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**The Effect of International Tourism Demand on
Agricultural Sector in Turkey**
*Türkiye'de Uluslararası Turizm Talebinin
Tarım Sektörü Üzerindeki Etkisi*

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Abstract

Tourism and agriculture are two important sectors in Turkey. The tourism sector is among the primary sectors that demand input from the agricultural sector. Thus, the more developed tourism, the more development expected in agriculture. For this reason, it is especially important to determine the long- and short-run effects of tourism demand on the agricultural sector. In this context, this study aims to investigate the effect of international tourism demand on the share of agricultural sector revenues in the Gross Domestic Product. For this aim, research analyses were conducted using the annual data of the variables between 1990 and 2018 with the Autoregressive Distributed Lag (ARDL) bounds test. The results of the analyses revealed that the demand for international tourism increases the share of agricultural sector revenues in the Gross Domestic Product in the short-run. In the long-run, the 1% increase in international tourism demand reduces the share of agricultural sector revenues in GDP by 0.4%. Finally, the error correction coefficient estimated between 0 and -1 value indicates that short-term deviations will be balanced in the long run. At the end of the study, economic and political inferences are made based on these findings.

Keywords: Agriculture, Tourism, Sectoral Linkages, Bound Test

Öz

Türkiye için turizm ve tarım sektörü iki önemli sektördür. Turizm sektörü tarım sektöründen girdi talep eden önemli sektörler arasındadır. Böylece turizmin gelişmesiyle birlikte tarımında gelişmesi beklenmektedir. Bu sebepten dolayı özellikle turizm talebinin tarım sektörü üzerindeki uzun ve kısa dönemli etkilerinin belirlenmesi önem arz etmektedir. Bu doğrultuda çalışmanın amacı Türkiye'ye yönelik uluslararası turizm talebinin tarım sektörü gelirlerinin Gayrisafi Yurtiçi Hasıla içindeki payına etkisinin belirlenmesidir. Belirtilen amaç doğrultusunda değişkenlere ait 1990-2018 arası yıllık veriler kullanılarak Gecikmesi Dağıtılmış Otoregresif (ARDL) modele dayalı sınır testiyle analizler yapılmıştır. Yapılan analizler sonucunda kısa dönemde uluslararası turizm talebini tarım sektörü gelirlerinin Gayrisafi Yurtiçi Hasıla içindeki payını artırmaktadır. Uzun dönemde ise uluslararası turizm talebinde meydana gelen %1'lik artış tarım sektörü gelirlerinin Gayrisafi Yurtiçi Hasıla içindeki payını %0.4 oranında azaltmaktadır. Son olarak hesaplanan hata düzeltme katsayısının 0 ile -1 değeri arasında yer alması göstermektedir ki kısa dönemli sapmalar uzun dönemde dengeye gelmektedir. Çalışmanın sonunda bu bulgulara dayanarak iktisadi ve politik çıkarımlar yapılmaktadır.

Anahtar Kelimeler: Tarım, Turizm, Sektörel Bağlantı, Sınır Testi

1. Introduction

The tourism sector has positive economic effects in developing countries. The development of the tourism sector has positive effects such as increasing the incomes and employment levels of countries, closing balance of payments deficits and reducing the differences in development among regions (Bahar and Kozak, 2006; Kozak et al., 2011). Due to these positive economic effects, there have been increases in investments and incentives for the tourism sector in Turkey as well as in many developing countries. As Toker (2007) pointed out, the development of the tourism sector in Turkey accelerated with the Tourism Encouragement Law No. 2634 enacted in 1982. In the period following this year, and especially in the 1990s, significant increases in the number of international tourists coming to Turkey and tourism revenues began to occur. Dilek and Kulakoğlu Dilek (2017) stated that it was a sector that gained momentum with the 1990s. According to the World Bank (2020) figures, while the number of tourists coming to Turkey in 2018 was 45,768 million, total tourism revenue was 37.15 billion dollars. This figure amounts to 4.8% of Turkey's Gross Domestic Product (GDP) for 2018. In 2018, Turkey was the sixth country in the world to attract the most foreign tourists.

