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Panel cointegration analysis of relationship between international trade and tourism: Case of Turkey and silk road countries

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ABSTRACT

Tourism development has been examined from various aspects and studies examining relations between tourism and other sectors are increasing. This study tests the relationship between the incoming tourists and volumes of import and export of Turkey and 13 Silk Road countries, through Panel ARDL. The study is important since it is thought to be the first to check the relation between tourist flows and trade amongst the Silk Road countries. Findings point out that even though there are differences in short-term and long-term relations, tourist flows and international trade are related, which indicates that international trade is important for tourism development.

1. Introduction

The recent reign of neoliberal policies worldwide has popularized the policies to increase international trade. Therefore, activities facilitating trade and relations between trade and other economic activities are amongst the main agenda items for both academicians and decision-makers (Kónya, 2006). According to World Trade Organization (WTO), export per capita has increased about 30 times over the last 50 years (Fischer & Gil-Alana, 2009). Moreover, the increase in international travels since 1950s has led tourism revenues to reach high sums as US $ 1.220 billion (United Nations World Tourism Organization [UNWTO], 2017). The sector is set to continue growing, and the number of international tourists is expected to reach 1.8 billion in 2030 (UNWTO, 2017) and revenues to reach US$ 2.1 trillion in 2050 (Coban & Ozcan, 2013). Tourism produces one-tenth of worldwide GDP and employment and is the third largest worldwide export sector after chemicals and fuels (UNWTO, 2018). Therefore, it would be logical to assume that there is a relationship between international tourism and trade of goods. International tourism, which is an on-site sale activity unlike traditional goods trade, is considered as export due to the foreign exchange inflow to the country (Brida, Cortes-Jimenez, & Pulina, 2016). It is also generally accepted that international tourists may cause international trade to increase since they can provide the transportation of goods from their own countries to destinations or from destinations to their homelands (Tsui & Fung, 2016). Given these, there has been an increasing interest in examining relationship between international trade and tourism. Researches are about whether there is a relationship between tourism and international trade and what is the direction and duration of the relation. Although relationships have been identified in empirical studies using different variables and in different counties and regions, there is no consensus on the direction and term of the relationship (Gwenhure & Odhiambo, 2017; Suresh & Tiwari, 2018).

If it is determined that there is a systematic relationship between tourism and international trade, it can be an important step in terms of regulating international policies. Useful consequences can be set forth to determine the main success elements of foreign trade. In addition, identifying the existence and nature of the relationship between tourism and trade can steer the efforts to increase tourism demand.

By this research, tourist arrivals from Silk Road countries (Azerbaijan, China, Georgia, India, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan) to Turkey and international trade of Turkey (import and export) with those countries were analyzed with Mean Group (MG) and panel cointegration methods. Behind the work lies the assumption that international trade will positively impact tourism development.

This study contributes to the extant literature in three ways. First, the relationship between tourism and trade is examined amongst countries with different economic development. Secondly, it is probed for the countries with divergent economic relation volumes. Lastly, it provides empirical results from previously non-examined region, Silk Road.

The next section reviews the relevant literature including the concepts and studies that frame this study. After the methodology and findings, the conclusion presents and interprets the study findings.

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These are compared with other studies, and inferences are presented.

2. Literature

2.1. Conceptual framework

As a consequence of the effect of neoliberal policies and globalization, 'export' constitutes the basic development strategy in many developing countries (Bhagwati, 1978) and policies to increase trade are continuously implemented. Such policies (facilitating human and property mobility, simplifying border operations, etc.) are also initiating the development of tourism (Kulendran & Wilson, 2000).

Since the 1960s, amongst the topics that have drawn the interest of academics and decision makers is whether there is a relationship between international trade and economic growth (Kónya, 2006; Sinclair, 1998). On the basis of this interest, two theories are tested; these are the Export-Led Growth Theory (ELG), which is based on the assumption that exports lead to economic growth, and the Growth-Led Export Theory (GLE), which suggests that exports are increasing as a result of economic growth (Clancy, 1999). The ELG theory states that rise in exports due to increase in branching and specialisation, improved performance and productivity, investment in new technologies and even capital increase will lead to a general economic growth (Nowak, Sahli, & Cortés-Jiménez, 2007; Thirlwall, 2000). According to the theory, GDP will increase due to the demand for national products and services in the international market. At the same time, trade will support the enhancement of innovative products by increasing human capital, thus disseminating the knowledge to the society in general (Nowak et al., 2007). The GLE theory argues that there will be an increase in exports after economic growth, so it claims that the mechanism works in reverse of what ELG proposes (Kónya, 2006). Ultimately, these two arguments are not contradictory or mutually exclusive theories, but show that there may be a reciprocal relationship between exports and economic growth.

