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RESEARCH ARTICLE

The asymmetric effect of tourism, financial development, and globalization on ecological footprint in Turkey

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Abstract

With the growing interest among researchers in analyzing the ecological footprint of any country, this study focuses on new dimensions to analyze the long-run and short-run asymmetric impact of tourism, financial development, and globalization on ecological footprint in Turkey by using Quantile Autoregressive Distributed Lag model for the period from 1986 to 2018. Further, the EKC hypothesis was also tested. The results show that tourism, globalization, and financial development are positively and significantly associated with the EFP. This means that the increase in these variables will further increase the ecological footprint in Turkey. The U-shaped EKC curve was found to be valid in Turkey. The results also depict nonlinear and asymmetric association among most of the variables. Hence, based on the results, further research directions and practical implications can be suggested.

Keywords Tourism · Ecological footprint · Globalization · Financial development · Turkey

Introduction

Thus, the purpose of this particular study is to investigate the association of tourism, FDEV, and globalization with the EFP in Turkey, through which the effective policy measures will be proposed depending on the results of the study. One of the major global issues for future generations that have been increasingly threatening and responsible for global warming is environmental degradation (EN_DEG). The world is striving for the protection of the environment along with the achievement of economic development simultaneously. In many studies, it has been observed that due to a continuous decline in environmental quality, it becomes vital for the countries to develop some strategies that reduce these deteriorations so that the quality of the environment can be improved. In literary studies, it has been examined that human beings have unlimited needs and as the natural resources are limited with higher economic well-being and expansion stages; the energy consumption, in this case, leads to pollution and environment degradation (Borhan and Ahmed 2012; Anatasia 2015; Jumadilova 2012; Zee and Burford 2008; Katircioglu 2014).

Further, it also becomes important that natural habitat should be preserved in this process of economic welfare. Keeping this view in mind, economic growth and pollution have been researched comprehensively in the previous literature. By extending the classical work of Kuznets (1955), many

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scholars such as Istaiteyeh (2016), Grossman et al. (1991), Ozcan and Ari (2017), and Dinda (2004) have argued that with the rise in economic development activities of a country, the per capita income also increases, as a result of which energy consumption and economic growth cause damage to the environment. But as activities of economic development reach the optimum level, EN_DEG is likely to reduce with the rise in per capita income. This particular fact has been named environmental Kuznets curve (EKC) hypothesis and is also being tested in an extensive number of countries (Ozatac et al. 2017; Katircioglu 2017; Kapusuzoglu 2014; Kalayci and Koksal 2015).

However, because of differences in proxy settings and economic estimation processes, various studies have also failed to govern an inverted U-shaped EKC for some of the nations and states that have earlier confirmed the hypothesis. In one of the studies conducted by Dogan et al. (2017), it was observed that the EKC hypothesis was not supported in some of the selected OECD countries, because the expected coefficient signs of variables were opposite to that of the path of hypothesis. At the same time, it was concluded by Bozkurt et al. (2016) that the EKC hypothesis was not supported and provided the same results by showing that as tourist arrival was increased in the BRICS countries, the CO_2 level also increased. Additionally, it was also found that the EKC hypothesis in China, Malaysia, Turkey, and Sri Lanka was also not supported (Solarin 2014; Naradda Gamage et al. 2017; Zhang and Gao 2016; Karasoy, 2019; Katircioğlu and Katircioğlu, 2018).

Further, the ecological footprint (EFP) has been considered one of the most significant issues these days under the umbrella of EN_DEG for developing as well as developed countries. In this study, we have considered the same, i.e., the ecological footprint, as a measure of EN_DEG in Turkey. It is referred to as a natural production area with respect to the water and land that an individual, people, or activity entails to yield all resources that are consumed while absorbing waste (carbon dioxide) with the help of modern technology along with the managing of resources (Rudolph and Figge 2017). According to Ewing et al. (2012) and Ozturk and Al-Mulali (2015), EFP is a comprehensive measure, which is used as an indicator to measure EN_DEG (Aslan et al. 2018; Charfeddine and Mrabet 2017; Ozturk et al. 2016). Further, it highlights the direct and indirect effects of manufacturing and consumption on the atmosphere (Ulucak and Bilgili 2018). EFP is the indicator showing the demand of people for natural resources and is considered one of the most widely used indicators of natural resource consumption (Teixidó-Figueras and Duro 2015) and is mostly recognized as a measure of environmental sustainability (Mostafa 2010). EFP can also measure and manage the resources of the overall economy. It is very advantageous because of the fact that environmental data can be merged in this single measure and is easily compared with production capacity (Costanza 2000).

Due to the significance of the EFP, the focus of researchers has turned to several key issues causing deterioration of environments such as tourism (TOUR), financial developments (FDEV), and globalization (GLOB). Previous literature highlighted various factors affecting EFP, such as "FDI" (Solarin and Al-Mulali 2018), "economic growth" (Tutulmaz 2015), "tourism" (S. Katircioğlu & Katircioğlu, 2018), FDEV (Charfeddine and Khediri 2016; Destek & Sarkodie 2019), "GLOB" (Sharif et al. 2019), and "natural resources" (Hassan et al. 2019).

