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Navigating Uncertainty: The Impact of Real Exchange Rate Changes on Türkiye's Tourism (2013-2023)

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Belirsizlikte Yol Almak: Gerçek Döviz Kuru Değişikliklerinin Türkiye Turizmine Etkisi (2013-2023)

Abstract

This study investigates the causal relationship between tourism revenues and the real effective exchange rate within the context of economic and social crises. Monthly data from 2013-2023 were analysed using structural break tests and Granger causality analysis. The findings show that the July 15 coup attempt, the Pastor Brunson crisis, and the COVID-19 pandemic influenced the relationship in various ways. No immediate short-term causality was identified; tourism revenues were more affected by security concerns, seasonal patterns, and global crises. The exchange rate advantage diminished during crises and vanished during the pandemic. The study emphasises the need for greater political stability and effective crisis management in tourism policy, and offers key recommendations.

Keywords : COVID-19, Crises, Granger Causality Analysis, Real Exchange Rate, Tourism Revenue.

JEL Classification Codes : E43, O520, Z32.

Öz

Bu çalışma, Türkiye'de turizm gelirleri ile reel efektif döviz kuru arasındaki nedensel ilişkiyi, ekonomik ve sosyal krizler bağlamında analiz etmektedir. 2013-2023 dönemi aylık verileri kullanılarak yapısal kırılma testleri ve Granger nedensellik analizi uygulanmıştır. Bulgular, 15 Temmuz darbe girişimi, Pastor Brunson krizi ve COVID-19 pandemisinin ilişkiyi farklı biçimlerde etkilediğini göstermektedir. Kısa vadede doğrudan nedensellik bulunmazken, turizm gelirleri daha çok güvenlik endişeleri, mevsimsellik ve küresel krizlerden etkilenmektedir. Kriz dönemlerinde döviz kuru avantajının etkisi azalmakta, pandemi sürecinde ise tamamen ortadan kalkmaktadır. Çalışma, turizm politikalarında siyasi istikrar ve kriz yönetiminin önemini vurgulamakta ve politika geliştirmeye ve gelecek çalışmalara yönelik öneriler sunmaktadır.

Anahtar Sözcükler : COVID-19, Krizler, Granger Nedensellik Analizi, Reel Döviz Kuru, Turizm Gelirleri.

1. Introduction

Tourism plays a vital role in strengthening the economies of both emerging and developed nations (Streimikiene et al., 2021: 260), as well as contributing to the foreign exchange reserves of all countries and generating direct or indirect employment opportunities within society (Thommandru et al., 2021: 1). For developing countries, tourism offers a crucial opportunity to reduce poverty, stimulate economic growth, and better integrate into the global economy (Croes & Vanegas, 2008: 94). It can also be noted that the tourism sector, which actively supports foreign exchange needs, helps improve the balance of payments deficit (Perez-Rodríguez et al., 2015: 268). Therefore, the sector, closely monitored by policymakers, is believed to influence both individual- and national-level variables (Gülcü, 2024: 847).

The process of structural change in Türkiye's tourism sector and its development began in 1980 (Bulut, 2000: 72). Following the decisions made on 24 January 1980 regarding active foreign tourism in Türkiye, the import-substitution policy was replaced by an export-oriented policy. The Tourism Incentive Law of 1982 was a key milestone, offering significant investments and financial support to the sector (Yamak et al., 2006: 206). During this period, tourism revenues made up just 0.6% of GDP in 1980 (Albayrak, 2017: 135; Kanca, 2015: 4), rising notably to 5.4% by 2023.

As shown in Table 1, tourism revenues generally increased between 2013 and 2019, peaking at USD 38.9 billion in 2019. During this period, tourism revenues accounted for 5.1% of GDP. However, the COVID-19 pandemic in 2020 led to a sharp decline, with revenues falling to USD 14.8 billion and the share of GDP decreasing to 2%. This notable contraction in the tourism sector was primarily due to travel restrictions and health concerns, which reduced international tourist arrivals.

Table: 1
Distribution of Tourism Revenues, Average Annual Expenditures, and Tourism's Contribution to GDP

Year	Tourism Revenues ($, billion)	Average Expenditure ($)	Tourism Revenue Share in GDP (%)
2013	33.07	843	4.0
2014	35.14	848	4.3
2015	32.49	781	3.7
2016	22.84	728	2.6
2017	27.04	700	3.1
2018	30.55	669	3.8
2019	38.93	751	5.1
2020	14.82	936	2.0
2021	30.17	1028	3.7
2022	46.28	901	5.1
2023	55.87	979	5.4

Source: Created by the authors using data from TÜRSAB, 2024; Ministry of Culture and Tourism, 2024; TUIK, 2024.

In 2021, tourism revenues partially recovered, reaching USD 30.2 billion, although their share in GDP remained below pre-pandemic levels at 3.7%. The recovery continued in 2022 and 2023, with revenues increasing to USD 46.3 billion and USD 55.9 billion, respectively. Correspondingly, the share of GDP grew to 5.1% in 2022 and 5.4% in 2023.

The rise in 2023 reflects the ongoing recovery of the tourism sector and positive developments that support its growth.

When analysing international tourism flows, it becomes clear that the movement of people directly influences fluctuations in foreign exchange rates. These fluctuations affect the demand for foreign currency in countries that send tourists and impact the supply in nations that receive them (Bulut, 2000: 78). The real exchange rate (RER), which compares the price levels of goods and services between domestic and foreign markets, functions as a key indicator for assessing a country's global trade competitiveness (Edwards, 1988).

