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Determination of International Tourism Demand in Turkey: Panel Data Analysis

Research Article

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ABSTRACT

Accordingly, the main objective of this study is to reveal the determinants of international demand in the tourism sector, which is an important source of income for Turkey, together with other developing countries. Within the scope of the study, Argentina, Brazil, South Africa and Egypt are also considered since they have similar economic structures and their tourism structures are similar to Turkey. The dependent variable of the study is the "number of international tourism arrivals" as an indicator of international tourism demand for each country. "International tourism expenditures (current US$)", 'International tourism, revenues (current US$)', 'GDP (current US$)' and 'International tourism, number of departures' are used as independent variables in the study. The data used in the study consist of annual data for the period 1995-2023. The data used in the study were obtained from the World Bank, UNWTO and annual data for 2020 and beyond were obtained from each country's own statistical agency. Since the data set of the study consists of both time series and cross-sectional data, panel data analysis is used. The results show that international tourism revenues have a significant effect on tourism demand. The study also found that the number of international departures has a negative impact on tourism demand. This indicates that an increase in the number of Turkish citizens traveling abroad reduces international tourism demand. On the other hand, Gross Domestic Product (GDP) is found to have a negative impact on international tourism demand. This is elaborated in the scope of the study. Finally, tourism expenditure does not have a significant impact on tourism demand.

Keywords: Tourism, Tourism Demand, Turkey, Panel Data Analysis.

1. INTRODUCTION

The rapid development of the tourism industry can affect societies in many ways. Tourism can affect societies in many ways, including social, cultural, psychological, demographic and environmental. In addition to its own sectors such as accommodation, travel, transportation and food and beverage sectors, tourism is also known to affect sectors such as construction, trade, health, banking and agriculture. According to Bahar and Bozkurt (2010), tourism has a spillover effect on many other sectors. Therefore, the undeniable fact underlying many of these effects is the economic effects of tourism. Economy affects tourism bilaterally. In other words, while countries where tourism develops develop economically, tourist-sending countries need to have a good economy in order to be able to send tourists.

The fact that the tourism industry has become so important has led countries rich in touristic resources to make intensive efforts to gain a share in the tourism market. The tourism sector stands out as a strategic sector that provides multifaceted economic benefits, especially for developing countries. Expenditures made by foreign tourists create an export effect by providing foreign exchange inflows to a country and this situation contributes significantly to the national economy. In cases where active foreign tourism revenues exceed passive foreign tourism expenditures, these revenues can play an important role in reducing the foreign trade deficit. The positive effects of tourism are not limited to this; due to its labor-intensive nature, it creates employment opportunities in many sectors such as agriculture, construction and transportation. Moreover, the consumption expenditures of tourists support other economic activities within the country and increase the level of income.

Tourism sector is one of the most important sources of income especially for developing countries. For this reason, foreign tourists coming to the country create an export effect in terms of being a source of foreign exchange. Moreover, if active foreign tourism revenues are higher than passive foreign tourism expenditures in a country, tourism revenues contribute positively to closing the foreign trade deficit. Moreover, the positive effects of the tourism sector on the economy are not limited to this. Since the tourism sector is a labor-intensive sector, it provides employment to many sectors, especially agriculture, construction and transportation sectors. In addition, the consumption expenditures of tourists within the country generate income for other sectors. Accordingly, the main objective of this study is to reveal the determinants of international demand in the tourism sector, which is an important source of income for Turkey, together with other developing countries.

In line with the main purpose of the study, the study consists of three main sections. The first section deals with the basic concepts and historical development of the tourism sector. In addition, the scope, historical development and different types of tourism are analyzed in this section. The next section deals with the international tourism demand, which is the focus of the study. In this section, the conceptual framework of tourism demand, its determinants and competition in international markets are analyzed. The last section presents the empirical study in line with the objective of the study. In line with the results obtained, a general conclusion is formed by analyzing the tourism demand structures of developing countries such as Turkey.

2. Analysis of Tourism Demand in Turkey: Panel Data

In this section, information on the analysis methodology for determining the factors affecting tourism demand is given. In addition, the empirical literature is presented.

