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Impact of Inflation, Exchange Rate and Tourist Arrivals on Tourism Revenues: An ARDL Approach

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ABSTRACT

Tourism revenues are one of the key indicators reflecting a country's economic performance and several dynamic factors influence these revenues. Among these factors, inflation, exchange rates, and the number of tourists stand out. In this study, the relationship between inflation, exchange rate, number of tourists and tourism revenues was examined using the ARDL (3,4,0,0,3) model. The F-statistic of the model was found to be 8.1772, with the lower critical value being 3.74 and the upper critical value being 5.06. Since the F-statistic value exceeds the critical values, the model is statistically significant at the 1% level, indicating that inflation, exchange rate and the number of tourists have a strong long-term effect on tourism revenues and that the variables are cointegrated. In the study, the long-term coefficients of the ARDL (3,4,0,0,3) model were also examined. It was found that the number of tourists has a strong positive effect on tourism revenues, with a 0.70 positive impact on tourism income. Additionally, inflation was found to have a positive effect on tourism revenues, with this effect being 0.50. This finding suggests that inflation may indirectly have a positive effect on the tourism sector. On the other hand, it was determined that the exchange rate variable has a negative effect on tourism revenues at the 10% significance level, with an impact of -0.30 on tourism income. The findings of the study reveal that exchange rate fluctuations, inflation, and the number of tourists are significant factors influencing tourism revenues, and they have a substantial impact on tourism income.

Keywords: Tourism Revenues, Inflation, Exchange Rate, Number of Tourists, ARDL Model
JEL Codes: C32, E31, F31, L83

Enflasyon, Döviz Kuru ve Turist sayısının Turizm Gelirleri Üzerindeki Etkisi: Bir ARDL Yaklaşımı

ÖZET

Turizm gelirleri, bir ülkenin ekonomik performansını yansıtan önemli göstergelerden biri olup, bu gelirleri etkileyen birçok dinamik faktör bulunmaktadır. Bu faktörler arasında enflasyon, döviz kuru ve turist sayısı öne çıkmaktadır. Çalışmada, ARDL (3,4,0,0,3) modeliyle enflasyon, döviz kuru, turist sayısı ve turizm gelirleri arasındaki ilişki incelenmiştir. Modelin F istatistiği 8.1772, alt kritik değeri 3.74, üst kritik değeri 5.06 ise bulunmuştur. Modelin F istatistiği değerinin kritik değerlerden yüksek çıkması modelin %1 önem seviyesinde istatistiksel olarak anlamlı olması nedeniyle enflasyon, döviz kuru ve turist sayısının turizm gelirleri üzerinde uzun dönemde güçlü etkisinin olduğu ve değişkenlerin eşbütünleşik olduğu sonucuna varılmıştır. Çalışmada ayrıca, ARDL (3,4,0,0,3) modelinin uzun dönem katsayıları bağlamında turist sayısının turizm gelirleri üzerinde güçlü bir pozitif etkisi olduğu ve turizm gelirini 0,70 oranında olumlu yönde etkilediği saptanmıştır. Enflasyonun da

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turizm gelirleri üzerinde pozitif bir etkisi bulunduğu ve bu etkinin 0,50 oranında olduğu belirlenmiştir. Bu bulgu, enflasyonun turizm sektörünü dolaylı yoldan olumlu yönde etkileyebileceğini göstermektedir. Öte yandan, döviz kuru değişkeninin turizm gelirleri üzerinde %10 anlamlılık seviyesinde negatif bir etkisinin olduğu ve turizm gelirini -0,30 oranında etkilediği tespit edilmiştir. Çalışmadan elde edilen bulgular, döviz kuru dalgalanmaları, enflasyon ve turist sayısının turizm gelirlerini etkileyen önemli faktörler olduğu ve turizm gelirleri üzerinde önemli bir etkiye sahip olduğunu ortaya koymaktadır.

Anahtar Kelimeler: Turizm Gelirleri, Enflasyon, Döviz Kuru, Turist Sayısı, ARDL Modeli
Jel Kodlar: C32, E31, F31, L83

INTRODUCTION

Tourism is considered an important driver of economic growth in both developed and developing countries today. The tourism sector creates a unique opportunity for the realization of economic potentials while preserving the natural and cultural values of regions. Tourism provides significant economic gains for both destination countries and those that send tourists. Additionally, the tourism sector contributes to the growth of other industries through both backward and forward links. The diversity and innovative developments in tourism services positively impact the economic activities of sectors such as agriculture, fisheries, construction, handicrafts, insurance, logistics, banking, manufacturing, and other service industries.

Revenues from outbound tourism can be classified into two main categories: direct export and invisible export. Direct export consists of products such as souvenirs, gifts, food and beverages that tourists purchase in vacation areas. Tourists, especially those from developed countries, spend significant amounts on transportation, entertainment, accommodation, tourist products, and other services during their travels to countries with natural and historical riches for holidays or cultural events. These types of expenditures generate additional export revenue for the country visited, creating economic benefits (Sezgin,2001:67).

Invisible export refers to the export and import of services, which are difficult to measure and identify. Therefore, exchange rate fluctuations can directly affect the travel preferences and expenditure amounts of foreign tourists who make payments in foreign currencies (Beyazit,2003:36,37).

Tourism revenues are one of the key indicators of a country's economic health, and many factors influence these revenues. Among these factors are inflation, exchange rates and the number of tourists. Inflation, with its impact on the overall price levels in a country, can affect both domestic and foreign tourists' spending habits. High inflation rates can reduce tourists' purchasing power, negatively impacting the demand for the tourism sector. In an emerging economy, the increase in both domestic and international tourism activities leads to a rise in demand for both local production and imported goods. As tourism activities grow, the demand for tourist products and services also increases. This situation not only raises the costs of production factors but also leads to short-term price increases due to the time gap between the investments made to meet the demand and the realization of these investments. Touristic developments and tourism activities in a region can lead to inflationary pressures. These pressures can result in price increases not only for the products and services offered in the tourism sector but also for prices in other areas that serve the sector (Öztaş,2002:63).