In this context, the RER plays a vital role in boosting Türkiye's appeal to international visitors and promoting local expenditure. Moreover, global economic factors such as security, international connectivity, and exchange rates substantially affect both the number of tourist arrivals and tourism income. Exchange rate fluctuations, in particular, significantly affect tourism earnings (Aktaş et al., 2014: 493-494).

The RER is usually calculated by adjusting nominal exchange rates for inflation differences between countries. It essentially shows the relative price of domestic goods compared to foreign ones (Kızıltan & Ciğerlioğlu, 2008: 424). An increase in the RER indicates that domestic goods and services become more expensive relative to foreign goods and services, potentially reducing a country's tourism competitiveness. Conversely, a decrease means that foreign products are becoming more expensive, making domestic tourism more attractive (Gülcü, 2024: 847-848).

Given that tourism contributes to economic growth through foreign exchange earnings and employment creation, exchange rates are a vital factor in boosting tourism revenues (Öner, 2022: 100). The link between exchange rates and tourism revenues is therefore crucial for designing effective sectoral strategies and incentives. Fluctuations in exchange rates directly influence international tourist demand and modify domestic tourists' spending behaviour. As a result, incorporating exchange rate dynamics into tourism policy formulation is essential for enhancing policy effectiveness.

The tourism sector is inherently susceptible to external shocks and is among the most immediately affected industries during crises (UNWTO, 2020). Factors such as pandemics, geopolitical tensions, and economic uncertainties deeply impact the sector through both demand contraction and financial instability. In the face of such shocks, the timely and targeted implementation of fiscal and monetary policies directly influences the pace of recovery and the long-term sustainability of the tourism industry (Hevia & Neumeyer, 2020; Gössling et al., 2021). For instance, during crisis periods, fiscal policies such as stimulus packages, tax deferrals, and direct subsidies help tourism businesses remain operational, while monetary policies, including interest rate adjustments and liquidity support, aim to stimulate demand (Şengel et al., 2023).

However, the literature provides limited empirical evidence on the effectiveness of these policies within the tourism sector, particularly regarding macroeconomic variables such as exchange rates (see Sastre, 2017; Sarker, 2020; Şengel et al., 2023). This study aims to address this gap by analysing the effect of crisis periods on tourism revenues and the real exchange rate, offering policymakers practical, data-driven advice. The results obtained through empirical methods such as the Granger causality test offer insights into which types of macroeconomic policies are more effective in stabilising tourism revenues during crises, thereby making a strategic contribution to Türkiye and to other economies with similar structural vulnerabilities.

A significant body of literature has examined the relationship between real exchange rates and tourism revenues (see Pekmezci & Bozkurt, 2016; Aktaş et al., 2014; Akar & Özcan, 2021). However, to date, no research has incorporated recent events and data, such as the COVID-19 pandemic, the Pastor Brunson crisis, and the attempted coup, that could considerably affect a country's current economic conditions as variables in the analysis.

Following the Pastor Brunson crisis, significant exchange-rate shocks were observed, accompanied by rapid increases in both exchange rates and inflation (Nazlıoğlu, 2024; Solmaz, 2002). These economic fluctuations heightened volatility in the Borsa Istanbul (BIST) and prompted foreign investors to withdraw from equity markets amid heightened risk perceptions during the crisis (Somuncu, 2021). Although the World Health Organisation declared COVID-19 a pandemic in March 2020 (McCartney, 2020), the virus caused unprecedented socioeconomic impacts globally, owing to its mutation-driven rapid transmission and lethality, which far surpassed those of previous MERS and SARS outbreaks. The tourism sector, characterised by its dynamic nature and reliance on physical interaction, was among the most severely affected industries (Gralinski & Menachery, 2020; Backer et al., 2020). Consequently, the pandemic's impacts remain highly relevant to scientific investigation.

This study aims to make an original contribution by examining the relationship between exchange rates and tourism revenues, which is most often analysed in the literature using conventional period data, in the context of three major recent shocks in Türkiye: the COVID-19 pandemic, the Pastor Brunson crisis, and the July 15 coup attempt. Existing studies primarily focus on long-term relationships and often exclude such sudden political, economic, and global shocks from their analyses. However, these events can have direct and significant effects on both exchange rate volatility and tourism demand. In fact, a study by Kartal (2019) highlights that the series of events starting with the Gezi Park protests and continuing through the July 15 coup attempt and the Pastor Brunson crisis substantially influenced the cointegration and causality relationship between foreign trade and exchange rates.

To empirically examine these relationships, this study uses a monthly dataset from January 2013 to December 2023, comprising tourism revenue data from the Turkish

Statistical Institute (TUIK) and exchange rate data from the Central Bank of the Republic of Türkiye (TCMB). All analyses were performed using EViews 10.0.

Given the significant structural breaks during this period, including the 2016 coup attempt, the 2018 Pastor Brunson crisis, and the COVID-19 pandemic, the study employs advanced econometric techniques that account for these shifts. Stationarity tests that incorporate structural breaks (e.g., the Lee-Strazicich unit root test) are applied to assess the data's robustness. Additionally, sub-period causality analyses are conducted using the Granger Causality Test, differentiating between pre-crisis and crisis regimes to capture changing dynamics.

Moreover, dummy variables representing each crisis are included in the model to explicitly assess their effects on tourism revenues and exchange rate volatility. This methodological approach enhances the study's capacity to provide practical insights and policy advice relevant to emerging economies facing similar shocks.