2. 1. Purpose of the Study

The tourism sector is one of the most important sources of income especially for developing countries. Therefore, foreign tourists coming to the country create an export effect in terms of being a source of foreign exchange. In addition, if active foreign tourism revenues are higher than passive foreign tourism expenditures in a country, tourism revenues contribute positively to closing the foreign trade deficit. Moreover, the positive effects of the tourism sector on the economy are not limited to this. Since the tourism sector is a labor-intensive sector, it provides employment to many sectors, especially agriculture, construction and transportation sectors. In addition, tourists' consumption expenditures within the country generate income for other sectors. Based on this fact, the main objective of this study is to reveal the determinants of international demand in the tourism sector, which is an important source of income for Turkey, together with other developing countries.

2. 2. Data

In addition to Turkey, Argentina, Brazil, South Africa and Egypt were taken into consideration within the scope of the study. These countries were chosen because they have similar economic structures and their tourism structures are similar to Turkey. As a matter of fact, the selected countries are classified as emerging market economies and have similar per capita national income levels as they are in the upper-middle income group in the World Bank classification. In addition, their tourism sector characteristics are also similar. Each of the selected countries has its own unique tourist attractions and tourism revenues account for a significant share of GDP. Another aspect is that these countries can be said to show similar seasonal patterns in international tourist flows.

Moreover, the selected countries represent different geographical regions within the emerging economies category. Thus, Turkey is located in Eurasia, Egypt in North Africa/MENA region, South Africa in Sub-Saharan Africa, Brazil and Argentina in Latin America. Thus, a common tourism demand structure for countries with similar tourism structure and economies, but located in different regions, has been tried to be provided.

Within the scope of the study, studies in the literature were taken into consideration in the modeling study and dependent variables and independent variables were determined according to these studies. The dependent variable of the study is “number of international tourism arrivals” as an indicator of international tourism demand for each country. As a matter of fact, this variable can be expressed as the most objective and measurable indicator of international tourism demand. It is also the main performance indicator accepted by the World Tourism Organization (UNWTO).

“International tourism expenditures (current US$)”, ‘International tourism, receipts (current US$)’, ‘GDP (current US$)’ and ‘International tourism, number of departures’ were used as independent variables in the study. The data used in the study consist of annual data for the period 1995-2023. The data used in the study and information on data sources are presented in Table 1. The data used within the scope of the study were not transferred to international institutions such as the World Bank and UNWTO in a healthy way during the pandemic period. For this reason, annual data, especially for 2020 and beyond, were obtained from each country's own statistical institution.

Table 1: Variables and their Descriptions

Dependent Variable	Represent	Source
International tourism, number of arrivals	demand	– World Bank Data, – United Nations World Tourism Organization (UNWTO), – Instituto Nacional de Estadística y Censos (INDEC) for Argentina – Central Agency for Public Mobilization and Statistics (CAPMAS) for Egypt – Instituto Brasileiro de Geografia e Estatística (IBGE) for Brazil – Statistics South Africa (Stats SA) for South Africa – Turkish Statistical Institute (TurkStat) for Türkiye.
Independent Variables		
International tourism, expenditures (current US$)	expenditures	
International tourism, receipts (current US$)	receipts	
International tourism, number of departures	departures	
GDP (current US$)	gdp	

First, the variable “International Tourism Expenditures” represents the expenditures made by tourists in the destination country. This variable reflects the economic dimension of tourism demand as well as price sensitivity. The variable “International Tourism Receipts” represents the revenue generated by countries from the tourism sector. This variable not only represents the economic size of the tourism industry but also measures the contribution of the sector to the national economy. Another independent variable, “Number of International Tourism Departures”, is a very important variable for revealing reciprocal tourism flows. This variable reflects the dynamics of two-way tourism movements. It also shows the intensity of tourism relations between countries. Finally, the variable “GDP (current US$)” is included to represent the economic size of the countries. This variable functions as a proxy variable for tourism infrastructure and service quality, and is also effective in revealing the impact of the level of economic development on tourism demand.