In the framework of ELG, tourism leads to the development of new models because it incorporates the goods and services which are traditionally not internationally traded. In this context, tourism-led growth theory (TLG), which is based on the assumption that the increase in tourism activities and revenue will affect economic growth, is foregrounded (Balaguer & Cantavella-Jorda, 2002).

In contrast to the ELG, TLG is also applicable for underdeveloped countries, since it recognizes that advantages such as natural and cultural beauties which are not unique to developed countries can be utilized (Balaguer & Cantavella-Jorda, 2002). Furthermore, tourists do not only participate in consumption in the countries they visit; they may also increase exports by demanding products and services produced in the host country. As a result of such demand, such products may be sold in their own countries; or the business opportunities which they observed during their visits may be realized when they return to their home countries (Fischer & Gil-Alana, 2009). In this context, tourism is considered to provide solid export and growth (Lee & Kwon, 1995; Mansfeld & Winckler, 2004).

Within this scope, it is possible to distinguish between two strands of research - studies that examine the relationship between tourism and growth and those that investigate the connection between trade and tourism.

For example, Du, Lew, and Ng (2016) who analyzed 109 countries, found that tourism had a positive effect on GDP. Based on data from 49 countries, Seghir, Mostéfa, Abbes, and Zakarya (2015) found a bi-directional relationship between tourism and economic growth. Brau, Lanza, and Pigliaru (2003) and Eugenio-Martin, Morales, and Scarpa (2004) employed the panel data approach to analyze the data of 1980–1995 and 1985–1998 figures for 14 and 21 Latin American countries, respectively. They revealed that tourism leads to economic growth in the medium term and long term in low and middle income countries, but the relation is not very clear in developed countries. Meanwhile, Beladi, Chao, Ee, and Hollas (2019), who examined data of 50 countries, showed that tourism (particularly medical tourism) contributed to economic development, especially in non-OECD countries. On the other hand, after examining 84 countries, Chiu and Yeh (2017) concluded that even though there is a relationship between tourism and economic growth, this relationship has not always developed in the same direction and has varied due to economic size of countries and level and type of tourism development.

By exploiting cointegration and causality analysis, Balaguer and Cantavella-Jorda (2002) found that the tourism and economic growth are related in the long term and that tourism leads to economic growth. They determined that a 5% increase in long-term tourism would generate a 1.5% increase in income. Although Nowak et al. (2007) stated that tourism development will result in Spanish citizens becoming impoverished, they also pointed out that tourism contributes to economic growth as it can finance imports of production goods, and that differentiation in tourism will contribute to growth more but that relation is only valid in the long run. Also, Durbarry (2004), Akinboade and Braimoh (2010), Mishra, Rout, and Mohapatra (2011), Kibara, Odhiambo, and Njuguna (2012), Massidda and Mattana (2013), and Jalil, Mahmood, and Idrees (2013) found that tourism is effective on growth over the long term in Mauritius, the Republic of South Africa, India, and Kenya, Italy and Pakistan, respectively.

Conversely, Chen and Chiou-Wei (2009) emphasized that while tourism supports economic growth in Taiwan, there is a two-way relationship in South Korea. Using the VAR approach to tourism revenues and GDP for the period 1960–2000, Dritsakis (2004) also concluded that there are bidirectional relations between tourism and economic growth in the long term in Greece. Oh (2005) analyzed Korean tourism revenue and economic development figures between 1975 and 2001 by using the Granger causality test and the VAR approach. He determined that there was no relation between tourism and economic growth in the long term, and that the unidirectional relation from economic growth towards tourism was only present in the short run.

For India, Suresh and Tiwari (2018) stated that, in the short term, tourism supports economic growth but in the long term there is a reverse relationship. Similarly, Narayan and Prasad (2003) revealed that while GDP has an impact on tourism development in the short term, tourism development is more influential on GDP in Fiji in the long term.

Many studies also examine the relationship between tourism and economic growth in Turkey. Bahar (2006) who analyzed tourism income and GDP data between 1963 and 2004 with the VAR analysis, found a long-term relation between tourism and economic growth. By using the number of tourists instead of tourism revenue, Gunduz and Hatemi (2005) also achieved the same result. Cetintas and Bektas (2008) analyzed the data between 1964 and 2006, using the ARDL method and reached the same result for the long term, but they stated that there is no relation in the short term. Additionally, Kasman and Kirbas Kasman (2004) and Yıldırım and Öcal (2004), who used co-integration and Granger tests, achieved similar results. These studies suggest that the TLG is valid for Turkey. On the other hand, using the Toda-Yamamoto method to analyze data between 1992 and 2006, Kizilgol and Erbaykal (2008) found that there is a one-way causality towards tourism from economic development and that tourism will develop as a result of economic growth. Uysal, Erdogan, and Mucuk (2004) found a two-way relationship between tourism and economic growth; meanwhile, Yavuz (2006), Arslanturk, Balcilar, and Ozdemir (2011) and Katircioglu, Katircioglu, and Altun (2018) concluded that there was no relation between tourism revenues and GDP.