Tourism is a cultural, economic, and social occurrence which demands the process of moving of an individual to the areas or locations outside of their normal surrounding for business or personal purposes. The TOUR industry seems to be one of the major industries in the world. This industry is considered to be constantly growing, and as result incomes and services improve (Pırnar and Günlü 2012). Over the last few years, it has been observed that international TOUR has gained significant increase by representing almost 7% of exports around the world generating 1.5 trillion US dollars and 30% of service exports while contributing 10% of world GDP (Glaesser et al. 2017). However, despite the fact that TOUR considerably contributes to growth in economic activities and development, it also adds a negative influence on the overall environment of that country. The TOUR industry can lead to deterioration of the environment in different forms such as air pollution, loss of natural habitat, and erosion of soil (Ozturk et al. 2016). Secondly, the amount of energy consumption in TOUR activities for catering, accommodations, and transportation can produce higher levels of CO_2 in the atmosphere. In a report of IEA (2019), 2/3 of CO_2 emission is due to electricity or heat production including the transportation sector. In the study carried out by Qureshi et al. (2019) on the panel of countries, the results showed that tourists' arrival is connected with loss in biodiversity while increasing carbon dioxide and greenhouse gas emissions (GHG). Moreover, trade liberalization also impacts EF and the habitat area. They also found a direct relationship between EFP and outbound tourists.

By extending our knowledge on EN_DEG, another most important factor reported in previous literature is FDEV. Although, for the development of a country's economy, the financial sector plays a vital role, yet, it can have a number of adverse effects on the environment in different ways. A consumer buys or builds certain items such as building large houses, machinery, automobiles, and the like that usually impact the atmosphere, as manufacturing these items requires energy consumption. So as a result of FDEV, investors are likely to purchase and arrange modern plants and machinery that require a huge amount of energy, and as a result of this, a large number of pollutants and CO_2 are emitted into the environments (Pata 2018). In contrast, few prevailing studies also suggest that FDEV decreases pollution. For example, Juan (2011) suggests that FDEV fetches environmentally friendly

ventures by stimulating research and development (R&D) that results in the reduction of EN_DEG. In addition, Shahbaz et al. (2016) also discuss that FDEV leads to the financing of efficient technologies and encourage sources of renewable energy, which are less expected to impair the environment. Majeed and Mazhar (2019) found that FDEV reduces the EFP and considerably helps in improving environmental quality. Thus, it shows that FDEV and EN_DEG are reasonably linked to one another.

Furthermore, the causes and effects of GLOB are described and examined in several different ways by various scholars depending on the prevailing global view and relevant disciplines (Dreher and Gaston 2008; Jones 2010). GLOB, all over the world, has enhanced economic development and has a very strong impact on different aspects of human life such as socio-economic, environment, and politics. GLOB is a shift from isolated national and self-constrained economies having trade barriers, strict regulations, and tough cultural differences towards a more unified and mutually dependent global economy (Hill 2008). The economic facets of globalization may perhaps affect the environment through the channel of trade and foreign direct investment (FDI). For example, the use of sophisticated and innovative technology by foreign investors may reduce energy consumptions and improve environmental quality, but if they employ the conventional and obsolete machinery, the environment degradation further increases (Shahbaz et al. 2016). The influence of globalization results in the improvement of environmental quality as capital inflows and trade openness aid to import more advanced technology which is environmentally friendly (Godil et al. 2020; Shahbaz et al. 2018a).

Current research has targeted Turkey due to the rise in EN_DEG. The Turkish economy has witnessed an average annual growth rate of 2.8% against 2.3% of OECD during 2018 (World Bank 2018). This growth was achieved at the cost of various issues including environmental ones. Although the attention of the world since 2001 is mostly on the developed and emerging economies, another most important yet emerging bloc of the global economy is MINT (Mexico, Indonesia, Nigeria, and Turkey) (Dogan et al. 2019). In 2016 the energy sector alone contributed 72.8% of aggregate GHG emissions (Turkish Statistical Institute 2018). Moreover, it is an emerging economy and a member of the European Union with the highest levels of carbon emissions in the world. The EU may put forth pressure on Turkey for implementing some strategies in its national scheme on climate variation and global warming in addition to CO_2 emission targets and curtailing the same. Turkey has been placed on number 23 worldwide in terms of carbon emissions with 1% emissions in 2006 according to the World Bank (Erdogdu 2010). Turkey is located in the most strategic region of the world, and due to its economic growth, it is likely to attract tourists, FDIs, and global attention, and due to these factors, the EFP of Turkey is expected to be disturbed.

Yet, in our knowledge very little or no single study has been carried out by integrating these three variables, i.e., TOUR, FDEV, and GLOB, on EFP along with the Quantile Autoregressive Distributed Lag (QARDL). Keeping in view that this study offers a clear vision about the relationships developed here, it differs from previous studies in certain ways. Firstly, one of the important research tasks is to combine these three variables to further extend our understanding of the EFP in the context of Turkey as it has not been explored with respect to the intensities of EFP, i.e., how the said variables influence at different environmental levels.

