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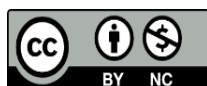
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Relationship between Tourism Incomes, Economic Growth, and Exchange Rate in Türkiye: Economic Growth Based Tourism Incomes in the Shadow of Covid-19*

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Abstract

The main objective of this study is to empirically test the cointegrated relationship between tourism revenues, economic growth and exchange rate in Türkiye. The difference of this study from other studies is that it takes into account the shock effect by including the Covid-19 period in the analysis period. In our study, the ARDL model developed by Pesaran, Shin, Smith is estimated using time series data for the period 2003Q1-2024Q3. The dependent variable is tourism revenues, while the independent variables are Gross Domestic Product and real exchange rate. In addition, a dummy variable is used to show the Covid-19 effect. The long-run coefficients are positive and significant. The long-run coefficient of the Covid-19 dummy variable is negative and significant as expected. Accordingly, a 1% increase in economic growth and exchange rate during the Covid-19 period increased tourism revenues by 1.49% and 1.25%, respectively, while shocks arising from Covid-19 decreased tourism revenues by 1.41%. Accordingly, 0.23% of the shocks to growth and exchange rate can be eliminated within the same period. Finally, the empirical findings suggest that the economic growth-based tourism hypothesis is valid for Türkiye.

Keywords

Tourism Incomes, Economic Growth, Covid-19, Shocks, ARDL

JEL Classification

L83, Z32

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Türkiye'de Turizm Gelirleri, Ekonomik Büyüme ve Döviz Kuru Arasındaki İlişki: Covid-19'un Gölgesinde Ekonomik Büyümeye Dayalı Turizm Gelirleri

Öz

Bu çalışmanın temel amacı Türkiye'de turizm gelirleri, ekonomik büyüme ve döviz kuru arasındaki eşbütünleşik ilişkiyi ampirik olarak test etmektir. Bu çalışmanın diğer çalışmalardan farkı Covid-19 dönemini analiz dönemine dahil ederek şok etkisini dikkate almasıdır. Çalışmamızda Peseran, Shin, Smith tarafından geliştirilen ARDL modeli 2003Q1-2024Q3 dönemi için zaman serisi verileri kullanılarak tahmin edilmiştir. Bağımlı değişken turizm gelirleri, bağımsız değişkenler ise gayri safi yurtiçi hasıla ve reel döviz kurudur. Ayrıca Covid-19 etkisini göstermek için bir kukla değişken kullanılmıştır. Uzun dönem katsayıları pozitif ve anlamlıdır. Covid-19 kukla değişkeninin uzun dönem katsayısı beklendiği gibi negatif ve anlamlıdır. Buna göre Covid-19 döneminde ekonomik büyüme ve döviz kurundaki %1'lik artış turizm gelirlerini sırasıyla %1,49 ve %1,25 oranında artırırken, Covid-19 kaynaklı şoklar turizm gelirlerini %1,41 oranında azaltmıştır. Buna göre, büyüme ve döviz kuru şoklarının %0,23'ü aynı dönem içerisinde bertaraf edilebilmektedir. Son olarak, ampirik bulgular ekonomik büyümeye dayalı turizm hipotezinin Türkiye için geçerli olduğunu göstermektedir.

Anahtar Kelimeler

Turizm Geliri, Ekonomik Büyüme, Covid-19, Şoklar, ARDL

JEL Kodları

L83, Z320

1. Introduction

Today, the contribution of the tourism sector to the economy of many developed and developing countries is a situation that needs to be handled carefully (Oh, 2005). In fact, tourism is a sector that has a very important impact not only in terms of foreign exchange inflow, but also in terms of providing the necessary financial instruments for the technological equipment used in the production process, correcting the balance of payments, providing employment and ensuring economic growth. In short, tourism is seen as a 'smokeless factory' for countries.

As a result of the rapid and effective change and development of technology, improved communication and transport facilities have accelerated the prominence of the tourism sector. This positive effect has laid the foundation for tourism to constitute a significant portion of the world GDP (Dereli & Akiş, 2019). In addition, this positive effect of tourism on national income has also brought development. In this sense, raising the level of welfare, infrastructure and superstructure investments, creating an educated labour force and diversifying economic activity have been effective in supporting national development as well as regional development. On the other hand, tourism provides resources for the balance of payments with the foreign exchange inflow it provides and thus is used to finance budget deficits (Rasheed et al., 2019).

Tourism activities are included in the international services section of the current account of the balance of payments. In addition to being a service sector, it is considered as an

invisible export item due to its income-generating effect (Dinçer et al., 2015). Because the touristic expenditures made by foreigners in the country provide foreign currency inflows to the country and this is considered to contribute to economic growth since it is similar to exports. As it is known, net exports express autonomous size from a macroeconomic perspective. Each unit increase in tourism incomes leads to an autonomous increase in exports and thus the multiplier effect emerges.

The direction and size of the relationship between tourism incomes and economic growth are very important for policymakers to make the right decisions and develop strategies (Ayas & Çallı, 2022). Four different hypotheses are used in the studies on tourism incomes and economic growth: I. Tourism-led economic growth hypothesis, II. Growth-led tourism hypothesis, III. Feedback hypothesis and IV. Neutrality hypothesis. When we look at the econometric studies conducted for Türkiye, it comes to the fore that the tourism- economic growth hypothesis is valid for Türkiye (Gündüz & Hatemi-j, 2005; Bahar, 2006; Demir & Bahar, 2022; Ayas & Çallı, 2022). Our main question in this study is to test these four hypotheses is valid for Türkiye.

The main objective of this study is to investigate the empirical relationship between tourism incomes and economic growth for Türkiye. In this context, the period between 2003Q1 - 2024Q3 is estimated using time series analysis method. Covid-19 process is taken into account in the study. Thus, an answer to the question to what extent the shocks occurring in the period analysed affect the relationship was sought. In the study, firstly, the historical process of tourism in Türkiye is briefly mentioned, then cyclical fluctuations in the tourism sector are tried to be shown with some data. Afterwards, the impact of the pandemic, which was effective between 2019-2021, on tourism in Türkiye was mentioned. Subsequently, the literature review section is included. Here, empirical and econometric studies examining the relationship between tourism incomes and economic growth are examined and the results obtained from these studies are summarised. In the methodology section, empirical findings of the estimated relationship are presented and the results are evaluated. In the last section, the results obtained from the study are summarised and policy recommendations are presented.

