ln EC_{t-j}^-) + \sum_{j=0}^{n4} (\omega_j^+ \Delta \ln IQ_{t-j}^+ + \omega_j^- \Delta \ln IQ_{t-j}^-) + \phi ECM_{t-1} + \epsilon_t \tag{4}$$

The effects of the variables IQ, EC, and (tourist expenditure) TE can be divided into positively and negatively components, as we have demonstrated in Eq. (3).

$$\ln TE_t = \ln TE_0 + \ln TE_t^+ + \ln TE_t^- \tag{5}$$

$$\ln EC_t = \ln EC_0 + \ln EC_t^+ + \ln EC_t^- \tag{6}$$

$$\ln IQ_t = \ln IQ_0 + \ln IQ_t^+ + \ln IQ_t^- \tag{7}$$

Where  $\ln TA$  depict the arbitrarily selected integer, then  $\ln EG-t$ ,  $\ln IQ_{t}^{+}$   $\ln IQ_{t}^{-}$ ,  $\ln EC_{t}^{+}$   $\ln EC_{t}^{-}$ , and  $\ln TE_{t}^{+}$   $\ln TE_{t}^{-}$  are used to describe summation processes that accrue both positively and negatively modifications are recognized as:

$$\ln TE_t^+ = \sum_{j=0}^t \Delta \ln TE_t^+ = \sum_{j=0}^t \max(\Delta \ln TE_{j,0}) + \epsilon_t \tag{8}$$

$$\ln TE_t^- = \sum_{j=0}^t \Delta \ln TE_t^- = \sum_{j=0}^t \min(\Delta \ln TE_{j,0}) + \epsilon_t \tag{9}$$

$$\ln EC_t^+ = \sum_{j=0}^t \Delta \ln EC_t^+ = \sum_{j=0}^t \max(\Delta \ln EC_{j,0}) + \epsilon_t \tag{10}$$

$$\ln EC_t^- = \sum_{j=0}^t \Delta \ln EC_t^- = \sum_{j=0}^t \min(\Delta \ln EC_{j,0}) + \epsilon_t \tag{11}$$

$$\ln IQ_t^+ = \sum_{j=0}^t \Delta \ln IQ_t^+ = \sum_{j=0}^t \max(\Delta \ln IQ_{j,0}) + \epsilon_t \tag{12}$$

$$\ln IQ_t^- = \sum_{j=0}^t \Delta \ln IQ_t^- = \sum_{j=0}^t \min(\Delta \ln IQ_{j,0}) + \epsilon_t \tag{13}$$

The asymmetrical causality test is used, as predicted by Hatemi-J, to reveal the directional asymmetry causality between both the variables. By praising nonlinearities and separating between both positive and negative shock, the test ties the theory of Toda and Yamamoto (1995) into a coherent whole. We use the cumulative version of the provided equation to understand the directional relationships of something like the referred variables:

$$Y_{it}^+ = \sum_{i=1}^t \epsilon_{ji}^+, \quad Y_{it}^- = \sum_{i=1}^t \epsilon_{ji}^-, \quad X_{it}^+ = \sum_{i=1}^t \epsilon_{ji}^+, \quad X_{it}^- = \sum_{i=1}^t \epsilon_{ji}^- \tag{14}$$

Where  $Y_{it}^+$   $\epsilon_{ji}^+$ ;  $Y_{it}^-$   $\epsilon_{ji}^-$ ;  $X_{it}^+$   $\epsilon_{ji}^+$ ;  $X_{it}^-$   $\epsilon_{ji}^-$  Draw the positive and negative shocks using the appropriate parameter estimates and  $X_{it}^+$   $\epsilon_{ji}^+$ ;  $X_{it}^-$   $\epsilon_{ji}^-$  Using time  $t$ , symbolize its other parameters.