Considering the shocks and their implications on both macroeconomic stability and sector-specific dynamics, this study hypothesises that real exchange rate volatility significantly influences tourism revenues during crises. By empirically incorporating dummy variables for events such as COVID-19, the Pastor Brunson crisis, and the 2016 coup attempt, this paper offers an evidence-based approach to understanding the effectiveness of fiscal and monetary interventions in stabilising the tourism industry. The findings are particularly relevant for policymakers seeking to strengthen the resilience of the tourism sector in emerging economies like Türkiye. Furthermore, the study evaluates whether export-oriented policy frameworks, as adopted after 1980, remain viable during crisis periods, or whether more targeted, shock-specific tools are necessary.

2. Literature Review

The literature review shows that numerous studies have examined the relationship between tourism and exchange rates, conducted at both national and international levels (see Table 2). The main difference among these studies lies in the variety of models and datasets used in the analyses. Additionally, many existing studies do not account for recent developments and overlook the impact of socio-economic crises, including the COVID-19 pandemic, the July 15 coup attempt, and the Pastor Brunson crisis. Table 2 summarises research investigating the link between real exchange rates and tourism revenues.

Table: 2
Studies on Real Exchange Rate and Tourism Revenues

Name of the Study	Researcher and Date of the Study	Study Period	Analyses Used in the Study	Findings
"*Real Exchange Relationship with Tourism Income in Türkiye*"	Gülcü, Y. (2024)	2005-2020	Unit root test and causality	The analysis indicates that, in 2013 and 2020, the real exchange rate causally affects tourism revenue, whereas in 2017 and 2018, the causality runs from tourism revenue to the real exchange rate.

"*The effect of real effective USD/TRY exchange rate on tourism income: An empirical analysis of Türkiye*"	Öner (2022)	2003Q1-2019Q4	Granger causality test	No Granger causality was found between the real effective USD/TRY exchange rate and tourism revenue.
"*Relationship between real exchange rate and tourism receipts: A VAR analysis with structural break*"	Akar ve Özcan (2021)	2012-2019	VAR Analysis	During the period under analysis, tourism revenues and exchange rate variables did not significantly influence one another.
"*Tourism Income Exchange Rate Relationship: In Türkiye (2008-2019)"*	Arslan ve Çetiner (2020)	2008-2019	Vector autoregression method	The variables demonstrate a significant relationship and exhibit low mutual explanatory power.
"*The Effect of Real Exchange Rate on Tourism Revenues in Türkiye: An Empirical Application for the Period 2010-2017*"	Albayrak (2017)	2010-2017	Dickey-Fuller (ADF) and Phillips-Perron (PP) methods	It has been determined that the real exchange rate impacts Türkiye's tourism revenues. According to the Granger Causality Analysis, a unidirectional causal relationship exists, flowing from the exchange rate to tourism revenues.
"*Relationship Between Tourism Revenue and Exchange Rate*"	Kaya (2017)	2003-2016	Least Squares (LSS) method	The exchange rate significantly influences Türkiye's tourism income.
"*Real Exchange Rate and Tourism Income Relationship in Türkiye: Empirical Application for The Period Of 2003-2016*"	Öncel vd. (2016)	2003-2015	FMOLS DOLS methods for Toda-Yamamoto Causality analysis and coefficient estimation	Although the two variables are cointegrated, causality runs solely from tourism revenues to real exchange rates.
"*The Türkiye Macroeconomic Determinants of Tourism Revenues: Panel Data Analysis*"	Özcan, C. C. (2015)	1995-2011	Panel Data Analysis	Every variable in the model influences tourism income; however, per capita GDP and the real exchange rate emerge as particularly significant determinants.
"*A note on modelling tourism revenues in Croatia*"	Payne ve Mervar (2002)	1993-1999	Regression analysis	Both the EU GDP and the real exchange rate play significant roles in shaping Croatian tourism revenues.

Kara et al. (2012) examined the relationship between tourism revenues and several macroeconomic variables from 1992 to 2011 using three models. Using methods such as the Engle-Granger cointegration approach, VAR analysis, and Granger causality tests, they found a one-way causal effect from economic growth to tourism revenues, a mutual relationship between tourism revenues and the current account balance, and a unidirectional causal link from exchange rates to tourism revenues.

Erkan et al. (2013) analysed monthly data from 2005 to 2012 using a VAR model and Granger causality tests. Their results indicated a reciprocal causal relationship between tourism revenues and the number of tourists in Türkiye, and that fluctuations in the real exchange rate do not significantly affect tourism revenues.

Şen & Şit (2015) examined the effect of the real exchange rate on tourism revenues using monthly data between 2000 and 2012. For this purpose, researchers employed unit root tests, frequency distribution, and Toda-Yamamoto causality tests. They concluded that both real exchange rates and Türkiye's tourism revenues have reciprocal effects.

Sevim & Oğan (2020) investigated the causality relationship between the exchange rate applied from 2012 to 2018 and the tourism sector, using data on exchange rates, tourism revenues, tourist numbers, and tourists' average expenditures. In the study in which Granger Causality analysis was conducted, the results showed no causal link among the real exchange rate, tourism revenues, and the number of visitors.

Ünkaracalar & Arslantürk (2021) examined the economic factors influencing tourism revenues in Türkiye. They indicated cointegration among the variables used in their research

for the periods 2010-Q1 and 2020-Q4. They showed that economic growth, the CPI-based real effective exchange rate, and inflation positively affected tourism revenues.

Demir (2021) examined the relationship between tourism revenues, real economic growth, and the real exchange rate for the period from 2003Q1 to 2020Q1. This study employed advanced econometric techniques, including the Zivot-Andrews structural break unit root test, Johansen cointegration analysis, FMOLS, and DOLS for coefficient estimation, as well as the Toda-Yamamoto causality test. The results showed that the real exchange rate has a significantly greater impact on real national income compared to tourism revenues.

