Contents lists available at Scopus

ECONOMICS - Innovative and Economics Research Journal

Journal homepage: www.economicsrs.com

THE ASYMMETRIC EFFECT OF EXCHANGE RATES ON TOURISM DEMAND IN SOUTH AFRICA: NON-LINEAR ARDL MODEL

Goitsemodimo Abel Molocwa[1*], Matome Glacious Kapa[2]

Received 25.10.2025. | Sent to review 13.11.2025. | Accepted 22.02.2026.

Original article

[1] University of Venda, Faculty of Management, Commerce, and Law, Extended Curriculum Programme, South Africa

[2] University of Venda, Faculty of Management, Commerce, and Law, Department of Tourism and Hospitality Management, South Africa

[*]**Corresponding Author:**
Goitsemodimo Abel Molocwa

Email:
goitsemodimo.molocwa@univen.ac.za

JEL Classification:
C33, E32, F31, F41, F43

Doi: 10.2478/eoik-2026-0014

UDK: 338.486.1.02:336.748.3

ABSTRACT

This study investigates the influence of exchange rate (nominal and real effective) fluctuations on tourism demand in South Africa between 1994 and 2023. The study employed the Nonlinear Autoregressive Distributed lag (NARDL) model to analyse how currency appreciation and depreciation affect the influx of international tourists in South Africa. The results show that when the South African Rand weakens (depreciates), it attracts more tourists, while a stronger Rand (appreciation) slightly reduces tourist arrivals in South Africa. Furthermore, the study shows that interest rates positively affect tourism demand, highlighting the importance of a stable economy for tourism growth. This research contributes to understanding the link between exchange rates and tourism by showing how economic factors influence destination appeal. It offers practical advice for policymakers, such as using weaker currency periods to promote affordable tourism and countering strong currency effects with targeted marketing. The study shows that attracting tourists from many different countries and improving infrastructure can help reduce the impact of exchange rate changes. These ideas can help developing countries create better plans to grow their tourism industry. This study is among the limited number of studies exploring the asymmetric impacts of nominal and real effective exchange rates on tourism demand. Notably, it is the first to apply the non-linear ARDL approach to investigate the impacts of both nominal and real effective exchange rates on tourism demand within the South African context.

Keywords: *Exchange rates, tourism demand, South Africa, asymmetric ARDL model, currency fluctuations, tourism forecasting*

1. INTRODUCTION

Since the end of apartheid in 1994, South Africa has experienced a significant rise in international tourism, marking a notable shift from its isolation during the apartheid era. Prior to 1994, tourism was primarily domestic due to international sanctions that limited the country's engagement with global markets (Rogerson, 2011). Following the political transformation, South Africa emerged as a premier destination in sub-Saharan Africa, ranking among the top five tourist destinations on the continent alongside Morocco, Egypt, Tunisia, and Zimbabwe (Glocker & Haxton, 2020). Post-apartheid economic reforms, including efforts to stabilise the currency and

attract foreign investment, further fueled the tourism sector's expansion. Political stability also enhanced the nation's global appeal, making tourism a key driver of economic development. The industry has played a vital role in improving infrastructure, such as constructing new roads and airports and reducing poverty through creating jobs and income generation, particularly in underserved areas.

Tourism is widely recognised as an important driver of economic growth and social well-being (Bini et al., 2022). The government has highlighted tourism as one of South Africa's top five sectors to boost economic growth, attract investments, and promote national development (South African Tourism [SAT], 2010). After the country's first democratic elections, international arrivals reached approximately 3.7 million, marking the beginning of a transformative period for the sector. Since then, tourism has become a significant economic pillar, generating employment, boosting foreign exchange revenue, and promoting sustainable and inclusive growth (Tourism, 2002).

Exchange rates are important in shaping tourism demand because they affect how affordable and competitive a destination is. Changes in currency value influence travel costs for international tourists (Alfdool et al., 2025). When a currency gains value, it makes the destination more expensive, but when it loses value, it attracts more visitors (Kisswani & Harraf, 2021; Jaipuria et al., 2021). South Africa has experienced notable exchange rate fluctuations in recent years (Central Bank of Kenya [CBK], 2022), yet their impact on tourism demand is not well understood. Some studies show a strong link between exchange rates and tourism demand (Santana-Gallego et al., 2010; Sharma & Pal, 2020), while others find the connection to be weaker (Tang et al., 2016). This inconsistency highlights the need for further research, particularly in developing economies such as South Africa, where exchange rate volatility is pronounced. This study is motivated by this gap. The present study investigates how nominal and real effective exchange rate fluctuations asymmetrically influence South Africa's tourism demand from 1994 to 2023. The study has two main objectives: (i) to examine the uneven short- and long-term effects of currency appreciations and depreciations on international tourist arrivals, and (ii) to assess the role of additional macroeconomic factors such as interest rates and per capita GDP in shaping tourism demand. Accordingly, the research seeks to answer three central questions: How do currency appreciations and depreciations affect international tourist arrivals in South Africa differently? Do nominal and real effective exchange rates exhibit distinct short- and long-term impacts on tourism demand? How do other macroeconomic indicators interact with exchange rate fluctuations to influence demand?

This study makes both scientific and practical contributions. Scientifically, it is among the first to apply a Nonlinear Autoregressive Distributed Lag (NARDL) model to the South African context, enriching the tourism economics literature by providing robust evidence on asymmetric exchange rate effects in an emerging market. The findings offer valuable insights for policymakers and industry stakeholders, suggesting how South Africa can leverage periods of currency weakness to promote affordability, counterbalance the adverse effects of appreciation with targeted marketing, and diversify source markets to enhance resilience. These contributions are significant for guiding sustainable tourism development and strengthening South Africa's competitiveness in the global tourism landscape.

2. LITERATURE REVIEW

Tourism plays a vital role in the global economy, contributing 10.3% to the world's GDP and providing employment for 333 million people before the COVID-19 pandemic (World Travel & Tourism Council [WTTC], 2022). However, the pandemic severely impacted the industry, as lockdowns and travel restrictions triggered exchange rate instability and increased travel

expenses, resulting in the loss of around 62 million tourism-related jobs in 2020 (International Labour Organisation [ILO], 2020). Although the sector rebounded in 2021, recovering 18.2 million jobs, economic instability driven by exchange rate fluctuations remains a significant challenge. Changes in exchange rates influence tourism demand by affecting how affordable destinations are, shaping traveller behaviour, and impacting financial stability. This is especially true for developing countries, where tourism plays a major role in driving growth. However, much of the research has focused on developed countries, leaving gaps in understanding the uneven effects in emerging markets. Athari et al. (2023) showed that exchange rate instability has a strong effect on international arrivals in politically unstable areas. Chaudhry et al. (2022) highlighted how good institutional management can help reduce these effects in East Asia. Exchange rates are widely recognised as key determinants of tourism demand because they directly influence destination affordability. A weaker domestic currency generally stimulates demand, while appreciation tends to reduce arrivals. However, the strength, direction, and persistence of these effects vary considerably across contexts, reflecting both structural and institutional differences (Mrkaić Ateljević, 2025). For example, studies in developing economies such as Pakistan and Turkey (Meo et al., 2018; Işik et al., 2019) show that currency depreciation boosts tourism inflows, whereas Dogru et al. (2019) found that appreciation of the U.S. dollar dampens travel to Canada and the UK but has negligible effects on Mexico. Similarly, Tang et al. (2016) reported minimal exchange rate impacts on China, except for Russian tourists. These variations suggest that the exchange rate–tourism nexus is highly context-dependent, shaped by source market characteristics and institutional quality. In politically fragile or institutionally weak contexts, depreciation may not translate into sustained tourism growth. Athari et al. (2023) and Chaudhry et al. (2022) show that political instability and weak institutions amplify the negative effects of volatility, while strong governance can mitigate risks. This highlights the importance of complementing affordability advantages with stability and supportive infrastructure.

South African studies to date remain limited in scope. Tshidzumba et al. (2022) confirm that a weaker Rand attracts more tourists, but their reliance on simple OLS models constrains understanding of asymmetric or nonlinear dynamics. Meyer (2018) further shows that exchange rate volatility, combined with political uncertainty, undermines the sector's competitiveness. Yet, few studies systematically distinguish between nominal and real effective exchange rates or explore their interaction with other macroeconomic variables such as GDP per capita or interest rates. This research investigates this uneven relationship by examining data from 1994 to 2023 to assess both the short- and long-term impacts of exchange rate fluctuations on tourism demand. By integrating insights from global trends, regional studies, and advanced economic models, this study enriches the literature on tourism economics. It also offers practical advice for policymakers to minimise the negative impacts of a stronger rand while maximising the benefits of favourable exchange rate conditions. These findings aim to promote sustainable tourism strategies and strengthen South Africa's appeal as a leading global travel destination.