2. 3. Methodology

The data set of the study consists of both time series and cross-sectional data. In this case, it was deemed appropriate to utilize panel data analysis techniques for the analysis of variables in the study. In this section, panel data models and inter-model selection tests are discussed. Panel data is a form of data that follows the units in a selected sample over time and creates more than one observation for each cross-section over time (Hsiao, 2022: 1). Therefore, in panel data, a data set consisting of at least two periodic observations of at least two different units emerges. The rapidly developing panel data method is preferred by countries, international organizations (WB, OECD, etc.), universities or search engines (Pesaran, 2015: 633). Panel data forecasts differ from time series and cross-sectional forecasts by using sub-indices symbolizing time (T) and cross-sectional (N) dimensions for each of the variables in the model. The cross-sectional dimension of the model can consist of many different units such as households, cities, countries, and firms. The time dimension can be daily, monthly, quarterly or annually depending on the nature of the data used. The basic econometric estimation equation for panel data, symbolized by the cross-sectional dimension (i) and the time dimension (t) (Baltagi, 2021: 15):

$$y_{it} = \beta_{1it} + \sum_{k=2}^{K} \beta_{kit} x_{kit} + \mu_{it} \quad (1)$$

Where i = 1,2,3,...,n units and k = 1,2,3,...,n time dimensions. Thus, the volume of a panel data is calculated as unit x dimension.

$y_{it} =$ observation of the i-th unit at time t,
$\mu_{k_{it}} =$ coefficient of the k-th variable of the i'th unit at time t,
$x_{k_{it}} =$ kth observation of the i-th unit at time t,
$\mu_{k_{it}} = is\ the\ error\ term\ of\ the\ kth\ observation\ of\ the\ i-th\ unit\ at\ time\ t.$

As seen above, in the classical model, the coefficients of variables vary according to the i'th unit and t'th time of each variable and the variable. However, panel data models vary depending on whether the coefficient β varies by unit, time or both unit and time. Classical Panel Data Regression Model is the first model we will consider. The basic approach in the classical panel data regression model is that all coefficients are constant.

$$y_{it} = a + \beta x'_{it} + \varepsilon_{it} \quad (2)$$

As seen in equation (2), the coefficients remain constant regardless of unit and time. This assumes that the coefficients and therefore the observations satisfy the homogeneity assumption.

In classical panel regression models, the Least Squares (LS) method is applied as the estimation method. However, EKK is only valid if the mean and variance are stochastic. To obtain panel data models in which the homogeneity assumption is rejected in classical models, one should examine models that allow for variation by unit, time or both dimensions. This variation is called fixed effect models and random effect models according to the way it is evaluated.

The model structure is such that all coefficients, including the constant and slope coefficients, are constant.

The fact that the coefficients do not vary across units and/or time leads to the conclusion that all observations represent the same main population and the observations satisfy the assumption of complete homogeneity.

In Fixed Effect panel data models, the differences created by unit and/or time differences under fixed coefficients are measured. In this model, the change in fixed coefficients is used by adding “Dummy Variable Model” or “Covariance Model” to the model. Fixed effect panel data models vary according to the size of the panel data. Accordingly, models that are analyzed only by unit or time are referred to as “One-Factor Fixed Effects Model”, while models that are analyzed both by time and unit are referred to as “Two-Factor Fixed Effects Model”. In the one-factor fixed effects model, unit effects are added to the model through a separate parameter independent of the time dimension. This unit effect is expressed through the fixed coefficient in the model. Here, although the variable coefficients of the model are independent, the constant coefficient affected by unit differences varies from unit to unit (Davidson ve Mackinnon, 1993: 320-323).

$$y_{it} = (\gamma_1 + \mu_i)e \ + \textstyle\sum_{k=2}^{K} a_k x_{kit} + \epsilon_t \quad (2)$$

In the model, γ is the mean of the constant coefficients in all units, μ_i is the difference of the mean of the constant coefficient in the i-th unit and finally $(\gamma_1+\mu_i)$ is the estimated constant coefficient in the i-th unit. As in the classical model, the error term of this model is assumed to have a homogeneous distribution with zero mean and constant variance. In addition, while the error term of the model is uncorrelated with other explanatory variables, there may be a relationship between the variables with the unit effect (Yerdelen Tatoğlu, 2012: 80). The two-factor Fixed Effects Model is constructed by adding a time effect to the one-factor fixed effects model and the relevant model is given below

$$y_{it} = a_{it} + \beta x'_{it} + \varepsilon_{it} \quad (3)$$

In this model;

$$\sum_{i}^{n} \mu_i = 0\,; \sum_{i}^{n} \lambda_t = 0\,;$$

$$a = \frac{1}{NT} \textstyle\sum_i^n \sum_t^n a_{it} \quad Average\ Effect \quad (4)$$

$$a + \mu_i = \frac{1}{T} \textstyle\sum_t^n a_{it} \quad Unit\ Effect \quad (5)$$

$$a + \lambda_t = \frac{1}{N} \textstyle\sum_i^n a_{it} \quad Time\ Effect \quad (6)$$