Timur & Mert (2021) examined the asymmetric relationship between the real exchange rate and tourism revenues in Türkiye using data from 2003Q1 to 2020Q1. Their analysis showed that, over the long term, the relationship between exchange rates and tourism revenues is asymmetric, whereas in the short term it appears symmetric.

Therefore, several studies have examined the relationships among tourism revenue, exchange rates, and other macroeconomic variables in Türkiye. Various studies have examined the relationships between tourism revenues and exchange rates using diverse methods (e.g., Engle-Granger, VAR, Granger causality, Johansen cointegration). This diversity reflects the subject's complexity and multidimensional nature. Most studies have found mutual causality relationships between tourism revenues and other macroeconomic variables. However, some studies indicate that the effect of exchange rates on tourism revenues is limited or absent. Additionally, these studies cover different periods. As a result, the literature offers a wide range of findings on the relationships between tourism revenues and exchange rates in Türkiye, but contradictory results and methodological differences also emerge. This situation indicates that further research on the subject is necessary.

Granger Causality Analysis has significantly contributed to understanding the dynamic relationship between tourism and macroeconomic variables, especially during periods of crisis. By assuming that past values contain valuable information for predicting the future development of other variables, this approach uncovers both the direction and the strength of causality. Studies such as Radulescu (2020) and Aslan (2014) comprehensively demonstrate the impact of tourism on economic growth through Granger causality tests. Additionally, research by Lean & Tang (2010) and Tang & Tan (2013) indicates that tourism's effect on economic growth may vary over time and across economic regimes. Pairwise Granger Causality Tests were conducted for each sub-period. This method enables the examination of causal relationships between two variables, separately, across different time frames and during periods of crisis.

Incorporating fiscal and monetary policy interventions, as well as significant structural breaks such as the COVID-19 pandemic, the 2016 coup attempt, and the Pastor Brunson crisis, into the analysis is crucial for enhancing both the realism of the results and the practical applicability of policy recommendations. The use of dummy variables to

capture these shocks within Granger causality frameworks provides a more nuanced understanding of how sudden and unprecedented events alter the tourism-exchange rate nexus.

For Türkiye and similar emerging economies, this enhanced Granger Causality method functions not only as a data-driven predictive tool but also as a crucial instrument for managing future uncertainties in tourism. It supports the development of adaptive and crisis-responsive policy measures to stabilise and enhance the tourism sector's resilience amid macroeconomic volatility.

3. Methodology

This study examines the causal relationship between Türkiye's tourism revenues and the exchange rate, with particular emphasis on the dynamic effects of economic and social crises on this link. For this purpose, a dataset consisting of 132 monthly observations from January 2013 to December 2023 was used. The tourism revenue data were obtained from the Turkish Statistical Institute (TUIK), while the U.S. dollar exchange rate data were sourced from the Central Bank of the Republic of Türkiye (TCMB). All empirical analyses were conducted using EViews 10.0.

3.1. Analytical Framework and Methodological Approach

The period covered by this study (2013-2023) encompasses a timeframe marked by significant political, social, and health-related structural breaks that have notably affected the Turkish economy. In the presence of such structural breaks, traditional econometric methods may yield misleading results. Therefore, to improve the robustness and reliability of the study's findings, more modern and dynamic econometric techniques have been employed.

Within this framework, the analytical process involves four key steps:

- **Stationarity Analysis with Structural Breaks**: The series' stationarity properties were evaluated using unit root tests that consider potential structural breaks.
- **Sub-Period Causality Analysis**: The causal relationship between the variables was examined by dividing the sample into sub-periods that represent different economic regimes (pre-crisis periods and crisis periods).
- **Model Validity Tests**: The statistical validity of the VAR models used in the causality analysis was evaluated through stability and autocorrelation diagnostics.
- **Crisis-Oriented Graphical Analysis and Interpretation**: To visualise the statistical findings and highlight the unique dynamics of each structural break, the main crisis episodes (Post-Coup Attempt, Pastor Brunson Crisis, and COVID-19 Pandemic) were analysed and interpreted individually using graphical representations.

3.1.1. Stationarity Analysis with Structural Breaks

In time-series analysis, testing the stationarity of variables before examining causal relationships is a critical prerequisite. To account for potential abrupt shifts in the level or trend of the series (structural breaks) that crises during the study period may have induced, the Lee and Strazicich (2003) LM unit root test, allowing for two endogenous structural breaks, was employed. This test offers a theoretical advantage in that it permits breaks under both the null hypothesis (H_0: unit root) and the alternative hypothesis (H_1: stationarity).

The primary hypotheses of the test are as follows:

- **H_0 (Null Hypothesis)**: The series contains a unit root when structural breaks are present (i.e., it is non-stationary).
- **H_1 (Alternative Hypothesis)**: The series remains stationary despite structural breaks.

The LM statistic from the test is compared with the relevant critical values to assess the series' stationarity. The test results are shown below.

For the logarithmic tourism revenue series (LOG_REVENUES), the test statistic was -5.939. This value is more negative than the 5% critical value of -5.438. Accordingly, the null hypothesis of a unit root in the presence of structural breaks is rejected at the 5% significance level. This finding indicates that the tourism revenue series is stationary (I(0)) after accounting for structural breaks. The test identified December 2019 (2019M12) as the most probable date of the structural break. The fact that this date coincides with the onset of the COVID-19 pandemic, an event that profoundly affected the global tourism industry, further emphasises the economic importance of the result.