2. 1. THE INFLUENCE OF EXCHANGE RATE FLUCTUATIONS ON TOURISM DEMAND

Recent research highlights that changes in exchange rates have a big impact on tourism demand. When a currency loses value, it makes destinations more affordable and often leads to more tourists visiting. For example, Tshidzumba et al. (2022) and Chaudhry et al. (2022) found that currency depreciation attracts more international visitors. Similarly, Dogru et al. (2019) and Tung (2019) showed that weaker currencies benefit tourism, although the effects differ by region. On the other hand, Kisswani et al. (2024) and Maiyo et al. (2024) noted that when a currency gains value, tourism demand usually drops due to higher travel costs. Political instability

can also worsen the negative effects of exchange rate changes, especially in high-risk destinations (Athari et al., 2021). Additionally, research by Balli et al. (2018) and Meo et al. (2018) shows that global economic conditions, like financial crises or uncertainty, can interact with exchange rate changes to influence tourism demand. These findings emphasise the need for policymakers to adopt strategies that take advantage of favourable exchange rate trends while minimising risks from global and political factors, ensuring consistent growth in the tourism industry.

Table 1 presents a summary of key studies from the past decade on the impact of exchange rates and tourism shocks on tourism demand. It outlines the authors, methodologies, and findings, offering a comparative overview of various approaches and outcomes. This makes it a useful reference for students, researchers, and policymakers alike.

Table 1. Key studies on Exchange Rates and Tourism Demand

Author(s)	Year	Methodology	Key Findings
Tang et al.	2016	copula–GARCH models	The study shows that changes in exchange rates have a minimal effect on the number of tourists visiting China, except for Russian tourists. They tend to travel less when the Russian Ruble (SUR) weakens or the Chinese Yuan (CNY) becomes stronger.
Ongan, Işık, and Özdemir	2017	CCE	Tourists are more influenced by changes in exchange rates than by changes in GDP, with British travellers being particularly sensitive to currency movements.
Balli et al.	2018	Multiple and Partial Wavelet Analyses	Global uncertainties affect tourism demand differently across countries.
Meo et al.	2018	NARDL	Exchange rate depreciation positively impacts tourism demand.
Irandoust	2019	ECM and VAR	Exchange rates significantly impact tourism demand, varying by country.
Dogru et al.	2019	ARDL	When the U.S. dollar strengthens, it dampens travel trade with Canada and the UK, creating noticeable ripples. However, Mexico seems to stand steady, with little to no lasting effect from the dollar's rise.
Işik et al.	2019	ARDL	Euro depreciation boosts Turkey's tourism balance but has negligible effects on Spain.
Tung	2019	OLS and Granger Causality	Domestic currency devaluation increases foreign tourist demand.
Athari et al.	2021	OLS, GMM	Low domestic exchange rates attract higher tourist flows.
Chaudhry et al.	2022	DCCE	Exchange rate fluctuations significantly impact regional tourism revenue.
Tshidzumba et al.	2022	OLS	Domestic exchange rate depreciation promotes international tourism inflow.
Kisswani et al.	2024	NARDL	Exchange rate changes impact tourism in ASEAN-5 countries in complex ways, creating different short-term and long-term effects. These shifts don't affect all tourists the same, showing an uneven pattern that adds to the dynamic nature of tourism in the region.

Source: Authors' own creation

This study looks at how changes in the Real Effective Exchange Rate (REER) and nominal exchange rate (EXCH) affect tourism demand in South Africa. Unlike earlier research, which mostly focused on short-term trends or used simple models, this study uses the Nonlinear Autoregressive Distributed Lag (NARDL) model to study both short- and long-term effects. Previous studies, as shown in Table 1, reveal that currency depreciation and long-term appreciation

have a major impact on tourism demand. This research fills a gap by focusing on South Africa, a developing country with unique currency changes, rather than wealthier nations. It also includes other important economic factors, like interest rates and per capita GDP, for a more detailed analysis. By using data from 1994 to 2023, the study offers valuable insights into long-term financial patterns and provides recommendations for better tourism policies.

2. 2. KEY FACTORS AFFECTING EXCHANGE RATES AND TOURISM DEMAND

Tourism demand is influenced by both economic and non-economic factors, such as exchange rates, income levels, prices, political stability, and travel behaviour. Kuek et al. (2017) found that exchange rates play a big role in shaping the number of Chinese tourists visiting the United States. Similarly, Borhan and Arsad (2016), using the ARDL method, identified a long-term connection between exchange rates, income, and tourism prices. These studies highlight that economic factors, particularly exchange rates and income, have a lasting effect on tourism costs and sustainability. In Romania, Gabriela and Smaranda (2015) found that exchange rates and income boosted tourism demand, but high travel costs made the country less appealing. In Uruguay, Mordecki (2014) used the Johansen-Juselius method and found that exchange rates, income, and consumer habits positively impacted tourism demand. This suggests that favourable exchange rates and higher incomes make Uruguay more attractive to international tourists. Similarly, DaiKarimzadeh et al. (2014) identified real income per capita, market exchange rates, and trade openness as key drivers of international tourism. However, they noted that political instability and high prices discouraged visitors. While these studies provide valuable insights, most of them focus on linear relationships and don't fully capture the uneven effects of exchange rate fluctuations on tourism demand.

Researchers have explored how exchange rates impact tourism in the Middle East and Caspian regions. Pishbahar and Yadavar (2018) studied tourism in Iran's Aras Free Zone and found that it is influenced by factors like business satisfaction, religious and historical sites, and available facilities. Rasekhi and Mohammadi (2017) looked at the Caspian Sea countries from 2000 to 2013 and found that per capita income, exchange rates, and trade liberalisation boosted tourism demand, although economic instability created challenges. Using an ARDL model, Khoshnevis Yazdi and Gomami (2016) found that GDP and the Consumer Price Index (CPI) supported Iran's tourism demand, while the nominal exchange rate and oil prices had negative effects. Furthermore, much of the research has been conducted in wealthier nations or Middle Eastern economies, leaving it underexplored in developing markets, such as South Africa. Given the high volatility of the South African rand, it is crucial to understand how exchange rate changes influence tourism demand to shape effective policies and industry strategies. This study tackles this issue by applying a Nonlinear Autoregressive Distributed Lag (NARDL) model to investigate the short- and long-term uneven impacts of exchange rate fluctuations on South Africa's tourism demand. Exchange rates are a critical factor in tourism, as they affect travel costs and the country's appeal as a competitive destination.

Various studies across different regions have identified key economic drivers, including income levels, trade policies, inflation, political stability, and non-economic factors, such as tourist behaviour and perceptions. Samitas et al. (2018) studied how terrorism affects tourism demand in Greece, showing that such events have long-lasting negative impacts. This highlights how non-economic factors can seriously disrupt tourism. Assaf et al. (2019) used the Bayesian Global Vector Autoregressive (BGVAR) model to investigate how economic shocks in one Southeast Asian country impact neighbouring countries. Their findings show the strong connections between regional economies and tourism. Khan et al. (2020) explored how global eco-

nomic growth influences tourism, emphasising the importance of security, infrastructure, and quarantine measures during crises in shaping tourism demand. Polyzos et al. (2021) analysed the impact of COVID-19 on tourism and noted a significant drop in Chinese tourist arrivals. They predicted recovery times of six months for Australia and twelve months for the USA, highlighting the need for policy and health support. Rosselló Nadal and Santana Gallego (2022) reviewed studies and used gravity models to identify GDP, population, and distance as key factors shaping tourism demand. Their research underscores how economic capacity (GDP), demographics (population), and geographical distance play important roles in influencing tourism flows, showing the complex relationship between financial and structural factors.

2. 3. SOUTH AFRICA'S ECONOMIC PHASES (1994-2023) AND TOURISM DEMAND IMPACT

In South Africa, tourism demand is closely tied to the Rand's volatility. Depreciation improves affordability for tourists from stronger-currency regions, particularly the United States and Europe, while appreciation reduces competitiveness (Muyambiri, 2025). Tshidzumba et al. (2022) confirmed that a weaker Rand attracts more arrivals, but their reliance on simple OLS models limited the ability to capture asymmetric patterns or long-run dynamics. This gap is critical because South Africa's tourism sector is influenced not only by exchange rates but also by political risk, infrastructure, and limited market diversification. Table 2 gives a summary of South Africa's economic phases from 1994 to 2023 and how these affected tourism demand. Each phase is marked by major economic changes and challenges, including the end of apartheid, global financial crises, political instability, and the COVID-19 pandemic. The table also shows how changes in the South African Rand and other economic factors impacted the country's affordability and appeal as a tourist destination.