Exchange rates, which represent the value of a country's local currency against other currencies, have a significant impact on tourism revenues. The effect of the tourism sector on foreign exchange supply and demand is primarily shaped through export and import relationships. Tourist products and services offered to foreign tourists increase the supply of foreign currency, similar to goods exports. On the other hand, the foreign currency demand is

generated by the tourism expenditures of a country's citizens abroad and the imported products and services needed by the tourism sector (Aktaş, 2002:61).

Many countries around the world use the tourism sector as a tool to support economic growth and generate foreign currency. Especially in developing countries, tourism is adopted as a strategic tool to accelerate economic development and overcome foreign currency shortages. These countries promote tourism to earn foreign currency and improve their foreign trade balances. Additionally, the tourism sector offers these countries important opportunities to secure necessary foreign resources, strengthen their economic infrastructure and provide essential inputs such as intermediate goods. In this context, tourism is used not only as a means of generating foreign currency but also as a tool to contribute to the economic development of developing countries. To contribute to the local economy and increase competitiveness in the international market, the tourism sector stands out as an important development strategy. Therefore, the development of tourism plays a critical role in the economic sustainability of these countries (Bulut,2000:78).

Spending on various needs such as transportation, souvenirs, shopping, sightseeing, entertainment, dining, and accommodation during their vacations significantly increases the economic revenues of the countries hosting them. These expenditures not only stimulate the tourism sector but also trigger other sectors related to tourism, leading to the expansion of overall economic activities. Moreover, the continually growing interest in tourism fosters investments in the sector, thereby increasing the revenues of both the tourism industry and the production and service activities in other areas that support this sector (Kızılgöl and Erbaykal,2008:354).

The number of tourists is also a direct factor influencing tourism revenues. An increase in the number of tourists leads to higher demand in sectors such as accommodation, transportation, food and beverages and various services, resulting in a rise in tourism revenues. Therefore, tourism not only provides economic growth and income increase but also serves as a mechanism that reduces the trade deficit for countries. Restaurants and accommodation facilities operating in the tourism sector purchase food and beverage supplies from the local market, which leads to an increase in the region's internal income. Additionally, producers and wholesalers who source their products from local farmers ensure that tourism revenue extends to the agricultural sector. In this context, the number of tourists significantly boosts tourism revenues, making a crucial contribution to the increase in economic activities in other areas related to this sector (Tutar et al., 2013:15).

This study aims to analyze the effects of inflation, exchange rates and the number of tourists on tourism revenues. Understanding how these factors interact with each other and their long-term effects on the tourism sector plays a critical role in shaping tourism policies and strategies. In this context a thorough examination of the relationships between the mentioned variables will make a significant contribution to ensuring the sustainability of tourism revenues and making effective decisions for the sector.

This study consists of three main sections. Following the introduction, a literature review is presented. The literature review focuses on previous studies that examine the relationship between tourism revenues, inflation, exchange rates and the number of tourists, highlighting the findings of these studies. In the second section, the aim and methodology of the study are explained, with a detailed description of the research model. In the third section, the short and long-term relationships between tourism revenues, inflation, exchange rates and the number of tourists are analyzed and the findings are presented. In the conclusion section, the findings are evaluated, and various recommendations are made based on these findings. Based on the results of this study, it is recommended to implement flexible policies against

inflation and exchange rate fluctuations, strengthen international promotion to increase the number of tourists and adopt sustainable tourism strategies. Additionally, diversifying products within the tourism sector and revising pricing strategies to enhance competitiveness are considered crucial.

1. LITERATURE REVIEW

The relationship between tourism revenues and inflation, exchange rates, and the number of tourists has been an important topic in both theoretical and empirical research. Studies conducted in this area yield various results in different countries, depending on the analysis methods used and the characteristics of the variables. Some studies examining the impact of inflation, exchange rates, and the number of tourists on tourism revenues in Turkey and other countries are summarized in the table below.

Table 1. Domestic and International literature Studies on the Subject

Author or Authors	Period and Variables	Method	Findings
Aydın and Alpağut (2022)	. 2003:M1 – 2021:M3 (Monthly Data) Tourism Receipts and Exchange Rate	TGARCH Model Toda Yamamoto Causality Test	The study found a bidirectional causality relationship between exchange rate volatility and tourism revenues, and that exchange rate volatility affects tourist expenditures in Turkey.
Chen et al. (2023)	2011-2020 (Yearly Data) Domestic Tourism Revenue, Number of Domestic Tourists, Per Capita Disposable Income of Urban Residents, Per Capita Disposable Income of Rural Residents, Highway Length, Railway Length and Number of Travel Agencies	Linear Regression Model	The study has identified that factors such as the number of travel agencies, the length of the railway network, the intensity of domestic tourism activities, and the per capita income in urban areas have a significant impact on tourism revenue.
Ceyhun (2015)	1995-2011 (Annual Data) General Level of Prices, Gross Domestic Product per Capita, Real Exchange Rate, Political Stability Index and Tourism Revenue	Panel Data Analysis	The study found that all the examined variables have a positive impact on tourism revenue; however, the variables of GDP per capita and the real exchange rate play a significant role among the determinants of tourism revenue.
Cheam et al (2013)	1974-2010 (Annual Data) Real Economic Growth, Real Tourism Receipts, Real Government Tourism Expenditure, Real Physical Capital, Real Education, Real Health and Real Exports of Goods.	Granger Causality Test	The study found bidirectional causality between economic growth, tourism receipts, and health, while unidirectional causality was identified between tourism expenditure, physical capital, education, exports, and economic growth.
Dritsakis (2004	1960: q1–2000: q4, (Quarterly Data) Real Gross Domestic Product, Real Effective Exchange Rate and International Tourism Receipts	A Multivariate Auto Regressive (VAR) Model	The study found a strong causal relationship between international tourism earnings and economic growth, as well as between the real exchange rate and economic growth.
Gric and Bojnec (2013)	2000:M1 - 2011:M12 (Monthly Data) Hospitality Industry, Index of Prices in Hospitality Industry in The Eurozone, Consumer Price Index in The Eurozone, Consumer Price Index in Slovenia, Index of Prices for Food, Nonalcoholic Beverages in Slovenia and Dummy Variable for The Monetary Change	A Multivariate Auto Regressive (VAR) Model	The study found that the inflation rate and hospitality industry prices are integrated of order one, and there is a cointegration relationship between inflation and the hospitality sector.
Işık (2010)	1970-2008 (Yearly Data) Tourism Receipts and Tourist Expenditures	Granger Causality Test	The study has identified a long-term bidirectional causality relationship between tourism

