



Research Article

**THE CAUSAL RELATIONSHIP BETWEEN EXCHANGE RATE, TOURISM DEVELOPMENT,
AND ECONOMIC GROWTH IN TÜRKİYE: THE TODA-YAMAMOTO APPROACH**

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Abstract

This study examines the causal relationships between exchange rates, tourism development, and economic growth in Türkiye using annual data covering the period 1995–2024. Given the foreign-exchange-generating nature of the tourism sector and its potential contribution to economic growth, analyzing these variables within an integrated framework is particularly important for economies exposed to macroeconomic volatility. Accordingly, the Toda-Yamamoto causality approach is employed in order to address potential differences in the integration orders of the variables. The empirical findings reveal a bidirectional causal relationship between economic growth and tourism development, while a unidirectional causality is found running from tourism development to the exchange rate. However, no direct causal relationship is identified from the exchange rate to economic growth. Overall, the results suggest that tourism plays a strategic role in supporting economic growth in Türkiye and that tourism revenues may contribute to stabilizing foreign exchange markets. In this context, the study provides relevant implications for policymakers by offering a comprehensive assessment of the tourism–exchange rate–growth nexus.

Keywords: Exchange Rate, Tourism Development, Economic Growth, Time Series Analysis

Introduction

The tourism sector is quite important in the economic development strategies of many countries as it provides foreign exchange earnings, creates employment, and reduces regional development disparities (Dwyer, Forsyth and Spurr, 2004; Lin, Yang, Lee, 2018; Nunkoo et al., 2020). Especially for developing countries, tourism plays an important role in balancing the foreign trade deficit, contributing to the current account balance, and supporting international capital movements (Balaguer and Cantavella-Jordá, 2002). Tourism activities also contribute to social development by enhancing cultural interaction (Tisdell, 2001). Türkiye is one of the countries that stands out in world tourism with its natural, historical, and cultural riches. The increase in investments in the tourism sector within the framework of the liberalization policies implemented in the 1980s was supported by the legal basis provided by the Tourism Encouragement Law No. 2634, which came into effect in 1982. This situation facilitated the institutionalization of tourism and allowed the private sector to take a more active role (Tosun and Jenkins, 1996).

Since the early 1990s in Türkiye, the increasing share of tourism revenues in the national income has made the sector's economic importance more visible (Erkuş-Öztürk and Eraydın, 2010). The contribution of tourism to economic growth occurs through both direct and indirect effects. Direct effects encompass income generation through service sectors such as accommodation, transportation, food and beverage, and entertainment; while indirect effects stem from the activities of supporting sectors such as agriculture, construction, and energy (Dwyer et al., 2004). Additionally, tourism, due to its labor-intensive nature, provides employment opportunities for low-skilled workers, thereby promoting social inclusivity (Sharples, 2009). The inclusion of the local population in the tourism process and the designation of tourism as a priority area in regional development plans also contribute to sustainable growth (Fayissa, Nsiah and Tadasse 2009). In the case of Türkiye, the number of foreign visitors, which was approximately 7 million in 1995, exceeded 51 million in 2019 (TURSAB, 2021). However, this growth process has been interrupted by various crises; events such as the 1999 Marmara Earthquake, the 2001 economic crisis, the 2009 global financial crisis, and the 2020 COVID-19 pandemic have caused temporary contractions in the sector (Ivanov and Webster, 2007; Gülcü,

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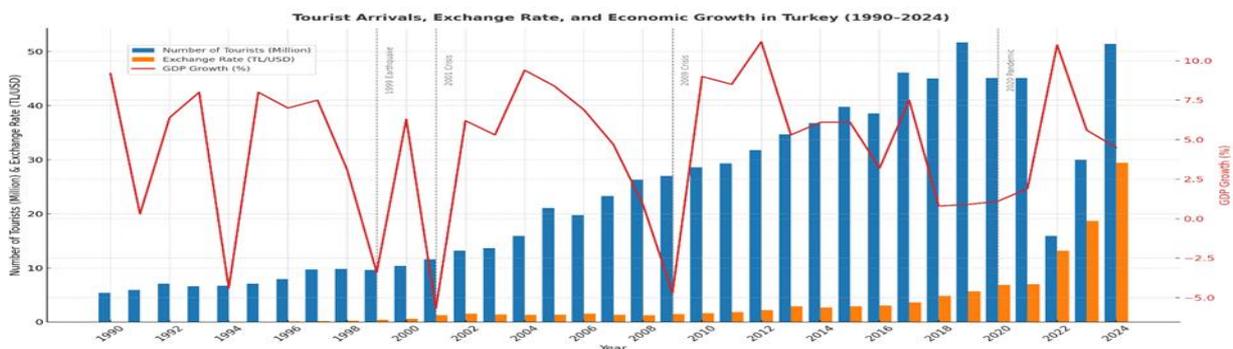
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2024). Understanding the impact of these crisis periods on economic indicators is extremely important for policymakers as well.