The tourism-trade relationship is also remarkable. Happy-end (resulting in economic gains and partnerships) business trips may encourage other entrepreneurs; therefore tourism may occur. Those who travel to buy or sell products or services are a source for both tourism and trade (Santana-Gallego, Ledesma-Rodriguez, & Perez-Rodriguez, 2011), and spouses, relatives and friends who accompany people on business trips are driving an increase in tourism (Kulendran & Wilson,

2000). Trade helps a country integrate with other countries and results in investment in infrastructure such as transportation, linguistics and technology, which all make travel easier and more alluring (Chaisumpunsakul & Pholphirul, 2018; Santana-Gallego et al., 2011). Moreover, trade between countries can make it easier for tourists to find the goods and services they are familiar with in their own countries and this may also attract tourists (Khan, Toh, & Chua, 2005; Kulendran & Wilson, 2000; Santana-Gallego et al., 2011). In addition, theoretically, tourism has some indirect impacts on increase of trade. For example, tourism development encourages trade as it will lead to the import of the necessary raw materials for the production of tourist products/services, and tourists can improve the image of the region by transferring information about the destination, leading to different business opportunities (Santana-Gallego et al., 2011). By experiencing and commenting on local products, tourists may not only provide very valuable feedback (with no cost) to local companies about preferences of foreign customers (Santana-Gallego, Ledesma-Rodríguez, & Pérez-Rodríguez, 2016), but may also increase demand for local products in foreign markets (Kullendran and Wilson, 1998; Madaleno, Eusébio, & Varum, 2017).

The reasons mentioned above are motivational sources for many researchers to examine the tourism-trade relationship. Keintz, whose 1971 findings revealed that the international trade of the USA was influential on the tourism demand for the country (Khan et al., 2005) were confirmed about 50 years later by Kumar, Prashar, and Jana (2019). Shan and Wilson (2001), Habibi, Rahim, Ramchandran, and Chin (2009), Leitão (2010), Chaisumpunsakul and Pholphirul (2018) also achieved supportive results for China, Malaysia, Portugal, and Thailand, respectively. In the study on New Zealand, Turner and Witt (2001) also found that international trade significantly affects business tourism. Likewise, Aradhyula and Tronstad (2003) disclosed that business trips are particularly effective in terms of border trade between the USA and Mexico, and Tsui and Fung (2016) showed that business travel and trade have reciprocal links for Hong Kong, China, Taiwan and the United States.

Shan and Wilson (2001) examined trade and tourism between China and Australia, Japan, the UK and the USA by using the VAR method and found that there was a bi-directional causality. Easton (1998) revealed that Canada's total exports can be complemented or replaced by tourist visits. This result means that tourism and trade activities are complement each other and act together. Santana-Gallego et al. (2011) indicated that there is a two-way relationship between trade and international tourism both in the short and long terms in the Canary Islands. They asserted that a 1% increase in the number of tourist arrivals and departures would result in an increase of trade by 0.76–1.73% and 1.02–1.22%, respectively, and that a 1% increase in trade would lead to an increase in the number of tourist arrivals and departures up to 1.65% and 1.58%, respectively. They pointed out that in the short term, while exports influence tourism, tourism affects import. In other words, while the increase in export creates an increase in tourism demand, the increase in the number of tourist arrivals/departures also increases the imports for the products and services that they will need (Santana-Gallego et al., 2011). Işik, Kasimati, and Ongan (2017) also stated that there is a two-way relationship between tourism and trade for Greece. Suresh and Tiwari (2018) found a dual relationship between trade and tourism for India, but that while both positive and negative changes in trade affect tourism, only positive changes in tourism are effective on international trade. Meanwhile, Katircioglu (2009) and Fry, Saayman, and Saayman (2010) found a bi-directional relationship between international tourist numbers and international trade, for the Turkish Republic of Northern Cyprus and South Africa.

Al-Qudair (2004) analyzed the relationship between the number of tourists and trade in nine Muslim countries using cointegration and Granger tests and identified a long-term relationship for two of the countries in the sample, but no relationship for others. Sarmidi and Salleh (2011), who examined tourism and trade relations between Malaysia, Brunei, Indonesia, Singapore and Thailand through cointegration analysis and the ARDL method, found that tourist travel is the reason for the trade in the short term, and that tourism and trade move together in the long term. In their topical work, Ozer Balli, Balli, and Tsui (2019) stated that the international trade of New Zealand with Australia, Canada, China and Hong Kong has positive impacts on tourism, but that when Japan, Korea, the USA or Singapore were taken into account, a relationship between trade and tourism cannot be determined.