Secondly, the study examines the use of quantile asymmetries between our independent variables (tourism, financial development, and globalization) and dependent variable (EFP) by employing QARDL model of Cho et al. (2015), which will be comparatively a new addition to the existing literature and differs from the previous techniques used. Moreover, this technique has some advantages which are not included in standard models. For example, the QARDL model helps to test the extent to which the long-term relationship across the quantiles is stable. Additionally, it provides a flexible econometric framework to examine the various links among variables. In comparison with the linear ARDL model, the QARDL model is more helpful as it introduces the asymmetries in EFP due to an increase and/or decrease in TOUR, financial development, and globalization under diverse stages. In terms of methodology, the QARDL model is more useful because firstly the model allows for asymmetries location-wise, i.e., it may depend on the location of EFP within its conditional distribution. Secondly, the QARDL addresses the long-term relationship of tourism, financial development, and globalization with EFP, which is further related to short-term dynamics across a range of quantiles of the conditional distribution of EFP.

Lastly, in previous studies, it was found that there was a lack of cointegration between the time series due to the usage of traditional econometric techniques like Johansen cointegration test and linear ARDL model. It is because of the fact that the negative outcome could be explained by the existence of quantile varying cointegration coefficients over the short term, although the variables continue to move together in the long term (Xiao 2009). Moreover, the QARDL model is also considered superior to other nonlinear models, i.e., NARDL (nonlinear autoregressive distributed lag) model (Shin et al. 2011). In this model, the nonlinearity is shown exogenously, and the threshold is set to zero rather than it is determined by the data-driven process. These reasons justify our choice of adopting this model in our study which will encompass all the gaps of previous studies and show the accurate nonlinear and asymmetric linkages of tourism, financial development, and globalization with an EFP in Turkey.

Further, the paper is planned as follows: Selected literature is shown in the "Literature review." Research methodology

and examination procedure are shown in "Methodology." Data analysis and related discussion are produced in "Results," while the closing statements and policy suggestions are placed in "Conclusion."

Literature review

Over the last few decades, many studies have been carried out that examine the relationship between TOUR and pollution (Bakhat and Rosselló 2011; Becken 2002; Lohmann and Dredge 2012; Tabatchnaia-Tamirisa et al. 1997; Akadiri et al., 2019; Akadiri et al. 2020; Eluwole et al. 2020). TOUR is considered to be one of the major factors towards EN_DEG because it requires huge energy levels for different functions such as "food supplying, transportation, housing, and the management of TOUR-related attractions" (Gössling et al. 2012; Hall and Gössling 2013; Saenz-de-Miera and Rossello 2014). These activities are likely to increase CO_2 emission and lead to EN_DEG (Tovar and Lockwood 2008; Xuchao et al. 2010; Alola et al. 2019). Previously, CO_2 emission has been considered one of the most significant factors leading to polluting the environment. Lee and Brahmasrene (2013) analyzed the TOUR impact on economic growth and carbon dioxide emission using statistics from the European Union countries. The results showed that tourism impacts negatively on carbon dioxide emissions. In one of the studies conducted by Katircioğlu (2014), the TOUR development effect on CO_2 emissions in Singapore was analyzed using the EKC hypothesis from 1971 to 2010. The findings revealed that tourism development and carbon dioxide emissions are negatively related. Moreover, the determinants of carbon dioxide emissions with macroeconomic variables and TOUR were examined in Malaysia (Solarin 2014). A long-run relationship was observed between these variables.

With respect to Turkey, Katircioglu (2014) studied the impact of TOUR and CO_2 emissions. The study showed that an increase in TOUR leads to higher energy consumptions and carbon dioxide emissions. Additionally, the impact of TOUR was studied in association with environmental quality and EFP in 10 countries by Katircioğlu and Katircioğlu (2018). The results show that the TOUR induced EKC hypothesis was found valid and a negative influence was observed between TOUR development and EFP. In one of the studies conducted by Ozturk et al. (2016), international TOUR and EFP were examined by using the EKC hypothesis for the period of 1988 to 2008 in the panel of 144 countries. An indirect relationship between TOUR growth and the EFP was found in the high-income and upper-middle nations. Habibullah et al. (2016) inspected the impacts of TOUR activities on the loss of biodiversity in the panel of 141 countries. The results reveal that tourist arrival in the country proves to be dangerous for mammals, birds, plants, and fishes, while the high per capita income decreases the loss of biodiversity. It was concluded by Lin et al. (2018) that as tourism EFP in the metropolitan increases, the traffic intensity, overload on cultivated land, frequency of shopping, and ecosystem footprint are also likely to increase creating a severe problem for the sustainability schedule of the country.

It was further highlighted that there is a need to reconsider the TOUR insights by implying new perceptions about TOUR destinations that would be aligned with public-private collaboration, e-TOUR, knowledge-based TOUR, and others, rather than conventional TOUR (Jovicic 2019). Further, it was confirmed by Katircioglu et al. (2018) that the sustainable TOUR infrastructure can lead to better environmental quality which reduces the EFP on a global level. Moreover, sustainable TOUR marketing is considered the most suitable policy tool in preserving natural plants and wildlife of the country (Kiráľová 2019).