Table 2. Economic conditions and their impact on tourism demand in South Africa (1994-2023)

Economic Phase	Period	Economic Conditions	Tourism Demand Impact
Post-Apartheid Era	1994-2000	• Economic reforms to address apartheid inequalities. • Introduction of democratic government. • Liberalisation of trade. • GEAR strategy and currency stabilisation.	• Positive outlook for tourism with steady growth. • Lifting international sanctions boosted tourism demand.
Pre-Global Financial Crisis	2000-2008	• Strong economic performance driven by high global commodity prices. • Appreciation of the South African Rand.	• Strong Rand made South Africa more expensive for international tourists, potentially reducing demand. • Mixed impact on tourism, still maintained position in African tourism.
Global Financial Crisis and Economic Challenges	2008-2014	• The global financial crisis led to the economic downturn. • Sharp depreciation of the Rand. • Decline in commodity prices.	• Weaker Rand made South Africa more affordable, boosting international tourism. • Tourism demand saw recovery as visitors took advantage of favourable exchange rates.

Economic Phase	Period	Economic Conditions	Tourism Demand Impact
Economic Volatility and Political Uncertainty	2014-2018	• Slow economic growth. • Rising unemployment. • Political instability and concerns over governance. • Further depreciation of the Rand.	• Weaker Rand made South Africa more attractive for budget travellers. • Concerns about safety, political instability, and social unrest tempered overall tourism demand.
Recent Trends and Post-Pandemic Effects	2018-2023	• The COVID-19 pandemic caused a severe downturn in global tourism. • Gradual reopening of international borders post-pandemic. • Exchange rate fluctuations and global health concerns.	• The sharp decline in international arrivals during a pandemic. • Recovery signs post-pandemic, with potential for growth aided by weaker Rand. • Ongoing health and infrastructure concerns impacted tourism recovery.

Source: Author's own creation

South Africa's economic phases from 1994 to 2023 have significantly influenced tourism demand, shaped by domestic and global factors. During the Post-Apartheid Era (1994–2000), democratic governance, economic reforms, and the lifting of international sanctions boosted tourism as South Africa rejoined the global market (Statistics South Africa [Stats SA], 2019). The pre-Global Financial Crisis (2000–2008) saw substantial economic growth driven by high commodity prices, though Rand's appreciation made the country more expensive for international visitors (Kindleberger & Aliber, 2011). The Global Financial Crisis (2008–2014) led to a sharp Rand depreciation, making South Africa more affordable and increasing international tourism despite broader economic challenges (Rena & Msoni, 2014). However, the Economic Volatility and Political Uncertainty (2014–2018) period brought slow growth, rising unemployment, and governance concerns, deterring some international visitors despite a weaker Rand (World Bank, 2020). In the Recent Trends and Post-Pandemic Era (2018–2023), COVID-19 caused a sharp decline in arrivals, with a slow recovery as borders reopened. A weaker Rand made South Africa attractive for budget travellers, but ongoing health concerns and infrastructure challenges hindered full recovery (StatsSA, 2023). Despite these fluctuations, tourism remains vital to the economy, with future growth dependent on addressing political instability and infrastructure constraints (WTTC, 2022; National Treasury, 2019b).

2. 4. GAP IN LITERATURE

The reviewed literature highlights three key gaps. First, most South African studies have relied on linear models, which cannot adequately capture asymmetric effects. Second, little attention has been paid to comparing nominal and real effective exchange rates, despite their distinct implications for affordability and competitiveness. Third, interactions between exchange rate shocks and other macroeconomic factors such as interest rates and GDP per capita remain underexplored. This study addresses these gaps by applying a Nonlinear ARDL model to examine the asymmetric effects of nominal and real effective exchange rate fluctuations on South Africa's tourism demand (1994–2023). By accounting for both short- and long-run dynamics, the study advances theoretical understanding of asymmetric demand elasticity while offering policymakers practical insights on capitalising on Rand depreciation and mitigating appreciation risks through marketing, infrastructure investment, and market diversification.

3. METHODOLOGY

This section outlines the study's methodology, encompassing data description, model specification and estimation techniques. It provides a complete overview of the methods used to ensure rigorous analysis and reliable results. Overall, the methodology is intended to provide a comprehensive and insightful assessment of exchange rates' asymmetric impact on South Africa's tourism demand.

3. 1. DATA SET

This study examines how exchange rate changes affect tourism demand in South Africa, focusing on their uneven impact. It uses yearly data from 1994 to 2023 from the World Bank's World Development Indicators. The dataset includes essential factors such as international tourist arrivals (tourism demand), the real effective exchange rate, the nominal exchange rate, the real interest rate, and per capita Gross Domestic Product (PGDP). This study measures the exchange rate as the local currency unit (LCU) per US dollar, specifically expressed as the South African rand against the US dollar (ZAR/USD). An increase in the exchange rate indicates a depreciation of the rand, while a decrease in the exchange rate reflects an appreciation. This period was chosen to reflect South Africa's economic and structural transitions, including post-apartheid economic liberalisation, adopting inflation targeting in 2000, and significant exchange rate fluctuations that have influenced tourism trends.

3. 2. MODEL SPECIFICATION

Tshidzumba et al. (2022) used Ordinary Least Squares (OLS) to study how exchange rate regimes affect international tourist inflows in South Africa. Building on their work, this study adapts and modifies their model to analyse exchange rates' uneven short- and long-term effects on tourism demand.

$$lnITI_t = \beta_0 + \beta_1 ERR_t + \beta_2 lnPCI_t + \beta_3 lnINF_t + \beta_4 lnEXR_t + \varepsilon_t \quad (1)$$

This model examines factors influencing international tourist arrivals (ITI). The exchange rate regime (EER) affects currency stability and competitiveness. Per capita GDP (PCI) measures economic well-being and its impact on tourism demand. Inflation (INF) influences travel costs and affordability, while the exchange rate (EXR) determines the purchasing power of foreign visitors. In the model, β_0 is the intercept, and β_1 to β_4 are the coefficients that show how these factors affect tourist arrivals. The expectation is that all coefficients ($\beta_1 > 0$ to $\beta_4 > 0$) will be positive, meaning that economic growth, stable exchange rates, and controlled inflation should help attract more international tourists.

Equation 1 outlines the model proposed by Tshidzumba et al. (2022), while the modified model employed in this study is presented in Equation 2. The modification introduces the real interest rate (RIR) as a vector control variable, incorporates both real effective and nominal exchange rates, and excludes the inflation rate to mitigate potential multicollinearity issues within the model. This adaptation aims to enhance the robustness and explanatory power of the analysis.

$$lnTd_t = \beta_0 + \beta_1 REER_t + \beta_2 EXH_t + \beta_3 RIR_t + \beta_4 lnPGDP_t + \varepsilon_t \quad (2)$$

Where:

Td	: Tourism demand
REER	: Real effective exchange rate
EXCH	: Nominal exchange rate
RIR	: Real interest rate
PGDP	: GDP per capita growth

3. 3. ESTIMATION TECHNIQUES

This study uses the Nonlinear Autoregressive Distributed Lag (NARDL) model developed by Shin et al. (2014) to analyse how exchange rate changes (both real effective exchange rate REER and nominal exchange rate EXCH) affect tourism demand in the short and long run. The NARDL model separates exchange rate movements into positive and negative changes, allowing a more detailed understanding of their effects. A key advantage of this approach is its ability to simultaneously analyse short-term dynamics and long-term equilibrium relationships within a unified framework, even when the underlying variables exhibit different orders of integration, specifically I(0) and I(1). This makes it highly suitable for economic time series analysis. The study's primary goal is to evaluate how real (REER) and nominal (EXCH) exchange rate fluctuations influence tourism demand. This relationship is represented in the following equation:

$$Td = f(REER^{+}, REER^{-}, EXCH^{+}, EXCH^{-}, RIR, PGDP) \quad (3)$$

Where:

Td = Tourism demand

RIR = Real interest rate

PGDP = Per capita GDP

Building on the work of Tshidzumba et al. (2022), this paper incorporates the asymmetric effects of exchange rate changes on demand for tourism by utilising the following model:

$$Td_t = \upsilon_0 + \upsilon_1 REER_t^{+} + \upsilon_2 REER_t^{-} + \upsilon_3 EXCH_t^{+} + \upsilon_4 EXCH_t^{-} + \upsilon_5 RIR_t + \upsilon_6 PGDP_t + \varepsilon_t \quad (4)$$

Positive variations in exchange rates ($REER^{+}$ and $EXCH^{+}$) and negative changes ($REER^{-}$ and $EXCH^{-}$) are analysed separately. The entire effect of exchange rate fluctuations is measured by summing up these positive and negative components. This approach helps to uncover whether increases and decreases in exchange rates impact tourism demand differently, providing deeper insights into exchange rate dynamics in the tourism sector. Equation 2 represents the factors influencing long-run effects. To determine the short-run coefficients, the study reformulates Equation 2 within an error correction framework, as shown below:

$$\Delta Td_t = \beta_0 + \sum_{k=1}^{n1} \beta_{1k} \Delta Td_{t-k} + \sum_{k=1}^{n2} \beta_{2k} \Delta REER_{t-k} + \sum_{k=1}^{n2} \beta_{3k} \Delta EXCH_{t-k} + \sum_{k=1}^{n4} \beta_{4k} \Delta RIR_{t-k} + \sum_{k=1}^{n5} \beta_{5k} \Delta PGDP_{t-k} + \vartheta_1 Td_{t-k} + \vartheta_2 REER_{t-k} + \vartheta_3 EXCH_{t-k} + \vartheta_4 RIR_{t-k} + \vartheta_5 PGDP_{t-k} + \varepsilon_t \quad (5)$$