			revenue and tourist expenditures.
Kanca (2015)	1980–2013 (Annual Data) Economic Growth and Tourism Receipts	Granger Causality Test	The study found a statistically significant Granger causality relationship between economic growth and tourism revenues, with tourism revenues positively impacting economic growth.
Kara et al. (2012)	1992:M1, 2011:M5 (Monthly Data) Tourism Receipts, Real Production Index, Real Exchange Rate, Current Account Deficit	Engle-Granger, VAR Analysis Granger Causality Analysis	The study identified a unidirectional causality from economic growth to tourism revenues, a bidirectional causality from tourism revenues to the current account balance, and a unidirectional causality from exchange rates to tourism revenues.
Kim et al (2006)	1956 – 2002 (Annual Data) Economic Growth and Tourism Sector.	Granger Causality Test	The study found a long-term relationship and bidirectional causality between economic growth and the tourism sector.
Liu et al. (2021)	2001-2018 (Yearly Data) Tourism Receipts, Traffic Conditions, The Total Number of Tourists, Per Capita Chinese Residents GDP	Error Correction Model and Combining Granger Causality Test.	The study has found a significant relationship between the increase in tourism revenue in Qinghai Province and the total number of tourists, per capita Gross Domestic Product (GDP), and traffic conditions.
Mahmoudini et al (2011)	1995 – 2007 (Annual Data) Exchange Rate, Tourism Receipts and Economic Growth.	Panel Cointegration Technique	The study found a bidirectional causality relationship between tourism receipts and economic growth in MENA countries, both in the short run and the long run. Additionally, a unidirectional causality relationship was identified between the exchange rate and economic growth, as well as between the exchange rate and tourism receipts.
Meo et al. (2018)	1980–2015 (Annual Data) CO2 emissions, institutional Quality, Oil Prices, Exchange Rate and Inflation.	NARDL Model	The study, using the NARDL model, found that CO2 emissions have a long-term negative and significant effect on tourism demand, while institutional quality is positively related to tourism demand. Additionally, a long-term asymmetric relationship between oil prices, exchange rates, inflation, and tourism demand was identified.
Mestanoğlu and Yıldırım (2021)	2003:M1-2019:M9 (Monthly Data) Tourist Arrivals, Tourism Receipt, Currency Basket, Inflation and Interest Rate	Johansen Cointegration and Granger Causality Test	The study found that exchange rate volatility has no effect on the number of tourists arriving in Turkey and Turkey's tourism revenue.
Pekmezci and Bozkurt (2016)	2005:M1-2015:M6 (Monthly Data) Tourism Receipt, Dollar and Euro Exchange Rate	Johansen Cointegration and Granger CausalityTest	The study found no statistically significant causality or cointegration relationship between tourism revenues and the US Dollar. However, a long-term relationship was identified between tourism revenues and the Euro.
Raifu and Afolabi (2024)	1995Q1 - 2020Q4 (Quaterly Data) Tourism Arrivals, Tourism Receipts, Inflation Rate, Exchange Rate, Real GDP and Geopolitical Risk	OLS, DOLS and GMM Models	The study found that inflation negatively affects international tourist arrivals to Nigeria and leads to a decrease in tourism revenues.
Şit and Şen (2022	2000:M1 - 2020:M12 (Monthly Data) Tourism Receipts and Inflation	Granger Causality Test	The study found bidirectional causality between tourism

			revenue and inflation in both the short and long run.
Sulasmiyati (2019	2010: q1 - 2018: q4 (Quaterly Data) Economic Growth, Inflation and Total Foreign Tourist Arrivals	Descriptive and Multiple Linear Regression Analysis	The study has identified that the number of foreign tourists influences economic growth, while inflation affects the number of foreign tourists.
Tomak (2024)	2012 Q1 to 2024-Q2 (Quaterly Data) Tourism Receipts, Economic Growth. Inflation, Gross Domestic Product Per Capita, Unemployment Rate and Exchange Rate	Generalized Linear Model	The study found no statistically significant causality relationship between tourism revenue and economic growth. However, it was concluded that inflation has a significant impact on both the economy and tourism revenues.
Webber (2001)	1983: q1 – 1997: q4 (Quaterly Data) Tourism Departures to Destination, Destination Country, Prices Relative to Australian Prices, The Bilateral Exchange Rate Between Australia and Country and The Substitute Relative Price Index	Johansen and Engle-Granger Cointegration Model	The study has found that exchange rate volatility is an important determinant of long-term tourism demand. Additionally, it has been established that real disposable income and substitute prices have inelastic long-term effects on tourism.

2. DATA SET AND METHODOLOGY

This study analyzes the cointegration, short-term, and long-term relationships between tourism revenues, the number of tourists, exchange rates, and inflation. The aim of the study is to support the assumed relationship between the examined variables with empirical findings. The study seeks to investigate the effects of the number of tourists, exchange rates, and inflation on tourism revenues and uses a quantitative analysis technique, utilizing the monthly logarithmic data of the examined variables. This study is based on empirical analyses and focuses on only four parameters. The variables used in the study are the consumer price index representing inflation, the nominal exchange rate, and the number of tourists. The following equation will be used as the estimation equation in this study:

$$Tr_t = \alpha_0 + \alpha_1 Ta_t + \alpha_2 inf_t + \alpha_3 exc_t + \varepsilon_t. \quad (1)$$

In the equation: Tr_t ; represents tourism revenue at time t, Ta_t represents the number of tourists at time t, inf_t; represents the consumer price index (inflation) at time t. exc_t; represents the exchange rate at time t and ε_t; represents the error term at time t.