FDEV enhances countries' economic efficiency due to which their overall financial status improves. It also helps many undertakings of a country to boost such as FDIs, banks, and the stock market (Katircioglu 2014). An upsurge in FDEV broadens the scope of investments across the borders while providing a greater opportunity to use advanced technologies. On the other hand, FDEVs can impact the environment in many ways. Several previous researches have highlighted the effect of FDEV on EN_DEG (Pata 2018; Sarkodie and Strezov 2019) and have shown the negative impacts of FDEV on the environment (e.g., Abbasi and Riaz 2016; Park et al. 2018; Sadorsky, 2010; Sarkodie and Strezov 2019).

However, very few studies have been carried out linking FDEV and EFP. For example, FDEV was found to be positively related to EFP in Qatar (Charfeddine and Mrabet 2017). Likewise, Mrabet and Alsamara (2017) also found a positive relationship between FDEV and EFP in Qatar. Charfeddine and Mrabet (2017) found that EFP increases with the increase in FDEV activities. Yet, in one of the studies of Uddin et al. (2017) conducted on 27 countries, emitting the highest quantity of CO_2 showed that FDEV lessens EFP. Furthermore, Hafeez et al. (2018) argued that environmental problems can be inflated because of FDEV in the country. However, FD is also found to be positive in improving the environment of the country with the improvement in technological progress and research and development (Shahbaz et al. 2013). Supporting this, Baloch et al. (2019) argued that FDEV decreases EFP.

GLOB has been studied widely with different outcomes, positive as well as negative. Although GLOB is termed as an important factor in promoting the linkages politically, economically, and socially among different countries all over the world, however, due to trade flows, transfer of technology, FDIs, industrialization, and urbanization, it can have adverse impacts on countries' environment and atmosphere. According to Shahbaz et al. (2017), GLOB is transferring of

technology from developed to developing economies in the form of FDIs and imports while promoting division of labor and enhancing relative advantage of countries. However, it has been observed that besides an increase in economic development through different influences of GLOB, the environment is greatly affected by surging energy consumption.

The classical study of Grossman and Krueger (1991a, b) showed that free trade among economies can have a significant impact on the environment. Additionally, Managi and Jena (2008) examined the impact of trade liberalization on EN_DEG in some advanced and emerging nations. The study results showed that opening trade in these countries causes EN_DEG. In support, few other studies reported the negative impact of GLOB on the environment (Frankel, 2003; Shahbaz, 2013). A reverse relationship was reported between GLOB and carbon dioxide emissions in 15 countries by Lv and Xu (2018). Similarly, Shahbaz et al. (2017) investigated the effect of GLOB on CO_2 emissions in 25 developed countries, and the findings showed a positive impact. By further studying the literature, authors such as Doytch and Uctum (2016), Martens and Raza (2010), and Salahuddin et al. (2019) have found mixed results of the effect of GLOB on CO_2 emission. The findings vary according to the countries' global perspectives.

On the other hand, in the previous literature, the association between "globalization and EFP" has been studied scarcely. In one of the studies conducted by Rudolph and Figge (2017), a relationship between GLOB and the EFP was examined using the KOF index in 171 countries through panel data. The study findings confirmed that GLOB has a significant positive impact on EFP depending on the economic, social, and political aspects of GLOB. In a study conducted by Dreher and Gaston (2008), different environmental factors were studied such as "CO_2 emissions," "sulfur," water pollution, and "round wood" production. The results of the study, however, were found to be ambiguous and inconclusive. In another study of Sabir and Gorus (2019), it was examined that different dimensions of GLOB like a foreign direct investment, trade liberalization, and KOF index are positively and significantly associated with EFP. The study concludes that GLOB is responsible for increasing environmental degradation through unsustainable economic growth in South Asian countries. In the study of Ahmed et al. (2019), it was found out that GLOB is not a significant factor of EFP but it intensifies the ecological carbon footprint significantly.

The study further fills the gap as previously the influence of TOUR, FDEV, and GLOB on EFP was examined cumulatively, i.e., it was not analyzed according to the condition of the environment, whereas the prevailing study has identified the influence of the said variables according to the magnitude of the environment, i.e., whether the influence of TOUR, FDEV, and GLOB is at a high, moderate, or low level of EFP. QARDL is best suited for these types of multivariate evaluations especially when the influence of variables is required to be checked at different intensities of the environment.