In these equations, α is the average obtained from the unit and time effects, μ_i is the standard deviation of the unit effect from these averages and finally λ_i s the deviation of the time effect from the averages. If α_i is to be expressed in a more detailed form, we obtain the following equation.

$$y_{it} = a + \mu_i + \lambda_t + \beta x'_{it} + \varepsilon_{it} \quad (7)$$

Specification tests are used to decide on the model to be used in panel data analysis. The F test (Fischer test) is used to decide whether to use the ECT model or the fixed effect model.

$$F = \frac{\frac{RSS_r - RSS_{ur}}{N-1}}{\frac{RSS_{ur}}{NT-N-K}} \sim F_{N-1,\ N(T-1)-K} \quad (8)$$

In this equation, RSSr is equal to the residual sums of squares (RSS) of the restricted model (LS) and RSS_ur is the sum of the residual sums of squares of the unrestricted model (one-factor fixed effect model). The null hypothesis (H_0) and alternative hypothesis (H_1) tested by the F test are as follows.

$$H_0: a_1 = a_2 = \cdots = a_{N-1} = 0 \quad (9)$$
$$H_1: a_1 \neq a_2 \neq \cdots a_{N-1} \neq 0 \quad (10)$$

As can be seen from the hypothesis H_0, it shows that the efficient model is the LS. To summarize the decision rule, the null hypothesis H_0 is rejected when the F statistic is above the table value ($F>F_{Table}$). Since this means that the coefficients of the dummy variables are different from each other, a one-factor fixed effect model including individual effects is used.

Again, the F test determines whether the two-factor fixed effect model or the ECM model is more appropriate, but the new equation has a different number of degrees of freedom:

$$F = \frac{\frac{RSS_T - RSS_{ur}}{N-T-2}}{\frac{RSS_{ur}}{(N-1)(T-1)-K}} \sim F_{N+T-2,\ (N-1)(T-1)-K} \quad (11)$$

In this equation, RSS was equal to the sum of the remaining squares of the LS model. RSS_{ur} is the sum of the remaining squares of the two-factor fixed effects model. The null hypothesis (H_0) and the alternative hypothesis (H_0) tested by the F test are as follows:

$$H_0: a_1 = a_2 = \cdots = a_{N-1} = 0 \ \ and \ \ \lambda_1 = \lambda_2 = \cdots \lambda_{T-1} = 0 \quad (12)$$
$$H_1: a_1 \neq a_2 \neq \cdots a_{N-1} \neq 0 \ \ and \ \ \lambda_1 \neq \lambda_2 \neq \cdots \neq \lambda_{T-1} \neq 0 \quad (13)$$

The null hypothesis indicates that the effective model is the LS. To summarize the decision rule, the null hypothesis H_0 is rejected when the F statistic is above the table value ($F>F_{Table}$). Since this means that the coefficients of the dummy variables are different from each other, a two-factor fixed effect model with unit and time effects is used.

Random effect panel data models are models that do not have fixed coefficients for each unit and time, but rather are considered to have independent random variables. Similar to the fixed effect model, it can be analysed under two subheadings as one-factor and two-factor random models. In the one-factor random effect model, it is assumed that these are not fixed coefficients, but rather independent random variables. The one-factor random effect model is as follows (Greene, 2003: 285-304) :

$$y_{it} = a + \beta x'_{it} + u_{it} \quad (14)$$

$$u_i = \mu_i + \varepsilon_{it} \quad (15)$$

The error term μ_{it} in the model consists of two parts. While ϵ_{it} is the known error term in the model, μ_i denotes the differences between units. In other words, the constant i is the specific effect term for the relevant unit. The basic assumptions of the model regarding μ_{it} and its components are as follows:

$E(\mu_i\, \varepsilon_{it}) = 0$	Errors are not correlated with each other..	(16)
$E(\mu_i) = E(\varepsilon_{it}) = 0$	*Means of Errors are zero.*	(17)