Recently, the relationship between tourism and trade has been examined import or export data separately or the trade of particular products. For example, Ozer Balli et al. (2019) found that economy class airline passengers affected tourism demand and hence trade volume. Kulendran and Wilson (2000) examined the relation between tourism and trade by applying the Granger causality test and concluded that there is a long-term relationship between Australia and the EU, Japan, New Zealand and the UK. However, this situation differs from country to country (relation is valid for the USA, Japan and Australia but not for New Zealand and the UK) and there is generally a stronger one-way relationship between export and holiday tourism. In Singapore, Khan et al. (2005) reported a relationship between tourism and trade, particularly between business travel and import, and that there is no or very weak trade relation between trade and other types of tourism. By comparing theirs with the results of Kulendran and Wilson (2000), they claimed that the tourism-trade relationship is country-specific. As an example, they pointed out that people go to Singapore to sell and to Australia to buy. Fischer and Gil-Alana (2009) investigated the relationship between imports and tourism, and found that tourism positively impacts trade of personal consumption products (as in the case of red wine) and has positive effects on imports. Madaleno et al. (2017) examined whether Portugal's export of cheese, olive oil, sausage, canned fish and wine affects the demand for tourism. They found that there is a two-directional relationship between wine export and tourism in the short term, and that cheese and canned fish exports increase tourism in the long term, but the export of olive oil and sausage has no impact on tourism.

In the literature, only one study examining the tourism and trade relationship for Turkey has been identified. Bahar and Baldemir (2008) used export and tourism data between 1980 and 2005 and determined a one-way relationship from tourism to export. However, the tourism-import relationship was not addressed in this study.

It was observed that different and contradicting results were achieved and there is no clear compromise on either the global scale or on Turkey's scale. Although the relationship in the long term was generally determined, results vary on direction and period of relation of tourism with both development and trade (Gwenhure & Odhiambo, 2017; Kizilgol & Erbaykal, 2008; Suresh & Tiwari, 2018). Considering divergent factors such as level of tourism development, share of tourism in the economy, different variables (exchange rate, number of tourists, tourism income, average expenditure level, etc.) and using diverse methods affect the results (Gunduz & Hatemi, 2005; Massidda & Mattana, 2013; Nowak et al., 2007).

2.2. Turkey and silk road

In Turkey, the tourism sector has been amongst the very important tools in the country's public policies since the 1960s; however, it developed significantly after the 1980s with the help of public incentives (Coban & Ozcan, 2013; Yavuz, 2006). In 2015, Turkey accounted for 4.2% of the European tourism market which hosts half of the international tourists, and ranked sixth in the tourism premier league with 39.5 million international tourists. However, due to international and domestic problems (particularly aircraft crisis with Russia and failed coup attempt), in 2016 she ranked tenth on the number of international tourists list and seventeenth in the highest tourism revenue sequence (UNWTO, 2017). This is because the average expenditure per tourist

was only US$ 705 (international tourists spent an average of US$ 633, while domestic tourists spent an average of US$ 978) (Ministry of Culture and Tourism, 2018).

Moreover, tourism is of great importance for Turkish economy. After the manufacturing sector, it is the second most important foreign exchange source (Gunduz & Hatemi, 2005). Beyond 4.1% direct contribution, tourism contributes to GDP at the rate of 12.5% by indirect and multiplier effects (World Travel and Tourism Council [WTTC], 2018). After the construction sector, tourism provides the highest employment rate (Kizilgol & Erbaykal, 2008); it employs 462.000 people, representing 1.6% of total employment. This rises to 7.4% when employment in related sectors is also considered (WTTC, 2018). The share of tourism revenues in total exports also showed an upward trend in the period between 1960 and 2002 increasing from 2.1% to 33.9%. Since 2002, however, there has been a downward trend and tourism accounted for 15% of exports in 2016 (Association of Turkish Travel Agencies [TURSAB], 2019).

The Silk Road which is one of the most important historical routes has attracted more attention since the Samarkand Declaration in 1994 and the UNWTO Silk Road Programme in 2014. In accordance with the growth of tourism, Silk Road destinations have also been promoted to provide sustainable competitive advantages while at the same time reviving substantial trade (UNWTO, 2014).

For scope of this study, the number of outbound tourists from Silk Road countries is important since it exceeded 6.5 million in 2015 which constituted 15.2% of all international tourists of Turkey. However, in 2016, due to a huge fall in the number of Russian tourists caused by political tensions between Turkey and Russia, the tourist numbers declined to under four million, accounting for 10.7% of total international tourists (Figs. 1 and 2) (Ministry of Culture and Tourism, 2017). Moreover, regarding country-specific international tourism figures for Turkey; Iran, Ukraine, Russia (at the 2nd rank in 2014 and 2015) and China ranked the 3rd, 5th, 6th and 11th ranks respectively (Ministry of Culture and Tourism, 2017).