Methodology

In order to examine the relationship of our variables used in this study (tourism, financial development, globalization, and EFP), we have employed the QARDL model given by Cho et al. (2015). This model is an extension of the ARDL model, which helps to investigate the potential asymmetries and nonlinearities between the tourism, financial development, globalization, and EFP. The QARDL model for our study is written as follows.

$$\begin{aligned} EFP_t = {} & \mu + \sum_{i=1}^{p} \sigma_{EFPi} EFP_{t-i} + \sum_{i=0}^{q} \sigma_{GDPi} GDP_{t-i} \\ & + \sum_{i=0}^{r} \sigma_{GDP^2 i} GDP^2{}_{t-i} + \sum_{i=0}^{s} \sigma_{\mathrm{FDEV}i} \mathrm{FDEV}_{t-i} \\ & + \sum_{i=0}^{U} \sigma_{TOURi} TOUR_{t-i} + \sum_{i=0}^{v} \sigma_{\mathrm{GLOB}i} \mathrm{GLOB}_{t-i} \\ & + \varepsilon_t \end{aligned} \tag{1}$$

Where ε_t is defined as error term indicated as $EFP_t - E[EFP_t/\omega_{t-1}]$ where ω_{t-1} is considered the smallest υ-field which is produced by EFP_t , GDP_t, GDP^2_t, $FDEV_t$, $TOUR_t$, $GLOB_t$, EFP_{t-1}, GDP_{t-1}, GDP^2_{t-1}, $FDEV_{t-1}$, $TOUR_{t-1}$, $GLOB_{t-1}\}$ and *p, q, r, s u and v* are lag orders stated by the Schwarz Information Criterion. We use *EFP*, *GDP*, GDP^2, *FDEV*, *TOUR*, and *GLOB* in Eq. 1 as ecological footprint, gross domestic product, the square of GDP, financial development, tourism, and globalization.

This Eq. 1 is extended as recommended by Cho et al. (2015), which further leads to the form of QARDL, given as follows:

QARDL (p,q,r,s,u,v) model:

$$\begin{aligned} Q_{\Delta \mathrm{EFP}_t} = {} & \mu(\tau) + \sum_{i=1}^{P} \sigma_{\mathrm{EFP}i}(\tau)\, EFP_{t-i} \\ & + \sum_{i=0}^{q} \sigma_{\mathrm{GDP}i}(\tau) GDP_{t-i} \\ & + \sum_{i=0}^{r} \sigma_{\mathrm{GDP}^2 i}(\tau) GDP^2{}_{t-i} \\ & + \sum_{i=0}^{s} \sigma_{\mathrm{FDEV}i}(\tau) FDEV_{t-i} \\ & + \sum_{i=0}^{U} \sigma_{\mathrm{TOUR}i}(\tau) TOUR_{t-i} \\ & + \sum_{i=0}^{v} \sigma_{\mathrm{GLOB}i}(\tau) GLOB_{t-i} + \varepsilon_t(\tau) \end{aligned} \tag{2}$$

Where, $\varepsilon_t(\tau) = EFP_t - Q_{EFP_t}\ (\ \tau/\delta_{t-1}\ )$ (Kim and White, 2003) and $0 > \tau < 1$ shows quantile. Further, the QARDL

Model in Eq. 2 is generalized as under because there might be some serial correlation in the error term.

$$\begin{aligned} Q_{\Delta EFP_t} = {} & \mu + \rho EFP_{t-1} + \pi_{GDP} GDP_{t-1} \\ & + \pi_{GDP^2} GDP^2{}_{t-1} + \pi_{\mathrm{FDEV}} FDEV_{t-1} \\ & + \pi_{TOUR} TOUR_{t-1} + \pi_{\mathrm{GLOB}} \mathrm{GLOB}_{t-1} \\ & + \sum_{i=1}^{P} \sigma_{EFP_i} \Delta EFP_{t-i} + \sum_{i=0}^{q} \sigma_{GDP_i} \Delta GDP_{t-i} \\ & + \sum_{i=0}^{r} \sigma_{GDP^2 i} \Delta GDP^2{}_{t-i} \\ & + \sum_{i=0}^{s} \sigma_{\mathrm{FDEV}_i} \Delta \mathrm{FDEV}_{t-i} \\ & + \sum_{i=0}^{U} \sigma_{TOUR_i} \Delta TOUR_{t-i} \\ & + \sum_{i=0}^{v} \sigma_{\mathrm{GLOB}_i} \Delta \mathrm{GLOB}_{t-i} + \varepsilon_t(\tau) \end{aligned} \quad (3)$$

By extending the above eq. 3, it can be further reformulated as per (Cho et al. 2015) to get the ECM of QARDL model given as follows:

$$\begin{aligned} Q_{\Delta EFP_t} = {} & \mu(\tau) + \rho(\tau)(EFP_{t-1} - \beta_{GDP}(\tau) GDP_{t-1} - \beta_{GDP^2}(\tau) GDP^2{}_{t-1} \\ & - \beta_{\mathrm{FDEV}}(\tau) \mathrm{FDEV}_{t-1} - \beta_{TOUR}(\tau) TOUR_{t-1} - \beta_{\mathrm{GLOB}}(\tau) \mathrm{GLOB}_{t-1}) \\ & + \sum_{i=1}^{P} \sigma_{EFP_i}(\tau) \Delta\, EFP_{t-i} + \sum_{i=0}^{q} \sigma_{GDP_i}(\tau) \Delta GDP_{t-i} \\ & + \sum_{i=0}^{r} \sigma_{GDP^2 i}(\tau) \Delta GDP^2{}_{t-i} + \sum_{i=0}^{s} \sigma_{\mathrm{FDEV}_i}(\tau) \Delta \mathrm{FDEV}_{t-i} \\ & + \sum_{i=0}^{U} \sigma_{TOUR_i}(\tau) \Delta TOUR_{t-i} + \sum_{i=0}^{v} \sigma_{\mathrm{GLOB}_i}(\tau) \Delta\, \mathrm{GLOB}_{t-i} + \varepsilon_t(\tau) \end{aligned} \quad (4)$$