2. Overview of Türkiye Tourism

Although the breakthroughs in the tourism sector in our country started during the transition to a planned economy, the real development was achieved with the transition to a liberal economic system after 1980 (Demir & Bahar, 2022). After this year, the adoption of exports, which is accepted as the key to growth, and the adoption of industrialisation strategy

for this purpose helped tourism to gain importance (Polat & Günay, 2012). For this purpose, the ‘Tourism Incentive Law’ was enacted in 1982 and the sector was aimed to be a driving force for the Turkish economy. Moreover, resources were transferred to the tourism sector in order to increase economic growth (Aslantürk & Atan, 2012).

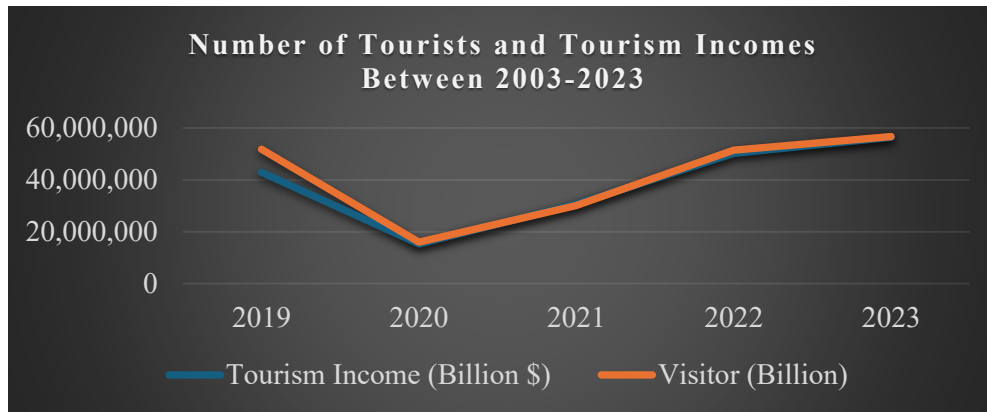


Figure 1. Number of Tourists and Tourism Revenues between 2019-2023 (Note: CBRT EDDS. This graph was created by the author.)

After the 80s, when tourism came to the forefront, more effective strategic decisions were taken and it turned into a dynamic activity phenomenon, the increase in tourism incomes made a significant contribution to GDP. Table 1 shows that tourism incomes increased to 13 billion USD in 2003, 24 billion USD in 2010, 42 billion USD in 2019 and 56 billion USD in 2023. Again, the table shows that tourism incomes in 2015 and 2016 were lower than the previous years and have been on an upward trend since 2017. On the other hand, the share of tourism incomes in GDP has also increased. While the share of tourism in GDP was 2.3% in 2003, this ratio increased to 3.1% in 2010, 4.0% in 2018, 4.5% in 2019 and finally to 4.7% in 2023. On the other hand, while this ratio decreased during the pandemic period, it regained an upward momentum in 2020 and reached its previous level in 2023.

Table 1

Number of Tourists and Tourism Incomes between 2003-2022

Date	Rate \$	Income (Billion \$)	P.P Expend. (Tousand \$)	Visitor (Billion)	Share in GDP	Expenses (Billion \$)
2003	1.49	13,854.868	849	16,302.053	2.3	2,424.826
2004	1.42	17,076.607	843	20,753.734	2.4	2,954.459
2005	1.34	20,322.111	842	25,045.142	2.4	3,394.601
2006	1.43	18,593.951	803	23,924.023	2.5	3,270.948
2007	1.3	20,942.500	770	27,239.630	2.7	4,043.283

2008	1.29	25,415.067	820	31,137.774	2.7	4,266.197
2009	1.55	25,064.482	783	31,759.816	3.1	5,090.440
2010	1.5	24,930.997	755	32,997.308	3.1	5,874.520
2011	1.67	28,115.692	778	36,769.039	3.4	5,531.486
2012	1.79	35,717.337	980	37,715.225	3.5	4,525.101
2013	1.9	40,186.327	1,024	39,860.771	3.7	5,875.183
2014	2.19	41,316.834	998	41,627.246	3.8	5,791.095
2015	2.72	37,700.923	906	41,114.069	3.7	6,296.506
2016	3.02	26,539.007	846	30,906.680	3.5	5,255.797
2017	3.65	31,253.835	809	37,969.824	3.6	5,487.607
2018	4.81	35,920.910	787	46,112.592	4.0	5,530.582
2019	5.67	42,851.778	826	51,747.199	4.5	4,655.848
2020	7.01	15,287.810	958	15,971.201	3.4	1,188.382
2021	8.89	30,528.342	1,032	30,038.961	4.1	2,203.157
2022	16.56	50,248.936	971	51,387.513	4.4	5,098.884
2023	23.79	56,439.612	979	56,693.837	4.7	8,429.980

Source. CBRT EDDS (2024), TURKSTAT (2024), Ministry of Tourism and Culture of the Republic of Türkiye (2024)
 Ex.Rate: Exchange Rate; Income: Tourism Income; P.P Expend: Per Person Tourism Expenditure; Visitor: Number of Tourism Visitor; Share in GDP: Share of Tourism Incomes in GDP; Expenses: Tourism Expenses. This table was created by the author.

Cyclical fluctuations may occur periodically in international tourism activities due to some foreseeable or unforeseeable factors such as natural disasters, epidemics, pandemics and geopolitical instability. Looking at Table 1, the downing of the Russian plane and the coup attempt in 2015-2016 and the Covid-19 outbreak between 2018-2020 represent unpredictable negative fluctuations. Especially the Covid-19 outbreak that emerged in China at the end of 2019 led to the restriction of transportation opportunities worldwide, suppressed the activities of the accommodation and travel industries, which are among the important stakeholders of tourism, and led to a decrease in sector incomes (Duro et al., 2021). Although Turkish tourism, like all countries around the world, has been negatively affected economically during the Covid-19 pandemic, studies show that the sector has entered a rapid recovery process. According to TURKSTAT data, the revenue generated by Turkish tourism in 2021 was announced as 30 billion dollars. Moreover, in 2022, the revenue increased by 64.5% and the total tourism revenue was announced as 50 billion dollars.