The specification presented in Equation 5 adopts an error correction approach, allowing the estimation of both short-run and long-run coefficients. The short-run coefficients are captured by the differenced variables (Δ). Equation 6 below depicts the NARDL model of this paper after the variables have been proven to be nonlinear in nature using the linearity tests.

$$\Delta Td_t = \beta_0 + \sum_{k=1}^{n1} \beta_{1k} \Delta ITA_{t-k} + \sum_{k=1}^{n2} \beta_{2k} \Delta REER^{+}{}_{t-k} + \sum_{k=1}^{n3} \beta_{3k} \Delta REER^{-}{}_{t-k} + \sum_{k=1}^{n4} \beta_{4k} \Delta EXCH^{+}{}_{t-k} + \sum_{k=1}^{n5} \beta_{5k} \Delta EXCH^{-}{}_{t-k} + \sum_{k=1}^{n6} \beta_{6k} \Delta RIR_{t-k} + \sum_{k=1}^{n7} \beta_{7k} \Delta PGDP_{t-k} + \vartheta_1 Td_{t-k} + \vartheta_2 REER^{+}_{t-k} + \vartheta_3 REER^{-}_{t-k} + \vartheta_4 EXCH^{+}_{t-k} + \vartheta_5 EXCH^{-}_{t-k} + \vartheta_6 RIR_{t-k} + \vartheta_7 PGDP_{t-k} + \varepsilon_t \quad (6)$$

In the equation above, Td represents tourism demand, which depends on several key economic factors, including the real effective exchange rate (REER), which measures currency value against multiple currencies; the nominal exchange rate (EXCH), which is the standard exchange rate between two currencies; the real interest rate (RIR), which is the adjusted interest rate after accounting for inflation; and per capita GDP growth (PGDP), which reflects economic well-being and its impact on tourism. The symbol Δ represents changes (differences) in vari-

ables, β refers to short-run effects, and ϑ indicates long-run effects. The term $\sum_{t-k}^{n}$ shows how past values (lags) of variables influence the present, while ± highlights the asymmetric effects of exchange rate changes, showing whether increases and decreases impact tourism demand differently. Shin et al. (2014) applied the bounds-testing approach from Pesaran et al. (2001), confirming that this method is also suitable for analysing Equation 6 in their study.

4. RESULTS

This section explores the impact of real and nominal exchange rate variations on demand for tourism in South Africa from 1994 to 2023, a task made possible by the indispensable NARDL model. The discussion begins with descriptive statistics and linearity tests to examine the data's characteristics and confirm the suitability of a nonlinear approach (Narayan, 2005). In addition, the study conducted unit root tests, including the Kapetanios, Shin, and Snell (KSS) test and the Elliott-Rothenberg-Stock (ERS) test, to ensure that the variables meet the NARDL model's requirements by being integrated at I(0) or I(1), but not at I(2). The section then presents the descriptive statistics results (Table 3) before moving on to a detailed discussion of the estimation process and results, all of which underscore the importance of the NARDL model in this significant study.

Table 3. Descriptive statistics results

	Td	REER	EXCH	RIR	PGDP
Mean	16.00966	91.77828	9.418897	5.279189	8.597873
Median	16.05287	90.33814	8.235596	4.785896	8.657269
Maximum	16.56738	125.8460	18.45024	12.69103	8.727596
Minimum	15.17305	69.83482	3.550798	0.472107	8.356616
Std. Dev.	0.459356	16.16797	4.163756	2.818261	0.127623
Skewness	-0.221908	0.463927	0.552089	1.060450	-0.624036
Kurtosis	1.615387	2.169572	2.192313	3.659437	1.810102
Jarque-Bera	2.642656	1.938155	2.339458	6.166341	3.716927
Probability	0.266781	0.379433	0.310451	0.045814	0.155912
Sum	480.2898	2753.348	282.5669	158.3757	257.9362
Sum Sq. Dev.	6.119240	7580.694	502.7690	230.3353	0.472339
Observations	30	30	30	30	30

Source: Author's own calculation using EViews 12 software

The results presented in Table 3 reveal that the variables Td and PGDP exhibit negative skewness coefficients, indicating that their distributions are left-skewed. Conversely, REER, EXCH, and RIR have positive skewness coefficients, suggesting their distributions are skewed to the right. The Jarque-Bera probability values indicate that Td, REER, EXCH, and PGDP are normally distributed, whereas RIR does not follow a normal distribution. However, this does not hinder the construction of an appropriate NARDL model for this study, as the assumption of normality primarily applies to the residuals of the estimated NARDL models, which will be evaluated accordingly. Table 4 presents the results of the BDS linearity test applied to the study's main variables.

Table 4. BDS linearity test results

Variable	Dimension	BDS Test Statistics	P-Values
Td	2	16.71252	0.0000***
	3	17.34239	0.0000***
	4	17.65864	0.0000***
	5	18.93615	0.0000***
	6	21.27251	0.0000***
REER	2	14.68287	0.0000***
	3	14.23427	0.0000***
	4	13.90740	0.0000***
	5	13.92985	0.0000***
	6	14.63929	0.0000***
EXCH	2	13.11031	0.0000***
	3	12.05680	0.0000***
	4	11.64944	0.0000***
	5	10.14441	0.0000***
	6	8.976096	0.0000***
RIR	2	4.124613	0.0000***
	3	3.630000	0.0003***
	4	3.154970	0.0016***
	5	4.058626	0.0000***
	6	5.009132	0.0000***
PGDP	2	17.31457	0.0000***
	3	18.24645	0.0000***
	4	19.06814	0.0000***
	5	20.58349	0.0000***
	6	22.34348	0.0000***

Notes: ***/**/* represents statistical significance at 1%, 5% and 10% respectively

Source: Author's own calculations using EViews 12 Software

The BDS linearity test outcome reveals that the null hypothesis of linearity is rejected for all key variables at the 1%, 5%, and 10% significance levels, confirming the presence of nonlinear patterns in the data (Table 4). The White linearity test is also conducted as part of the analysis to further investigate the presence of linearity or nonlinearity in these key variables. Table 5 presents the results of the White linearity test.

Table 5. White linearity test results

Variable	Test statistics (X^2)	DF	P-Values
Td	5.7441	2	0.0565*
REER	2.3957	2	0.3018
EXCH	0.2571	2	0.8793
RIR	7.3799	2	0.0116**
PGDP	8.5831	2	0.0136**

Notes: ***/**/* represents statistical significance at 1%, 5% and 10% respectively

Source: Author's own calculations using R Package Software

The results in Table 5 show that the null hypothesis of linearity is not rejected for key variables like REER and EXCH, meaning they have both linear and nonlinear characteristics. However,

for Td, RIR, and PGDP, the study failed to accept the null hypothesis at the 10% and 5% significance levels, indicating that these variables follow a strictly nonlinear pattern. These findings, supported by Tables 4 and 5, confirm that while exchange rate variables (REER and EXCH) have a mix of linear and nonlinear traits, tourism demand (Td), actual interest rate (RIR), and per capita GDP (PGDP) strongly follow a nonlinear pattern. The linearity test results presented in Tables 4 and 5 indicate that the relationship between REER, EXCH, and Td can appropriately be modeled using either a linear or a nonlinear approach (ARDL or NARDL), as both REER and EXCH exhibit a combination of linear and nonlinear dynamics (see the study by Monamodi, & Choga, 2021). Although the BDS and White tests on REER and EXCH produced mixed outcomes, the decision to employ the NARDL model remains justified for several reasons. First, the linearity test results (Tables 4 and 5) indicate that both REER and EXCH exhibit a mixture of linear and nonlinear dynamics, which suggests that relying solely on a linear ARDL specification may overlook important asymmetric adjustment processes. As noted by Monamodi and Choga (2021), macroeconomic variables often respond asymmetrically to shocks, and capturing such nonlinearities provides a more comprehensive understanding of the underlying relationships. Second, the BDS and White tests have known sensitivities to sample size and lag structure, which may contribute to the observed contradictions. The NARDL framework is particularly valuable in this context because it allows researchers to test for both short- and long-run asymmetries directly within the cointegration framework, thereby mitigating the risks of model misspecification that arise from conflicting pre-test results.

This study applies unit root tests, specifically the Kapetanios, Shin, and Snell (KSS) and Elliott-Rothenberg-Stock (ERS) tests, to ensure the appropriate NARDL model. These tests check that none of the variables are integrated at order two (I(2)), as this would violate the model's assumptions and make it unsuitable for analysis. The results of the KSS unit root test are shown in Table 6.