Tourism activities and tourism development are closely related to macroeconomic variables such as exchange rates. The exchange rate, as one of the factors determining a country's competitiveness, directly affects tourism demand. The depreciation of the local currency against other countries' currencies can make the country more attractive to foreign tourists, thereby increasing the number of foreign tourists. On the other hand, as the citizens of a country with a depreciating currency reduce their demand for outbound tourism, it can increase net tourism revenues (Crouch, 1994; Neumayer, 2004). However, sudden fluctuations in exchange rates create cost pressures, especially for hospitality and tourism businesses that rely on imported inputs, and negatively affect profitability (Brida et al., 2010). To better analyze this multifaceted relationship network, it is necessary to reveal the causal links between exchange rates, tourism development, and economic growth. The relationship between tourism revenues and growth rates is often discussed in the literature within the framework of the tourism-led growth hypothesis (TLGH). According to this hypothesis, the tourism sector supports economic growth by providing foreign exchange earnings, increasing tax revenues, and promoting investments (Katircioglu, 2009). Some studies conducted specifically in Türkiye have revealed a strong and positive causality between tourism revenues and economic growth (Gunduz and Hatemi-J, 2005; Fayissa et al., 2009).

Empirical evidence further suggests that the impact of exchange rates on tourism often manifests asymmetrically. The depreciation of the local currency against foreign currencies can increase the country's attractiveness and boost tourist demand in the short term; however, in the long term, it can trigger a perception of macroeconomic instability, negatively affecting tourist inflow (Neumayer, 2004). Additionally, exchange rate volatility creates uncertainty for tourism investors and complicates financial decision-making processes for the sector (Ivanov and Webster, 2007). In Graph 1, the exchange rate (USD/TRY), tourism development (annual foreign tourist numbers), and economic growth (GDP growth rate) data for Türkiye from the period 1995–2024 are presented in a normalized and comparative manner. The graph shows the temporal development of all three variables together, while also providing the opportunity to visually examine the effects of critical periods such as 1999, 2001, 2009, and 2020. Additionally, the graph allows for a clear analysis of the synchronization, divergence, and sensitivity to crisis periods among the three variables.

Figure 1. Number of Tourists in Türkiye, Exchange Rate, and Economic Growth from 1995 to 2024



Source: TURSAB, TCMB, TÜİK

Moreover, exchange rate stability also has indirect effects on the composition of tourism revenues (Samirkas and Samirkas, 2016). Food and beverage expenditures constitute a significant component of total tourist spending, and the literature indicates that exchange rate movements influence tourism demand primarily through price competitiveness and expenditure sensitivity (Lim, 1997; Dritsakis, 2004; Song, Witt and Li, 2010). In this context, a depreciation of the local currency may increase foreign tourists' purchasing power with respect to food and beverage services as well as other service-based tourism activities, thereby indirectly shaping the composition of tourism expenditures (Topallı, 2015). However, excessive exchange rate volatility may adversely affect the cost structures of accommodation and gastronomy-related businesses, complicating pricing and planning processes (Kaya and Çömlekçi, 2013). Therefore, ensuring exchange rate stability is important not only for maintaining macroeconomic balance but also for supporting the sustainability and competitiveness of tourism-related service sectors.

The main objective of this study is to reveal the causal relationship between exchange rate, tourism development and economic growth in Türkiye between 1995 and 2024 within the framework of the Toda-Yamamoto approach. The period in question is a time frame during which Türkiye experienced various political, economic, and social fluctuations, the exchange rate was occasionally subjected to shocks, the tourism sector was affected by foreign policy, security, and health crises, and economic growth went through different structural phases. In this context, the study seeks to answer the following three fundamental questions:

- Is there a causal relationship between exchange rates and tourism development in Türkiye between 1995 and 2024?
- Did tourism development in Türkiye significantly affect economic growth during this period?
- Is there a causal relationship between exchange rates and economic growth, and if so, what is its direction?