## 4. Estimation of Results

### 4.1 Descriptive Analyses

The means value of tourist arrival has 7.155651percent and maximum 8.242154 for period of analysis with standard deviation 0.538461, however, mean value for tourist expenditure has 0.783809 percent and maximum 2.248467 with 0.477774 percent standard

deviation. institutional quality has average value of 2.515671percent and maximum 9.654487 percent with 2.608618 percent variations. Furthermore, energy consumption mean value is 7.554937 and maximum value is 25.84052 while standard deviation is 4.318528.

**Table 2**  
**Summary Statistics**

	<b>TA</b>	<b>TE</b>	<b>IQ</b>	<b>EC</b>
Mean	7.155651	0.783809	2.515671	7.554937
Median	7.117503	0.744939	1.428036	7.002016
Maximum	8.242154	2.248467	9.654487	25.84052
Minimum	6.299071	0.006294	-0.338954	0.018993
Std. Dev.	0.538461	0.477774	2.608618	4.318528
Skewness	0.554327	0.650404	1.565637	1.598294
Kurtosis	2.286278	3.147604	4.048643	7.046895

$$TA_t = \alpha_0 + \alpha_1(TE) + \alpha_2(IQ) + \alpha_3(EC) \tag{15}$$

So,  $\alpha_0, \alpha_1, \alpha_2$  and  $\alpha_3$  are large list of variables. Meaningful change includes the asymmetric impacts of (institutional quality) IQ and (energy consumption) EC,  $IQ+ t$  and  $EC+ t$  and negative (-) changes  $IQ- t$  and  $EC- t$ , respectively. The cumulative summation of the both positive and negative variations in institutional quality (IQ) and energy consumption (EC), correspondingly, are denoted mostly by symbols  $IQ+, IQ-, EC+, t,$  and  $EC t.$

#### 4.2 Unit Root Test Results

The stationarity test, which evaluates the variables' order of integration, is what we do next. Two of the first-generation unit-roots employed in the study were the LLC test and the IPS test proposed by Choi (2001). Variables are incorporated in a mixed sequence, either at level I (0) or/and after the first difference I, according to the results of the panel unit root tests (1).

**Table 3**  
**Levin Lin Chu test (LLC)**

<b>Name Of Variables</b>	<b>At Level</b>	<b>At First Difference</b>
TA	-1.78899*	2.26237
TE	1.90556	-1.68517*
IQ	-1.64517*	-5.22039*
EC	-1.24590*	-4.01006*

**Table 4**  
**Unit Root test (IPS)**

<b>Variables</b>	<b>At Level</b>	<b>At First Difference</b>
TA	-0.81883	-2.64562*
IQ	-3.26907*	-6.24161*
TE	0.34398	3.39192*
EC	-2.19050*	6.39717*

#### 4.3 Asymmetric Long-Run and Short-Run Effects Estimation

In the part that follows, the study examines any potential asymmetric links amongst institutional quality, visitor expenditure, visitor arrival, & energy consumption using a nonlinear framework created by Herron (1967).

The results of the long-run and short-run estimations of the NARDL model are shown in Table 4. The major objective of this study is to identify the nonlinear asymmetric relationship between tourist expenditure, energy use, and institutional quality. The output of the long-term model displays the estimated coefficients for the positive and negative sums of the changes in

the decomposed variables. The long-run imbalance between the decomposed variables and tourist arrival has been shown. A nonlinear long-term link between the variables is evident from the nonlinear limits test F statistic findings of 15.64, which are significant at the 1% level.

According to the long-run NARDL results, a decomposed tourist expenditure (TE) with positive and negative shocks has coefficient estimates of 0.01 and 0.000, respectively. The coefficients of increasing (decreasing) tourist expenditure are significant at the 1% level, which means that an increase in tourist expenditure is expected to result in a 0.00% decline in tourism activity while a drop in tourist expenditure is expected to result in a 0.01% increase in visitor arrival. The government begins programmes that increase output by lowering travel expenses, which in turn raises tourist arrival, but the fall in tourist expenditure motivates decision-makers to boost the industry's economy.