For the logarithmic real effective exchange rate series (LOG_REEL_EFFEKTIVE), the test statistic was -5.527. This value is more negative than the 5% critical value of -5.370. Therefore, the null hypothesis (H_0) stating that the series contains a unit root is rejected at the 5% significance level. This result confirms that the real effective exchange rate series is also stationary (I(0)) in the presence of structural breaks. The test identified October 2014 (2014M10) as the structural break date for this series.

Table: 3
Results of the Lee-Strazicich LM Unit Root Test

Variables	Test Statistic	5% Critical Value	Break Date	Conclusion
LOG_REVENUES	-5.939	-5.438	2019M12	Stationary (I(0))
LOG_REEL_EFFECTIVE	-5.527	-5.370	2014M10	Stationary (I(0))

The stationarity test results indicate that both the tourism revenue series and the real effective exchange rate series are stationary (I(0)) when structural breaks are accounted for. This has two main implications. First, it indicates that differencing the series is unnecessary when examining causal relationships between these variables, thereby enabling reliable

analysis using their level values (Sünbül, 2025: 154). Second, the identified break dates (late 2014 and late 2019) align with key periods in the Turkish economy, underscoring the validity of an approach that explicitly accounts for structural breaks.

3.1.2. Sub-Period Causality Analysis

Assuming that the causal relationship between tourism revenues and the real effective exchange rate may not remain stable over time and that its structure or direction could vary, especially during crisis periods, this study does not apply the standard Granger causality test to the entire sample period. Instead, to examine the temporal stability of the relationship and to identify the potential influence of structural breaks, a sub-period division strategy reflecting different economic regimes was adopted (Söyler, 2021: 70).

Consequently, the entire dataset was divided into pre-crisis and crisis periods, and separate Pairwise Granger Causality Tests were performed for each sub-period. This method enables direct comparison of whether the causal relationship is statistically significant across different economic conditions (Danyal & Gümüş, 2022).

Before starting the analysis, two key methodological choices were made to ensure model robustness (Karaca, 2003: 249): selecting the appropriate lag length and setting the analysis periods.

3.1.2.1. Determination of Optimal Lag Length

In causality tests based on the Vector Autoregressive (VAR) model, selecting the appropriate lag length is crucial for the reliability of the results. To this end, the VAR Lag Length Selection Criteria test was applied to the variables LOG_REVENUES and LOG_REEL_EFFECTIVE over the entire study period (2013M01-2023M12). According to the test outcomes, both the Schwarz Criterion (SC) and the Hannan-Quinn Criterion (HQ) suggested an optimal lag length of 3.

In econometric modelling, it is a common principle to prefer "parsimonious yet adequate" models that retain explanatory power with fewer parameters, thereby reducing the risk of overparameterisation (Ucal, 2006: 47). Based on this principle and support from multiple criteria, a lag length of 3 was regarded as the optimal value for the analyses.

3.1.2.2. Determination of Analysis Periods (Pre-Crisis and Crisis Period Separation)

The central hypothesis of the study posits that the causal relationship undergoes a structural change during periods of crisis. To examine this hypothesis, rather than analysing the entire sample as a single unit, a strategy was employed that divides it into meaningful sub-periods representing different economic regimes. This method enables testing the stability of the relationship over time and clearly identifying the effects of potential structural

breaks (Yurdakul, 2000). In selecting these periods, the results of the Lee-Strazicich unit root test, conducted in the previous section, were also used.

- **Pre-Crisis / Relatively Stable Period (2013M01-2017M12)**: This phase reflects a time when the Turkish economy was comparatively more stable, and significant structural breaks such as the Pastor Brunson crisis and the COVID-19 pandemic had not yet taken place. It was designated as a baseline to observe the "normal" course of the relationship between the variables.
- **Crisis and Structural Break Period (2018M01-2021M12)**: The start of this period includes 2018, which was identified as a significant breakpoint for the real effective exchange rate series in the unit root test. This period also encompasses the onset and peak of the COVID-19 pandemic in December 2019, which was found to cause a significant structural break in the tourism revenue series in tests. Therefore, this period was selected to measure the effects of structural breaks on the model directly.

To test the study's main hypothesis, the Pairwise Granger Causality Test was conducted on the defined sub-periods with a lag length of 3. The results concerning the causality from the real effective exchange rate (LOG_REEL_EFFECTIVE) to tourism revenues (LOG_REVENUES), which is the central focus of the analysis, are presented as follows:

- **Pre-Crisis Period (2013M01-2017M12) Analysis**

The test conducted during this period yielded a p-value that was not statistically significant, supporting the null hypothesis that "the real effective exchange rate is not a Granger cause of tourism revenues." The low F-statistic of 0.3886 indicates that, during this period, the real effective exchange rate lacked sufficient statistical power to predict tourism revenues.

- **Crisis Period (2018M01-2021M12) Analysis**

During this period marked by significant economic and social disruptions, the test yielded a p-value of 0.934 for the same null hypothesis. This p-value is considerably higher than the 5% significance level. This result confirms that, contrary to expectations, no significant causal effect of the real effective exchange rate on tourism revenues was observed, even during the crisis period. To provide a more straightforward overview of the analysis results, the findings are summarised in Table 4.

Table: 4
Sub-Period Causality Test Results

Null Hypothesis (H_0)	Period	Number of Observations	F	P	Result (5%)
REEL_EFFECTIVE → REVENUES No causality exists	2013-2017	57	3.886	0,872	H_0 Fail to reject
REEL_EFFECTIVE → REVENUES No causality exists	2018-2021	48	1.410	0,934	H_0 Fail to reject

3.1.3. Model Validity Tests

To assess whether the VAR models used in the causality analysis are statistically sound and reliable, stability and autocorrelation tests were conducted on the models estimated for each sub-period.