The study is important in that it reveals the interaction between tourism, economic growth and exchange rates at the macro level, thereby guiding policymakers, investors and industry professionals in their decision-making processes. In terms of its contribution to the literature, it is significant in that it goes beyond the analyses generally addressed in the existing literature within the framework of bilateral relations and proposes a holistic model that evaluates the three variables together. The study explains the complex interaction between the exchange rate, tourism development, and economic growth in Türkiye from a theoretical and historical perspective, thereby establishing the framework for empirical analysis. The findings of the causality analysis to be conducted using the Toda-Yamamoto method will contribute to both the literature and practice by revealing the direction and structure of these multidimensional relationships.

Literature

The relationship between exchange rates, economic growth and tourism has been a subject of intense research in economics and tourism literature since the late 20th century. The foreign exchange-generating effect of tourism and its role in supporting economic growth have made it necessary to consider these three variables together, especially for developing countries. Ghali (1976), a pioneer in studies on tourism and economic growth, emphasised the income-generating and employment-creating aspects of tourism for small developing economies. Similarly, one of the early quantitative analyses of the tourism-growth relationship was conducted by Sheldon (1990), who highlighted the foreign exchange-generating and employment-creating aspects of tourism, particularly for small economies dependent on the service sector (Sheldon, 1990). When examining the rich literature that has emerged since these studies, the relationship between tourism and economic growth is generally centred around four different hypotheses: that tourism triggers economic growth, that economic growth affects tourism development, that there is a reciprocal relationship between tourism and economic growth, and that there is no relationship between the two variables. (Balaguer and Cantavella-Jorda 2002; Payne and Marvar 2010; Aslan 2014; Mérida and Golpe, 2016; Katircioğlu, et.al., 2018; Gul and Ozer 2018; Ozer and Kuçuksakarya, 2021; Mete, 2022; Adeleye et al. 2022). Lanza and Pigliaru (2000) state that tourism activities promote economic growth and conclude that countries with abundant natural resources and high tourism capacity have higher growth rates. Fuinhas et al. (2020), on the other hand, state that for this development to occur, tourism revenues must be realised in the long term and in a positive direction. Lee and Chang (2008), who examined the relationship between tourism and economic growth in OECD and non-OECD countries, found that there is a one-way causal relationship from economic growth to tourism in OECD countries, while there is a two-way causal relationship in non-OECD countries. Fayissa et al. (2009), Sequeira and Nunes (2008), Narayan et al. (2010) and Apergis and Payne (2012) similarly concluded that there is a one-way causal relationship from economic growth to tourism development. Perles-Ribes et al. (2017), in their study examining TLGH specifically in Spain, concluded that there is a reciprocal and positive relationship between economic growth and tourism.

Studies examining the relationship between exchange rates and tourism development have primarily been shaped within the framework of foreign trade models. McKinnon (1964) stated that foreign exchange earnings could contribute to growth by financing capital goods imports, while Dornbusch (1986) offered early insights into how currency depreciation could support export sectors (Athari et al., 2020; Chaudhry, 2022). Since the 1990s, tourism has been evaluated as an economic activity similar to foreign trade and has begun to be integrated into commercial growth models. This approach has led to studies, particularly in small and medium-sized developing economies, that focus on tourism's corrective role in the current account and its contribution to foreign exchange reserves (Kulendran and Wilson, 2000). In subsequent years, studies that integrate tourism and exchange rate variables into a single empirical model have emerged prominently. Lim (1997) examined

the direct effect of the exchange rate on tourism demand and concluded that tourists are highly sensitive to price elasticity. Dwyer et al. (2001) emphasised that the real effective exchange rate is a critical factor in determining the price competitiveness of destinations. Dritsakis (2004) used Johansen cointegration and Granger causality to examine the long-term causal relationship between real GDP, exchange rates, and tourism revenues in Greece and concluded that tourism development not only supports economic growth but is also influenced by the real exchange rate (Dritsakis, 2004).