In this study, the effect of the number of tourists, inflation and exchange rates on Turkey's tourism revenues has been analyzed within the framework of the ARDL model. The nominal exchange rate (USD) is used as the exchange rate variable, while the consumer price index (CPI) is used to represent inflation. Additionally, considering the close relationship between tourism revenues and the number of tourists, both domestic and foreign tourist numbers have been used.

Table 2. Variables and Dataset Used in The Study

Symbol	Descriptions Of Abbreviations	Analysis Period	Data Source
TR	Tourism Receipt	2010:M1-2024:M12	https://evds2.tcmb.gov.tr and https://www.ktb.gov.tr/
TA	Tourist Arrivals		
INF	Inflation (Consumer Price Index		
EXC	Exchange Rate (US Dollar (Foreign Currency Purchases)		

In this study, the logarithms of all variables have been taken for the analysis. The number of tourists has been included as a variable since it has a significant impact on tourism revenues. Additionally, to better illustrate the relationship between exchange rates and tourism, nominal exchange rates have been preferred over real exchange rates, and the U.S. dollar has been used as the basis for the exchange rate representation. To measure the effect of inflation on tourism revenues, the consumer price index (CPI) has been used.

The null and alternative hypotheses for the research are formulated as follows:

H_0: There is no long-term relationship between tourism revenues, the number of tourists, exchange rates and inflation.

H_1: There is a long-term relationship between tourism revenues, the number of tourists, exchange rates and inflation.

2.1. Cointegration Analysis

Cointegration analysis is a statistical approach used to determine the relationship between multiple non-stationary time series in the long run. In this study, the degree of integration between tourism revenues, inflation, exchange rates and the number of tourists is determined using the ARDL bounds test, which is a highly useful cointegration approach developed to overcome the limitations of the Engle-Granger and Johansen cointegration tests, as well as the studies by Pesaran, Shin and Smith.

2.1.1. ARDL (Lag Distributed Autoregressive Bounds Test)

The long-term relationship between multiple non-stationary variables can be identified through cointegration tests. In this context, the study uses the Autoregressive Distributed Lag (ARDL) model, which allows for examining the long-term interactions between variables without considering the integration degrees of the analyzed time series. This model provides an appropriate approach for evaluating both short-term and long-term relationships. The ARDL model (Autoregressive Distributed Lag Bounds Test) is a highly useful cointegration method developed in the work of Pesaran, Shin and Smith (2001) to overcome the limitations of the Engle-Granger and Johansen cointegration tests. This approach is designed to effectively analyze the long-term relationships between variables, even when they have different integration levels and provides a more flexible and robust framework for testing cointegration. One of the key advantages of the ARDL model is that it can be applied regardless of the stationarity of the variables, meaning it can be used whether the variables are I(0) or I(1). This feature makes the ARDL model highly flexible and applicable to a broader range of situations, as it does not require the variables to be stationary at the same level, allowing for a more comprehensive analysis of long-term relationships between variables. In the ARDL model, the time series being analyzed can be integrated at I(0) or I(1) levels. This characteristic makes the ARDL test a highly practical, useful, and reliable technique for obtaining results. Its ability to work with both stationary (I(0)) and non-stationary (I(1)) series gives the ARDL model flexibility and a wide range of application possibilities, making it a versatile tool for analyzing relationships between variables. Another important feature of the ARDL model is that, because it is based on autoregressive distributed lag methods, it does not account for the endogeneity issue of the variables being analyzed. This allows the model to exclude the effects of internal dynamics, which in turn facilitates more reliable results. The model structure of the ARDL bounds test can be expressed as follows:

$$\Delta y_t = C_0 + C_1 t + \pi_{yy} y_{t-1} + \pi_{yx.x} x_{t-1} + \sum_{i=1}^{p-1} \psi i \Delta z_{t-i} + w \Delta x_t + \theta \omega_t + \omega_t + u_t \quad (2)$$

In the model; C_0: represents a constant parameter, t: refers to time or the trend variable, π_{yy} ve $\pi_{yx.x}$; represent the coefficients in the long run, z_t= (y_t,x_t) is the vector of variables that are expected to have a long-term relationship. Here: $\mathbf{y_t}$ is the dependent variable, x_t: represents the independent variables, with which a long-term relationship is sought, ω_t; represents fully independent variables, such as shadow variables or other factors, u_t: represents the error term, which is assumed to be autocorrelation-free.

In the study, the ARDL (Autoregressive Distributed Lag) model is used, with tourism revenue (TR) as the dependent variable, and inflation, exchange rate, and the number of tourists as the explanatory variables. The logarithms of the monthly data for these variables are used in the model. This model analyzes both long-term relationships and short-term dynamics. The ARDL model allows for the examination of the relationship between the dependent and independent variables, providing insights into both short-term and long-term interactions.

The general expression of the ARDL model used in the study can be expressed as follows:

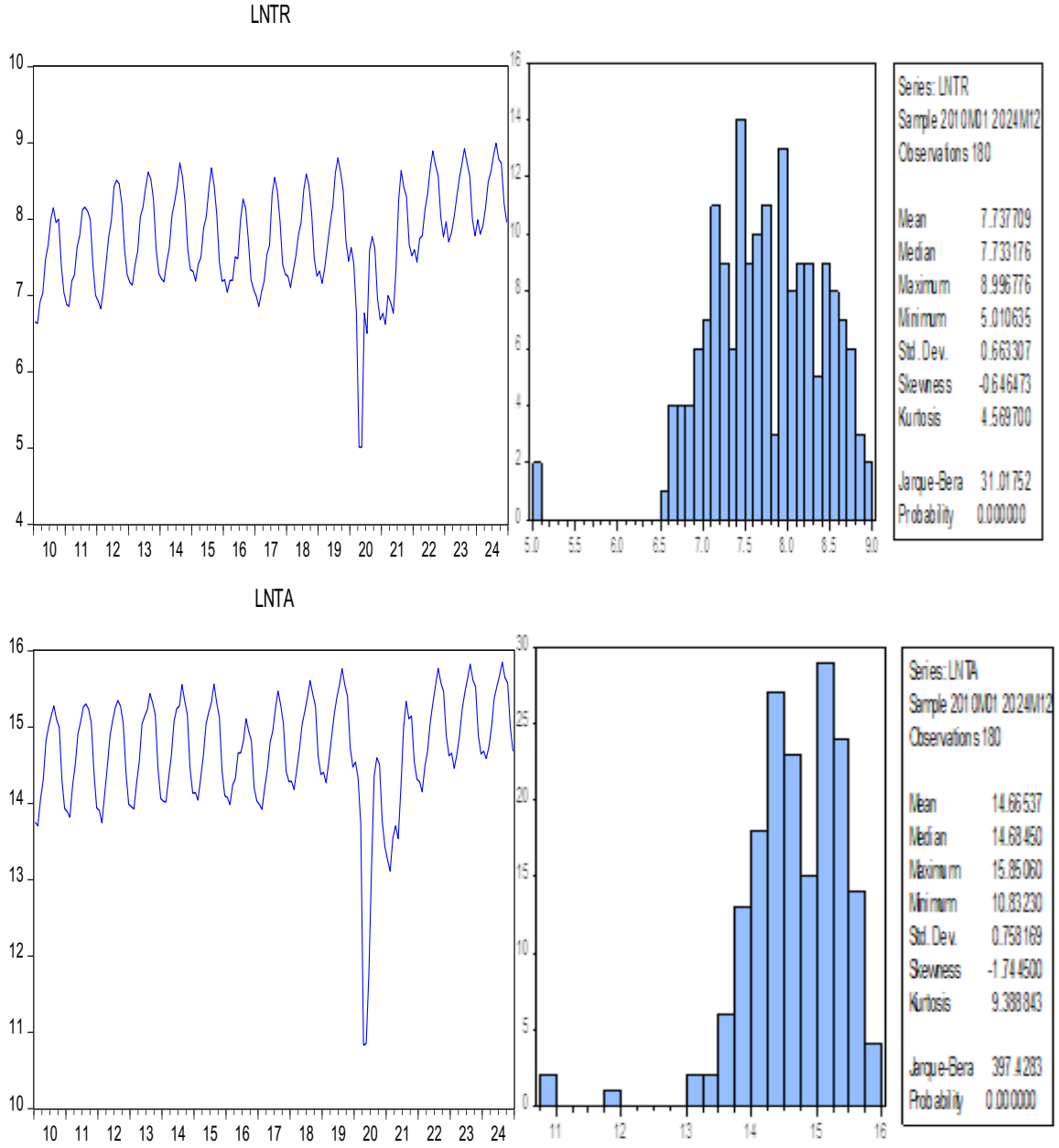
$$\Delta TR_t = \alpha_0+\sum_{i=1}^{p} \psi_i \Delta TR_{t-i}+\sum_{i=1}^{q} \varphi_i \Delta TA_{t-i}+\sum_{i=1}^{r} \theta_i \Delta INF_{t-i}+\sum_{i=1}^{s} \gamma_i \Delta EXC_{t-i}+\lambda_1 TR_{t-1} +\lambda_2 TA_{t-1}+\lambda_3 INF_{t-1}+\lambda_4 EXC_{t-1} +\varepsilon_t \quad (3)$$

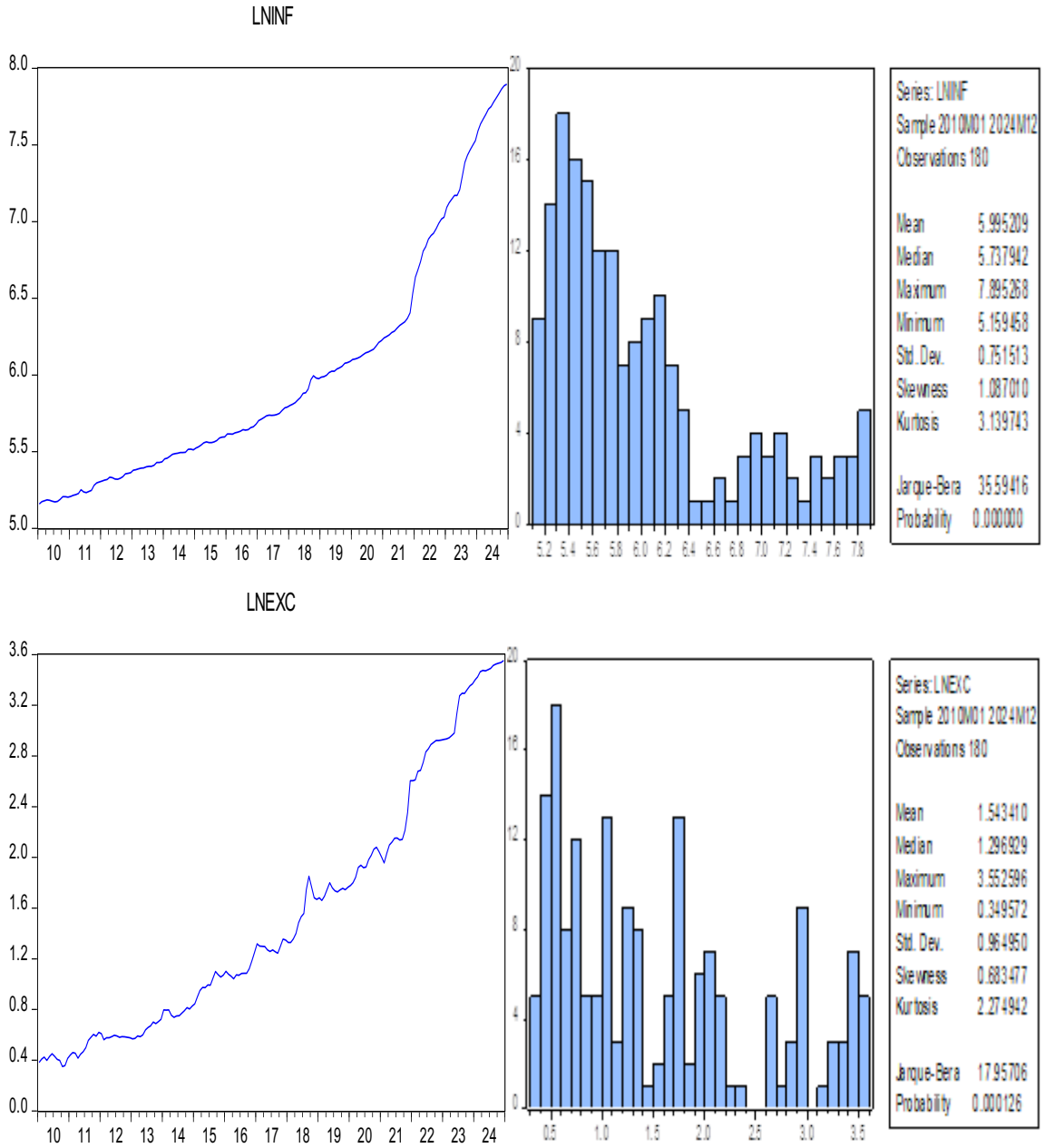
In the constructed ARDL models: α: represents the constant coefficient (intercept), ε: is the error term, Δ: denotes the difference operator, ψ, φ, θ ve $\boldsymbol{\gamma}$**;** represent the short-term relationship coefficients, indicating how the independent variables affect the dependent variable in the short run., λ_k: represents the long-term relationship coefficients between the variables, showing the equilibrium relationship in the long run, p: is the optimal lag length of the dependent variable, q_k: represents the optimal lag lengths of the independent variables. These symbols represent the core components of the ARDL model and each parameter in the model serves the purpose of analyzing the relationships between the dependent and independent variables in both the short and long term.