2.1. Türkiye Tourism in the Shadow of Covid-19

The Covid-19 pandemic, commonly known as coronavirus, first emerged in Wuhan, China, in late December 2019, and then spread extremely rapidly to all countries of the world. The virus, which still continues to make its impact felt today, has caused great damage to the global economy, especially between 2019-2021.

As the disease reached pandemic proportions, countries have been extremely sensitive about taking a series of health measures. This led to a contraction in demand, particularly in the transport, tourism and trade sectors, as well as in some other important service sectors. Moreover, the lagged effect of demand contractions led to production shocks. In addition, the emergence of financial shocks caused the crisis to deepen in real economies (Bahar & İlal, 2020).

The negative effects of Covid-19 were felt mostly on the service sector. Because with travel restrictions, air transport, hotel accommodation, restaurants and eateries, entertainment and recreational activities, sports and cultural activities were suspended. As a result, this situation led to a decrease in private consumption expenditures. Indeed, studies on e-commerce sales across the US have shown that there were large decreases in the demand for suitcases and bags (-77%), sunglasses (-43%), cameras (-64%), camping and swimming equipment (-38%) during the mentioned period (Bahar & İlal, 2020). On the other hand, according to the calculations of Çetin & Erdil (2021), tourism incomes in Türkiye decreased by 60% and health tourism incomes decreased by 39% during the Covid-19 pandemic period.

Shocks caused by the measures taken against the Covid-19 pandemic on GDP and the labour market with the input-output model. Accordingly, he found that demand shocks in the service sector caused a contraction of 7.8% in GDP and more than 10% in the labour market. The reports of the World Tourism Organisation published in 2020 supported the aforementioned studies. The organisation stated that tourism mobility due to epidemics decreased by 72%, resulting in a loss of 2.4 trillion dollars in total tourism incomes.

3. Literature Review

Tourism is recognised as one of the sectors considered as a locomotive in both the development and economic growth of countries (Sinclair-Maragh, 2014). From this point of view, it contains many issues worthy of research. While tourism incomes and economic growth are the main topics of research, there are also researches on specific topics such as tourism incomes and economic freedom, tourism and export incomes, exchange rate, financial development, etc.

The relationship between tourism incomes and economic growth has been addressed in many studies in the literature, but the differences in the countries, the data set used and the preferred econometric methods, as well as the different development levels of the countries have led to a lack of consensus in the results (Demir & Bahar, 2021; Ayas & Çallı, 2022;

Eeckels, Filis & Leon, 2012; Durbarry, 2004). However, the findings from empirical studies mostly show that tourism incomes have a positive, stable and significant effect on economic growth

Table 2
International Empirical Literature

Author	Period	Country	Method	Results
Balaguer & Cantavella-Jordá, 2002	1975Q1-1997Q1	Spain	Johansen & Granger Causality	A stable long-run relationship between tourism incomes and economic growth was found. According to Granger Causality results, tourism has a positive effect on economic growth.
Durbarry, 2004	1970-1990	Mauritus	Johansen & Granger Causality	Tourism-led economic growth hypothesis is valid.
Oh, 2005	1975Q1-2001Q1	Korea	Engle-Granger, VAR Analysis & Granger Causality	There is no cointegration relationship between the series. There is a unidirectional causality relationship from tourism incomes to economic growth. However, tourism-led growth hypothesis is not valid.
Belloumi, 2010	1970-2007	Tunisia	Johansen & Granger Causality	There is a cointegration relationship between the variables. In addition, there is unidirectional causality in tourism incomes on economic growth. Tourism incomes have a greater impact on real output per capita. Since Türkiye and Tunisia are located outside the euro area, they do not benefit from the increase in real exchange rates.
Dritsakis, 2012	1980-2007	7 Countries	FMOLS	Tourism-led economic growth hypothesis is valid
Eeckels, Filis & Leon, 2012	1976-2004	Greece	VAR & Spectral Analysis	The growth hypothesis is valid for Latvia, Slovakia and Cyprus. However, it is not valid for Poland and the Czech Republic.
Chou, 2013	1988-2011	10 Countries	Granger Causality	

Ranasinghe & Sugandhika, 2018	1970-2017	Sri Lanka	OLS	Stable political situation has a positive effect on tourism income.
Bhattarai & Karmacharya, 2022	1976-2020	Nepal	ARDL	There is no cointegration relationship in the short and long run. However, total trade volume is significant on economic growth in the short run. Tourism-led growth hypothesis is rejected.

Source. This table was composed by the author.

Table 2 and Table 3 show the studies analysing the relationship between tourism incomes and economic growth in foreign and domestic literature, respectively. The variables preferred in empirical analyses are mostly tourism incomes and GDP, which is accepted as an indicator of economic growth. In addition to these variables, some studies have included other variables such as export incomes, number of tourists, real exchange rate and exports of non-tradable goods in the model. It is observed that the authors generally use time series methods in the studies. In this sense, it is known that the main components of time series analyses are cointegration and causality tests. In order to determine the appropriate method to be applied in our study, unit root test was conducted.

The findings obtained from the studies show that the variables have a significant cointegrated structure in the long run, short run or both long and short run. In addition, the positive effect of tourism incomes is accepted as the cause of economic growth and it is argued that the tourism-led growth hypothesis is valid for the economies of the countries analysed (Balaguer & Cantavella-Jordá, 2002, 2002; Durbarry, 2004; Aslan, 2008; Belloumi, 2010; Polat & Günay, 2012; Bozkurt & Topçuoğlu, 2013; Esen & Özata, 2015; Kızılkaya et al., 2016; Çınar & Ülker, 2018; Demir & Bahar, 2022; Ayas & Çallı, 2022; Özkurt & Bilgir, 2022). On the other hand, cointegration studies where no relationship was found are also available in the literature (Yamak, et al., 2012; Oh, 2005; Pata, 2020; Bhattarai & Karmacharya, 2022). However, although the authors were able to establish a linear relationship between tourism incomes and different variables such as services sector, foreign trade and economic growth in causality tests, they supported the claim that tourism-led economic growth is not valid for the countries analysed. Similar empirical results have been obtained in studies that only analyse causality. Accordingly, in many studies, there is a unidirectional relationship from tourism incomes to economic growth (Balaguer & Cantavella-Jordá, 2002, 2002; Uysal et al., 2004; Oh,

2005; Bahar, 2006; Aslan, 2008; Kızılgöl & Erbaykal, 2008; Belloumi, 2010; Polat & Günay, 2012; Dereli & Akiş, 2019), while in some studies there is a bidirectional relationship (Ongan & Demiröz, 2015). There are also causality analyses in the literature where there is no relationship (Yavuz, 2006).