Subsequent studies have shown that currency depreciation makes a country more attractive to foreign tourists and directly increases tourism revenues (Song et al., 2010). Some studies examining the impact of exchange rate changes on tourism have suggested that exchange rate volatility may have a deterrent effect on tourist behaviour, particularly for tourists who plan long-term trips and may be inclined to avoid risk by choosing different destinations (Santana-Gallego et al., 2010; Dragouni et al., 2016). Belloumi (2010) stated that an increase in the exchange rate would have a negative impact on tourism revenues in the short term, while a decrease in the exchange rate would lead to an increase in tourism revenues in the long term. Akar and Özcan (2021) found that an increase in the real exchange rate had a positive effect on tourism revenues, and that this effect was particularly evident in foreign currency-based expenditures. Boskurt et al. (2021) state that changes in the exchange rate have an effect on tourism development, but that these effects are temporary and diminish in the long term. Rookayyah et al. (2024) noted in the case of Mauritius that income growth in the main country would increase tourism demand, but that both low exchange rates and volatility had a negative impact on tourism in the long term. This finding contradicts some early findings for Türkiye, as the Turkish literature generally suggests that currency depreciation encourages tourism. Obi and Kumankoma (2023), who studied African countries, analysed how financial development and exchange rate stability shape the tourism-development relationship and found that the impact of tourism on growth is more pronounced in countries with strong financial infrastructure.

The literature on exchange rates, tourism development and economic growth generally shows that there is a positive relationship between tourism development and economic growth, and that the strength and direction of this relationship is affected by exchange rate changes and fluctuations. Studies conducted in Türkiye show that tourism contributes to growth and that exchange rate volatility has significant effects on tourism revenues. However, the direction and strength of these causal relationships vary depending on the period analysed, the type of data used, and the econometric method applied. Recent studies indicate that, in addition to multivariate models, artificial intelligence, structural equation modelling, and sustainability-based analyses have come to the fore in the literature. This situation reveals both an increase in methodological diversity and a shift towards interdisciplinary research.

Model and Data Definition, Method and Empirical Findings

Model and Data Definition

This study investigates the causal relationship between exchange rates, tourism development and the economy in Türkiye. Per capita GDP was used as the growth variable. Annual data from 1995 to 2024 were used. Tourism data up to 2020 were obtained from the World Bank database, while the last four years of data were compiled from the Ministry of Culture and Tourism of the Republic of Türkiye and the Turkish Statistical Institute (TÜİK). The growth variable was also obtained from the World Bank database. Finally, the exchange rate variable was obtained from the Central Bank of the Republic of Türkiye's electronic data distribution system (EVDS). *The study was carried out based on publicly available secondary data sets; therefore, ethical approval was not required.*

The exchange rate is a crucial factor for the tourism sector. It directly affects the cost of travelling to a country for tourists. When the real exchange rate falls, the host country becomes cheaper for foreign tourists, thereby increasing tourism demand. In this regard, the exchange rate is one of the primary factors determining tourism development. Furthermore, exchange rate fluctuations also determine the international competitiveness of the tourism sector. For example, countries with an exchange rate advantage over similar tourism destinations can attract more tourists. In this context, research has been conducted on the direction of the causal relationship between tourism development and the exchange rate in Türkiye. It is accepted that the relationship between tourism and economic growth is bidirectional at a theoretical level and that they are closely linked. Tourism improves the balance of payments by increasing foreign exchange earnings. This, in turn, supports economic growth. Furthermore, tourism revenues stimulate local businesses and increase employment through tourist spending. The resulting increase in economic growth raises income levels and creates opportunities for people to travel more, which in turn develops the tourism sector. Ultimately, a developed economy strengthens

tourism infrastructure and increases its capacity to attract international tourists. Therefore, there is a mutual interaction between economic development and tourism development. What is the situation in Türkiye during the period analysed? This has been added to the model to observe this.