The development of the tourism sector in Turkey, which has such a high demand for tourism, is expected to increase revenues from other sectors as well. As Hirschman (1958) stated, there are forward

and backward linkage among the sectors involved in economic life. The relationships expressed here are the input-output relationship of the sectors with one another. In this context, with the development of the tourism sector in one country or region/destination of the country, it is expected that there will be an input-output relationship between the other sectors. This leads to an increase in other sector revenues. With the effect of direct and indirect revenue generated by tourism demand, in particular, the revenues of other sectors are expected to increase (Coltman, 1989; Dwyer et al. 2010; Page, 2009).

Food is one of the most basic needs of people involved in the tourism sector. For this reason, it is expected that there will be an increase in the revenues of the economic units operating in the agricultural sector by purchasing the products produced by the agricultural sector of the tourism establishments founded with the development of the tourism sector in a region, area or destination. The report prepared by Mediterranean Touristic Hoteliers Association (2014) indicates that the tourism sector is one of the top 15 sector that use input from other sectors. According to the report, the tourism sector made a purchase of 2 billion dollars from the agriculture and livestock sector. The tourism is the sector that receives the most input from the fisheries sector. Moreover, the total meat consumed in hotels amounts to 10% of the total meat consumption in Turkey, while milk consumption has been determined that close to 2%. These examples show that the tourism sector will increase the income of the agricultural sector. It is emphasized that there will be an increase in the income of the country in general, along with the increase in the revenues of the agricultural sector. However, in terms of employment, as Clark (1957) noted in the Three-Sector Theory, as the development levels of countries increase, employment is concentrated in the industrial and services sectors, respectively, moving from the agricultural sector. This suggests that there will also be an income stream between sectors as a result. According to the World Bank (2020) data, the added value of the agricultural sector in GDP in Turkey was 54% in the 1960s, compared to 5.8% in 2018. The added value of the industrial sector was 17.3% in 1960 and increased to 29.4% by 2018. Additionally, the added value of the tertiary sector was 28.44% in 1960 and 54.26% in 2018. Canbay and Kırca (2020) also revealed that economic growth in Turkey has a negative impact on the agricultural sector. As the economy develops in Turkey, it is observed that the share of agricultural sector revenues in GDP has gradually decreased, while the share of tertiary sector revenues in GDP has increased. As these statistical data indicate, whether there is a positive effect of the tourism sector in the tertiary

sector on the share of agricultural sector revenues in GDP in the long-run calls into question. As economies develop and dependence on the tourism sector is high, there can be an exchange relationship between the tourism sector and the agricultural sector.

Moreover, the negative economic effects of the tourism sector may also adversely affect the share of agricultural sector revenues in GDP. The reason is that with the development of the tourism sector, there may be an increase in the trend of imported goods, as stated by Bahar and Kozak (2006) and Kozak et al. (2011). Besides, it should be noted that the opening of agricultural land to tourism in regions where tourism is developing and the employment of local people living in those regions can have a negative effect on the share of agricultural sector income in the GDP of the tourism sector.

Based on these arguments in the literature, this study aims to investigate the effects of international tourism demand on agricultural sector revenues in Turkey for the period between 1990 and 2018. For this purpose, the relationships between variables are analyzed using time-series analyses. The study is particularly important because it is the first study to investigate the long and short-run effects of international tourism demand on the share of agricultural sector revenues in GDP.

The rest of the study is structured as follows: In the second chapter, the relevant literature is reviewed. Research data is analyzed in the third chapter. After the introduction of the data, methodology and findings are discussed in the fourth chapter. The study is concluded in the fifth chapter.

2. Literature Review

There are many studies on the relations between the tourism sector and other sectors. In this study, as it is aimed to determine the effects of the tourism sector on the agricultural sector, studies on this subject are discussed. With the development of the tourism sector, many studies have been carried out, especially for developing countries. For example, Latimer (1985) examined the relationships between tourism and agriculture using data from 1975-1982 for small island countries. He emphasized that the effects of tourism on agriculture are valid for island countries with limited growth potential and restrictive import policies. He stated that with the development of tourism, the workforce has not shifted from agriculture to other areas, and a clear decrease in agriculture has not been observed. Telfer and Wall (1996) investigated the relationships between tourism and food production on the Lombok islands in Indonesia. In their studies, they showed in their

literature review that food production has a relationship with tourism as part of agriculture. As a result of their analyses, they highlighted that there is a potential to increase posterior connections between tourism and local food production, but there are also some obstacles. They also emphasize the necessity of removing the barriers and practices that encourage the tourism sector to shop from local economic units. The study also found that the strict adherence of large hotels in the region to quality led to the rise and institutionalization of the standards of local suppliers in the region.