**Table 5**  
**Asymmetric Long-Run and Short-Run Effects Estimation**

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
IQ_POS	0.025697	0.047011	0.546620	0.5861
IQ_NEG	-0.338962	0.047549	-7.128664	0.0000
EC_POS	-0.018184	0.005812	-3.128646	0.0024
EC_NEG	0.028279	0.008076	3.501434	0.0007
TE_POS	0.017131	0.007584	2.258761	0.0265
TE_NEG	0.001830	0.010949	0.167172	0.8676
<b>Asymmetric Short Run</b>				
ECT	-0.114775	0.152782	-0.751232	0.4546
d(IQ_POS)	0.013950	0.028860	0.483381	0.6301
d(IQ_NEG)	0.28279q	0.080761	3.601335	0.0008
d(EC_POS)	0.171312	0.075843	2.276581	0.0354
d(EC_NEG)	0.009108	0.012612	0.722171	0.4722
d(TE_POS)	-0.016876	0.015185	-1.111362	0.2696
d(TE_NEG)	0.037835	0.025821	1.465288	0.1466

As a consequence, the BRICS economy looks for policies that might keep tourism alive in recessions. The opposition between a negative impact and a positive shock lends weight to the BRICS parameters' dependability. Statistics reveal associations between these variables, positive and negative shocks, and institutional quality. This suggests that for every 1% gain (declination) in institutional quality, tourist arrival should increase by 0.02 and 0.3%, respectively. The findings support the two instances of the impact on institutional quality that were described in the section of the article headed "Body of literature" about just the dynamic interplay of institutional quality on visitor arrival. Tourism is also positively and significantly impacted by the energy consumption 's elasticity under positive shocks; for every 1% increase in the energy consumption, an increase of 0.01% in tourist arrival is projected. The efficiency of energy consumption states that an increase in energy consumption should result in an increase in tourist arrival. The findings show that the economies of the BRICS are using energy or technology that is either ineffective or excess, which lowers quality of the environment. The BRICS government then must progress energy-efficient technologies and strengthen their economies in order to investigate further renewable energy sources and reduce the expense for travelers (Shafiq, Raheem, & Ahmed, 2020). The deconstructed variables with positive and negative shocks produce short-term results that are consistent with long-term results. The relationships are quite comparable, despite slight variations in the levels of estimators.

#### 4.4 Diagnostic Tests

The table of different diagnostic test of jarqa-bera tells us that the variables are not distributed normally and the test for tests for heteroscedasticity, and normality shows there is no problem.

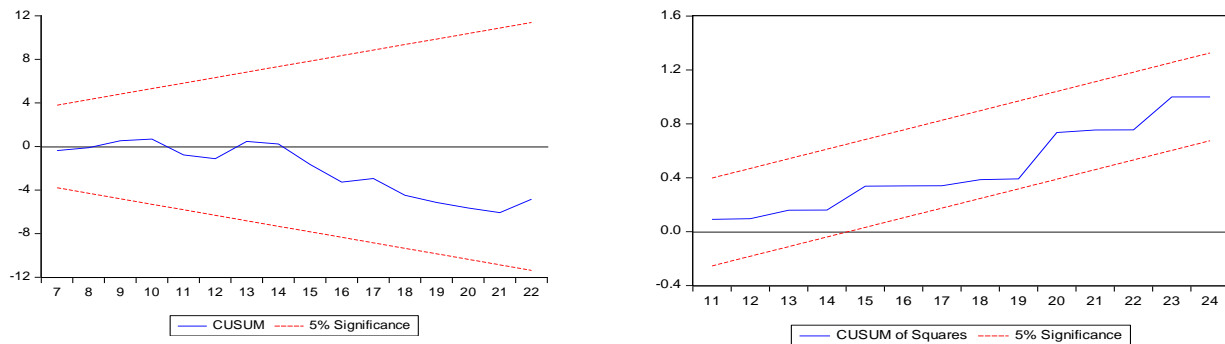


**Table 6**  
**Diagnostic tests**

Diagnostic Tests	F-Statistic	P-Value
Serial correlation	21.6	0.00
Breusch-Pagan-Godfrey test	57.5	0.00
Heteroskedasticity tests	5	0.000
Normality test Jarque – Bera test	22.8	0.000

### 4.5 Structural Stability Tests

This research also applied stability methodologies to evaluate the structural support of the models. According to Brown, Durbin, and Evans (1975) the With statistically significant stats at the 5% significance level, the models' coefficients that are significant at the 5% degree of significance, the coefficients in the models pass the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) stability tests. This is shown in Figure below.