Trade figures between Turkey and Silk Road countries are also rising and Turkey imports more than she exports to these countries. Moreover, while these countries account for approximately 30% share in Turkey's total imports, 10–15% of Turkey's export trade is directed to these countries (Figs. 3 and 4). Amongst Turkey's top 20 international trade partners, Iran, China and Russia occupy the 11th, 15th and 17th ranks for export figures, and 7th, 1st and 3rd places for import figures, respectively (TUIK, 2018).

The relationship between tourism and international trade in Turkey and Silk Road countries has been examined for several reasons. First, in terms of the number of international tourists, Turkey is consistently amongst the world's top 10 countries (excluding the crisis years referred to above). In 2015, 2016 and 2017, Turkey hosted approximately 36.2, 25.4 and 32.4 million international tourists respectively (TURSAB, 2018) and tourism generates considerable foreign exchange for Turkey (Gunduz & Hatemi, 2005). Also, with the exception of the decline in 2016, the number of tourists from Silk Road countries to Turkey continues to increase and constitutes about 18% of international tourists (Figs. 1 and 2). Another reason for this is that although Turkey and Silk Road countries engage in intensive trade (see Figs. 3 and 4) due to geographical proximity, historical and cultural ties, the relationship between tourism and trade in this region has not been studied. The method of the study is described below.

3. Methodology

The main objective of this study is to investigate whether there is a long-term relationship between tourist arrivals and international trade (exports and imports) in Silk Road countries. For this purpose, tourist figures and real export and import figures for the period of 2000–2016 between Turkey with Azerbaijan, China, Georgia, India, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan were used.

Data of international tourist numbers and figures of import and export between 2000 and 2016 were used. This period has been chosen since the majority of the examined countries were members of the Soviet Union and data were available after the transition period. Figures of imports and exports were gathered from the Foreign Trade Statistics of the Turkish Statistical Institute (TUIK), and International Tourist Statistics of Ministry of Culture and Tourism were used for international tourist numbers. Although 17 Silk Road countries (including Turkey) were initially identified for the study, Armenia, Afghanistan and Mongolia were excluded due to lack of data, so the final sample comprised Turkey and 13 Silk Road countries.

Due to the heterogeneity of the parameters, the Mean Group (MG) method developed by Pesaran and Smith (1995) and Pesaran, Shin, and Smith (1999) is used to investigate the relationship between the variables. The MG method is preferred since it produces very successful results in examining non-stationary dynamic panels. The MG estimator is based on average values of coefficients and on combining coefficients (Pesaran et al., 1999; Pesaran & Smith, 1995). This estimator also makes it possible to achieve error variance, constant coefficients and short-term parameters that vary throughout the group. However, it is not possible to achieve long-term coefficients simultaneously. Pesaran and Smith (1995) propose that the MG method eliminates the bias due to nonhomogeneous slopes in dynamic panels. MG estimators provide "*the long-run parameters for the panel through making an average of the long-run parameters from ARDL models for individual countries*" (Papageorgiou, Michaelides, & Tsionas, 2016: 60). ARDL model equation can be shown as follows;

$$Y_t = a_i + \gamma_i Y_{1,t-1} + \beta_1 X_{it} + \varepsilon_{it} \quad (1)$$

here, i represents the country where $i = 1, 2, 3, \ldots, n$. Long-run parameter is $\theta_i = \frac{\beta_i}{1-\gamma_i}$ and the MG estimators for the whole panel will be given by $\hat{\theta} = \frac{1}{N}\sum_{i=1}^{N}\theta_i$ and $\hat{a} = \frac{1}{N}\sum_{i=1}^{N} a_i$. Y_t represents dependent variable and X_{it} represents independent variables.

The series affected by variables such as trend, seasonality, fashion,

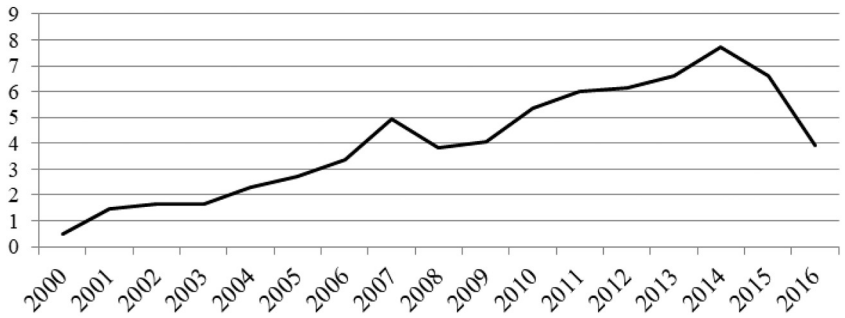

Fig. 1. Number of tourists from silk road countries to Turkey (millions).
Source: Ministry of Culture and Tourism, 2017