Torres (2002) concluded that Mexican food, tropical fruits, and organic products are essential for linking tourism and local agriculture, according to data from 615 people visiting the Yucatan region of Mexico. Torres (2003) interviewed all tourism stakeholders in the region to explore the linkages and barriers between tourism and agriculture in the Quintana Roo region of Mexico. In the results of the study, they emphasized that the linkages between the tourism and agriculture sector are weak due to some restrictive reasons for the Quintana Roo region. Similar findings were found in the study by Torres and Momsen (2004). They also emphasized the importance of developing pro-poor tourism along with mass tourism in increasing the linkages between agriculture and tourism. In their study for Mexico, Jarquin, Velazquez, and Castellanos (2017) expressed the conduct of new policies, research, and discussions for the development of the agricultural sector through tourism. They also mentioned the importance of developing a pro-poor tourism policy.

Timms (2006) examined the relationships between tourism and agricultural activities in the Caribbean. The researcher suggests that the linkage between hotels and farmers should be encouraged as a result of research in the St. Lucia area. With the provision of this linkage, domestic agricultural production is thought to be revived. Thus, it was emphasized that import dependence on agriculture would decrease. Similarly, Bain (2007) conducted a study examining the tourism and agriculture sector in the Caribbean. In their study, they examined strategies to accelerate the future development of both sectors. Bain (2007) stated that tourism-agriculture linkages do not ensure the development of tourism or agriculture. It was also underlined that the tourism sector in the Caribbean countries would not develop the agricultural sector alone, the agricultural sector could increase the development of rural tourism in particular, and thus agricultural land could be protected. A developed tourism sector (mass tourism) has less impact on agricultural sector development.

Kuo et al. (2006) conducted a study for Taiwan investigating the linkages between agricultural eco-tourism and organic agriculture. As a result of the study, they concluded that there are linkages between organic agriculture and agricultural eco-tourism, and eco-organic tourism activities, especially based on organic agriculture, can attract more tourists.

Mshenga (2010) investigated local agricultural products bought by hotels in the coastal regions of Kenya and hotel properties that affect the purchase of local products. Using the multi-stage sampling technique, descriptive statistics and data obtained using the logit model were analyzed. They indicated that hotels prefer local agricultural products such as eggs, red meat, chicken, vegetables, fruits, and dairy products. It was also concluded that the foundation year, bed capacity, and the number of employees of the hotel affected the purchase of local agricultural products. Finally, Mshenga (2010) proposed improving tourism and agriculture linkages to improve the livelihoods of rural areas and reduce poverty.

Rogerson (2012) investigated the linkages between agriculture and tourism in developing countries. As a result of their literature review, they stated that there are relationships between the tourism and agriculture sector in these countries. However, they pointed out that there are some supply, demand, and marketing-related problems in establishing a connection between tourism and agricultural enterprises.

Rogerson et al. (2012) explored the linkages between tourism and agriculture sectors in Botswana. The study's findings reveal that local linkages between agriculture and tourism are limited, with high levels of food imports from neighboring South Africa instead. Besides, the study reveals that there are a number of obstacles that reduce the linkages of the tourism sector with the local agricultural sector, and there is a need to tackle them. Pillay and Rogerson (2013) attempted to contain the linkages of accommodation businesses in the KwaZulu-Natal coastal region of South Africa with agriculture by interviewing 50 hotels located in the region. They noted that tourism revenue is an important potential source of income for small-scale farmers through supply chain linkages. However, the study highlighted that there are obstacles to the development of both tourism and agriculture in a pro-poor manner. Finally, as Rueegg (2009) stated in their study for Bolivia, the tourism sector is not an appropriate strategy to reduce poverty as long as agricultural research and agricultural sprawl are neglected in the countryside.

Mao et al. (2014) conducted a study investigating the linkages between agriculture and tourism in the Siem Reap-Angkor region of

Cambodia. Their study, using a two-stage qualitative method, found that, as in other developing countries, domestic farmers face institutional and supply-induced constraints in their entry into the tourism market.