Table 6. KSS unit root results

Variable	Criteria	Lags	KSS stats	1% CV	5% CV	10% CV	Conclusion
Td	Fixed	3	-1.588	-3.551	-2.860	-2.542	Nonlinear Stationary
REER	Fixed	3	-2.162	-3.551	-2.860	-2.542	Nonlinear Stationary
EXCH	Fixed	3	-0.134	-3.551	-2.860	-2.542	Nonlinear Stationary
RIR	Fixed	3	-1.791	-3.551	-2.860	-2.542	Nonlinear Stationary
PGDP	Fixed	3	-0.878	-3.551	-2.860	-2.542	Nonlinear Stationary

Note: Critical values of the KSS test at the 1%, 5%, and 10% significant levels are -3.551, -2.860 and -2.542, respectively

Source: Author's own calculations using Stata 17 Software

Table 6 presents the results of the Kapetanios, Shin, and Snell (KSS) unit root test, showing that at all significance levels (1%, 5% & 10%), the null hypothesis of a nonlinear unit root is rejected for all key variables. This means the variables do not follow a unit root process but demonstrate asymmetric and nonlinear stationarity. The KSS test statistics exceed the critical values of -3.551 (1%), -2.860 (5%), and -3.542 (10%), further confirming the presence of nonlinear stationarity. To strengthen these findings, the study also applied the Elliott-Rothenberg-Stock (ERS) unit root test, which provides an additional check on whether the variables have unit roots. The findings of the ERS test are presented in Table 7, allowing for a more comprehensive assessment of stationarity across different testing methods.

Table 7. ERS unit root test results (null hypothesis: have unit root)

ERS regression with a constant only					
Variable	P-Statistics	1%	5%	10%	Conclusion
Td	7.2988	1.8700	2.9700	3.9100	I(0)
REER	21.2831	1.8700	2.9700	3.9100	I(0)
EXCH	43.4595	1.8700	2.9700	3.9100	I(0)
RIR	2.7796	1.8700	2.9700	3.9100	I(0)
PGDP	95.9482	1.8700	2.9700	3.9100	I(0)

Source: Author's own calculations using EViews 12 Software

Table 7 presents the results of the Elliott-Rothenberg-Stock (ERS) unit root test, which examines whether the key variables are stationary or contain a unit root. The test was conducted with constant-only regression, and the null hypothesis assumes that each variable has a unit root. The results indicate that for Td, REER, EXCH, and PGDP, the study failed to accept the null hypothesis at the 1%, 5%, and 10% significance levels, meaning these variables are stationary at level (I(0)). However, for the real interest rate (RIR), the null hypothesis is only rejected at the 1% significance level. These conclusions are drawn by comparing the ERS test statistics (in absolute terms) with the corresponding critical values at each significant level. Since most variables are uncovered to be stationary at level, they are classified as I(0), confirming that they do not require differencing for further analysis. This finding supports the suitability of the NARDL model, which requires variables to be either I(0) or I(1) but not I(2).

Selecting the optimal lag length is essential before proceeding with VAR, VECM, or NARDL analyses (Brooks, 2014). This is achieved using VAR analysis, which evaluates different lag structures. Table 8 presents the corresponding values for the Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC), and Hannan-Quinn Criterion (HQIC) for lag orders 0, 1, and 2.

Table 8. Optimum lag length results

Lag	LogL	LR	FPE	AIC	SIC	HQIC
0	-193.4833	NA	0.988213	14.17738	14.41527	14.25010
1	-78.79390	180.2262*	0.001687*	7.770993*	9.198355*	8.207352*
2	-64.07891	17.86820	0.004251	8.505636	11.12247	9.305628

Notes: * denotes the lag length selected based on the information criterion.

Source: Author's own calculations using EViews 12 Software

Table 8 presents the results of the optimum lag length selection, which helps determine the most suitable lag structure for the NARDL model. Several statistical criteria, including the Likelihood Ratio (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Criterion (SC), and Hannan-Quinn Criterion (HQ), were used to select the appropriate lag length. The results show that all information criteria consistently identify lag 1 as the optimal choice, as indicated by the asterisks (*) in the table. This means a lag length of 1 provides the best model fit while balancing complexity and accuracy. Based on this, the NARDL model is specified as NARDL (1, 1, 1, 1, 1, 1, 1), ensuring uniform lag selection across the positive and negative decompositions of exchange rate changes, other control variables, and the dependent variable (tourism demand). Since previous unit root tests confirmed that no variable is integrated at order two (I(2)), the next step in the analysis is to test for asymmetric cointegration, which examines whether a long-term relationship exists between the variables. The results of this NARDL bounds test are presented in Table 9.

Table 9. NARDL Bound test results

Test Statistics	Value	Significance	I(0)	I(1)	Conclusion
F-Statistics	9.02284	10%	2.12	3.23	Asymmetric Cointegration
		5%	2.45	3.61	Asymmetric Cointegration
		1%	3.15	4.43	Asymmetric Cointegration

Notes: ***/**/* represents statistical significance at 1%, 5% and 10% respectively

Source: Author's own calculations using EViews 12 Software

Table 9 presents the NARDL bounds test results, which assess whether a long-run relationship (cointegration) exists between tourism demand and its explanatory variables. The F-statistic value of 9.022 is compared against the critical values at different significance levels (10%, 5%, and 1%) for both the lower bound I(0) and upper bound I(1) cases. The results show that the F-statistic (9.022) is greater than the upper bound (I(1)) critical values at all significance levels (10%, 5%, and 1%). This confirms the presence of asymmetric cointegration, indicating that tourism demand and its regressors exhibit a stable long-term relationship despite experiencing short-term fluctuations. Since asymmetric cointegration is established, the study estimates the NARDL model, analysing short- and long-run effects. The results of this estimation are presented in Table 10.

Table 10. NARDL long and short-run model results

Asymmetric long-run for NARDL (1,1,1,1,1,1,1,1) Dependent variable: *Td*				
Regressors	Coefficient	Std. Error	t-Statistic	P-value
Td(-1)*	-1.220007	0.185979	-6.559912	0.000**
$REER^{+}$(-1)	0.032842	0.014310	2.294999	0.0377**
$REER^{-}$(-1)	-0.031437	0.017415	-1.805181	0.0926*
$EXCH^{+}$(-1)	-0.049325	0.065601	-0.751893	0.4646
$EXCH^{-}$(-1)	0.299329	0.103975	2.878870	0.0121**
RIR(-1)	0.079158	0.0253632	3.088266	0.0080***
PGDP(-1)	-1.043611	2.101488	-0.496606	0.6272
C	17.73290	2.667585	6.647548	0.0000***
Asymmetric short-run for NARDL (1,1,1,1,1,1,1,1) Dependent variable: Δ*Td*				
Regressors	Coefficient	Std. Error	t-Statistic	P-value
$\Delta REER^{+}$	0.054447	0.014546	3.742979	0.0022***
$\Delta REER^{-}$	-0.010100	0.008515	-1.186228	0.2553
$\Delta EXCH^{+}$	-0.019483	0.052683	-0.369818	0.7171
$\Delta EXCH^{-}$	0.605052	0.120950	5.002482	0.0002***
Δ*RIR*	0.085225	0.013913	6.125716	0.0000***
Δ*PGDP*	0.002233	0.000231	9.673816	0.0000***
C	17.73290	2.667585	6.647548	0.0000***
CointEq	-1.220007	0.128437	-9.498865	0.0000***

Notes: ***/**/* denotes statistical significance at 1%, 5% and 10% respectively

Source: Author's own calculations using EViews 12 Software

Table 10 presents the long-run and short-run results of the NARDL model, examining how real and nominal exchange rate fluctuations asymmetrically affect tourism demand (Td) in South Africa. The long-run findings indicate that a positive shock to the Real Effective Exchange Rate ($REER^{+}$), representing depreciation in the local currency unit (rand), positively affects tourism demand in South Africa. These results imply that a 1% depreciation in the South African rand

leads to a 0.033% increase in Td. However, a negative shock to the Real Effective Exchange Rate ($REER^{-}$), representing appreciation in the rand, has a negative effect on demand for tourism; this simply means that a 1% appreciation in the rand results in a marginally significant 0.031% decline in demand for tourism in South Africa. These results align with Dogru et al. (2019), Işik et al. (2019), and Moe et al. (2018), who found that depreciation enhances tourism demand while appreciation reduces it. Interestingly, positive nominal exchange rate shocks ($EXCH^{+}$) are insignificant, whereas negative nominal exchange rate shocks ($EXCH^{-}$) significantly boost tourism demand, with a 1% appreciation increasing demand by 0.299%. This contradicts Tung (2019) and Athari et al. (2021), who reported that currency devaluation attracts more foreign tourists. Additionally, real interest rates (RIR) significantly positively affect tourism demand, while per capita GDP (PGDP) is statistically insignificant in the long run.