Method and Empirical Findings

The empirical application of the study first examined whether the series were stationary. The Augmented Dickey-Fuller (ADF) test was used to determine the stationarity of the series. This test was developed by Dickey-Fuller (1979-1981). The equations used in calculating the ADF test are as follows:

$$\Delta Y_t = \alpha_1 T_{t-1} + \sum_{i=1}^k \beta_i \Delta Y_{t-i} + \varepsilon_i \tag{1}$$

$$\Delta Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \sum_{i=1}^k \beta_i \Delta Y_{t-i} + \varepsilon_i \tag{2}$$

$$\Delta Y_t = \alpha_0 + \alpha_2 trend + \alpha_1 Y_{t-1} + \sum_{i=1}^k \beta_i \Delta Y_{t-i} + \varepsilon_i \tag{3}$$

This test examines the null hypothesis that ‘the series contains a unit root’. If the null hypothesis is accepted based on the test's probability value, it is concluded that the series contains a unit root. If the null hypothesis is rejected, it means that the series does not contain a unit root and is stationary.

Table 1. ADF Unit Root Test Results

Variables	Level		First Difference	
	Fixed	Trend and Fixed	Fixed	Trend and Fixed
LogT	-1.428 (0.554)	-2.872 (0.185)	-5.547 (0.000***)	-5.438 (0.000***)
LogDK	-1.267 (0.630)	-2.033 (0.559)	-5.977 (0.000***)	-6.306 (0.000***)
LogEB	0.202 (0.968)	-3.004 (0.148)	-4.905 (0.000***)	-4.917 (0.002***)

Note: The lag length has been set to 1 according to the AIC information criterion. *, ** and * indicate significance levels of 10%, 5% and 1% respectively..**

According to the statistics shown in the table, it has been observed that the probability values have stabilised at the I(1) level for all variables. After determining the degrees of stationarity of the series, it was decided to apply the Toda-Yamamoto causality test to the series. However, it is first necessary to determine the appropriate lag length for the VAR model. Table 2 shows the statistics required for the lag length.

Table 2. VAR Lag Length

Number of Delays	Information Criteria					
	LogL	LR	FPE	AIC	SC	HQ
0	72.16497	NA	1.20e-06	-5.123331	-4.979349	-5.080517
1	140.9124	117.1252*	1.44e-08*	-9.549063*	-8.973136*	-9.377810*
2	149.2383	12.33471	1.56e-08	-9.499132	-8.491259	-9.199439
3	158.5841	11.76885	1.64e-08	-9.524751	-8.084932	-9.096617

Note: AIC: Akaike, SC: Schwarz and HQ: Hannan-Quinn information criteria.

In order to perform the Toda-Yamamoto causality test, the VAR lag length must be determined. In Table 2, the second row with the most asterisks (*) according to the AIC, SC, and HQ information criteria indicates the appropriate lag length. In this context, it was decided that the appropriate lag length for the VAR estimation model should be selected as 1 according to the AIC, SC, and HQ information criteria. After determining the degrees of stationarity of the series, the second criterion required for the Toda-Yamamoto causality test, the appropriate lag length, was also determined. After this stage, the Toda-Yamamoto causality test was performed. Before proceeding to the causality test, it is necessary to examine the required diagnostic tests. In this context, Table 3 shows the diagnostic test results for the VAR model estimated in this study.

Table 3. Diagnostic Test Results

Autocorrelation LM Test		
Number of Delays	LM Statistics	Probability
1	1.645	0.128
2	1.436	0.199
White Test for Changing Variance		
Probability	Ki Square	
0.365	38.297	

According to the statistics in the table, the probability values of the autocorrelation, heteroskedasticity, and normality test statistics of the estimated VAR model have been accepted at the 5% significance level. Since the probability values are >0.05 , it has been concluded that the model does not have autocorrelation and heteroskedasticity problems.

In this study, the Toda–Yamamoto approach is employed in order to examine the causal relationships among the variables at a more advanced level. The Toda–Yamamoto causality test was developed by Toda and Yamamoto (1995) based on the vector autoregressive (VAR) model. This method allows for statistically significant results to be obtained by augmenting the VAR model with additional lags equal to the maximum order of integration of the variables, regardless of whether the series are stationary. This feature minimises potential pre-test errors and enhances the reliability of the analysis (Zapata & Rambaldi, 1997).