Sanches-Pereira et al. (2017) conducted a study to show the linkages between tourism and small-scale agricultural activities in Tanzania. In their study, they concluded that tourism and agriculture had an important contribution to local development. However, they emphasized that agricultural producers (gardening) have some obstacles in reaching local tourism sector enterprises, which are the lack of direct communication channels and bottlenecks or inefficiencies in the supply chain. Anderson (2018) also conducted a study exploring the linkages between tourism and agriculture with a value chain approach in the Lushoto region of Tanzania. The study conducted interviews with 195 people, including businesses operating in the agriculture and tourism sector. As a result of the interviews, it was stated that the tourists were in interaction with the local people. However, it was stressed that the linkages between the tourism and agricultural sector are not strong due to the fact that products supplied from local people and local agricultural enterprises are quantitatively and qualitatively incompatible with the requirements of the tourism sector. Furthermore, the study suggested that widespread poverty could be reduced by strengthening inter-sectoral linkages.

Welteji and Zerihun (2018) gathered data from 372 households in Bale Mountains National Park, Southeastern Ethiopia, and found that the linkages between tourism and agriculture are not strong. However, they also express the necessity of turning the development of tourism into opportunities.

The relationship between the tourism and agriculture sector in Turkey is often explored in the context of rural tourism and ecotourism. For example, Çıkmış et al. (2009) examined the effects of the tourism sector on the agricultural sector in Turkey with a theoretical approach. In the study, they emphasized that the development of agrotourism, in particular, would have positive effects on both the tourism and agricultural sector depending on the demand for tourism. In order for positive effects to happen, they outlined some of the preconditions in summary as follows: Providing integration of tourism and agriculture, implementing a flexible working program of farmers working in tourism, being careful about biodiversity by those living with agricultural tourism, increasing awareness of tourism to those engaged in agriculture, promotion of local products and services, improvement of infrastructure and superstructure in agricultural

tourism areas, supporting family boarding houses, providing credit and incentives to those who will invest in this area, and organizing courses for homemakers to improve their hand skills. A similar study was conducted by Ekiztepe (2012). Ekiztepe's (2012) results and suggestions are in coincidence with the study of Çıkın et al. (2009). Another different study for Turkey was conducted by Türkben et al. (2012). In the study, it was found that new vineyard areas were created, and new grape varieties started to be produced by increasing wine consumption in parallel with increasing domestic and international tourism in a number of viticultural zones. Similar to these studies, Pezikoğlu (2012), Civelek et al. (2014), Ahmadova and Akova (2016), Yılmaz and Gürol (2012) and Özşahin and Kaymaz (2015) also worked in the context of Turkey. Additionally, Kırca (2017:47) examined the relations between the tourism sector and other sector revenues for the period 1998Q1-2013Q4 in Turkey. In the study, they tested the relationships between variables using multiple breaks cointegration tests and cointegration parameter estimators. The analysis showed that the 1% increase in tourism demand increased agricultural sector revenues by 0.06%, but underlined that this effect was not as high as expected.

Considering the studies in the literature in general, there are local effects of tourism activities in a particular region in the agricultural sector. In addition, it is observed that frequently qualitative and survey-based quantitative research methods are used in the studies reviewed. Unlike other studies, only Kırca's (2017) study examined the effects of international tourism demand on direct agricultural sector revenues. When the findings are analyzed, it is emphasized that the linkages between the tourism and agriculture sector can be strengthened, especially with the development of rural and pro-poor tourism activities. In addition, it was noted that there are many supply, demand, and marketing barriers that hinder tourism and agricultural sector linkages. In this study, the effect of total foreign tourist demand (international tourism demand) on the share of agricultural sector revenues in GDP is investigated using time series econometrics. The impact of the tourism sector on the agricultural sector is presented in a national context. For this reason, the study differs from most previous studies in the literature.