2.2. Monthly Time Series and Histogram Plot of Plot of Variables (2010:M1-2024:M12)

In this section, time series and histogram graphs of the variables used in the study are provided. By examining the monthly time series graphs of the variables presented in the figures below, it can be observed that the time series for tourist numbers and tourism revenues, as well as inflation and exchange rates, follow similar trends.

Figure 1: Monthly Time Series and Histogram Plot of Plot of Variables (2010:M1-2024:M12)





When examining the graphs of the monthly price changes of the variables, it can be observed that the time series for tourism revenue and tourist numbers exhibit stationarity. However, for macroeconomic variables such as the exchange rate and inflation, the price series do not show stationarity. Additionally, by analyzing the histogram graphs of the time series, it was observed that the Jarque-Bera statistics and p-values for all time series are extremely low. This finding provides strong evidence that the examined time series do not follow a normal distribution.

2.3. Descriptive Statistics

In the study, descriptive statistics were calculated to gain information about the general characteristics of the time series of the variables before predicting the relationships between the variables. The findings obtained are presented in Table 3 below.

Table 3. Descriptive Statistics

	LNTR	LNTA	LNINF	LNEXC
Mean	7.737709	14.66537	5.995209	1.543410
Median	7.733176	14.68450	5.737942	1.296929
Max	8.996776	15.85060	7.895268	3.552596
Min	5.010635	10.83230	5.159458	0.349572
Std.Dev	0.663307	0.758169	0.751513	0.964950
Skew	-0.646473	-1.744500	1.087010	0.683477
Kurt	4.569700	9.388843	3.139743	2.274942
J.Bera (Prob)	31.01752 (0.0000)	397.4283 (0.0000)	35.59416 (0.0000)	17.95706 (0.00012)
Obs	180	180	180	180

Table 3 presents the descriptive statistics of the variables used in the model. When examining the means of the variables TR, TA, INF and EXC, it is observed that the number of tourists (TA) has the highest mean with a value of 14.66, while the exchange rate (EXC) has the lowest mean with a value of 1.54. The standard deviations of the variables are generally high. The standard deviations of the analyzed variables range from 0.66 to 0.96. This indicates that the variables are not stable and exhibit significant volatility. When examining the skewness values, it is observed that the tourism revenue (TR) and number of tourists (TA) variables have negative skewness, while the inflation (INF) and exchange rate (EXC) variables have positive skewness. This suggests that the data for TR and TA are primarily concentrated around values lower than the mean. The kurtosis values of the variables range from 2.27 to 9.38. This indicates that for the TR and TA variables, the data deviates from a normal distribution and contains significant outliers. Particularly, the kurtosis value for the TA variable is quite high at 9.38, suggesting that its distribution has a higher concentration of extreme values. For the EXC and INF variables, with kurtosis values of 2.27 and 3.13, respectively, the deviations from normal distribution are within reasonable levels, and there are no significant outliers.

2.4. The Correlation Matrix Between Variables

In line with the objective of the study, a correlation matrix was created to identify the interactions between tourism revenue, number of tourists, inflation, and exchange rate. Table 4 below presents the correlation coefficients between the monthly logarithmic values of the variables.

Table 4. Correlation Matrix Results Between Variables

	LNTR	LNTA	LNINF	LNEXC
LNTR	1			
LNTA	0.9480	1		
LNINF	0.3327	0.2020	1	
LNEXC	0.2960	0.1650	0.9873	1

Table 4 presents the results of the correlation matrix between the variables used in the model. Among the analyzed variables, tourism revenue (TR) has a very strong correlation with the number of tourists (TA) and inflation (INF) with the exchange rate (EXC), at 0.94 and 0.98, respectively. On the other hand, a relatively low correlation is observed between the exchange rate (EXC) and the number of tourists (TA), and between the number of tourists (TA) and inflation (INF), with correlation values of 0.16 and 0.20, respectively. The table shows that the relationship between tourism revenue and inflation, as well as the exchange rate, is weak, indicating that these variables do not move in a similar direction and are therefore not related to each other.

3. FINDINGS OF THE STUDY

In this section of the study, the results of the unit root test and ARDL cointegration, short-term, and long-term tests obtained through the econometric methods used in the study are presented.

3.1. Unit Root Test Results

In the study, the stationarity of the time series for the variables was investigated using both level values and first differences through the Phillips-Perron (PP) and Augmented Dickey-Fuller (ADF) unit root tests. In this context, the hypotheses were formulated as follows:

H_0: The series has a unit root.

H_1: The series does not have a unit root.