### 5. Conclusion

In this paper, we examine many aspects of the travel demand in the BRICS economies. The following factors were considered: tourist arrival, tourist expenditure, institutional quality and EC. We constructed a non-linear Autoregressive distributed lag model using the data in order to search for potential asymmetries and non-linearity. The series is nonlinear, according to the test's results. The method of NARDL bound testing is used to verify a nonlinear long-run relationship between the series.

In this research, the results suggest that asymmetric cointegration may be possible. Researchers were able to pinpoint the numerous factors that have an effect on the Tourist arrival in BRICS economies by using a general to systematic technique. First, the findings confirmed the claim made in past studies that there is no observable connection between visitor spending and tourist arrival. However, tourist arrival could also encourage tourist expenditure. It has been determined that increased electricity demand hinders tourist arrival. Also, there was a negative correlation between institutional quality and travel propensity. High institutional quality is linked to strong leaders, lower levels of corruption, and institutional honesty. These characteristics also have an impact on a nation's economic and political stability. Visitors will choose a stable nation to visit. The improvement of institutional quality must also take into account the major issues that the BRICS economies have with effective governance and information availability.

The findings suggest that increasing the use of high quality of institutional performance can improve BRICS economies image in the eye of the world. Which would end up benefiting the travel and tourism industry. Many facets of institutional quality growth will support longer-term political and economic stability in addition to tourist arrival. When formulating policies, such factors need to be taken into account. Consequently, the asymmetrical behavior of tourist arrival

must be addressed by the government of the BRICS Countries. The asymmetry study's findings can support the BRICS countries' economic forecasting and policymaking.

## 5.1 Practical Implications

The policy argued that in order to increase investment in institutional quality and energy consumption, appropriate measures must be taken, including deregulation of economic activity, the development of The implementation of adequate regulatory frameworks and tax constructions, the development of port infrastructure, a road network, a rail system, and telecommunications facilities, the achievement of trade - related clarity and labour market adaptability and the expansion of the nation's infrastructure in to accommodate more tourists. As a result, recommendations for measures to improve Tourist arrival, promote high-quality institutions, and stop environmental damage were suggested. As a result, the present study offers the BRICS countries a foundation for their policies.

## 5.2 Limitations

We discuss the study's limitations, one of which being the lack of complete data for a number of BRICS nations. This investigation looked at the connection between tourist arrival and tourist expenditure along with energy consumption while taking institutional quality into account. The scope of this research was significantly constrained by the absence of data from 1996 to 2021; subsequent work should enhance the quantity of data available for these parameters. Sadly, time restrictions constrained the study's breadth and depth. According to the researcher, a wider range would have provided a more accurate picture of the circumstance.

## 5.3 Direction for Future Research

This study examines tourism using institutional quality as a predictor and recent considerable increases in the number of tourists visiting the BRICS countries. The impact of these factors on visitor arrival is also taken into account in connection to the function of institutional quality. So new study will add institutional quality to the body of tourism literature. Despite this, new research seeks to address some undiscovered areas of sustainable tourism. The new study will add to the body of prior research by considering other elements in order to provide a fresh viewpoint on the discussion surrounding tourism-led sustainable development for BRICS economies. Future researchers may be able to add to the body of literature by using data that has been broken out for other growing blocks, including sub-Saharan African, and by considering new confounders, like demographic and economic globalization.

### Authors Contribution

Ayesha Awan: writing introduction-original draft

Saif Ur Rahman: writing literature and methodology-original draft

Mubashar Ali: contributed to the conception, study design

Mahwish Zafar: analysis, and interpretation of the findings

### Conflict of Interests/Disclosures

The authors declared no potential conflicts of interest w.r.t the research, authorship and/or publication of this article.

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