- **Stability Tests**

The dynamic stability of the VAR models for both sub-periods (2013-2017 and 2018-2021) was assessed by examining the roots of the characteristic polynomial. For both models, all calculated roots lie within the unit circle, with moduli less than 1. The EViews output confirmed this with the statement: "No root lies outside the unit circle. VAR satisfies the stability condition." These findings suggest that both models are stable and that the effects of structural breaks fade over time, thus confirming the reliability of the results.

- **Autocorrelation Tests**

The presence of autocorrelation (serial correlation) in the model residuals was examined using the LM test applied to the VAR residuals. The test results vary between the periods:

- **Pre-Crisis Period (2013-2017)**: Conversely, the model for this period exhibited statistically significant autocorrelation at the 7th and 12th lags (with p-values of 0.019 and 0.000, respectively). This indicates that some serial correlation persists in the model's residuals.
- **Crisis Period (2018-2021)**: For the model established during this period, no statistically significant autocorrelation was detected in the residuals up to the 12th lag. All p-values exceeding 0.05 indicate that the residuals of this model conform to a "white noise" process, confirming the model is specified correctly.

According to the diagnostic test results, the models for both periods satisfy the stability condition. The model representing the crisis period (2018-2021) is statistically robust and free of autocorrelation. The detection of autocorrelation in the pre-crisis period (2013-2017) model suggests that the causality test results for this period (which were insignificant at the 5% level) should be interpreted with caution. However, the absence of causality in both periods supports the study's overall conclusion.

The causality analysis consistently shows that, both during relatively stable economic periods and during crisis periods with significant structural breaks, the real effective exchange rate does not have a short-term, direct Granger-causality effect on Türkiye's tourism revenues. This finding suggests that the relationship between these two variables is more complex than a simple causal link and indicates that non-exchange-rate factors may exert a greater influence on tourism revenues.

3.1.4. Crisis-Focused Graphical Analysis and Interpretation

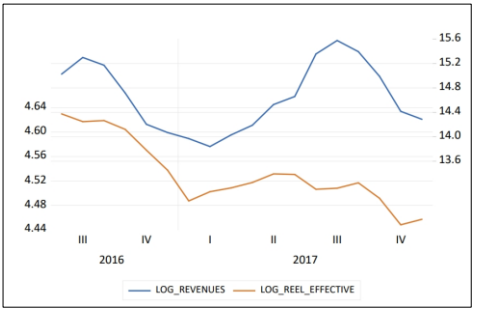
To support the statistical analysis with visual evidence and to reveal the unique dynamics of each structural break, the main crisis periods were examined and graphically interpreted.

3.1.4.1. Post-Coup Attempt Period (2016-2017)

Figure 1 covers the period from the third quarter of 2016 to the fourth quarter of 2017. This interval aligns with the political and economic uncertainty immediately following the coup attempt in Türkiye on July 15, 2016. The graph displays the logarithmic values of two key economic indicators.

- **Tourism Revenues (LOG_REVENUES)**: Shown by the solid line on the graph. The values of this series are shown on the right vertical axis, which ranges from 13.6 to 15.6.
- **Real Effective Exchange Rate (LOG_REEL_EFFECTIVE)**: Shown by the dashed line. The values for this series are displayed on the left vertical axis, ranging from 4.44 to 4.64.

Figure: 1
Tourism Revenue and Exchange Rate Graph for the Post-Coup Attempt Period (2016-2017)



The sharp decline in tourism revenues after the third quarter of 2016 can be attributed to both security concerns and image issues caused by the coup attempt, as well as to seasonal sector dynamics. By 2017, especially in the second and third quarters, there was clear evidence of a strong recovery in tourism revenues. During the same period, the real effective exchange rate showed a general downward trend, indicating a real depreciation of the Turkish Lira and making Türkiye a relatively cheaper destination for foreign tourists. The graph suggests a possible inverse relationship between these two variables. Specifically, during the recovery phase in 2017, the drop in the real effective exchange rate coupled with rising tourism revenues implies that, following the initial shock of the coup attempt, the currency's real depreciation may have helped drive the sector's rebound.

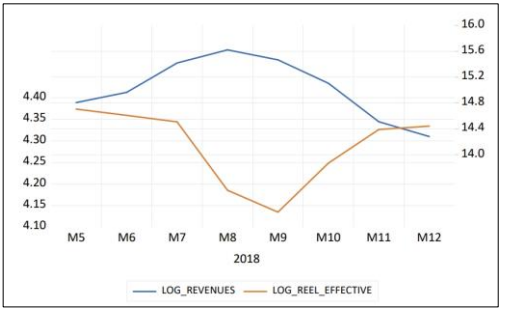
3.1.4.2. Pastor Brunson Crisis Period (2018)

According to Figure 2, the period from May 2018 to December 2018 is covered, focusing on the "Pastor Brunson Crisis," during which the Turkish economy experienced a sharp exchange rate shock. The graph compares the logarithmic series of tourism revenues and the real effective exchange rate during this critical period.

- **Tourism Revenues (LOG_REVENUES)**: Shown by the solid line, tourism revenues exhibit a clear seasonal pattern as expected. Revenues increase with the start of summer, peak in August (M8), and then decline seasonally towards the end of the year.
- **Real Effective Exchange Rate (LOG_REEL_EFFECTIVE)**: Shown by the dashed line, the real effective exchange rate displays a dramatic movement during this period. The sharp decline, which began in July (M7), reaches its lowest point in September (M9). This visually demonstrates how rapidly and severely the Turkish Lira depreciated in real terms, making Türkiye considerably cheaper for foreign visitors.