3. Research Data

In this study, the relations between the tourism sector and the agricultural sector in Turkey are investigated, and the number of international tourists' arrivals to Turkey (LTUR) representing the

tourism sector and the share of agricultural income in GDP (LAGR) representing the agricultural sector¹ are used as the research data. The data for the variables are annual and cover the period 1990-2018. In addition, the share of industrial sector revenues in GDP² (LIND) data was taken as the controlled variable. The LIND variable is included in the analysis as a controlled variable. The data for the LTUR variable was obtained from The Association of Turkish Travel Agencies (TÜRSAB). Data for LAGR and LIND variables were acquired from the World Bank (2020) database. Logarithmic transformations of variables are used in the analysis. The graphics of variables are seen in Figure 1.

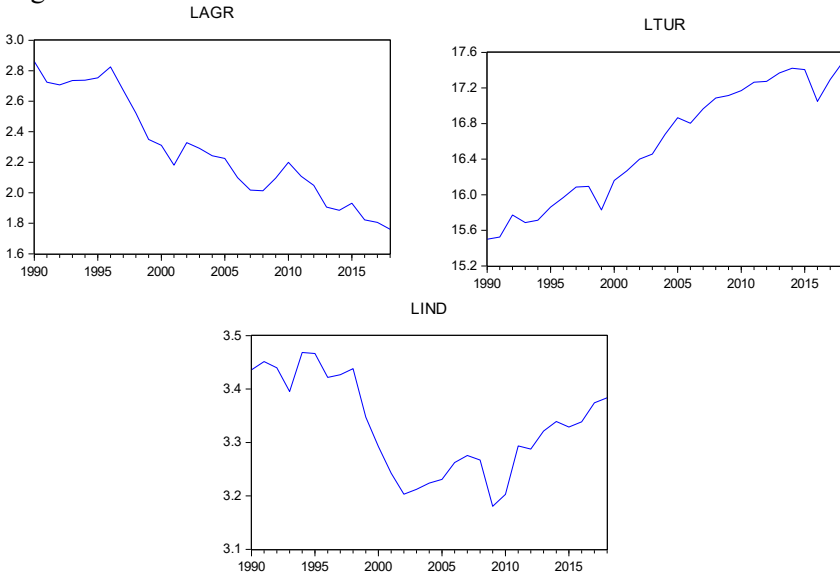


Figure 1: Graphics of Variables

Based on the variables in Figure 1, it is seen that there are structural breaks in the LAGR and LTUR variables. It is important to take this situation into account in the analyses made.

4. Methodology and Findings

In the study, the relationships between variables were investigated by a two-step methodology. In the first step, the levels of stationarity of variables are examined by Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests, which are often used in

¹ Agriculture, forestry, and fishing, value added (% of GDP)

² Industry (including construction), value added (% of GDP)

time series econometrics. In addition, since structural breaks are observed in the variables at this stage, the levels of stationarity of the variables are determined by using the single break unit Root Test (ZA) developed by Zivot and Andrews (1992) to control ADF and PP unit root test results. In the second stage, the bounds test based on the Autoregressive Distributed Lag Bound Test (ARDL) developed by Pesaran et al. (2001) is used to determine the cointegration relationship between variables. Thanks to this test, the long-and short-run effects of LTUR on LAGR are demonstrated.

The second stage also determines the levels of stationarity of the variables. As stated above, the levels of stationarity are obtained using the ADF, PP, and ZA unit root tests. The null hypothesis of the ADF test, developed by Said and Dickey (1984), is that “H₀: There is a unit root in variables and non-stationary”. The probability value of the test statistic calculated to decide about the hypothesis can be compared with the statistical significance levels. H₀ is rejected if the probability value is less than the statistical significance levels. In Phillips and Perron’s (1988) PP unit root test, the hypothesis is the same as the ADF unit root test. The purpose of adding this test to the study is that it is stronger than the ADF test. Thus, the results of two traditional unit root tests can be compared and contrasted mutually.

Table 1: ADF and PP Unit Root Test Results **

Model:	Constant		Constant and Trend					
	ADF		PP		ADF		PP	
Test:	Test	Statistics	Test	Statistics	Test	Statistics	Test	Statistics
Variables	(Prob.)	(Prob.)	(Prob.)	(Prob.)	(Prob.)	(Prob.)	(Prob.)	(Prob.)
LAGR	-0.82	(0.794)	-0.87	(0.779)	-2.82	(0.199)	-2.33	(0.402)
LTUR	-0.88	(0.777)	-0.88	(0.777)	-2.43	(0.354)	-2.43	(0.354)
LIND	-1.58	(0.476)	-1.42	(0.557)	-0.80	(0.953)	-0.80	(0.953)
ΔLAGR	-4.14*	(0.003)	-4.67*	(0.0009)	-4.08*	(0.019)	-4.57*	(0.005)
ΔLTUR	-6.05*	(0.0001)	-6.05*	(0.0001)	-6.00*	(0.0002)	-6.00*	(0.0002)
ΔLIND	-4.31*	(0.002)	-4.29*	(0.002)	-4.59*	(0.005)	-4.59*	(0.005)

* refers to stationarity at a 5% statistical significance level.