These hypotheses were tested for validity on the relevant series, and the results are presented in Table 5 below.

Table 5. Unit Root Test Results

Phillips-Perron (PP) Unit Root Test Results								
	Level				**Difference**			
Variables	Constant		Constant&Trend		Constant		Constant&Trend	
	t-ists	Prob	t-ists	Prob	t-ists	Prob	t-ists	Prob
LNTR	-4.4265	0.0004	-4.4781	0.0021	8.3583	0.0000	-8.3158	0.0000
LNTA	3.6543	0.0056	-3.6301	0.0300	-7.2760	0.0000	-7.2104	0.0000
LNINF	5.7600	1.0000	1.4392	1.0000	-6.0474	0.0000	-7.3135	0.0000
LNEXC	2.1034	0.9999	-1.2350	0.8996	-8.4567	0.0000	8.4621	0.0000
Augmented Dickey-Fuller (ADF) Unit Root Test Results								
	Level				**Difference**			
Variables	Constant		Constant&Trend		Constant		Constant&Trend	
	t-ists	Prob	t-ists	Prob	t-ists	Prob	t-ists	Prob
LNTR	2.3781	0.1495	-2.5728	0.2934	-4.5552	0.0002	4.5552	0.0017
LNTA	-2.6571	0.0838	2.6746	0.2486	-4.4202	0.0004	-4.4175	0.0027
LNINF	2.5739	0.9999	2.5728	0.2934	-3.7864	0.0523	3.8836	0.0147
LNEXC	1.9844	0.9999	-1.3371	0.8753	9.3468	0.0000	-9.7912	0.0000

When Table 5 is examined, it is found that in the Phillips-Perron (PP) test, the tourism revenue (TR) and number of tourists (TA) variables do not contain a unit root at the 1% significance level in both the level and the level with trend models, indicating that they are stationary. On the other hand, the inflation (INF) and exchange rate (EXC) variables were found to contain a unit root at the level and do not meet the stationarity condition at the 95% confidence interval. However, when the first differences of the time series are taken, it is observed that all variables become stationary at the 1% significance level, do not contain a unit root, and are suitable for analysis

3.2. ARDL (Lag Distributed Autoregressive Bounds Test) Results

In this section, the ARDL bounds test was used to investigate cointegration, as well as the short- and long-term relationships between the variables. To examine the long-term relationship between tourism revenue, number of tourists, inflation, and exchange rate, a linear estimation equation was first constructed under the assumption that tourism revenue is the dependent variable, and the other variables are independent variables. Following this, the ARDL model was applied to make predictions based on the formulated estimation equation. In

the study, the results obtained from the ARDL model were evaluated at the 5% significance level. The F-statistic showing the long-term relationship between the stock markets, predicted by the ARDL (3,4,0,0,3) model, along with the critical values, the estimation model used, the number of explanatory variables, and the maximum lag, are presented in Table 6 below.

Table 6. ARDL (3,4,0,0,3) Model F Statistic and Critical Values

Model	K	M	F ist	Importance Level	Lower Critical Value	Upper Critical Value
ARDL (3.4.0.0.3	4	4	8.1772***	%10	2.45	3.52
				%5	2.86	4.01
				%1	3.74	5.06

Note: M: Maximum lag length, K: Number of explanatory variables and *** represents 1% significance level.

When examining Table 6, it can be seen that the F-statistic value, which indicates the long-term cointegration of the variables, is greater than the critical values at the 1%, 5%, and 10% significance levels. This suggests that, in the long run, tourism revenue is cointegrated with the number of tourists, inflation and exchange rate at the 1% significance level. When evaluating the ARDL (3,4,0,0,3) model results at the 5% significance level, it was determined that tourism revenue is cointegrated with the number of tourists, inflation and exchange rate in the long run. Therefore, it can be concluded that there is a long-term relationship between tourism revenue and the number of tourists, inflation, and exchange rate, and that tourism revenue is integrated with these variables and does not move independently from them.

Table 7. ARDL (3,4,0,0,3) Model Long Run Coefficients

Variables	Coefficient	Std.Error	t-stat	Prob
LNTA	0.705449	0.053583	13.16542	0.0000
LNINF	0.516105	0.221359	2.331522	0.0210
LNEXC	-0.300332	0.171057	-1.755749	0.0810
Dummy	0.706334	0.538013	1.312856	0.1911

When examining Table 7, a positive and statistically significant relationship is found between tourism revenue and the number of tourists, inflation and exchange rate at the 1%, 5% and 10% significance levels, respectively, in the long run. In this context, it is observed that in the long term, the number of tourists (TA) positively affects tourism revenue by 0.70, while inflation has a positive impact of 0.51. On the other hand, the exchange rate negatively affects tourism revenue by -0.30 at the 10% significance level.

Table 8: ARDL (3,4,0,0,3) Model Short Run Coefficients

Variables	Coefficient	Std.Error	t-stat	Prob
Constant	-2.024881	0.313467	-6.459625	0.0000
LNTR (-1)	0.060515	0.065897	0.918321	0.3598
LNTA	0.841078	0.030700	27.39632	0.0000
Dummy	0.303757	0.079847	3.804237	0.0002
CointEq(-1)*	0.303757	0.079847	3.804237	0.0000