We have used the delta method in order to measure the short-run impact of the previous EFP on recent EFP, and it is measured by $\sigma_* = \sum_{i=1}^{P} \sigma_{\mathrm{EFP}i}$, whereas the cumulative short-term impacts of recent and previous levels of GDP, GLOB, TOUR, GDP^2, and FDEV are measured by $\sigma_{\mathrm{GDP}_*} = \sum_{i=1}^{q} \sigma_{\mathrm{GDP}*}$, $\sigma_{\mathrm{GLOB}_*} = \sum_{i=1}^{v} \sigma_{\mathrm{GLOB}i}$, $\sigma_{\mathrm{TOUR}_*} = \sum_{i=1}^{u} \sigma_{\mathrm{TOUR}i}$, $\sigma_{\mathrm{GDP}^2{}_*} = \sum_{i=1}^{r} \sigma_{\mathrm{GDP}^2 i}$, and $\sigma_{\mathrm{FDEV}_*} = \sum_{i=1}^{s} \sigma_{\mathrm{FDEV}i}$. Furthermore, the long-run integrating parameter β for GDP, GLOB, TOUR, GDP^2, and FDEV is measured as

$$\begin{aligned} \beta_{\mathrm{GDP}*} = {} & -\frac{\beta_{\mathrm{GDP}}}{\rho}, \beta_{\mathrm{GLOB}*} = -\frac{\beta_{\mathrm{GLOB}}}{\rho}, \beta_{\mathrm{TOUR}*} \\ & = -\frac{\beta_{\mathrm{TOUR}}}{\rho}, \beta_{\mathrm{GDP}^2 *} = -\frac{\beta_{\mathrm{GDP}^2}}{\rho}, \beta_{\mathrm{FDEV}*} = -\frac{\beta_{\mathrm{FDEV}}}{\rho}. \end{aligned}$$

The conventional delta method is usually used to calculate the cumulative short-term and long-term parameters. ρ is the ECM parameter which should be negative. In this paper, we have used the Wald test in order to investigate statistically the short-run and long-run asymmetric influences of *GDP*, *GDP*^{2}, *FDEV*, *TOUR*, and *GLOB* on *EFP*. For e.g. considering ρ, the parameter for speed of adjustment, following is the null hypothesis, $\rho_*(0.05) = \rho_*(0.10) \ldots\ldots\ldots\ldots \rho_*(0.95)$. The same type of hypothesis is analyzed on β_{GDP}, β_{GLOB}, β_{TOUR}, β_{GDP^2}, and β_{FDEV} parameters and also on specific lags, i.e., σ_{EFP}, σ_{GDP}, σ_{GLOB}, σ_{TOUR}, $\sigma_{\mathrm{GDP}}{}^2$, and σ_{FDEV}, the short-term parameters.

Results

In this paper, we analyzed the impact of tourism, financial development, and globalization on EFP. Further EKC hypothesis with respect to Turkey was also analyzed. The annual data was used for analysis from the year 1986 to 2018 which was first converted into quarterly data by choosing the quadratic match sum method as applied by Sharif et al. (2019) and Shahbaz et al. (2018b). The data of TOUR was collected from the web site of Turkey's ministry of tourism and is measured in terms of no. of tourist arrival, GLOB is an index consists of political, economic and social globalization and was collected from KOF Swiss index, FDEV is the Domestic credit by Financial sector (% of GDP) whereas, GDP is per capita of GDP (constant US$) and the data source for FDEV and GDP is world Bank, finally, EFP is per capita of a global hectare (gha) and is collected from Global footprint network.

Table 1 shows the descriptive statistics of the variables used in this study, i.e., EFP, GDP, tourism, financial development, and globalization with respect to Turkey. All mean values of variables are found to be positive. Mean value for EFP is found to be 0.699 with minimum and maximum values of 0.526 and 0.854, respectively, GDP to be 2346.173 with minimum and maximum values of 1420.356 and 3767.514, tourism to be 4.318 with minimum and maximum values of 0.590 and 10.537, financial development to be 11.284 with minimum and maximum values of 4.808 and 19.533, and globalization to be 15.805 with minimum and maximum values of 12.026 and 18.723, respectively. The Jarque-Bera test results depict that the EFP, GDP, tourism, financial development, and globalization are not normally distributed at a 1% level of significance. The findings of Jarque-Bera confirmed the existence nonlinearity among the variables (Sharif et al.