** Lag lengths were determined using the t information criterion.

Table 1 shows the ADF and PP unit root test results. According to ADF and PP unit root test results, all variables are stationary in their first difference. This means that the variables are I(1). It was decided to perform the ZA unit Root Test due to the structural breaks of the variables in the graphics of the variables. Thus, as stated above, the results of the ADF and PP unit root tests are compared. The main

motivation in adding this test to the study was Perron's (1989) warning. In order to avoid the possibility that conventional unit root tests may produce incorrect results in case of structural breaks in variables, variables were also tested for stationarity by applying the ZA unit root test with a single break. In addition, the significant structural break date for LAGR obtained from the test was added as an exogenous variable to the corresponding test equations shown below. The main hypothesis of this test is " H_0 : There is a unit root in the structural break, not stationary". In the decision-making process, the test statistics and critical values are compared. If the calculated statistical value of the ZA unit root test with a single break is greater than the critical value, H_0 is rejected. Table 2 shows the results of the ZA unit root test with a single break.

Table 2: ZA Unit Root Test with a Single Break Result**

Model:	Constant		Constant and Trend	
Variables	Test Statistics Critical Value)	(5% Break Date	Test Statistics (5% Critical Value)	Break Date
LAGR	-4.79(-4.93)	1999	-4.82 (-5.08)	2008
LTUR	-3.56 (-4.93)	2004	-3.92 (-5.08)	2004
LIND	-3.83 (-4.93)	1999	-3.90 (-5.08)	1999
Δ LAGR	-5.19* (-4.93)	1997	-5.94* (-5.08)	2002
Δ LTUR	-6.20* (-4.93)	2002	-6.22* (-5.08)	2002
Δ LIND	-5.22* (-4.93)	1999	-5.34* (-5.08)	2003

* refers to stationarity at a 5% statistical significance level.

According to the results of the ZA unit root test with a single break, the first difference in all three variables is stationary, which is $I(1)$. In the test, the date of 1999 for the constant term model for the LAGR variable and 2008 for the constant-trend term model was determined as break dates. In Figure 1, it evident that as of the end of the 1990s, the share of agricultural sector revenues in GDP has been decreasing rapidly in Turkey. It is not thought that the breakdown in 2008 is independent of the global crisis in 2008. It is also seen in the graphic in Figure 1 that the share of agricultural sector revenues in GDP increased, especially after the crisis years. Since the LAGR variable is a dependent variable, these two break years are added to the related models as dummy variables. Dummy variables are created by entering 0 until the break date and including the break date and 1 after the break date. The break in 1999 for the LIND variable can be explained by the decrease in the share of industry sector revenues in GDP since the 90s, as seen in Figure 1. The break in the LTUR variable in 2004 was

determined as a significant break. In particular, given that Turkey's decision to start the EU negotiations in 2004, it is thought that the country experienced a significant jump in the number of foreign tourists (Republic of Turkey Ministry of Foreign Affairs (Directorate for EU Affairs), 2020).

After the determination of the stationarity levels of the variables, the cointegration relationship between the variables is analyzed by the bounds test based on the ARDL model developed by Pesaran et al. (2001). This method was chosen in the study due to some specific features of the ARDL model. First, it gives stronger results in small samples. It also allows cointegration testing between variables that are stationary at different levels. One of the most important conditions here is that the dependent variable must be $I(1)$. In unit root tests conducted, it is seen in Table 1 and Table 2 that all of the variables are $I(1)$. In the study, the cointegration test is firstly performed by using the ARDL bounds test based on Equation 1. Then, the LIND variable is added to Equation 1 as the exogenous variable for controlling purposes, and the cointegration test is performed again using the Equation 2 model. Thus, the effect of LTUR on LAGR is fully revealed³.