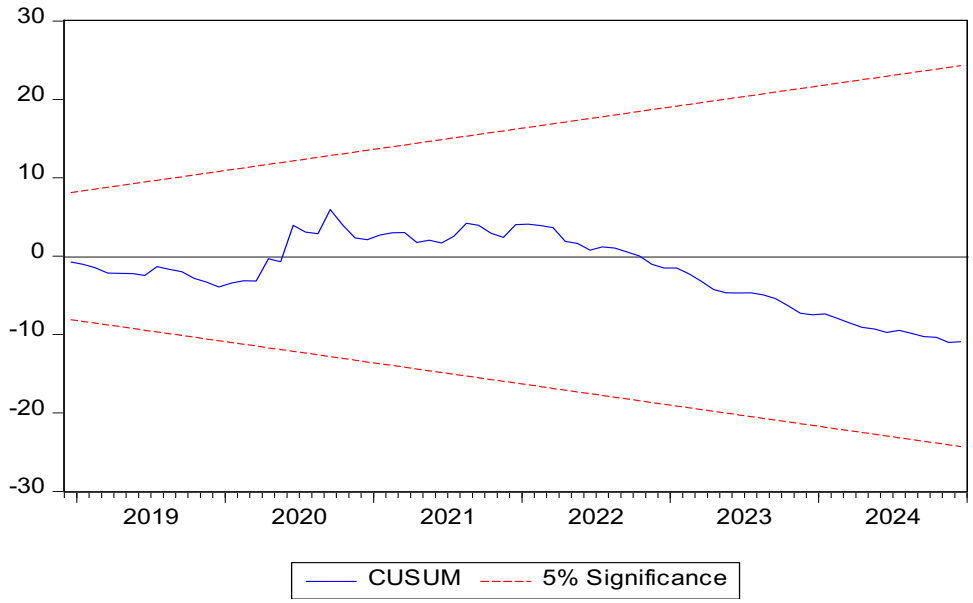
When examining Table 8, it is observed that there is a significant and positive short-term relationship between tourism revenue and the number of tourists (TA) at the 1% significance level. A 1% change in the number of tourists creates a positive impact of 0.84 on tourism revenue in the short term. On the other hand, no significant short-term relationship is found between tourism revenue and inflation (INF) and exchange rate (EXC) at the 5% and 10% significance levels. The coefficient of the error correction term in the model is negative and statistically significant at the 1% significance level, indicating that the model is functioning correctly. This suggests that any short-term imbalance (-0.30) between the variables will return to the long-term equilibrium after the period.

Table 9. Diagnostic Test Results of ARDL (3,4,0,0,3) Model

R-squared	0.9044	BG Serial Correlation LM Test	0.0771
F-Statistic (Prob)	156.183 (0.0000)	Heteroskedasticity Test ARCH	0.4820
Durbin-Watson Stat	2.17578	Jarque-Bera (Prob)	22.47479 (0.0000)

Table 9 presents the diagnostic test results for the ARDL (3,4,0,0,3) model. The R^2 value indicates that the model explains 90.44% of the variation in tourism revenue. The F-statistic, which shows whether the model as a whole is significant, is positive and significant, suggesting the model is valid. The Durbin-Watson statistic, with a value of 2.17578, is close to 2, indicating that the series are stationary. The Jarque-Bera normality test, which indicates whether the series follow a normal distribution, has a p-value of 0.0000, which is smaller than 0.05, suggesting that the residuals do not follow a normal distribution. Additionally, the p-values for the Breusch-Godfrey serial correlation test and the Heteroskedasticity Test ARCH (variance) are 0.0771 and 0.4820, respectively, both greater than 0.05. This indicates that there is no autocorrelation or changing variance in the ARDL (3,4,0,0,3) model. As a result, although the residuals do not follow a normal distribution, it can be concluded that the results obtained from the model are reliable.

Figure 2: CUSUM Graph Estimated with ARDL (3,4,0,0,0,3) Model



When examining the CUSUM graph in Figure 2, it is observed that the long-term coefficients of the variables predicted by the ARDL (3,4,0,0,3) model remain within the red critical bounds. This indicates that there is no structural break in the model, and the long-term coefficients of the variables are stable.

CONCLUSION

Tourism revenue is one of the key indicators reflecting a country's economic performance, and there are various dynamic factors influencing these revenues. Among these factors, inflation, exchange rates, and the number of tourists are particularly prominent. Inflation refers to the increase in the general price levels in a country, and it can affect the spending behaviors of both domestic and foreign tourists.

High inflation rates can reduce the purchasing power of tourists, thereby negatively affecting tourism demand. Additionally, exchange rate volatility is another crucial factor that influences the travel decisions and spending habits of foreign tourists. Fluctuations in exchange rates can directly impact the costs that tourists face when planning international travel and thus shape the demand for the tourism sector. Moreover, an increase in the number of tourists is generally considered a factor that leads to higher tourism revenues. An increase in the number of tourists contributes to the growth of the tourism sector by raising the spending of both domestic and foreign tourists. In this research article, the long-term effects of inflation, exchange rates, and the number of tourists on tourism revenues have been examined in detail. In the study, the relationship between inflation, exchange rate, number of tourists, and tourism revenues was analyzed using the ARDL (3,4,0,0,3) model. The F-statistic of the model was found to be 8.1772, with the lower critical value of 3.74 and the upper critical value of 5.06. Since the F-statistic is higher than the critical values, the model is statistically significant at the 1% significance level. Therefore, it can be concluded that inflation, exchange rate, and number of tourists have a strong long-term impact on tourism revenues and the variables are cointegrated. In the study, when examining the long-term coefficients of the ARDL (3,4,0,0,3) model, it was found that the number of tourists has a strong positive effect on tourism revenues, influencing tourism revenue in a favorable direction by 0,70. It was determined that inflation has a positive effect on tourism revenues, with an impact of 0.51. This finding suggests that inflation could indirectly have a positive effect on the tourism sector. On the other hand, the exchange rate variable was found to have a negative effect on tourism revenues at the 10% significance level, affecting tourism revenue by -0.30.

The findings reveal that inflation, exchange rate, and the number of tourists have a significant impact on tourism revenues. It has been determined that exchange rate fluctuations and inflation are key factors influencing tourism revenues. Furthermore, an increase in the number of tourists was found to have a very strong positive effect on tourism revenues. This highlights the importance of implementing flexible policies in the tourism sector in response to economic variables. Additionally, it underscores the need to strengthen international promotional activities aimed at increasing the number of tourists and to adopt sustainable tourism strategies. Revising product diversification and pricing strategies in the tourism sector could make the industry more competitive and contribute to long-term revenue growth. To increase tourism revenues, it is crucial to support tourism activities, take measures against the potential negative effects of inflation, and develop flexible strategies to cope with exchange rate fluctuations. This study is expected to provide valuable insights for policymakers and industry decision-makers, demonstrating the effective use of econometric analyses and modeling techniques to boost tourism revenues.

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