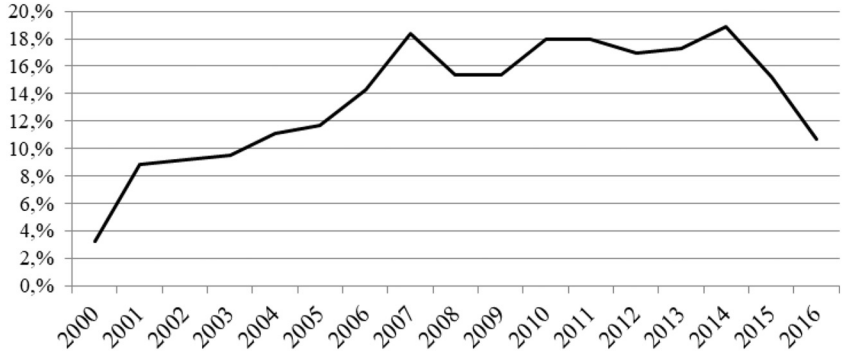

Fig. 2. Share of silk road countries in Turkish tourism.
Source: Ministry of Culture and Tourism, 2017.

political or economic factors (Sevinc, 2013) and which are therefore non-stationary, cause spurious regression problem (Coban & Ozcan, 2013). For this reason, cointegration analysis is used to determine whether the non-stationary series are related in the long run (Gujarati, 2004). The most important characteristic of cointegrated variables is that they correspond to any deviation from the long-run equilibrium. This reveals the dynamics of error correction for the variables in the system, which is shaped by deviations. Eq. (1) can be written as the error correction equation as follows:

$$\Delta Y_{it} = \varphi y_{i,t-j} - \theta_i X_{i,t-j} + \sum_{j=1}^{p-1} \beta_{ij} \Delta y_{i,t-j} + \sum_{j=0}^{q-1} \alpha_{ij} \Delta X_{i,t-j} + \mu_i + e_{it} \quad (2)$$

In equation, the error correction term θ_i indicates compliance rate. The coefficient sign should be negative and statistically significant. Error correction underlines what per cent of deviations from long-run equilibrium stemming from the shocks in the independent variables are eliminated within one year.

3.1. Unit root test

The non-stationarity of the macroeconomic time series may lead to an unrealistic relationship between the variables used (Dritsakis, 2004). Stability of the variables is required for the results to be reliable (Coban & Ozcan, 2013), and unit root tests are used to measure stability.

Levin, Lin, and Chu (2002) and Im, Pesaran, and Shin (2003) suggested that unit roots are tests suitable for examining the stationarity of series in dynamic panes. They proposed different panel unit root tests including specific constant terms and time trends. The LLC allows the unit root to be tested by removing the assumption of homogeneity in the autoregressive terms. The LLC test can be expressed as;

$$\Delta y_{it} = \gamma_{0i} + p y_{i,t-1} + \sum_{i=0}^{p} \gamma_{1t} \Delta y_{i,t-j} + \mu_{i,t} \quad (3)$$

In the equation, Δy refers to the first difference in the considered variable, γ_{0i} is the constant assumed to be different between horizontal sequences, and $p$is the identical autoregressive coefficient. $\mu_i$is defined as follows:

$$\mu_{i,t} = \sum_{j=0}^{\infty} \gamma_{1t} \Delta y_{i,t-j} + \varepsilon_{i,t} \quad (4)$$

The hypothesis tests are as follows:

H_0: $p_i = p = 0 H_1$: $p_i = p < 0$

Im et al. (2003) developed a new unit root test (IPS) for heterogeneous panels. IPS is based on the Augmented Dickey Fuller test (ADF), a traditional unit root test used to investigate whether the variables in the time series analysis include unit root, whereas test statistics of panel is based on the arithmetic average of the individual series. In the case that the series contains unit root, estimates would be spurious. For the IPS test, the following equation can be used:

$$\Delta y_{it} = \overline{w}_i + p y_{i,t-1} + \sum_{j=1}^{p} p_{i,j} \Delta y_{i,t-j} + v_{i,t} \quad (5)$$

In Eq. (5), Δy is the first difference in the considered variable. The IPS test allows the error term in Eq. (5) to be heterogeneous. The test statistic is calculated as follows:

$$\bar{t}_T = \frac{1}{N} \sum_{i=1}^{N} t_{i,t}(p_i)$$

The ADF test statistic is calculated as:

$$A_{\bar{t}} = \frac{\sqrt{N(T)}\,[\bar{t}_T - E(t_T)]}{\sqrt{Var(t_T)}}$$

The CADF unit root test developed by Pesaran (2007) is also used in this study. This test which considers cross-section dependency in dynamic panels is actually known as the second-generation panel unit root