$$\begin{aligned} LAGR_t = \beta_0 + \sum_{i=1}^m \beta_{1i} LAGR_{t-i} \\ + \sum_{i=0}^n \beta_{2i} LTUR_{t-i} \\ + \delta_1 d1999 + \delta_1 d2008 + u_t \quad (1) \end{aligned}$$

$$\begin{aligned} LAGR_t = \beta_0 + \sum_{i=1}^m \beta_{1i} LAGR_{t-i} \\ + \sum_{i=0}^n \beta_{2i} LTUR_{t-i} \\ + \alpha LIND_t + \delta_1 d1999 + \delta_1 d2008 + \varepsilon_t \quad (2) \end{aligned}$$

The β , α , and δ s in Equation 1 and Equation 2 express slope coefficients. The “t” in the index indicates that the variables are a time series, while “i” indicates the number of lags. d1999 and d2008 are dummies created for structural breaks that are added exogenously to the equations. m and n indicate the total number of lags. In the ARDL

³ For the equations of cointegration test equation and error correction mechanism, see: Pesaran et al., (2001).

model, lag lengths are determined according to various information criteria. In this study, lag lengths were determined according to the Akaike information criterion (AIC). u_t and ε_t represent the residual terms of the equations. Diagnostic tests for ARDL models calculated for both equations are shown in Table 3.

Table 3: Diagnostic tests and Coefficient Stability Test Results

Tests	Equation 1 (ARDL (2,3) Model)		Equation 2 (ARDL (2,3) Model)	
	Test (Probability)	Statistics	Test (Probability)	Statistics
Breusch-Godfrey Autocorrelation	3.84 (0.278)		1.43 (0.488)	
Breusch-Pagan-Godfrey Heteroscedasticity	11.39 (0.180)		12.23 (0.200)	
Jarque-Bera Normality	0.63 (0.728)		0.85 (0.650)	
Ramsey Reset	0.07 (0.793)		1.26 (0.278)	
CUSUM	Stable		Stable	
CUSUMQ	Stable		Stable	

When the results of diagnostic tests are examined, it is seen that the model does not have autocorrelation and heteroscedasticity, the terms are now normally distributed, and finally, there is no error in the functional form of the model. It was also determined that the coefficients to be obtained in both models were stable. Table 4 shows the results of the bounds test based on these models. There are two basic critical values in the bounds test: lower bound $I(0)$ and upper bound $I(1)$. These limits are used to make a final decision about the test. The main hypothesis of the test is that “ H_0 : There is cointegration between variables”. If the F test statistical value obtained using ARDL test Equation is greater than the upper limit value $I(1)$, H_0 is rejected.

Table 4: Bounds Test Results

F statistics	Equation 1		Equation 2	
	%5 cv		%5 cv	
	$I(0)$	$I(1)$	$I(0)$	$I(1)$
7.14*	3.62	4.16	4.93*	3.62 4.16

*%5 refers to the cointegration relationship at a 5% statistical significance level.

cv: critical values

According to the bounds test results, there is a cointegration relationship for both ARDL equations. This means that LTUR has a significant effect on LAGR in the long-run. After this stage, it is necessary to show that the error correction mechanism is functioning. It is also possible to reveal short- and long-run coefficients. Table 5

contains both the error correction coefficient for two equations (ECM (-1)) and short- and long-run coefficients. ECM (-1) coefficient is checked to test whether the error correction mechanism is functioning or not. If the coefficient of ECM (-1) is between 0 and -1 and statistically significant, it means that the error correction mechanism is working. This means that short-run deviations in equations (models) equilibrate in the long-run.