The Toda–Yamamoto method is particularly suitable for time series such as economic growth, tourism, and exchange rates, which generally exhibit different orders of integration (Konya, 2006). Moreover, the method has a wide range of applications as it enables the simultaneous analysis of both short- and long-term relationships. Considering the structural transformations experienced by the Turkish economy during the 1995–2024 period, including the transition to a floating exchange rate regime, financial crises, and external shocks, the selection of the Toda–Yamamoto approach as the primary method of this study is regarded as a methodological necessity. The main objective of this study is to reveal the causal relationship between exchange rates, tourism development, and economic growth in Türkiye for the period 1995–2024 within the framework of the Toda–Yamamoto approach. The period under consideration encompasses a time span during which Türkiye experienced various political, economic, and social fluctuations; the exchange rate was occasionally exposed to shocks; the tourism sector was affected by foreign policy, security, and health crises; and economic growth underwent different structural phases. In this context, the study seeks to answer the following three fundamental research questions. In this study, the lag length number was determined as 2 ($k=2$) for the Toda–Yamamoto causality test using the VAR model. Subsequently, based on the results of the unit root tests, the highest level of stationarity of the series was determined to be 1 ($d_{max}=1$). Accordingly, $d_{max}=1$, the highest level of stationarity of the series, was added to the lag length $k=1$ ($d_{max}+k=2$). After this stage, the Toda–Yamamoto causality test was applied to the series using the VAR model with increased lag length. The estimated equation of this causality test is as follows (Toda and Yamamoto, 1995).

$$X_t = \alpha_t + \sum_{i=1}^{k+d_{max}} \beta_1 X_{t-i} + \sum_{i=1}^{k+d_{max}} \beta_2 Y_{t-i} + \mu_t \quad (2)$$

$$Y_t = \alpha_t + \sum_{i=1}^{k+d_{max}} \beta_1 Y_{t-i} + \sum_{i=1}^{k+d_{max}} \beta_2 X_{t-i} + \mu_t \quad (3)$$

The null hypothesis for Equality 2 is that Y is not a Granger cause of X, while the alternative hypothesis is that Y is not a Granger cause of X. Similarly, the null hypothesis for equation 3 is that Y is not a Granger cause of X, while the alternative hypothesis is that Y is not a Granger cause of X. The statistic value in the T-Y causality test is investigated using the Wald test, which is based on the chi-square (χ^2) distribution. (Meçik and Koyuncu, 2020, p. 2626). The models to be estimated in the study are as follows:

$$\text{Log}T_t = \alpha_t + \sum_{i=1}^{k+d_{max}} \beta_1 \text{Log}DK_t + \sum_{i=1}^{k+d_{max}} \beta_2 \text{Log}EB_t + \mu_t \quad (4)$$

$$\text{Log}DK_t = \alpha_t + \sum_{i=1}^{k+d_{max}} \beta_1 \text{Log}T_t + \sum_{i=1}^{k+d_{max}} \beta_2 \text{Log}EB_t + \mu_t \quad (5)$$

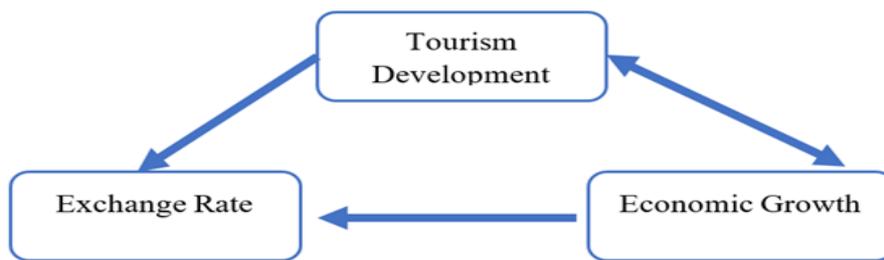
$$\text{Log}EB_t = \alpha_t + \sum_{i=1}^{k+d_{max}} \beta_1 \text{Log}DK_t + \sum_{i=1}^{k+d_{max}} \beta_2 \text{Log}T_t + \mu_t \quad (6)$$

Table 4. Toda-Yamamoto Causality Test Results

Model 1		Dependent Variable: Tourism Development (logT)			
Independent Variables	d_{max+k=2}	X²-Value	p-Value	Decision	Result
Exchange Rate (logDK)	2	2.687	0.260	H ₀ : Accept	logDK \neq logT
Economic Growth (logEG)	2	4.628	0.098*	H ₀ : Reject	logEB \Rightarrow logT
ALL	4	7.414	0.115	H ₀ : Accept	ALL \neq logT
Model 2		Dependent Variable: Exchange Rate (logER)			
Tourism Development. (logT)	2	5.976	0.050*	H ₀ : Reject	logT \Rightarrow logDK
Economic Growth (logEG)	2	5.348	0.069*	H ₀ : Reject	logEB \Rightarrow logDK
ALL	4	12.210	0.015**	H ₀ : Reject	ALL \Rightarrow logT
Model 3		Dependent Variable: Economic Growth (logEB)			
Tourism Development. (logT)	2	8.595	0.013**	H ₀ : Reject	logT \Rightarrow logEB
Exchange Rate (logDK)	2	3.745	0.153	H ₀ : Accept	logDK \neq logEB
ALL	4	14.619	0.060	H ₀ : Reject	ALL \Rightarrow logEB