The short-run results indicate that positive REER shocks significantly increase tourism demand, with a 1% depreciation leading to a 0.054% rise, while negative REER shocks have no notable effect. Moreover, negative nominal exchange rate shocks ($EXCH^{-}$) enormously enhance tourism demand, with a 1% appreciation, raising it by 0.605%, contradicting Tshidzumba et al. (2022), who found that depreciation increases international tourism inflow. Real interest rates (RIR) and per capita GDP (PGDP) significantly impact short-run tourism demand, with a 1% increase in RIR leading to a 0.085% rise and a 1% increase in PGDP resulting in a 0.002% boost, consistent with Gul et al. (2014) and Tshidzumba et al. (2022). The error correction term (CointEq) is highly significant at the 1% level, with a coefficient of -1.22, indicating a rapid return to equilibrium following short-term deviations. These findings underscore the asymmetric effects of exchange rates on tourism demand and highlight the importance of RIR and economic growth. To ensure robustness, coefficient stability and residual diagnostic tests, including the Ramsey RESET test, were conducted, confirming the model's validity.

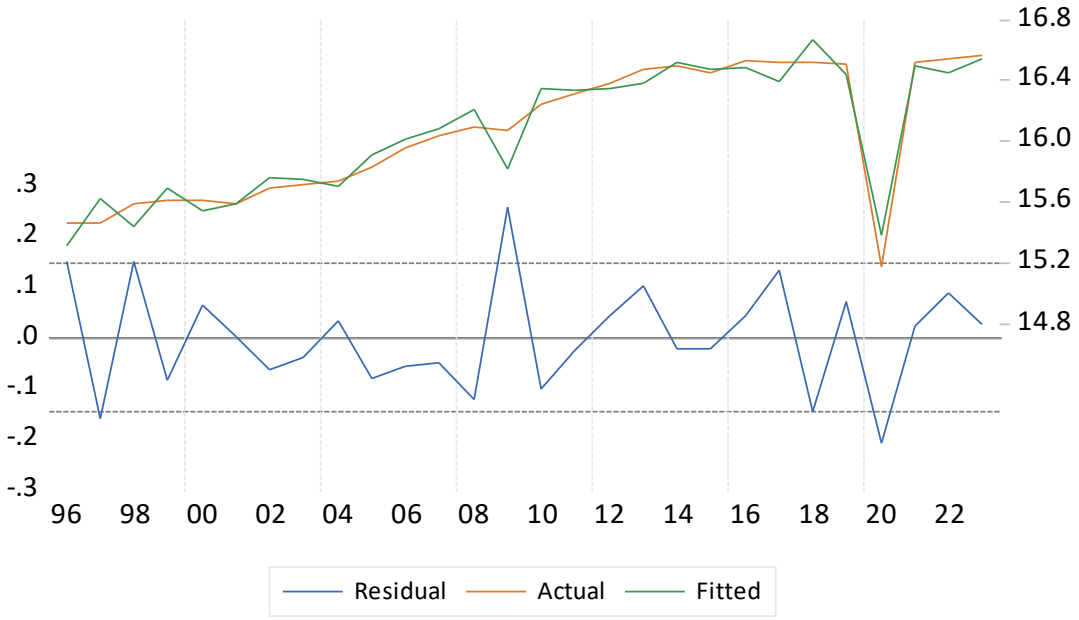
Table 11. Ramsey RESET test results for NARDL (1,1,1,1,1,1,1)

Test	Null Hypothesis	Prob (F statistics)	Conclusion
Ramsey Reset specification	: There is no misspecification	0.7119	The model is well-specified.

Source: Author's own calculations using EViews 12 software

Table 11 presents the results of the Ramsey RESET test, which assesses whether the NARDL (1,1,1,1,1,1,1) model is correctly specified. The test fails to reject the null hypothesis of no model misspecification, as the p-value of 0.7119 is well above the conventional significance levels of 1%, 5%, and 10%. This indicates that the model does not suffer from specification bias and is appropriately structured for analysing the asymmetric effects of exchange rate fluctuations on tourism demand. Furthermore, the model's validity is reinforced by Figure 1, which compares actual and fitted values. A close alignment between these values suggests that the model effectively captures the underlying relationship between tourism's demand and its key determinants. The combined evidence from the Ramsey RESET test and the fitted values analysis confirms the robustness of the NARDL model, ensuring that the findings provide a reliable basis for policy recommendations.

Figure 1. Actual and fitted values and residual graph results



Source: Author's own drawings using EViews 12 software

Figure 1 illustrates minimal variations between the fitted and actual values, suggesting that the model demonstrates a reasonable fit to the data, with relatively low error magnitudes. Additionally, the residual plot appears stationary throughout the study period, indicating that the residual series adheres to a white noise process. Collectively, these findings confirm the adequacy of the estimated NARDL model. Lastly, this study employed residual diagnostic tests. Thus, Table 12 exhibits the results for heteroscedasticity, normality and serial correlation tests.

Table 12: NARDL (1,1,1,1,1,1,1) Residual diagnostic tests results

Test	Null hypothesis	P-Value	Conclusion
Heteroskedasticity: Breusch-Pagan-Godfrey	: The variance of the residuals is homoscedastic (constant across observations)	0.1021	The variance of the residuals is homoscedastic.
Normality: Jarque-Bera	: Residuals are normally distributed	0.3119	Residuals are normally distributed.
Serial Correlation: LM test	: No serial correlation exists in the residuals up to the specified lag order.	0.1850	The residuals are not serially correlated.

Source: Author's own calculations using EViews 12 software

The residual diagnostic tests for the estimated NARDL model show that the null hypothesis cannot be rejected at the 1%, 5%, and 10% significance levels, confirming that the residuals are normally distributed and free from serial correlation or heteroscedasticity. Furthermore, after passing all coefficient stability and diagnostic tests, the model's coefficients are considered efficient and robust. The well-behaved residuals strengthen the reliability and validity of the model, ensuring confidence in the inferences drawn from the results.

5. DISCUSSION OF RESULTS

The findings of this study confirm that exchange rate fluctuations exert asymmetric effects on tourism demand in South Africa. Specifically, Rand depreciation significantly increases tourist arrivals, while appreciation produces more minor and less consistent negative effects. This asymmetry aligns with tourism demand theory, which suggests that international travellers are

highly sensitive to relative price reductions but less responsive to price increases. In other words, when the Rand weakens, South Africa becomes markedly more affordable and attractive relative to competing destinations, whereas appreciation does not entirely deter tourists due to the country's unique natural, cultural, and heritage attractions that sustain its appeal.

These results are consistent with Tshidzumba et al. (2022), who also observed that rand depreciation boosts international arrivals. However, this study advances their work using a Nonlinear ARDL framework, which captures the magnitudes of responses to positive and negative currency shocks. Similar evidence has been reported in other emerging economies: Meo et al. (2018) found that depreciation increased tourism demand in Pakistan, while Işik et al. (2019) observed that Euro depreciation boosted Turkey's tourism balance. On the contrary, Tung (2019) and Athari et al. (2021) reported stronger negative effects of appreciation on tourism flows, suggesting that South Africa's case may be somewhat unique. This divergence could be attributed to the country's competitive baseline pricing, the diversity of its attractions, and its reputation as a long-haul, once-in-a-lifetime destination, which reduces price elasticity in certain source markets.

The significant positive effect of real interest rates on tourism demand adds an essential dimension to the discussion (Seidualin et al., 2025). While higher interest rates typically raise borrowing costs and may suppress domestic consumption, South Africa's case is associated with improved macroeconomic stability, lower inflation, and more substantial investor confidence. These conditions create a favourable perception of the destination's stability, reassuring international travellers. This reinforces the argument of Gul et al. (2014) and Irandoust (2019), who noted that broader economic health indicators beyond exchange rates play a crucial role in shaping tourism flows.

The limited role of per capita GDP in influencing demand further highlights the importance of external rather than internal drivers of tourism in South Africa. This finding resonates with global studies (e.g., Dogru et al., 2019; Sharma & Pal, 2020), suggesting that income effects are more pronounced in source markets than destinations. Therefore, South Africa's tourism competitiveness hinges more on affordability and exchange rate positioning than on domestic income growth. These findings enrich the theoretical understanding of asymmetric tourism demand by showing how country-specific conditions, such as exchange rate volatility, political context, and source-market composition, interact with global economic dynamics. They also demonstrate the utility of nonlinear models in capturing the complex and uneven effects of exchange rate shocks, thereby extending the literature on tourism economics in emerging markets. From a policy perspective, the results underscore the need to leverage Rand depreciation through targeted marketing campaigns in high-income markets, while countering appreciation effects by diversifying source markets and enhancing value-added offerings.