Table 1 Results of descriptive statistics

Variables	EFP	GDP	TOUR	FDEV	GLOB
Mean	0.699	2346.173	4.318	11.284	15.805
Minimum	0.526	1420.356	0.590	4.808	12.026
Maximum	0.854	3767.514	10.537	19.533	18.723
Std. dev.	0.098	675.221	2.928	4.758	1.829
Skewness	0.030	0.692	0.447	0.422	− 0.426
Kurtosis	1.698	2.259	1.758	1.806	2.291
Jarque-Bera	9.344	13.560	12.874	11.759	6.769
Probability	0.009	0.001	0.002	0.003	0.034

Source: author estimation

2017; Sharif et al. 2018; Arain et al. 2020; Batool et al. 2019); Mishra et al. 2019. This implies that further analysis can be done through the QARDL model.

Table 2 shows the outcomes of the unit root test for which the ADF and the ZA test were utilized. The results of the ADF and ZA tests show whether data is stationary or not. Further, the structural break is also accounted for with the help of the ZA unit root test. In this study, all of the variables are not stationary at level but are stationary at the first difference, i.e., I (1). Table 3 shows the results of the QARDL model estimation for Turkey. The ρ parameter shows a significant relationship with a negative sign at the highest quantile ranges between 0.90 and 0.95. It depicts the parameter dependence of parameters. Further, the results represent the long-term relationship between independent variables (tourism, financial development, and globalization) and dependent variable (EFP) represented by β. GDP, in the outcome, shows that it is highly significant and negative at middle-high and high quantiles (i.e., (0.70–0.95), whereas GDP2 is significant but positive from quantile (0.60–0.95). So in the case of Turkey, we witnessed a U-shaped nexus between economic growth and EFP where at the beginning an upsurge in economic growth leads to the decline in EFP but, after a threshold stage, a further rise in GDP also deteriorates the environment. So here at high quantiles i.e. (0.70–0.95), further increases in the growth result in the decline of EFP, i.e. the condition of the environment improves. So here it shows the existence of the U-shaped EKC hypothesis in the case of Turkey. The outcomes are consistent with previous studies (e.g., Katircioğlu and Katircioğlu 2018).

TOUR is positive and significant at both the highest and lowest quantiles, i.e., 0.05–0.10 and 0.90–0.95, showing that tourist arrival in the country has a significant positive influence on the EFP of the country. However, when there is the low intensity of EFP, these tourists will further degrade the environment, but as the intensity of EFP increases, the effect of TOUR will become insignificant until EFP reaches the high intensity, i.e., 0.90–0.95, where the arrival of tourist will again deteriorate the environment. This finding indicates that as tourist arrival increases, the EFP is likely to increase which is aligned with the results of previous researches (e.g., Katircioğlu and Katircioğlu, 2018; Brandt and Buckley, 2018; Lin et al. 2018; Habibullah et al. 2016).

The result of FDEV shows that at a low or moderate intensity of EFP, the effect of FDEV is insignificant; however, FDEV is positive and significant at the higher quantiles, i.e., 0.80–0.95, showing that, at a high intensity of EFP, as financial development increases in the country, the EFP condition of that country deteriorates. These findings are aligned with the study of Hafeez et al. (2018), Charfeddine and Mrabet (2017), and Hafeez et al. (2018) in which financial development is one of the reasons for the increase in EN_DEG.

Lastly, GLOB depicts the same result as TOUR, i.e., it is also positively significant at both the lowest and the highest quantiles (i.e., 0.05–0.10 and 0.90–0.95), which indicate that with the global development, the EFP of the country is also disturbed, i.e., it will further deteriorate. It shows that when there is a low intensity of EFP, globalization will further degrade the environment, but as the intensity of EFP increases, the effect of globalization will become insignificant until EFP reaches the high intensity, i.e., 0.90–0.95, where the globalization will again deteriorate the environment. The findings are aligned with the results given by Rudolph and Figge (2017).

Further, the short-term dynamics show that the prevailing EFP changes are significantly and positively influenced from low to middle-high quantiles by their own previous levels in Turkey. The current and past changes in GDP negatively and significantly influence the current and previous variations in EFP at high quantiles, whereas current and past changes in GDP^2 positively and significantly influence the current and previous variations in EFP from the middle to high quantile in Turkey. The previous and recent variations in TOUR at high quantiles are found to be significant and negatively influencing current and previous changes in EFP in Turkey. FDEV and GLOB are found insignificant in the short run. Thus, the overall findings of the QARDL model suggest that tourism, financial development, globalization, and GDP are either positive or negative significant determinants of EFP either in the long-run or short-run with respect to Turkey.

Table 4 above shows the Wald test results of parameter dependency for both the long-run and short-run parameters.