The most notable observation from this graph is the apparent independence of the two series' movements. While the real effective exchange rate experienced one of its steepest declines in history, tourism revenues continued to follow their seasonal cycle. The extreme depreciation of the real exchange rate during this period did not produce an immediate or visible positive effect on tourism revenues.

Figure: 2
Tourism Revenue and Exchange Rate Chart during the Pastor Brunson Crisis (2018)

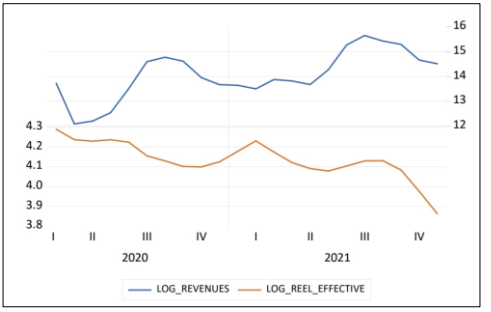


3.1.4.3. COVID-19 Pandemic Period (2020-2021)

Figure 3 centres on 2020 and 2021, when the COVID-19 pandemic, which profoundly affected the world and Türkiye, was at its peak. The graph displays the trajectories of the logarithmic tourism revenues and the logarithmic real effective exchange rate series during this period of global upheaval.

- **Tourism Revenues (LOG_REVENUES)**: As shown by the solid line, tourism revenues strongly reflect the pandemic's impact. The sharp, sudden decline starting in the first quarter of 2020 indicates that the sector nearly ground to a halt due to international travel bans and quarantines. Although some recovery and seasonal variation occurred in the second half of 2020 and throughout 2021, levels remained well below pre-pandemic levels.
- **The Real Effective Exchange Rate (LOG_REEL_EFFECTIVE)**, shown by the dashed line, continued its overall downward trend during this period. This suggests that the Turkish lira continued to depreciate in real terms, making Türkiye increasingly affordable for foreign visitors.

Figure: 3
Tourism Revenue and Exchange Rate Graph during the COVID-19 Pandemic (2020-2021)



The most notable finding in this graph is the complete decoupling observed between the two series. While Türkiye was becoming increasingly cheaper in real terms, tourism revenues experienced one of the largest collapses in its history. This visual evidence supports the results of the causality analysis conducted in the study. The findings suggest that, in the face of a widespread, global shock such as the pandemic, the exchange rate's attractiveness becomes entirely ineffective. In other words, regardless of how inexpensive a destination is, if people are unable or unwilling to travel, the exchange rate cannot produce a positive impact on revenues.

4. Conclusion & Discussion

Revenues from foreign tourist visits can be compared to export earnings from goods (Bahar & Kozak, 2005). Such income not only drives economic growth but also plays a vital role in increasing employment levels. Furthermore, tourism income is essential in reducing deficits for countries facing external payment imbalances (Öncel et al., 2016).

When reviewing the literature, the most notable feature distinguishing these studies is the diversity of models and datasets used in experimental analyses. However, a significant portion of the existing literature does not address current social and economic events,

particularly neglecting the economic and social impacts of critical turning points such as the COVID-19 pandemic, the coup attempts on 15 July 2016, and the Pastor Brunson crisis. This indicates that these studies do not sufficiently examine the damaging effects of crisis periods on economic structures or the potential repercussions of such extraordinary events on the relationship between tourism revenues and the exchange rate.

This study investigates the causal link between Türkiye's tourism revenues and the real effective exchange rate, emphasising the dynamic effects of economic and social crises on this relationship. Using monthly data from 2013 to 2023 and applying advanced econometric techniques, the analysis shows that crisis periods, including the 2016 coup attempt, the 2018 Pastor Brunson crisis, and the 2020 COVID-19 pandemic, have impacted the connection between the tourism sector and the exchange rate in various ways.

In the Granger causality analysis, no direct causal relationship was identified between exchange rates and tourism revenues. This aligns with many studies in the literature (Öner, 2022; Akar & Özcan, 2021; Sevim & Oğan, 2020). Dummy variables were included in the analysis to control for the effects of key events such as the COVID-19 pandemic, the July 15 coup attempt, and the Pastor Brunson crisis and to assess whether these turning points affected the relationship between exchange rates and tourism revenues. Notably, a significant relationship was observed only during the pandemic period, while no clear causal link was found in other periods. These findings suggest that the interaction between exchange rates and tourism revenues becomes more complex during crisis periods, with external factors possibly masking the relationship. The key findings are as follows:

- Both the tourism revenues and real effective exchange rate series were found to be stationary when considering structural breaks, enabling meaningful causality analyses using their level values.
- The causality analysis did not identify a significant causal link from the real effective exchange rate to tourism revenues either across the entire period or during times of crisis. This suggests that exchange rate changes do not directly and exclusively influence tourism revenues in the short term.
- Graphical analyses suggest that the depreciation of the real exchange rate following the coup attempt may have contributed to the recovery of tourism revenues, whereas no direct impact of the exchange rate shock on tourism revenues was observed during the Pastor Brunson crisis.
- During the COVID-19 pandemic, despite a significant depreciation of the exchange rate, tourism revenues experienced an unprecedented decline, leading to a complete decoupling of the relationship between the two variables. This finding suggests that global and extraordinary shocks, such as pandemics, outweigh the benefits of exchange rate depreciation.