Table 5: Long- and Short-Run Coefficients

Long-Run Coefficients		
	Equation 1	Equation 2
Variables	Coefficients (Prob.)	Coefficients (Prob.)
LTUR	-0.44* (0.001)	-0.40* (0.004)
D1999	-0.23** (0.021)	-0.33*** (0.061)
D2008	0.19 (0.108)	0.19 (0.126)
LIND	-	-0.43 (0.493)
C	9.59* (0.0001)	10.53* (0.0004)
Short-Run Coefficients and Error Correction Model		
	Equation 1	Equation 2
Variables	Coefficients (Prob.)	Coefficients (Prob.)
Δ LAGR(-1)	0.39** (0.021)	0.42** (0.021)
Δ LTUR	0.27* (0.010)	0.30* (0.007)
Δ LTUR(-1)	0.36** (0.013)	0.29*** (0.066)
Δ LTUR(-2)	0.44* (0.002)	0.40* (0.003)
Δ (D1999)	-0.11 (0.161)	-0.19** (0.037)
Δ (D2008)	0.11*** (0.086)	0.075 (0.342)
Δ (LIND)	-	-0.48 (0.294)
ECM(-1)	-0.67* (0.0001)	-0.66* (0.0004)

*, **, and *** respectively indicates %1, %5, and %10 statistically significance level.

According to the results in Table 5, it is seen that the error correction mechanism functions in both equations. In addition, the degree to which LTUR affects LAGR in the short and long-run is close to each other. The coefficients are also consistent. No statistically significant relation of the LIND variable added for control purposes could be determined on LAGR. According to the coefficient results, LTUR has a positive effect on LAGR in the short-run. In the long-run, an increase of 1% in LTUR reduces LAGR by 0.4%. This finding shows that the added value of international tourism demand for agriculture is not high. As can be seen in most studies in the literature, it is emphasized that the linkages and influences between the agricultural sector and the tourism sector are limited. In fact, some studies such as Rueegg (2009) also mention its negative effects. It can also be suggested that Clark's (1957) Three-sector Theory is in effect. However, it is interesting that the effect of the LIND variable taken as a controlled variable on the LAGR is insignificant.

5. Conclusion

In this study, in which the effect of international tourism demand on the share of agricultural sector revenues in GDP was examined, the existence of a cointegration relationship between the variables was determined according to the ARDL bounds test results. The meaning of this relationship is that long-run international tourism demand has a significant impact on the share of agricultural sector revenues in GDP. Based on the long-run coefficient results, a 1% change in international tourism demand reduces the share of agricultural sector revenues in GDP by 0.4%. On the other hand, based on the short-run coefficients, it was found that this effect was positive.

One of the most important reasons for the positive impact of international tourism demand in the short-run is thought to be the seasonal characteristic of the sector because the demand for international tourism is most experienced in the summer season. In these periods, the demand for agricultural and food products is increasing. However, the fact that this effect is not permanent and does not spread over a long period of time is a serious problem. The reason is that the tourism sector is expected to have a positive impact on other sector revenues, such as the agricultural sector, through a forward-backward linkage. However, as Kirca (2017) points out, the effect of international tourism demand on agricultural sector revenues is not as much as expected in the analysis for different periods. Furthermore, Kirca (2017) found that there is a causality relationship from the tourism sector to imports. For this reason, the sector also increases imports of agricultural products. Besides, Kirca (2017) shows a decrease in agricultural employment in new regions where the tourism sector is beginning to develop. Thus, it is inevitable that the share of agricultural income in GDP can decrease in the long-run.

Although the share of agricultural income in GDP in developed countries is low, the decrease in agricultural production and the share of agricultural income in GDP in Turkey are followed by serious economic problems. The most important of these is the increase in food prices along with the decrease in the food supply. In recent years, Turkey has been facing serious food inflation. As indicated in the bulletin published The Central Bank of the Republic of Turkey (2017:2), “excessive volatility in the prices of food products, which are quite high in the inflation basket, negatively affects price stability and disrupts macroeconomic balances.” This volatility particularly affects low-income families, who spend a significant portion of their income on food. Moreover, unemployment increases with a decrease in agricultural production.

Consequently, it is not possible for the tourism sector to have an effect on the agricultural sector alone. Other factors, such as climate and urbanization, affect the agricultural sector. However, the allocation of agricultural land to tourism in the regions where the tourism sector has started to develop draws attention to the importance of opportunity cost between tourism and agriculture. Investment in sectors with high added value is important for the country's macroeconomic performance. Therefore, whether tourism or agriculture will be a high added value for the country's economy is an important research subject. In this regard, Elver's (2020) argument that "food and agriculture will become much more important in the new world order" should be taken into account (Anadolu Agency, 2020). In addition, the development of pro-poor tourism or rural tourism activities will have a positive impact on the agricultural sector.

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