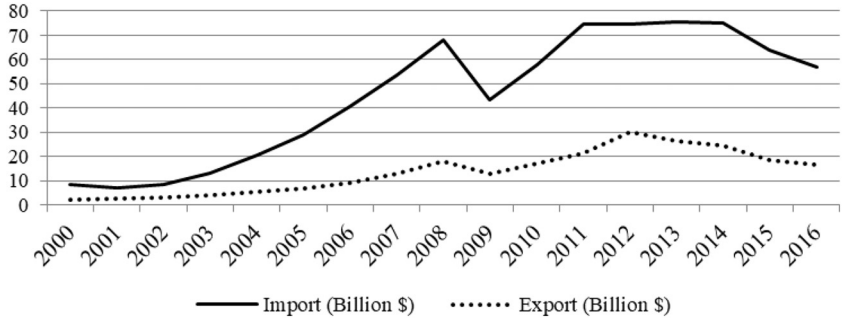

Fig. 3. Trade of turkey with silk road countries.
Source: TUİK, 2018.

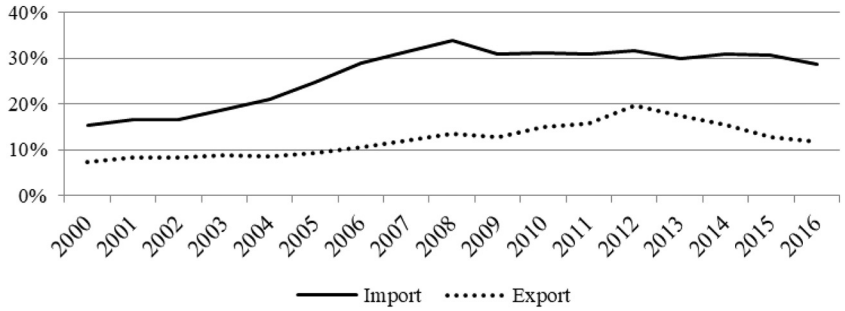

Fig. 4. Ratio of silk road countries in trade of Turkey.
Source: TUİK, 2018.

test. All of the above tests indicate that series are I(1).

4. Findings

Variables used in the model are number of tourist arrivals from Silk Road countries to Turkey, and figures (in million US$) of international trade (as export and import) with these countries. The data were compiled from the Ministry of Culture and Tourism, Tourism Accommodation Statistics and TUIK Foreign Trade Statistics.

All variables were transformed into logarithmic form to allow estimated coefficients to be interpreted as elasticity. The descriptive statistics of the variables used in the model are given in Table 1.

Descriptive statistics of the variables used in the model are shown in Table 1. According to the table, export has the highest mean, median and maximum values, with 'tourist' accounting for the minimum value. Export is also the variable with the highest standard deviation. This relatively high standard deviation indicates that the volatility of the export variable is high. Jarque-Bera statistics emphasize that the number of tourists is not normally distributed while imports and exports have normal distribution. Hence, the next step is to analyze whether the variables contain unit root.

Unit root test results show that the variables are stable and therefore suitable for the panel ARDL approach. Series with different levels of stationarity do not constitute a constraint for the use of the panel ARDL method. Table 2 shows that variables are stationary according to the CADF test that examines cross-section dependency (I (1)). This result indicates the necessity of the Haussman test, which makes it possible to choose between PMG and MG when performing a Panel ARDL analysis.

4.1. Panel ARDL results

The Hausman test is applied in order to determine estimator. According to the Hausman test results, heterogeneous long-run coefficients exist. Therefore, the Mean Group estimator was used.

Table 1
Descriptive statistics.

	LTOURIST	LIMP	LEXP
Mean	11.00779	19.95658	20.35534
Median	10.98487	20.00701	20.13871
Maximum	15.42651	23.01798	24.16894
Minimum	4.564348	15.31234	14.66972
Std. dev.	1.917689	1.371817	1.955412
Skewness	−0.255159	−0.289405	0.042652
Kurtosis	3.731838	2.965691	2.518123
Jarque-Bera	7.329949	3.095831	2.205234
Probability	0.025605	0.212691	0.332001
Sum	2432.723	4410.404	4498.530
Sum sq. dev.	809.0566	414.0137	841.1999
Observations	221	221	221

According to Table 3, a 1% rise in imports increases the number of tourists by 0.66%, while the increase in exports seems statistically insignificant. In terms of imports and exports, since the coefficient of the lagged value of the error term is both negative and statistically significant, the error term is meaningful and the shocks are eliminated in the short term. In addition, 80% of the shocks caused by independent variables in the short term disappear in the same period and the system exhibits convergence behavior to achieve long-term balance again.

5. Discussion

In this study, Panel ARDL analysis was conducted to analyze whether there is a relation between international tourist visits and trade (import and export) of Turkey and other 13 Silk Road Countries. This study is important not only because Turkey is an important international tourism destination and Silk Road countries are amongst its t major trading partners but also because it is amongst the first studies examining the relationship between trade and tourism in Silk Road countries.