Consequently, the analyses indicate that the real effective exchange rate in Türkiye does not have a short-term or direct Granger causality effect on tourism revenues. Non-exchange-rate factors, including security concerns, seasonal patterns, and global crises,

primarily drive fluctuations in tourism income. Notably, after the 2016 coup attempt, tourism revenues declined sharply and subsequently recovered in 2017, during which the exchange rate and tourism revenues moved in opposite directions. During the pandemic, the exchange rate's influence on tourism revenues disappeared.

The study by Işık et al. (2019) revealed that economic and policy-related uncertainties have a decisive impact on tourism demand. This study particularly highlights that policy uncertainties significantly affect tourists' travel plans and stresses that the level of uncertainty may vary across different tourist markets. These findings align with the present study's results, which showed that political and global crisis-related uncertainties have a greater influence on tourism revenues than economic variables such as the real effective exchange rate. While it is generally accepted that tourism has a strong relationship with economic growth (Wijesekara et al., 2022), it can be argued that in countries like Türkiye, where political and economic uncertainties are high, tourism revenues are more affected by policy- and crisis-related uncertainties than by economic indicators such as the exchange rate. In this context, tourism policies should focus not only on economic indicators but also on uncertainties stemming from political and global crises.

The finding that the real effective exchange rate does not have a short-term, direct causal effect on Türkiye's tourism revenues, and that political and global crisis-induced uncertainties have a greater impact on tourism demand, serves as a crucial warning for economic policymakers. Given Türkiye's financial structure, characterised by high and volatile inflation, double-digit real interest rates, and challenges for public debt sustainability (Akyüz & Boratav, 2003), traditional exchange rate policies alone are insufficient to revive the tourism sector during periods of crisis.

In this context, policymakers should focus not only on exchange rate and macroeconomic stability but also on managing uncertainties from political and global crises to bolster the tourism sector's resilience against shocks. As highlighted by Işık et al. (2019), the significant impact of political and economic uncertainties on tourism demand emphasises the need for institutional and political stability measures to reduce uncertainty during crises and support tourism revenues.

Furthermore, Türkiye's challenges with high real interest rates and public debt sustainability cannot be addressed solely through fiscal discipline policies, which may exacerbate adverse effects on economic growth and tourism revenues (Voyvoda & Yeldan, 2002). Therefore, measures that reduce financial market volatility and economic uncertainty, such as temporary capital controls and debt-restructuring mechanisms, should be employed alongside efforts to ensure debt sustainability (Sumer & Ozorhon, 2021; Cornelli & Felli, 1995; Krugman, 1999).

In conclusion, for Türkiye's tourism sector to become more resilient to crises, policies must be adopted that address not only economic indicators but also political stability, reduction of crisis-induced uncertainties, and more holistic and sustainable

approaches to debt management. Such policies will support both tourism demand and sustainable economic growth. Given the findings and the complex dynamics impacting the tourism sector, particularly during periods of economic and political instability, the following policy recommendations are proposed to enhance resilience and promote sustainable growth.

- Establish Multi-Dimensional Crisis Support Mechanisms:

The tourism sector is exposed to significant external shocks during crises, regardless of macroeconomic factors such as the exchange rate. Hence, policy responses should not depend solely on exchange rate policies; instead, direct sector-specific measures such as financial support, business grants, and tax deferrals should be enhanced to mitigate the impact on tourism.

- Exchange Rate Policies Are Merely One Tool for Tourism:

The stimulative effect of a depreciation in the real exchange rate on tourism is limited and context-dependent. Fluctuations in the exchange rate alone are not enough to increase tourist demand. Additional policies, such as marketing campaigns, infrastructure development, and measures to enhance perceptions of safety, are crucial to effectively supporting the tourism industry.

- Crisis Management Plans for Pandemics and Extraordinary Events:

Travel restrictions and health concerns during the COVID-19 pandemic have nullified exchange rate benefits. Long-term strategies, such as early warning systems, digitalisation, and improved hygiene standards, should be implemented to enhance the sector's resilience to global shocks.

- Maintain Overall Economic Stability:

Maintaining economic stability is essential for tourism growth. Stabilising exchange rates, securing macroeconomic balance, and reducing political uncertainties are key to sustaining confidence in the sector.

- Utilise Adaptable Policy Tools During Crises:

Literature and empirical evidence demonstrate that the course and effects of crises differ. Policymakers should implement adaptable, crisis-specific measures instead of uniform approaches.

- Balance Between Export-Led, Fiscal, and Monetary Policies:

During crises, the choice among export-led growth strategies, fiscal stimulus, and monetary easing depends on the nature of the shock and the economy's structural

characteristics. In Türkiye's case, given persistent high inflation and concerns about public debt sustainability, a carefully coordinated approach that combines targeted fiscal support for tourism, cautious monetary policy to control inflation, and export-promotion measures is recommended to ensure economic recovery without exacerbating vulnerabilities.

Although tourism is widely associated with economic growth, especially in countries such as Türkiye, where political and economic uncertainties are high, tourism revenues are more affected by political and crisis-induced uncertainties than by economic indicators such as exchange rates. Therefore, tourism policies should extend beyond traditional economic variables and focus on mitigating uncertainties arising from political instability and global crises. Adopting comprehensive, adaptable, and context-specific policies will strengthen Türkiye's tourism resilience and promote sustainable economic growth.

The main limitations of this study include its focus on only certain economic and political variables and the narrow timeframe of the dataset. Additionally, other social, cultural, and environmental factors influencing tourism demand were not addressed in this research. Future studies should utilise larger datasets, include regional and cross-country comparisons, and examine in detail how extraordinary circumstances, such as the post-pandemic period, affect tourism. Furthermore, comparing different types of economic uncertainties and their impacts on tourism could offer more comprehensive insights for policymakers.

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