6. CONCLUSION AND IMPLICATIONS

This study examines the asymmetric effects of exchange rate fluctuations on South Africa's tourism demand (1994–2023) using the Nonlinear Autoregressive Distributed Lag (NARDL) model to assess the impacts of the real effective exchange rate (REER) and nominal exchange rate (EXCH). The findings reveal that REER depreciation significantly increases international tourist arrivals, whereas appreciation has a marginally negative effect. The influence of EXCH varies between short- and long-term periods, demonstrating the complex role of exchange rate movements in shaping tourism demand. Additionally, actual interest rates positively impact tourism, underscoring the importance of macroeconomic stability, while domestic income levels show limited influence, emphasising the need for market diversification to sustain demand amid exchange rate volatility.

A strategic approach is essential for policymakers to enhance South Africa's global competitiveness as a tourism destination. Maintaining a competitive exchange rate can improve affordability and attract more international visitors. A controlled currency depreciation and targeted marketing campaigns for high-income markets during appreciation periods can help offset potential downturns. Additionally, investments in tourism infrastructure, such as transport networks and digital connectivity, are crucial for enhancing the visitor experience and ensuring long-term sector growth. Promoting sustainable and eco-friendly tourism practices can attract environmentally conscious travellers while preserving natural resources. Policymakers should also explore emerging source markets and utilise predictive analytics to monitor exchange rate trends, allowing for proactive and adaptive policy measures. South Africa can build a resilient and globally competitive tourism industry by aligning exchange rate management with sustainable tourism development and market diversification.

REFERENCES

Akadiri, S.S., & Akadiri, A.C. (2021). Examining the Causal Relationship between Tourism, Exchange Rate, and Economic Growth in Tourism Island States: Evidence from Second-Generation Panel. *International Journal of Hospitality & Tourism Administration, 22*(3), 235-250. https://doi.org/10.1080/15256480.2019.1598912

Alfdool, S. M., Teruel-Serrano, M. D., & Alonso-Monasterio, P. (2025). The brand image influence on the relationship between social media advertising and sustainable tourism practices in Petra (Jordan). *ECONOMICS - Innovative and Economics Research Journal*, *13*(1), 25-44. https://doi.org/10.2478/eoik-2025-0014

Assaf, A. G., Li, G., Song, H., & Tsionas, M. G. (2019). Modeling and forecasting regional tourism demand using the Bayesian global vector autoregressive (BGVAR) model. *Journal of Travel Research*, *58*(3), 383-397. https://doi.org/10.1177/0047287518759226

Athari, S.A., Alola, U.V., Ghasemi, M., & Alola, A.A. (2021). The (Un)sticky role of exchange and inflation rate in tourism development: insight from the low and high political risk destinations. *Current Issues in Tourism, 24(*12), 1670-1685. https://doi:10.1080/13683500.2020.1798893

Balli, F., Shahzad, S.J.H., & Salah Uddin, G. (2018). A tale of two shocks: what do we learn from the impacts of economic policy uncertainties on tourism?, *Tourism Management, 68*, 470-475. https://doi.org/10.1016/j.tourman.2018.04.008

Bini, H. L., Tichaawa, T. M. & Harilal, V. (2022). International Students as Generators of VFR Travel and Tourism in South Africa. *African Journal of Hospitality, Tourism and Leisure, 11*(6), 1937-1953. https://www.ajhtl.com/uploads/7/1/6/3/7163688/article_8_11_6_1937-1952.pdf

Borhan, N., & Arsad, Z. (2016, October). Determining factors affecting tourism demand for Malaysia using ARDL modeling: A case of Europe countries. In AIP Conference Proceedings (Vol. 1782, No. 1, p. 050005). AIP Publishing. https://doi.org/10.1063/1.4966095

Brooks, C., (2014). *Introductory econometrics for finance*. Cambridge University Press, New York. http://www.cambridge.org/9780521873062

Central Bank of Kenya (CBK). (2022). *Annual Report on the Economic Impact of Exchange Rate Volatility*. CBK. https://www.centralbank.go.ke/uploads/cbk_annual_reports/319054182_2022%20Annual%20Report.pdf

Chaudhry, S.I., Nazar, R., Ali, S., Meo, M.S., & Faheem, M. (2022). Impact of environmental quality, real exchange rate and institutional performance on East-Asia and Pacific region tourism receipts. *Current Issues in Tourism, 25*(4), 611-631. https://doi.org/10.1080/13683500.2021.1894101

DaiKarimzadeh, S., Ghobadi, S., & Foroudastan, N. (2014). Factors affecting the International tourism demand in Iran: ARDL approach. *Tourism Management Studies, 8*(23), 131-154. https://dor.isc.ac/dor/20.1001.1.23223294.1392.8.23.6.7

Dissanayaka, D. M. H. R., Hansani, W., Walakumbura, S. H. M. L., & Amarasena, B. W. C. M. (2023). Factors affecting exchange rate variability in sri lanka: An ardl approach. *FELICITATION E-VOLUME*. https://www.researchgate.net/profile/Kariyawasam-Sittarage-Prasangani/publication/371788251_STRENGTHENING_IDEAL_L2_SELF_TO_MOTIVATE_L2_LEARNING/links/64951c2cb9ed6874a5cf849b/STRENGTHENING-IDEAL-L2-SELF-TO-MOTIVATE-L2-LEARNING.pdf#page=72

Dogru, T., Isik, C., & Sirakaya-Turk, E. (2019). The balance of trade and exchange rates: Theory and contemporary evidence from tourism. *Tourism Management, 74*, 12–23. https://doi.org/10.1016/j.tourman.2019.01.014

Elliott, G., T. J. Rothenberg., & J. H. Stock. 1996. Efficient tests for an autoregressive unit root. Econometrica 64: 813–836. https://www.nber.org/system/files/working_papers/t0130/t0130.pdf

Esquivias, M. A., Sugiharti, L., Rohmawati, H., & Sethi, N. (2021). Impacts and implications of a pandemic on tourism demand in Indonesia. *Economics & Sociology*, *14*(4), 133-150. https://doi.org/10.14254/2071-789X.2021/14-4/8

Gabriela, T., & Smaranda, S. (2015). Analysing the Mountain Tourism Demand in Romania over the last two Decades. Annals of the University of Oradea: *Economic Science, 25*(1), 696-705. https://econpapers.repec.org/scripts/redir.pf?u=http%3A%2F%2Fanale.steconomiceuoradea.ro%2Fvolume%2F2015%2Fn1%2F079.pdf;h=repec:ora:journl:v:1:y:2015:i:1:p:696-705

Glocker, D., & Haxton, P. (2020). Leveraging tourism development for sustainable and inclusive growth in South Africa. https://doi.org/10.1787/457c263d-en

Gul, K., Asik, N.A., & Gurbuz, A.K., (2014). The effect of global economic crisis on Turkish tourism demand and a review for the period 2003-2013. *Journal of World Economic Research*, *3*(6-1), 22-32. http://www.sciencepg.com/journal/jwer

International Labour Organisation. (2020). Monitor: COVID-19 and the World of Work. Third Edition, 2020. 2020 edition. http://oit.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/briefingnote/wcms_743146.pdf

Irandoust, M. (2019). Exchange rate volatility and tourism demand: A review of the literature. *Journal of Economic Surveys*, 33(4), 1090-1107. https://doi.org/10.1111/joes.12278

Işık, C., Radulescu, M., & Fedajev, A. (2019). The effects of exchange rate depreciations and appreciations on the tourism trade balance: the case of Spain. *Eastern Journal of European Studies, 10*, 221-237. https://www.ceeol.com/search/article-detail?id=784837

Kapetanios, G., Shin, Y., & Snell, A., (2003). Testing for a unit root in the nonlinear STAR framework. *Journal of Econometrics*, *112*(2), pp.359-379. https://doi.org/10.1016/S0304-4076(02)00202-6

Khan, N., Hassan, A. U., Fahad, S., & Naushad, M. (2020). Factors affecting the tourism industry and its impacts on the global economy. *Available at SSRN 3559353*. https://www.researchgate.net/profile/Shah-Fahad-21/publication/340171808_Factors_Affecting_Tourism_Industry_and_Its_Impacts_on_Global_Economy_of_the_World/links/5e8636d692851c2f527792dc/Factors-Affecting-Tourism-Industry-and-Its-Impacts-on-Global-Economy-of-the-World.pdf

Khoshnevis Yazdi, S., Gomami, M. (2016). Estimating the Function of Tourism Demand in Iran. , 6(12), 1-12. https://www.magiran.com/p2045885

Kindleberger, C.P., & Aliber, R.Z .(2011). Manias, Panics and Crashes: *A History of Financial Crises*. New York: Palgrave Macmillan. https://www.proquest.com/openview/8779fb634cfd78f9327c89f1e9b81268/1?cbl=1818121&pq-origsite=gscholar

Kisswani, K. M., & Harraf, A. (2021). Asymmetric impact of oil price shocks on tourism: Evidence from selected MENA countries. In *Economic Development in the MENA Region: New Perspectives*, 45–63. Springer. https://doi.org/10.1007/978-3-030-66380-3_4