Finally, there are also studies in the literature that reveal the negative impact of the Covid-19 pandemic on the tourism industry (Çetin & Göktepe, 2020; Soylu, 2020; Alaeddinoğlu & Rol, 2020; Erol, 2020; Arica & Kaya, 2022; Eraslan, 2023). However, these studies appear as literature reviews rather than econometric analyses. It is seen that the authors approach the negative situation experienced in the period in question from many different aspects such as sociological, psychological, demographic and economic. The main idea obtained from the studies emphasises that the pandemic has brought a radical change in tourism habits, and that tourism activities should be developed in accordance with ethical and more responsible rules where the related balances are re-established. On the other hand, the authors state that the pandemic has led to significant changes in macroeconomic variables, and in this sense, it is important to restore the growth trend with the right monetary and fiscal policies.

Table 3

National Empirical Literature

Author	Period	Country	Method	Results
Uysal, Erdoğan & Mucuk, 2004	1992-2003	Türkiye	Granger Causality and Regression Analysis	There is a mutual relationship between the two variables. Tourism income has a positive effect on economic growth.
Yıldırım & Öcal, 2004	1992-2003	Türkiye	VAR	There is no relationship between the variables in the short run. In the long run, the increase in tourism incomes positively affects economic growth.
Ongan & Demiröz, 2005	1980Q1-2004Q2	Türkiye	Granger Causality	There is a mutual relationship between the variables in the short and long run.
Bahar, 2006	1963-2004	Türkiye	VAR	There is unidirectional causality from tourism incomes to economic growth. A 1% increase in tourism incomes is found to increase GNP by 0.16% in the long run.

Yavuz, 2006	1992Q1-2004Q4	Türkiye	Granger and Toda-Yamamoto Causality	There is no causality relationship between the two variables.
Aslan, 2008	1992Q1-2007Q2	Türkiye	Johansen & Granger Causality	Tourism stimulates economic growth. There is a cointegration relationship between both variables.
Kızılgöl & Erbaykal, 2008	1992Q1-2006Q2	Türkiye	Toda-Yamamoto Causality	There is a unidirectional causality relationship from economic growth to tourism incomes. Economic growth should be stable in order to increase tourism incomes.
Bahar & Bozkurt, 2010	1998-2005	21 Developing Countries	GMM-Systems Analysis	There is a significant, positive relationship between tourism and economic growth in developing countries. A 1% increase in tourism incomes increases economic growth by 2.8%.
Arslantürk, Balcılar & Özdemir, 2011	1993-2006	South Africa	Granger Causality & VECM	There is no relationship between tourism incomes and GNP. Tourism incomes caused a break in GNP in 1985 and 1990 and it is observed that tourism incomes have a positive effect on growth.
Polat & Günay, 2012	1969-2009	Türkiye	Johansen & Granger Causality	There is a long-run relationship between the variables. There is a unidirectional causality relationship from tourism and export incomes to economic growth.
Yamak, Tanrıöver & Güneysu, 2012	1968-2006	Türkiye	Granger Causality & Engle-Granger & Johansen-Juselius	There is no long-term relationship between the variables. In the short term, only real tourism revenues have a significant effect on the industrial and service sectors.
Bozkurt & Topçuoğlu, 2013	1970-2011	Türkiye	Engle-Granger & ECM	In the long and short run, a reciprocal relationship between the variables was found.
Çoban & Özcan, 2013	1963-2010	Türkiye	Johansen & Granger Causality	There is no relationship in the short run. In the long run, tourism has a

				positive effect on economic growth.
Esen & Özata, 2017	2003Q1-2015Q4	Türkiye	ARDL, Granger and Toda-Yamamoto Causality	There is cointegration relationship in the short and long run. There is a unidirectional causality relationship between tourism and economic growth.
Kızılkaya, Sofuoğlu & Karaçor, 2016	1980-2014	Türkiye	ARDL	There is cointegration relationship in the short and long run.
Çınar & Ülker, 2018	1977-2013	Türkiye & TRNC	ARDL	There is cointegration relationship in the short and long run. There is a unidirectional causality relationship between tourism and economic growth. There is no long-run relationship in TRNC.
Dereli & Akiş, 2019	1970-2016	Türkiye	Granger and Toda-Yamamoto Causality	There is no causality relationship in the short run, but there is a causality relationship from tourism incomes to economic growth in the long run.
Pata, 2020	1963-2017	Türkiye	Bootstrap ARDL, Hacker-Hatemi-j Symmetric and Hatemi-j Asymmetric Causality	There is no cointegration relationship between the variables. There is a unidirectional causality relationship from tourism incomes to the service sector and an asymmetric bidirectional causality relationship between the agricultural sector and the number of tourists.
Demir & Bahar, 2022	2003Q1-2018Q4	Türkiye	Engle-Granger	There is cointegration relationship in the short and long run.
Ayas & Çallı, 2022	1964-2018	Türkiye	ARDL & Time-Varying ARDL	According to the ARDL result, there is a long-run relationship between the variables. It supports the hypothesis of tourism-based economic growth.
Özkurt & Bilgir, 2022	1980-2020	Türkiye	ARDL	There is a stable and significant relationship between the variables in

				the long run. According to the ECM model, short and long run are integrated.
Toker, 2023	2000-2021	USA, UK, Germany, Spain, Italy, France, Türkiye, Austria, Mexico, Greece	Two Stage GMM	The Covid-19 pandemic caused a significant decrease in tourism income, while the other two variables, one-period lagged tourism income and the number of tourists, significantly increased tourism income.

Source. This table was composed by the author.

Empirical evidence from the literature suggests that there is a positive, significant and stable relationship between tourism incomes and economic growth. On the other hand, no evidence of any relationship has been obtained in a few studies. It is thought that the different economic development levels of the countries subject to the research are important in the differentiation of the results.

The findings obtained from the studies conducted for Türkiye show that there is no consensus due to the differences in data set and econometric analysis methods. However, it still indicates that tourism is a very important sector in economic growth in developing countries.