$E(\mu_i x'_{it}) = E(\varepsilon_{it} x'_{it}) = 0$	Errors are independent of variables.	(18)
$E(\mu_i^2) = \sigma_\mu^2$	The variance of the differences between units is constant.	(19)
$E(\varepsilon_{it}^2) = \sigma_\varepsilon^2$	The variance of the known errors is constant.	(20)
$E(\mu_i \mu_j) = 0$	i $\neq j$ in equation	(21)
$E(\varepsilon_{it}\varepsilon_{js}) = 0$	i $\neq j$ ve t $\neq s$ in equation	(22)
$E(u_{it}^2) = \sigma_\mu^2 + \sigma_\varepsilon^2$	is equal to the sum of the variance of μ_{it} and the variance of ϵ_{it}	(23)
$E(u_{it}u_{is}) = \sigma_\mu^2$	Their consecutive values are related.	(24)

Two-factor random effects models are models in which specific time effects are used in addition to the one-factor random effects model. In addition to α_i, λs are assumed not to be fixed coefficients. Rather, λ's are independent random variables. The general expression of the two-factor randomisation model is similar to the one-factor randomisation model. The difference between both models is due to the error term (μ_{it}).

$$y_{it} = a + \beta x'_{it} + u_{it} \quad (25)$$
$$u_{it} = \mu_i + \lambda_t + \varepsilon_{it} \quad (26)$$

The error term μ_{it} in the model consists of three parts. As in the equation above, ϵ_{it} is the known error term; μ_i are the differences between units; and λ_t denotes the specific effects over time. The basic assumptions about μ_it and its components of the two-factor random model are obtained when the one-factor random model is extended to include λ_t.

Langrange Multiplier (LM) tests are used to decide whether to choose the EKK model or the random effects model as the estimation method.

$$LM_\mu = \frac{NT}{2(T-1)} \left[\frac{\sum_{i=1}^{N}\left[\sum_{t=1}^{T}\varepsilon_{it}\right]^2}{\sum_{i=1}^{N}\sum_{t=1}^{T}\varepsilon_{it}^2} - 1\right]^2 \sim \chi_1^2 \quad (27)$$

In this equation, ε_{it} is based on the residuals of the LS model. The null hypothesis (H_0) and alternative hypothesis (H_1) tested by the LM test are as follows.

$$H_0: \sigma_\mu^2 = 0 \quad (28)$$
$$H_1: \sigma_\mu^2 \neq 0 \quad (29)$$

H_0 indicates that the variances of the units are equal (constant variance across units). H_0 means that the LS model will be used; H_1 means that a single factor fixed effect model is more appropriate. The LM test statistic shows the χ^2 (chi-square) distribution and the decision rule is obtained by comparing the LM test statistic value with the table value. H^0 is rejected if the LM test statistic value is greater than the table value ($LM_{\mu\lambda} > \chi^2{}_{Table}$). This means that if H_0 is rejected, the one-factor random effect model should be favoured.

2. 4. Modelling

In this study, the determinants of tourism demand are analyzed using panel data analysis. The model used in the analysis is constructed as follows.

$$demand = \alpha + \beta_1 expenditures_{it} + \beta_2 receipts_{it} + \beta_3 gdp_{it} + \beta_4 idepartures_{it} + \epsilon_{it}$$

where ;

demand:	International tourism, number of arrivals
expenditures:	International tourism, expenditures (current US$)
receipts:	International tourism, receipts (current US$)
departures:	International tourism, number of departures
gdp:	GDP (current US$)

is expressed as.

2. 5. Findings

Panel data analysis involves various testing and analysis processes. F-Test, LM test and Hausman test are conducted to determine the preference between the fixed effects model and the random effects model and to test whether the OLS or fixed effects model will be used. Then, unit root tests were applied to determine the stationarity of the data. Breusch-Godfrey / Wooldridge, Pesaran and Breusch-Pagan tests were then performed to test assumptions such as Autocorrelation, Horizontal Section Dependence and Heterokedasticity. Finally, the estimation results of the analysis are presented..

2. 5. 1. Model Identification Process

Within the scope of the study, identification tests were conducted for the Panel data model. In this direction, the F-Test results to test whether the OLS or fixed effects model will be used are presented in Table 2.

Table 2. F Test Results

	Hypotesis	One-way fixed effects	Two-way fixed effects
F Test	$H_0 = OLS$ $H_1 = Fixed\ Effects$	2.6354***	3.994*

*, **, *** indicate statistical significance at the 0.01, 0.05 and 0.10 levels, respectively.