Note: *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively.

Considering the statistics in the table, the hypothesis that the exchange rate (logDK) is not a cause of tourism development for Model 1 has been accepted, and no causal relationship from the exchange rate to tourism development has been found. However, the hypothesis that economic growth is not a cause of tourism development has been rejected. In line with this result, causality from economic growth to tourism development has been observed. For the model as a whole, the probability value is significant and the null hypothesis has been accepted. For Model 2, the hypothesis established from tourism development to the exchange rate has been rejected. Therefore, a causality from tourism development to the exchange rate has been found. The hypothesis established from economic growth to the exchange rate has been rejected at a 10% significance level. Accordingly, the existence of a causality relationship from economic growth to the exchange rate has been accepted. The probability value is also significant for this model as a whole. There is a causality relationship towards the exchange rate for the model as a whole. In the third model, the hypothesis established from tourism development to economic growth has been rejected. Therefore, a causality relationship from tourism development to economic growth has been identified. The hypothesis established from the exchange rate to economic growth has been accepted. Accordingly, no causal relationship has been found between the exchange rate and economic growth. The probability value for the entire model indicates that the null hypothesis should be rejected.

Figure 1. Causality Test Diagram

Source: Created by the author

Results and Discussion

The relationship between tourism, economic growth and exchange rates in the Turkish economy has long been the focus of academic research. The tourism sector contributes to growth by generating direct income, providing employment and creating a multiplier effect in the services sector (Balaguer and Cantavella-Jordá, 2002). Empirical studies conducted in Türkiye also reveal that tourism has a significant and positive impact on economic growth (Gunduz and Hatemi-J, 2005; Katircioglu, 2009). Tourism revenues also play an important role in closing the current account deficit by increasing foreign exchange supply and contribute to the stabilisation of foreign exchange markets (Zortuk, 2009). On the other hand, economic growth supports the development of tourism by encouraging investments in transport and accommodation infrastructure, thus creating a two-way causal relationship between growth and tourism (Tang and Abosedra, 2014). The exchange rate is both a source of vulnerability due to external shocks and can affect the value of the national currency through an increase in tourism revenues (Narayan, Narayan and Prasad, 2009). Within this framework, examining the causality dimension of the tourism–economic growth–exchange rate relationship in Türkiye is of strategic importance in terms of both ensuring macroeconomic stability and developing sustainable development policies.

This study applied the Toda-Yamamoto causality test using annual data from 1995 to 2024 to examine the causal relationship between exchange rates, tourism development and economic growth in Türkiye. The findings indicate that tourism development has a significant impact on economic growth and that tourism affects exchange rates.

According to the findings of the causality test, there is a causal relationship from economic growth to tourism. This result is consistent with previous empirical studies conducted on Türkiye and supports findings in the literature that emphasise the interaction between tourism and growth (Gunduz and Hatemi-J, 2005; Katircioglu, 2009; Zortuk, 2009; Arslanturk, Balcılar and Ozdemir, 2011). This finding can be interpreted as increasing economic growth in Türkiye accelerating the development of the tourism sector by supporting infrastructure investments (transport, accommodation, urban planning). Income growth stimulates both domestic tourism and tourism by increasing public resources allocated to tourism promotion. Given the strong causality from growth to tourism, infrastructure investments (transport networks, urban modernisation) should be directly linked to tourism. Public support for promotional activities for tourism should be increased, and tourism investments should be encouraged during periods of growth. Thus, tourism revenues will be increased, thereby supporting growth. Therefore, the mutually reinforcing relationship between tourism and growth should be enhanced. A causal relationship from tourism to growth has also been observed. Consequently, a two-way causal relationship has been found between these two variables. The tourism sector contributes directly to GDP in Türkiye, while also creating employment and revitalising the service sector. Tourism revenues are a factor supporting growth, particularly in closing the current account deficit. The findings of this study support the view that tourism is one of the ‘locomotive sectors’ in Türkiye.