4. Model and Data Set

4.1. Model

This study analyses the relationship between tourism incomes and economic growth in Türkiye for the quarterly data for the period between 2003Q1-2024Q3. In the model defined, the dependent variable is tourism incomes (TURG), while the independent variables are gross domestic product (GDP) and real exchange rate (REER), which are considered as indicators of economic growth. TURG and GDP series are calculated in dollar terms. Real Exchange Rate is preferred as 'US Dollar (USD)' from the Exchange Rates data published by the Central Bank of the Republic of Türkiye. The main reason for preferring the real exchange rate over the nominal exchange rate is that the real exchange rate reflects the actual purchasing power and competitive strength by eliminating the effects of nominal prices. On the other hand, the preference for the dollar is based on two different realities: First, the relevant exchange rate is the foreign currency with the highest acceptance in the global economy. The second reason is that tourism revenue data is calculated and published in U.S. dollars. Seasonal effects of all

variables used in the model are corrected with the TRAMO-SEATS method^a. In addition, a dummy variable is used in the model to show the Covid-19 pandemic effect. Based on the existing literature (Balaguer & Cantavella-Jordá, 2002, 2002; Bhattarai & Karmacharya, 2022), the analytical model is developed as follows:

$$\text{TURG} = f(\text{GSYIH}, \text{RDK}) \quad (1)$$

The time series of the variables used in the model are shown in Figure 3. All data are obtained from the Central Bank of the Republic of Türkiye Electronic Data Distribution System (CBRT EDDS) and Turkish Statistical Institute (TURKSTAT).

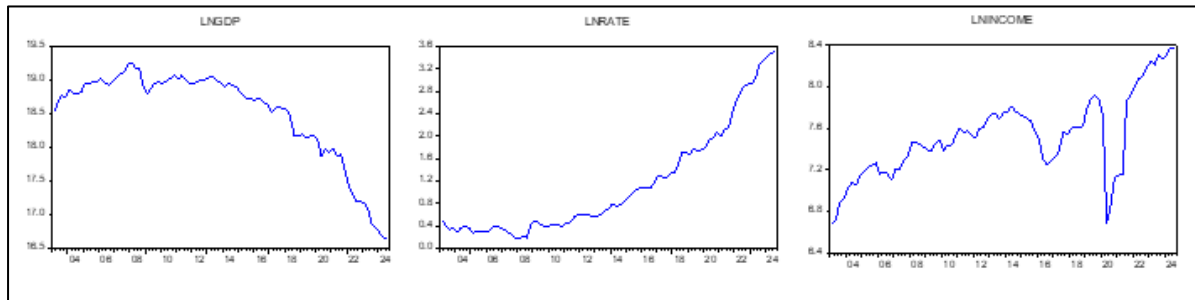


Figure 2. Time Graphs of Variables Time Graphs of Variables (Note: This graphs were created by the author)

The variables used in the model have been transformed into logarithmic form in order to minimise the sample size and reduce skewness. The model defined accordingly is as follows:

$$\text{LNTURG} = \beta_0 + \beta_1 \text{LNGSYIH} + \beta_2 \text{LNRDK} + \varepsilon \quad (2)$$

4.2. Descriptive Statistics

Descriptive statistics of the variables used in the model are shown in Table 4.

Table 4

Descriptive Statistics

	LNTURG	LNGSYIH	LNRDK
Mean	7.526	18.513	1.135
Median	7.525	18.803	0.707
Maximum	8.383	19.265	3.511

^a Seasonal and calendar adjustment of time series is performed with the TRAMO (Time Series Regression with ARIMA noise, Missing Values) SEATS (Signal Extraction in ARIMA Time Series) and Outliers) method developed by Gomez & Maravall (1996) working at the Central Bank of Spain. This method is used in many different central banks, universities and statistical offices around the world. In addition to reducing the danger of spurious correction, which is the most important advantage of the model-based method, another advantage is that it provides information on all statistical results of the process (Vakıfbank, 2023-1).

Minimum	6.679	16.655	0.174
Standart Dev.	0.388	0.682	0.950
Skewness	0.184	-1.374	1.096
Kurtosis	2.821	3.823	3.605
Jarque-Berra Test	0.611	29.868	17.436

As shown in the table, the series have a normal distribution (Jarque-Berra Test) around themselves and seem to be suitable for the model. On the other hand, it is observed that tourism incomes and GDP data take negative values and are left-tailed, while the real exchange rate takes positive values and is right-tailed. When kurtosis values are analysed, it is seen that tourism incomes are flat, while GDP and real exchange rate variables are inflated. In the literature, kurtosis values are accepted as flat if they are below three and as inflated if they are above three. Finally, when the standard deviation values of the series are examined, it is seen that they have a structure spread around the normal. In summary, the statistical structures of the variables are considered appropriate for the analysis.

5. Methodology

5.1. Unit Root Test

In econometric analyses, it is accepted that the presence of a unit root in the series will cause spurious regression (Granger & Newbold, 1974). Accordingly, it is assumed that the estimation results obtained from non-stationary series do not reflect the desired real economic relationship. In time series analyses, the stationarity of the series is examined first. For this purpose, the Extended Dickey Fuller (ADF) unit root test is used in our study. The equation used for the ADF test is as follows (Dickey & Fuller, 1979):

$$\Delta Y_t = \alpha_0 + \alpha_1 t + \gamma Y_{t-1} + \sum_{i=1}^p \beta_i \Delta Y_{t-1} + \varepsilon_t \quad (3)$$

In the equation, Δ is the difference variable, μ is the error term, α is the constant term, k is the maximum number of lags and Y is the time series. The ADF test is used to check whether the estimated values are equal to zero. Accordingly, when the unit root result is zero (null hypothesis), it means that the series is non-stationary; when a non-zero result is obtained (alternative hypothesis), it means that the series are stationary. If stationarity cannot be obtained in the unit root test, the first difference of the series is taken and the analysis is continued.

$$H_0: \gamma = 0$$

$$H_1: \gamma \neq 1 \quad (4)$$

ADF unit root test results of the variables are shown in Table 5.

Table 5

ADF Unit Root Test Results

Unit Roots Tests	Level		1.DF	
	Intercept	Trend&Intercept	Intercept	Trend&Intercept
LNGSYIH	2.776 (1.000)	-0.836 (0.0957)*	-7.688 (0.000)***	-8,979 (0.000)***
LNTURG	-1.926 (0.318)	-2.706 (0.236)	-8.582 (0.000)***	-8,531 (0.000)***
LNRDK	3.998 (1.000)	-0.506 (0.981)	-7.913 (0.000)***	-8,621 (0.000)***

Note: * and *** denote 10% and 1% significance levels, respectively. In addition, I(0) and I(1) indicate that the variables are stationary at level and difference, respectively. P values are in the bracket. P-values were determined according to the maximum lag length of 11 automatically determined by the SIC.)