Kisswani, K. M., Zaitouni, M., & Kisswani, A. M. (2024). On the asymmetric link between exchange rate variability and tourism inflows: Recent evidence from the asean-5 countries. *Journal of Policy Research in Tourism, Leisure and Events*, *16*(4), 590-619. https://www.tandfonline.com/journals/rprt20?src=pdf

Kuek, V. Z. H., Cheng, C., Loo, C., Wong, L. Y. and Tses, K. K. (2017). A Study of The Factors Affecting the China Tourist Arrival in the United States (Doctoral dissertation, UTAR). http://eprints.utar.edu.my/2690/1/fyp-BF-2017-1407241-KVZH.pdf

Lean, H.H. & Smyth, R. (2009). Asian financial crisis, avian flu, and terrorist threats: are shocks to Malaysian tourist arrivals permanent or transitory? *Asia Pacific Journal of Tourism Research, 14*(3), 301-321. http://www.tandfonline.com/journals/rapt20

Maiyo, A. K., Atitwa, E. B., & Morris, Z. N. (2024). Modelling exchange rate fluctuation on tourism demand. *African Journal of Hospitality, Tourism and Leisure*, *13*(1), 85-90. http://www.repository.embuni.ac.ke/bitstream/handle/embuni/4415/Modeling%20exchange%20rate%20fluctuation%20on%20tourism%20demand.pdf?sequence=1&isAllowed=y/@þ

Meo, M.S., Chowdhury, M.A.F., Shaikh, G.M., Ali, M., & Sheikh, S.M. (2018). Asymmetric impact of oil prices, exchange rate, and inflation on tourism demand in Pakistan: New evidence from nonlinear ARDL. *Asia Pacific Journal of Tourism Research, 23*(4), 408–422. https://doi.org/10.1080/10941665.2018.1445652

Meyer, D. F. (2018). An Analysis of the Impact of Economic Growth, Political Instability and Exchange Rate on Tourism Growth in South Africa. In *Proceedings of the 11th International RAIS Conference on Social Sciences* (pp. 22-31). Scientia Moralitas Research Institute. https://doi.org/10.5281/zenodo.1568638

Monamodi, N. E., & Choga, I. (2021). An Estimation of the Effect of Tax Revenue Collection on the Public Debt in South Africa. *Review Pub Administration Manag*, *9*, 292. an-estimation-of-the-effect-of-tax-revenue-collection-on-the-public-debt-in-south-africa-libre.pdf

Monitor, I. L. O. (2020). COVID-19 and the world of work. *Updated estimates and analysis*, *27*. https://ilostat.ilo.org/resources/methods/description-employment-by-status/

Mordecki, G. (2014). Determinants of Argentinean Tourism Demands in Uruguay, Working Paper: 1-17. https://hdl.handle.net/20.500.12008/4257

Mrkaić Ateljević, A. (2025). Bibliometric Analysis as a Basis for Research on Sustainability in Tourism in Bosnia And Herzegovina. Collection of papers new economy, 3(1), 57-70. https://doi.org/10.61432/CPNE0301057a

Muyambiri, B. (2025). South African Private Investment and Economic Growth: Impact of FDI Inflows and Outflows. *ECONOMICS - Innovative and Economics Research Journal*, *13*(2), 485–505. https://doi.org/10.2478/eoik-2025-0051

Narayan, P.K. (2005). "The Savings and Investment Nexus for China: Evidence from Cointegration Tests", *Journal of Applied Economics*, 37(17), 1979-1990. https://doi.org/10.1080/00036840500278103

National Treasury (2019a). Tourism Industry and its Impact on Economic Growth. South African Government. https://www.treasury.gov.za

National Treasury (2019b). South Africa's Tourism Sector and its Role in Post-Pandemic Recovery. Available at: https://www.treasury.gov.za

Ongan, S., Işık, C., & Özdemir, D. (2017). The Effects of Real Exchange Rates and Income on International Tourism Demand for the USA from Some European Union Countries. *Economies, 5*(4), 51. https://doi.org/10.3390/economies5040051

Pesaran, M.H., Shin, Y. and Smith, R.J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, *16*(3), pp.289-326. https://doi.org/10.1002/jae.616

Polyzos, S., Samitas, A., & Spyridou, A. E. (2021). Tourism demand and the COVID-19 pandemic: An LSTM approach. *Tourism Recreation Research*, *46*(2), 175-187. https://doi.org/10.1080/02508281.2020.1777053

Rasekhi, S., & Mohammadi, S. (2017). Factors Affecting Tourism Demand in the Caspian Sea Littoral States. *Tourism Management Studies, 12*(38), 63-81. https://doi.org/10.22054/tms.2017.6434.1148

Rena, R., & Msoni, M. (2014). Global financial crises and its impact on the South African economy: A further update. *Journal of Economics, 5*(1), 17-25. https://www.researchgate.net/publication/321222183_Global_Financial_Crises_and_its_Impact_on_the_South_African_Economy_A_Further_Update

Rossello Nadal, J., & Santana Gallego, M. (2022). Gravity models for tourism demand modeling: Empirical review and outlook. *Journal of Economic Surveys*, *36*(5), 1358-1409. https://doi.org/10.1111/joes.12502

Samitas, A., Asteriou, D., Polyzos, S., & Kenourgios, D. (2018). Terrorist incidents and tourism demand: Evidence from Greece. *Tourism management perspectives*, *25*, 23-28. https://doi.org/10.1016/j.tmp.2017.10.005

Santana-Gallego, M., García, R., & Llorca, M. (2010). The impact of exchange rates on tourism demand. *Tourism Management*, 31(3), 289-295. https://doi.org/10.1016/j.tourman.2009.04.013

Seidualin, D. A., Mussina, K. P., & Mukanov, A. H. (2025). PLS-PM model for sustainable development of ecotourism: Case study of Ulytau Nature Park. *ECONOMICS - Innovative and Economics Research Journal*, *13*(1), 309–332. https://doi.org/10.2478/eoik-2025-0019

Sharma, C., & Pal, D. (2020). Exchange rate volatility and tourism demand in India: Unraveling the asymmetric relationship. *Journal of Travel Research,* 59(7), 1282–1297. https://doi.org/10.1177/0047287519878516

Shin, Y., Yu, B., & Greenwood-Nimmo, M., (2014). Modelling asymmetric cointegration and dynamic multipliers in a nonlinear ARDL framework. *Festschrift in honor of Peter Schmidt: Econometric methods and applications*, 281-314. http://ssrn.com/abstract=1807745

Smyth, R., Nielsen, I., & Mishra, V. (2009). I've been to Bali too' (and I will be going back): are terrorist shocks to Bali's tourist arrivals permanent or transitory?, *Applied Economics, 41*(11), 1367-1378. https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=2e4cb13f5c430781bd799d60e1fbc01d36aadff5

South African Tourism (2010). The *Marketing Tourism Growth Strategy for South Africa 2011-2013*, 1-93. Sandton: SAT. http://www.btrust.org.za/downloads/8_tep_tourism_growth_strategy_2011_2013_sat.pdf

Stats SA (2019). Statistics South Africa (Stats SA) Sustainable Development Goals (SDGS) on 2 December 2019. https://www.statssa.gov.za

Stats SA (2023). Tourism Statistics and Recovery in South Africa Post-COVID. Statistics South Africa. https://www.statssa.gov.za

Tang, C. F., Saha, S., & Hu, B. (2016). Exchange rates, tourism demand, and the economic performance of developing countries. *International Journal of Tourism Research*, 18(1), 80-89. http://doi.org/10.1002/jtr.2059

Tang, J., Sriboonchitta, S., Ramos, V., & Wong, W. K. (2016). Modelling dependence between tourism demand and exchange rate using the copula-based GARCH model. *Current Issues in Tourism*, *19*(9), 876-894. https://doi.org/10.1080/13683500.2014.932336

Tourism (2002). *10 Years of Review of Tourism in South Africa*, 1-16. Sandton: SAT. https://www.statssa.gov.za/publications/Report-03-51-02/Report-03-51-022002.pdf

Tshidzumba, N.A., Oladunjoye, O.N., & Chaka, M., (2022). Impact of exchange rate regime on international tourists' inflow in South Africa. *African Journal of Hospitality, Tourism and Leisure*, *11*(6), pp.2159-2172. https://doi.org/10.46222/ajhtl.19770720.348

Tung, L. (2019). Does the exchange rate affect foreign tourist arrivals? Evidence in an emerging tourist market. *Management Science Letters*, *9*(8), 1141-1152. http://www.growingscience.com/msl

Webber, A.G. (2001). Exchange rate volatility and cointegration in tourism demand. *Journal of Travel Research, 39*(4), 398-405. https://journals.sagepub.com/doi/pdf/10.1177/004728750103900406

World Bank (2020). South Africa Economic Update: Navigating the Pandemic and Political Challenges. The World Bank. https://www.worldbank.org

World Travel & Tourism Council (WTTC). (2022). *The Economic Impact of Travel & Tourism 2022*. WTTC. https://wttc.org/research/economic-impact