Behind the work lies the assumption that international trade will positively impact tourism development and results confirm that. Findings show that tourist arrivals are related to export only in the short term; however, in the long run, there is a positive relation between tourism and import. The results are in line with many other studies revealing long-term relations between the number of international tourists and trade (Fry et al., 2010; Katircioglu, 2009; Kulendran & Wilson, 2000; Shan & Wilson, 2001). The study also partially corresponds to findings of Sarmidi and Salleh (2011) and Santana-Gallego et al. (2011) because it points out that there is a relation between international trade and tourism both in the short and long terms. The results of our study accord with those of, amongst others, Habibi et al. (2009), Leitão (2010) and Chaisumpunsakul and Pholphirul (2018) emphasizing that the impact of trade on tourism is higher in the long term. The study also supports Durbarry (2004) and Fischer and Gil-Alana (2009) who found that there is a relation between tourism and exports and imports, although they focused on particular products.

In the study by Santana-Gallego et al. (2011), the impact of trade on tourism was higher. This result may be related to the size and variety of national economies. While tourism is the main economic source of income for the Canary Islands (Wikipedia, 2018), Turkey has a more diversified economic structure.

As mentioned earlier, only Iran, China and Russia from the 13 countries examined are amongst Turkey's 20 largest trading partners and, furthermore, Silk Road countries are more important for import than for export in the case of Turkey (TUIK, 2018). In addition, from Russia and Iran, Turkey mostly imports mineral fuels, mineral oils and products of their distillation. Meanwhile, it is worth mentioning that Turkish total imports of oil and natural gas from both countries are over US$ 15 billion. These items also constitute the largest export items of Iran and Russia (İzmir Chamber of Commerce, 2017). Mostly electronic and chemical products are imported from China (TUIK, 2018).

Table 2
Unit root tests.

Variable	LLC level	LLC difference	IPS level	IPS difference	Pesaran CD level	Pesaran CD difference
Tourist	−0.0279	−7.4753[b]	−0.2868	−12.017[b]	−1.244	−3.844[b]
Import	−5.7895[b]	−2.2662[a]	−1.7733[a]	−2.7479[b]	−0.015	−1.826[a]
Export	−8.4005[b]	−2.3745[b]	−4.0357[b]	−3.8715[b]	0.374	−4.194[b]

[a] Significant at the 5% level.
[b] Significant at the 1% level.

Table 3
Panel ARDL (MG) estimations.

	Dependent variable: ΔTourist
Long run	
Import	0.6642[a]
Export	0.1466
Short run	
ECT	−0.8019[a]
C	−3.8074[a]

[a] Significant at the 1% level.

In contrast to conclusions by Santana-Gallego et al. (2011), these imported products are not directly related to tourism. Therefore, it can be stated that total trade volumes and import-export balance issues are important in terms of the relationship between tourism and exports and imports.

Moreover, Turkey's imports from these countries (in the broader sense, their exports) may contribute positively to the income of their citizens and, by implication, to their tourism demand. So, the results are in line with Dogru, Sirakaya-Turk, and Crouch (2017) who found that income is an important tourism demand determinant for Russians.

Since our findings underline that there are relationships in both the long term and the short term, they therefore differ from the studies which identify only a short-term effect of tourism on trade (Fry et al., 2010; Sarmidi & Salleh, 2011) or those which claim a relation between import and only business trips (Khan et al., 2005). Even though all international travels have been examined regardless of their purpose within the scope of the study, the structure of international trade and/or tourist visit motivations (it is supposed that the vast majority of tourists from Silk Road Countries are motivated for 3S and cultural tourism) is estimated to be reason for the differences in other studies.

The results offer useful information for public and private sector authorities. In addition, the results indicate to decision makers and planners that policies improving Turkey's situation both in its tourism and trade with Silk Road Countries will provide benefits. For this reason, we suggest that it would be appropriate to envisage coordinated and complementary tourism and trade practices in national and regional policies. In parallel with the conclusion that trade (particularly imports) impacts tourism more in the long term, planners and decision-makers should implement strategies to increase volume and product scale of trade with Silk Road countries.

Besides, due to the strong relationship between trade and tourism, it is also probable that the improvement in tourism would have positive impact on Turkey's foreign trade deficit in the short run. Furthermore, although it is beyond the scope of this study, the effectiveness of the efforts may be increased by focusing on products/services and tourist segments after determining what kinds of tourist visit and what types of product/service trade are strongly connected.

The limitations of this study mainly stem from analysis of all relevant data in a holistic manner. The results may be different on a country basis and so future studies may examine the countries separately to define country-specific strategies.

Declaration of Competing Interest

None.

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