Furthermore, the study identified a causality from tourism to the exchange rate. This result is consistent with studies in the literature that demonstrate the effect of tourism revenues on the exchange rate (Dritsakis, 2004; Pekmezci and Bozkurt, 2016; Sinan, 2022). Tourism is an important foreign exchange earner for tourist-attractive regions such as Türkiye. In this context, an increase in tourist arrivals increases the supply of foreign exchange and puts pressure on the exchange rate. This situation is also important in terms of general economic structures. The impact of the exchange rate is generally complex. In particular, the increase in tourism revenues during the summer months can lead to a temporary appreciation of the Turkish Lira. This relationship can be interpreted as a reflection of Türkiye's tendency to partially offset its foreign trade deficit with tourism revenues. In line with this finding, the existence of causality from tourism to the exchange rate and growth points to the strategic importance of the sector. Increasing diversity in Turkish tourism (cultural tourism, health tourism, winter tourism) can ensure a more balanced distribution of foreign exchange earnings, thereby spreading the impact of tourism more evenly across the country. In this context, developing policies to reduce the seasonality of tourism could make tourism revenues more regular and stable.

A causal relationship has been established between economic growth and the exchange rate. This finding is consistent with previous studies showing that growth creates pressure on the exchange rate by increasing import demand and foreign exchange demand (Yapraklı, 2010; Yılmaz and Kaya, 2011). Increased import demand during periods of growth can create pressure on the exchange rate by increasing foreign exchange demand. Capital inflows and outflows can affect exchange rates in line with growth rates. The relatively weak nature of this relationship (significant only at the 10% level) reveals that the relationship between growth and

the exchange rate in Türkiye varies depending on periodic fluctuations. The weak causality between economic growth and the exchange rate indicates that import dependency increases alongside growth. As Türkiye is dependent on imports of raw materials and intermediate goods for production, the causal relationship between these variables is weaker than others. It is essential to limit the negative impact of growth on the exchange rate by supporting domestic production. Furthermore, policies aimed at increasing the added value of exports will contribute to exchange rate stability, along with tourism revenues. Finally, no causality from the exchange rate to growth has been identified. This finding indicates that fluctuations in the exchange rate in Türkiye are often caused by external shocks (geopolitical risks, FED policies, energy prices), weakening the direct relationship between the exchange rate and growth. As the effects of the exchange rate are generally felt indirectly through inflation and import costs, it may not emerge as a strong direct channel explaining growth. As is well known, there are many factors that directly affect economic growth and the exchange rate. In this context, the impact of some variables may be indirect and therefore difficult to assess clearly. Their effect may become apparent, particularly with certain factors. Accordingly, although the exchange rate may not directly cause growth, it can negatively affect the economy through inflation due to its high pass-through. Therefore, price stability policies and tourism revenues should be considered together. A general assessment of these findings shows that there is a two-way relationship between growth and tourism in Türkiye, a one-way relationship between tourism and the exchange rate, and a weak relationship between growth and the exchange rate. Policymakers should view tourism as a strategic tool for exchange rate stability and growth, while also limiting the pressure on the exchange rate from growth by reducing import dependency.

The findings of this study reveal that the relationships between tourism, economic growth and exchange rates in Türkiye involve both bidirectional and asymmetric effects. However, to develop a deeper understanding of these relationships, future research should focus on several points. Firstly, the study's limitation to annual data prevents a sufficient analysis of short-term fluctuations; therefore, future studies could use monthly or quarterly data to examine the effects of seasonality and cyclical shocks in detail. Secondly, tourism's sub-sectors (e.g., cultural, health, winter, or gastronomic tourism) could be examined separately to analyse which areas are more decisive for the exchange rate and growth. Furthermore, including external factors such as structural breaks, global economic crises, geopolitical risks, and pandemics in the model would allow for a more realistic assessment of the relationship. Finally, it is anticipated that comparing Türkiye with similar developing countries through panel data analyses will contribute to comparing the effects of tourism on growth and exchange rates in an international context and to developing more inclusive policy recommendations.

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