As seen in Table 4.2, according to the F Test results performed for the selection of the OLS model with both the one-way fixed effects model and the two-way fixed effects model, both fixed effects models are preferred to the OLS model ($F_{Calculated} > F_{Table}$). Therefore, the H_0 hypothesis is rejected. The one-way fixed effects model will be preferred to the OLS model to create the model.

Another test to determine the method to be used in the model is the Lagrange Multiplier (LM) test. With this test, it will be decided whether to use OLS or random effects model in the model. The results of the LM Test are presented in Table 3.

Table 3. LM Test Results

	Hypotesis	One-way fixed effects	Two-way fixed effects
F Test	$H_0 = OLS$ $H_1 = Fixed\ Effects$	105.34***	145.25*

*, **, *** indicate statistical significance at the 0.01, 0.05 and 0.10 levels, respectively.

According to the test results, since $LM_{\mu\lambda} > \chi_{tablo}{}^2$, the hypothesis H_0 is rejected and it is determined that the two-way random effects model should be used instead of the OLS model. According to the F Test and LM Test results, the OLS model is not preferred in both tests. Therefore, Hausaman Test was applied to decide whether to use the one-way random effects model or the one-way fixed effects model.

2. 5. 2. Hausman Test Results

The Hausman test is a test of whether a fixed or random effects model should be used. The research question of this test is whether there is a significant correlation between unobserved idiosyncratic random effects and the independent variables. If there is no such correlation, the random effects model may be stronger. If there is such a correlation, the random effects model is inconsistently estimated and the fixed effects model is the preferred model. This correlation test is a comparison of the covariance matrix of the independent variables in the Least Squares with Dummy Variables model with those in the random effects model. The null hypothesis is that there is no correlation. If there is no statistically significant difference between the covariance matrices of the two models, then the correlations of the independent variables and the random effects are statistically insignificant (Yaffee, 2003). Hausman test statistics are used to test whether to use a random effects model or a fixed effects model and to test whether there is a correlation between the specific effects of the units and the explanatory variables.

The null hypothesis (H0) and alternative hypothesis (H1) tested by the LM test are as follows:

$$H_0: (\mu_i, x_{it}) = 0 \quad (30)$$
$$H_1: (\mu_i, x_{it}) \neq 0 \quad (31)$$

H_0 implies that there is no relationship between the specific effects of the units and the explanatory variables. Therefore, H_0 suggests that a one-factor random effects model should be used. In addition, H_1 indicates that a one-factor fixed effects model should be used. The Hausman test statistic is a χ^2 (chi-square) distribution and the decision rule is obtained by comparing the value of the Hausman test statistic with the table value. If the value of the Hausman test statistic is greater than the table value ($W > X^2_{table}$, H_0 is rejected. Rejection of the hypothesis means that the one-factor fixed effects model should be preferred. Table 4. presents the results of the Hausaman test statistic for the model.

Table 4. Hausman Test Results

	Hypothesis	One-way fixed effects

Hausman Test	$H_0 = Random\ Effects$ $H_1 = Fixed\ Effects$	18.750194

*, **, *** indicate statistical significance at the 0.01, 0.05 and 0.10 levels, respectively.

As a result of the test, it is observed that the p value is significant at 95% confidence interval. At the same time, H_0 is rejected since $W > \chi_{Tablo}{}^2$. In this case, it is concluded that the model is a fixed effects model.

2. 5. 3. Unit Root Tests

Before starting the panel data analysis, the stationarity of the data should be tested. The stationarity of the variables is tested by panel unit root tests. If the variables in the model are stationary, misleading results called spurious regression in the model are prevented. Levin Lin Chun (LLC) test is used to test the stationarity of the variables. The test results obtained are presented in Table 5.

Table 5. Levin Lin Chun (LLC) Unit Root Test Results

Variable	Level	1st Difference
demand	-1.24528 (0.1065)	-7.49380 (0.000)*
expenditures	-0.17531 (0.4304)	-9.22420 (0.000)*
receipts	-0.33178 (0.3700)	-7.38067 (0.000)*
departures	-0.59283 (0.2766)	-10.2856 (0.000)*
gdp	2.08512 (0.9815)	-6.33883 (0.000)

*, **, *** indicate statistical significance at the 0.01, 0.05 and 0.10 levels, respectively.