The degree of stationarity of the results obtained from the unit root test is decided by looking at the probability value (0.05). Accordingly, a test result greater than p in absolute value indicates that the series is non-stationary, while a test result less than p indicates that the series is stationary. On the other hand, Schwarz information criterion (SIC) was preferred as lag length. When Table 6 is analysed, it is seen that the series are non-stationary at level but stationary in their first differences. The unit root results obtained represent an acceptable level in terms of ARDL bounds test.

Table 6

DF Unit Root Test Results

DF Break Unit Roots Tests	Level		1.DF	
	Intercept	Trend&Intercept	Intercept	Trend&Intercept
LNGSYIH	-0.849 (>0.99)	-9.017 (2018Q3)***	-3.040 (0.898)	-9.660 (2008Q4)***
LNTURG	-4.428 (2021Q1)*	-10.366 (2020Q2)***	-4.165 (0.277)	-10.422 (2020Q2)***
LNRDK	0.741 (>0.99)	-8.496 (2018Q3)***	-3.067 (0.890)	-9.155 (2018Q3)***

Note: * and *** denote 10% and 1% significance levels, respectively. In addition, I(0) and I(1) indicate that the variables are stationary at level and difference, respectively. P values are in the bracket.

The fact that the series in the model defined in the study, especially tourism incomes, are highly sensitive to changes in economic and political conditions and the fact that structural changes in the Turkish economy due to internal and external shocks occurred during the period under review suggests the possibility that structural changes may occur in these series. In this

context, the study, which uses the data between 2003 and 2024, reveals that there have been periods of crises in the Turkish economy and tourism in Türkiye. Accordingly, the 2008 Global Economic Crisis, the downing of the Russian plane in 2015, the 2016 coup attempt, the foreign exchange crisis between 2018-2023, and the 2019 Coronavirus Pandemic refer to the crises in question. Therefore, it was decided that the possible structural break or breaks that these crises may cause on the Gross Domestic Product (LNGSYIH) and Tourism Incomes (LNTURG) variables should be taken into account and a test that takes into account the break in the data should be used to determine the stationarity properties of the relevant variables.

Table 6 presents the results of the Dickey & Fuller unit root test with structural breaks. Accordingly, the structural break dates of the variables at both I(0) and I(1) levels are indicated. The results show that all variables are stationary at I(1) level. First differences of the series were taken to ensure stationarity. The findings clearly showed the impact of the 2008 Global Economic Crisis, 2018 Currency Crisis and 2020 Pandemic on the Turkish economy.

According to the results obtained, the methods to be preferred in the study were determined as VAR, VECM and ARDL, respectively. With the ADF test, it was determined that all variables were stationary at first difference. In fact, although stationarity at the first level is a sufficient condition for the VECM (Vector Error Correction Model) model, the fact that the ARDL model has a number of advantages over the VECM model, as will be mentioned later, led to the preference of the ARDL model in the study.

5.2. Diagnostic Tests

Table 7 shows the compatibility and descriptive test results of the defined ARDL model. The model is tested for varying variance and autocorrelation, and the Ramsey Reset test shows that there is no functional form identification error in the model. Finally, the fact that the probability value is greater than 0.05 in the Jargue-Berra normality test indicates that the error terms are normally distributed.

Table 7

Diagnostic Test Results

Breusch-Godfrey Serial Correlation LM Probability	1.876 (0.163) (P>0,05)
Breusch-Pagan-Godfrey Variable Variance	0.679 (0.860) (P>0,05)
Ramsey Reset	0.057 (0.954) (P>0,05)
Jargue-Berra Normality	1.027 (0.598) (P>0,05)

5.3. Cointegration: ARDL Bounds Test

Cointegration tests aim to reveal the existence of a long-run relationship between the variables in the model. In this context, one of the methods used to observe the short and long term movements between tourism incomes, GDP and exchange rate is the Auto-Regressive Distributed Lagged Model (ARDL). Engle and Granger (1987), Johansen (1988) cointegration tests and Vector Auto Regressive (VAR) model, which are widely used in econometric analyses, stated that it would be possible to test two non-stationary variables after the series are stationary. In this sense, it is important for these methods that the series are stationary at the same level. However, this approach brings many difficulties in practice. Gujarati (1999) claims that taking the differences of the series to make them stationary will cause the loss of the long-run relationship obtained with the appropriate level values determined by the method (Gujarati, 1999).

This difficult and complex situation in econometric analyses has been tried to be overcome through the ARDL bounds test developed by Peseran et al., (2001). ARDL test has some advantages compared to other cointegration tests. Accordingly, the cointegration relationship between the variables can be tested in a healthy way regardless of their degree of stationarity. On the other hand, since it uses the unconstrained error correction model, it enables more statistically reliable findings compared to the classical cointegration tests. In addition, the fact that the test provides information about both short-term and long-term relationship is seen as another advantage of the model (Kızıl & Ceylan, 2018).

In our study, we seek an answer to the question of how tourism incomes affect economic growth in Türkiye. The ARDL model used for estimation with determined parameters is defined as follows:

$$\Delta \text{LNTURG}_t = \beta_0 + \sum_{i=1}^q \beta_{it} \Delta \text{TURG}_{i,t-i} + \sum_{i=0}^n \beta_{1it} \Delta \text{LNGSYIH}_{i,t-i} + \sum_{i=0}^p \beta_{2it} \Delta \text{LNRDK}_{i,t-i} + \delta_{1i} \text{LNTURG}_{t-i} + \delta_{2i} \text{LNGSYIH}_{t-i} + \delta_{3i} \text{LNRDK}_{t-i} + \delta_t \text{DUM}_t + \varepsilon_{it} \quad (5)$$

In the equation, Δ is the first difference operator, β_0 is the fixed operator, β_1 - β_2 is the short-run relationship and δ_1 - δ_2 is the long-run relationship.