According to the results obtained, all variables used in the study are found to contain unit root at the level, while the series whose first differences are taken are stationary. In this case, first differences of all variables were used in the model to be estimated.

2. 5. 4. Robustness Check

After deciding to use the random effects model as the model established with the Hausman test, it is necessary to test the assumptions of heterokedasticity, cross-section dependence and autocorrelation before proceeding to panel data analysis. The tests and results of the assumptions are presented in Table 6.

Table 6. Robustness Check Test Results

Varsayım	Test	Statistics
Autocorrelation	Breusch–Godfrey	3.024***

Cross-Section Dependence Test	Pesaran	17.158 *
Heterokedasticity	Breusch-Pagan	12.438 ***

*, **, *** indicate statistical significance at the 0.01, 0.05 and 0.10 levels, respectively.

In order to test the assumption of no horizontal cross-sectional dependence, which is one of the basic assumptions of panel data analysis, the assumption of uncorrelation between units was tested. The Pesaran Test, which is used to test the assumption of uncorrelation between units, was used. According to the results of the Pesaran Test, the null hypothesis H0, which states that there is no horizontal cross-sectional dependence, is rejected. In other words, there is horizontal cross-section dependence in the model. In order to test the assumption of no correlation between independent variables, which is another important assumption of panel data analysis, Breusch-Godfrey autocorrelation test was used to test the presence of autocorrelation in fixed effects models. According to the results obtained, there is no autocorrelation between the variables. According to the final test results, there is no cross-sectional dependence, autocorrelation and heterokedasticity problem among the variables used for the model.

2. 5. 5. Estimation Results

As a result of providing the necessary assumptions for the data and model used within the scope of the study, the appropriate model was determined and panel data analysis estimation was carried out. Within the scope of the study, the first difference of tourism demand (ddemand) is used as the dependent variable. The analysis was conducted with a balanced panel data set including 28 periods (years) and 5 cross-sections (countries) between 1996 and 2023. The estimation results of the model are presented in Table 7.

Table 7. Panel Data Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
d(departures)	-0.341910	0.130661	-2.616766	0.0102
d(expenditures)	0.000229	0.000139	1.640262	0.1040
d(gdp)	-4.34E-06	2.28E-06	-1.905168	0.0595
d(receipts)	0.000994	4.66E-05	21.31945	0.0000
C	117261.3	139238.0	0.842165	0.4016
R-squared:	0.912378			
F-statistic:	30.94029			
Prob(F-statistic):	0.000000			

The model estimated in this study includes both cross-section and period fixed effects. Thanks to this approach, fixed effects from each cross-section and each period are included in the model. Thus, it is possible to control for individual heterogeneities and time-varying effects. When the estimation results obtained are analyzed, the R-square value of the model is found to be 0.912378. In other words, 91.2% of the variance in the dependent variable can be explained by the independent variables. This shows that the model has a strong explanatory capacity. In addition, the F-statistic is 30.94029 and the probability value of this value ($p < 0.01$) indicates that the model is statistically significant in general. This means that the independent variables collectively have a significant effect on the model.

When the variables in the model are analyzed, it is determined that d(departures) has a negative and statistically significant effect on the dependent variable ($p < 0.05$). The coefficient of d(expenditures), another independent variable, is positive but not statistically significant ($p=0.1040>0.05$). This shows that the effect of d(expenditures) on (ddemand) is not significant. The variable d(gdp) has a negative coefficient and is statistically borderline significant ($p = 0.0595$). This can be taken into account at the 10% significance level and indicates that an increase in D(GDP) may lead to a small decrease in d(demand). The coefficient of d(receipts) is positive and statistically significant ($p < 0.01$). This indicates that an increase in d(receipts) leads to a positive increase in d(demand). Finally, the coefficient of the constant term is not statistically significant ($p = 0.4016$), indicating that the contribution of fixed effects to variance in the model is limited.

3. CONCLUSION

Tourism demand is recognized as one of the most important sources of economic development in developing countries. In particular, its contribution to economic diversification is undeniable. Lejárraga and Walkenhorst (2013) emphasize the importance of tourism, especially for developing countries, and argue that there is an important link between tourism and the overall economy. Moreover, as Dritsakis and Athanasiadis (2000) point out, transportation, trade, construction, accommodation, catering and other service sectors have a strong link and complementarity with tourism. The tourism sector is of great importance for Turkey, as it is for other developing countries. Turkey is an important actor in the world tourism market. In this context, this study focuses on the strategic importance of this sector, which is an important source of income for Turkey and similar developing countries, by revealing the multidimensional effects of the tourism sector on the economy and the determinants of international tourism demand. The demand dynamics in the tourism sector of both Turkey and other developing countries were examined with the panel data analysis method.

The findings of the study show that international tourism demand is significantly affected by various economic factors. The study found that international tourism receipts have a significant impact on tourism demand. This finding clearly demonstrates the positive impact of higher tourism receipts on international tourism demand. This finding is even more important when the multiplier effect of tourists' expenditures (e.g. hotel, transportation and food and beverage expenditures) on other related economic activities is considered. Another important variable emphasized in the study is the number of international departures. The effect of this variable on tourism demand is found to be negative. This indicates that an increase in the number of Turkish citizens traveling abroad decreases international tourism demand. This implies that an increase in demand from abroad means a loss of some of the revenues generated from domestic tourism. This finding emphasizes the importance of supporting domestic tourism and reducing outbound tourism in national policies.

Gross Domestic Product (GDP) has a negative effect on international tourism demand and is borderline significant (at the 10% level). This is evidence that an increase in economic size does not necessarily increase tourism demand. Indeed, factors such as richer countries or richer individuals may prefer alternative vacation destinations are behind this finding. Nevertheless, this finding suggests that the impact of economic dynamics on the tourism sector has different handicaps and is a separate issue that needs to be analyzed on its own. The findings on tourist expenditures (expenditures), on the other hand, fail to reach a significant result and show that expenditures do not have a significant impact on tourism demand. This suggests that aggregate tourism revenues and structure, such as country-wide economic structure, diversity and quality, are more determinant than individual tourist expenditures.

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Türkiye'de Uluslararası Turizm Talebinin Belirlenmesi: Panel Veri Analizi

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ÖZET

Bu çalışmanın temel amacı, diğer gelişmekte olan ülkelerle birlikte Türkiye için önemli bir gelir kaynağı olan turizm sektöründeki uluslararası talebin belirleyicilerini ortaya koymaktır. Çalışma kapsamında, benzer ekonomik yapılara sahip olmaları ve turizm yapılarının Türkiye ile benzer olması nedeniyle Arjantin, Brezilya, Güney Afrika ve Mısır da ele alınmıştır. Çalışmanın bağımlı değişkeni, her ülke için uluslararası turizm talebinin bir göstergesi olarak "uluslararası turizm varış sayısı"dır. Çalışmada "uluslararası turizm harcamaları (cari ABD doları)", "uluslararası turizm, gelirler (cari ABD doları)", "GSYİH (cari ABD doları)" ve "uluslararası turizm, ayrılış sayısı" bağımsız değişkenler olarak kullanılmıştır. Çalışmada kullanılan veriler 1995-2023 dönemine ait yıllık verilerden oluşmaktadır. Çalışmada kullanılan veriler Dünya Bankası, UNWTO'dan, 2020 ve sonrası için yıllık veriler ise her ülkenin kendi istatistik kurumundan elde edilmiştir. Çalışmanın veri seti hem zaman serisi hem de kesitsel verilerden oluştuğu için panel veri analizi kullanılmıştır. Sonuçlar uluslararası turizm gelirlerinin turizm talebi üzerinde önemli bir etkiye sahip olduğunu göstermektedir. Çalışma ayrıca uluslararası kalkış sayısının turizm talebi üzerinde olumsuz bir etkiye sahip olduğunu bulmuştur. Bu, yurtdışına seyahat eden Türk vatandaşlarının sayısındaki artışın uluslararası turizm talebini azalttığını göstermektedir. Öte yandan Gayri Safi Yurtiçi Hasıla'nın (GSYİH) uluslararası turizm talebi üzerinde olumsuz bir etkiye sahip olduğu bulunmuştur. Bu, çalışma kapsamında ayrıntılı olarak açıklanmıştır. Son olarak, turizm harcamalarının turizm talebi üzerinde önemli bir etkisi yoktur.

Anahtar Kelimeler: Turizm, Turizm Talebi, Türkiye, Panel Veri Analizi.