After estimating the defined equation, the bounds test is tested with the F-statistic. The null and alternative hypotheses expressing the cointegration relationship between the variables included in the model are shown below:

$$H_0 = \delta_1 = \delta_2 = \delta_3 = 0$$

$$H_1 \neq \delta_1 \neq \delta_2 \neq \delta_3 \neq 0$$

If the F-statistic value tested for the defined model is greater than the critical upper bound F-statistic value, the null hypothesis stating that there is no cointegration relationship is rejected. In other words, it indicates the existence of cointegration relationship between variables. On the other hand, if the tested F-statistic value is less than the critical lower bound F-statistic, the null hypothesis is accepted. This means that there is no cointegration relationship between the variables. Finally, if the test value remains between the F-statistic critical lower and upper bound value, it is stated that the cointegrated relationship is unstable. Another method suggested by Peseran et al. (2001) for the existence of a cointegration relationship is to examine the t statistic of the 1st order lag of the dependent variable.

If the alternative hypothesis expressing the cointegration relationship between the variables in the model is valid, the long-run model estimation is shown by the following equation:

$$TURG = \beta_0 + \sum_{i=1}^n \beta_1 GSYIH_{t-i} + \sum_{i=1}^p \beta_2 RDK_{t-i} + \delta_1 DUM_t + \varepsilon_t \quad (6)$$

After expressing the long-run relationship between the variables, the existence of a short-run relationship is tested by estimating the error correction model (ECM). The error correction model is shown in the equation given below:

$$\Delta TURG = \delta_0 + \sum_{i=1}^q \beta_{it} \Delta TURG_{i,t-i} + \sum_{i=1}^n \delta_1 \Delta GSYIH_{t-i} + \sum_{i=1}^p \delta_2 \Delta RDK_{t-i} + \delta_1 DUM_t + \delta_3 ECM_{t-1} + \varepsilon_t \quad (7)$$

The ECM_{t-1} parameter in the equation refers to the error correction term. This parameter shows the one lagged value of the residuals of the model in which the long-run relationship between the variables is tested. In this context, the ECM coefficient indicates how much of a short-run shock can be overcome within one period (Peseran et al., 2001).

6. Empirical Findings

Before testing the ARDL model, it is important to determine the optimal lag length. The lag length is repeated $(p+1)^k$ times in the econometric programme used and thus the optimal length is reached with the help of information criteria (Kızıllı & Ceylan, 2018). Where k is the number of variables and p is the optimal lag length. The findings obtained are shown in the table below:

Table 8

Optimal Lag Length Number of Tourists and Tourism Incomes between 2003-2022

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-26.046	NA	0.760	0.760	0.880	0.808
1	35.842	72.105	2.210	-8.578	-7.978	-8.337
2	39.539	64.776	1.320	-9.098	-8.018*	-8.666
3	40.595	17.650	1.530	-8.960	-7.401	-8.336
4	41.724	17.710	1.750	-8.841	-6.802	-8.024
5	43.595	27.472	1.670	-8.910	-6.390	-7.900
6	48.132	62.034	8.251	-9.653	-6.654	-8.452
7	51.145	42.097*	5.631*	-10.090	-6.611	-8.696*
8	51.145	19.643	5.931	-10.112*	-6.153	-8.526
9						

Note. It refers to the optimum lag where the values of all information criteria are relatively minimum and there is no autocorrelation problem. This table was created by the author.

As seen in Table 8, when the maximum lag length is preferred as 8, the optimum lag length is determined as 7.

After determining the lag length, F Test is applied to reveal the cointegration relationship between the series. The results obtained are shown in the table below:

Table 9

F Statistic Boundary Test

	ARDL Lag Length	F- Statistic Boundary Test
LNTURG=f(LNGSYIH, LNRDK)	(1,5,6,2,7)	5,227***
Significance Level (k=2)	Lower Boundary	Upper Boundary
1%	3,60	4,87
5%	2,68	3,69
10%	2,30	3,22
	T- Statistic	
	16.623***	

Note. ** denotes 5% significance levels. This table was created by the author. The T-statistic was derived from a model in which the dependent variable was included with one lag.

When we compare the F Statistic value calculated as 5.227 in Table 9 with the lower and upper critical values, it is seen that it is above 1% significance level. Accordingly, it can be said that there is a long-term relationship between the dependent and independent variables in

the model. In other words, it means that the variables of the model tend to move together over time.

After the boundary test, the long-run estimation results of the model are obtained. Accordingly, the results are shown in the table below:

Table 10

Long Run ARDL Results

Variables	Coefficient	Standart Deviation	T-Stat.	P-Value
LNGSYIH	1.495	0.387	3.857	0.000***
LNRDK	1.251	0.254	4.919	0.000***
DUM (Covid-19)	-1.415	0.244	-5.783	0.000***

Note: ** denotes 5% significance levels. This table was created by the author.

The long-run results obtained show that the independent variables used in the model are significant at the 1% level. Accordingly, a 1% increase in GDP increases tourism incomes by 1.49%. In addition, a 1% increase in exchange rates increases tourism revenues by 1.25%. Finally, the Covid-19 pandemic causes a 1.41% decrease in tourism incomes compared to other periods.

Following the long-run results, the results obtained for the short-run relationship of the model are shown in the table below. Short-term results are important in terms of showing how much of the deviation from equilibrium can be corrected in the current year.

Table 11

Short Run ARDL Results

Variables	Coefficient	Standart Deviation	T-Stat.	P-Value
ΔLNGSYIH	0.609	0.222	2.738	0.008
ΔDUM	-0.009	0.058	-0.161	0.872
ECM(t-1)	-0.236	0.040	-5.863	0.000***

Note: ** denotes 5% significance levels. This table was created by the author.

The table shows that the short-run parameter value is negative and significant as expected. Accordingly, 0.23% of the shocks arising from GDP, exchange rate and pandemic can be eliminated within the same period.

Following the results obtained from the short and long run relationships of the model, CUSUM and CUSUMQ tests were performed to determine whether the error terms are within the desired confidence interval.

The CUSUM test defines the statistical results that analyse the stability of the coefficients for the 5% significance level by taking the cumulative sums of the error terms obtained from repeated forecasts using the first n observations. In order for the graph to express the 5% significance level, the total figure obtained by continuously increasing the number of observations starting from the lowest level must remain within the band line starting from zero and continuing in a fluctuating manner. Thus, it can be concluded that the coefficients are significant. In addition, the CUSUM test, which is based on the sum of squares of error terms, is calculated similarly to CUSUMQ (Kızıl & Ceylan, 2018):

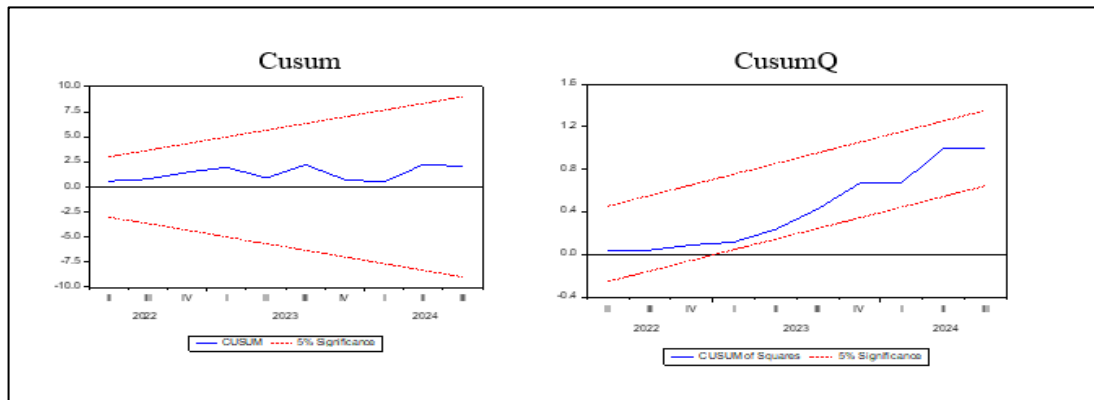


Figure 4. Cusum Tests Results (Note: This graphs were created by the author.)

First and second figures show the CUSUM and CUSUMQ test results, respectively. The coefficients are within the 5% significance level. The estimated coefficient values within the band in both graphs indicate that the model appears to be stable over time.

7. Conclusion

In this study, the empirical relationship between tourism incomes and economic growth is analysed for the period 2003Q1-2024Q3 in Türkiye. The findings indicate the existence of a cointegrated relationship between tourism incomes, GDP and exchange rate in the short and long run in Türkiye. According to the long-run results, a 1% increase in GDP and exchange rate increases tourism incomes by 1.49% and 1.25%, respectively. On the other hand, a dummy variable is included in the model in order to show the effect of Covid-19 induced shocks. Accordingly, the coefficient value of the dummy variable showed that there was a 1.41% decrease in tourism incomes due to the shocks that occurred during the pandemic period compared to other periods. Short-term results showed that 0.23% of these shocks could be

eliminated within the same period. In other words, it means that the shocks in the economy can enter a rapid recovery process with economic growth and exchange rate increases; however, there may be a limited increase in tourism incomes due to the economic activity restriction caused by the Covid-19 outbreak.

The fact that the long-run coefficients are estimated larger than the short-run coefficients indicates that long-term tourism policies are more effective than short-term policies. In this sense, it is important to focus on long-term policies to ensure growth and development and to eliminate the economic contraction due to demand and production shocks caused by Covid-19. On the other hand, long-run parameter values show that economic growth is valid under tourism priority in Türkiye. The underlying assumptions of the tourism-led growth hypothesis are that an increase in tourism incomes will directly lead to an increase in employment, other sectors will also develop as a result of the development of tourism activities, the balance of payments will improve, and finally, all these developments will add a positive atmosphere to the economy. In this sense, the long-run coefficient values obtained in our study support the assumptions of economic growth under tourism priority.

The increase in exchange rates indirectly helps to increase tourism incomes. Because tourist expenditures contribute to the national economy through foreign exchange earnings. On the other hand, high exchange rate policy leads to an increase in the production cost of raw material and semi-finished imports of the manufacturing sector. However, for tourism, which is an invisible export item, high exchange rates create a very profitable situation. This is because the high exchange rate reduces the price of export goods, which leads to an increase in demand. From the point of view of tourism demand, the fact that the high exchange rate cheapens service prices in terms of exchange rate will be effective in the preference of Turkish tourism. In addition, the fact that the tourism sector is a foreign currency earning sector helps the balance of payments of the country's economy during crisis periods. Closing the current account deficit in the balance of payments is of vital importance for developing economies such as Türkiye.

Türkiye needs a stable growth programme and exchange rate policy in order to increase its current tourism incomes. Tourism policies to be formulated should be handled carefully at both national and regional levels. In order to closely follow and adapt to the developments in the field of international tourism, the establishment of policies with a dynamic structure is effective in catching the changing trends. In this direction, it is important to diversify tourism activities, to identify more areas suitable for tourism in terms of cultural, historical and natural aspects and to complete infrastructure and superstructure investments in these regions. As a

result, sustainable and rational policies also support regional development and contribute to the development of the national economy in the long term. On the other hand, exchange rate fluctuations involve a very risky situation for the tourism sector. Because the correct calculation of service costs and the correct and rational pricing of products are directly affected by the volatility of exchange rates. In this sense, it is extremely important to consider exchange rates not only as a policy instrument, but also as a factor that has an impact on the expectations and future decision-making processes of economic actors.

It was not possible to quickly eliminate the negative shocks caused by Covid-19 in tourism and all other stakeholder sectors. Because, unlike the manufacturing sector, the fact that service production cannot be stocked and consumption is instantaneous did not allow the loss in the tourism sector to be eliminated quickly. Minimising the loss depends on constructive and rational tourism policies. In this sense, it is clear that expansionary fiscal policy will be highly effective on the tourism sector. Tax reductions/exemptions, banks diversifying payment options in accommodation and travel expenditures/increasing the number of installments, etc. Subsidising the sector contributes to the increase in tourism activities, which are already restricted due to the pandemic. At this point, companies operating in the tourism sector have a great responsibility. Pricing products with high profit margins in order to compensate for losses in the short-term causes tourism consumers with flexible demand not to prefer Türkiye. In this sense, the pricing of tourism products should be highly rational and meet the expectations of all stakeholders. In addition, the pricing behaviour of Türkiye's competitors in the so-called 'Mediterranean Basin' countries such as France, Greece, Italy, Spain, Portugal, Malta, Egypt, Lebanon, Morocco and Tunisia should be closely monitored.

Declaration of Research and Publication Ethics

This study which does not require ethics committee approval and/or legal/specific permission complies with the research and publication ethics.

Researcher's Contribution Rate Statement

Bariş Can KIZIL contributed 70% and Dilek ÇETİN contributed 30% to the study.

Declaration of Researcher's Conflict of Interest

There are no potential conflicts of interest in this study.

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