Table 2 Results of unit root test

Variables	ADF (level)	ADF (Δ)	ZA (level)	Break year	ZA (Δ)	Break year
EFP	0.296	− 5.334***	− 1.053	2012 Q01	− 13.247***	2012 Q01
GDP	− 0.109	− 4.267***	− 1.245	2008 Q04	− 8.325***	2010 Q04
TOUR	− 1.236	− 4.893***	− 2.093	1996 Q01	− 5.998***	2006 Q04
FDEV	− 1.093	− 5.038***	− 1.275	2014 Q01	− 6.095***	2008 Q04
GLOB	0.147	− 6.093***	0.254	2017 Q02	− 10.245***	2012 Q03

The values in the table specify statistical values of the ADF and ZA test. The asterisk ***, **, and * represent the level of significance at 1%, 5%, and 10%, respectively

Table 3 Results of Quantile Autoregressive Distributed Lag (QARDL) for EFP

Quantiles (τ)	μ_* (τ)	ρ_* (τ)	β_{GDP} (τ)	β_{GDP^2} (τ)	β_{TOUR} (τ)	β_{FDEV} (τ)	β_{GLOB} (τ)	σ_{EFP}	σ_{GDP}	σ_{GDP^2}	σ_{TOUR}	σ_{FDEV}	σ_{GLOB}
0.05	−1.951*** (0.421)	0.852 (0.697)	−0.155 (0.260)	0.038 (0.344)	0.930*** (0.334)	0.243 (0.251)	0.408* (0.217)	−0.801** (0.394)	−0.009 (0.204)	0.004 (0.122)	−0.048 (0.225)	0.078 (0.377)	−0.032 (0.225)
0.10	−0.638** (0.305)	0.234 (0.188)	−0.110 (0.659)	0.366 (0.843)	0.536*** (0.151)	0.536 (0.666)	0.397** (0.122)	0.015 (0.218)	−0.104 (0.136)	0.130 (0.146)	−0.101 (0.198)	−0.008 (0.312)	−0.086 (0.166)
0.20	−0.331*** (0.084)	0.080 (0.083)	−0.214 (0.903)	1.018 (1.502)	0.734 (2.088)	0.173 (1.254)	0.516 (1.099)	0.146** (0.067)	−0.056 (0.116)	0.034 (0.086)	−0.081 (0.129)	−0.023 (0.139)	−0.071 (0.115)
0.30	−0.170** (0.073)	0.025 (0.056)	−0.144 (2.314)	2.692 (6.510)	0.958 (4.069)	−1.727 (4.590)	1.196 (2.923)	0.236*** (0.062)	−0.068 (0.105)	0.049 (0.079)	−0.114 (0.083)	0.056 (0.111)	−0.073 (0.109)
0.40	−0.064 (0.050)	0.024 (0.037)	−1.401 (2.611)	0.694 (2.792)	−0.393 (2.450)	−3.347 (5.298)	0.499 (2.464)	0.183*** (0.046)	−0.038 (0.081)	0.039 (0.069)	−0.089 (0.056)	0.064 (0.097)	−0.052 (0.102)
0.50	0.049 (0.045)	−0.006 (0.042)	−10.165 (79.108)	1.781 (14.051)	8.501 (76.629)	12.594 (92.884)	0.358 (8.481)	0.220*** (0.041)	−0.022 (0.059)	0.052 (0.058)	−0.055 (0.051)	0.031 (0.092)	−0.021 (0.109)
0.60	0.116*** (0.038)	−0.054 (0.043)	−1.073 (1.521)	0.421*** (0.124)	0.054 (0.836)	0.678 (0.962)	−0.354 (0.857)	0.229*** (0.042)	−0.054 (0.065)	0.086* (0.047)	−0.048 (0.051)	0.053 (0.083)	0.011 (0.119)
0.70	0.212*** (0.055)	−0.036 (0.036)	−2.147*** (0.415)	0.139*** (0.034)	1.295 (2.171)	0.506 (1.148)	0.530 (1.719)	0.177*** (0.054)	−0.002 (0.080)	0.124** (0.058)	−0.039 (0.065)	0.115 (0.104)	0.014 (0.111)
0.80	0.335*** (0.114)	−0.033 (0.066)	−1.933*** (0.402)	0.809*** (0.241)	3.064 (5.140)	0.716*** (0.210)	1.987 (6.887)	0.086 (0.101)	−0.091 (0.129)	0.152*** (0.069)	−0.018*** (0.006)	0.136 (0.123)	−0.010 (0.127)
0.90	0.957*** (0.216)	−0.395*** (0.141)	−1.323*** (0.396)	0.578*** (0.146)	0.867*** (0.289)	0.623** (0.276)	0.999** (0.444)	−0.079 (0.280)	−0.364* (0.189)	0.143*** (0.042)	−0.036*** (0.010)	0.148 (0.208)	−0.072 (0.157)
0.95	1.381*** (0.190)	−0.330** (0.160)	−0.868*** (0.282)	0.513*** (0.171)	0.750*** (0.221)	0.499* (0.254)	1.118* (0.375)	−0.382 (0.246)	−0.535** (0.227)	0.312*** (0.080)	−0.036*** (0.011)	0.230 (0.284)	0.101 (0.179)

The table reports the quantile estimation results. The *t*-statistics are between brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

Source: author estimations

This analysis allows testing parameter dependency across all quantiles. Moreover, the Wald test also checks the nonlinearities in long-run and short-run parameters for evaluating locational asymmetries (Cho et al. 2015). When we fail to reject the null hypothesis indicating the dependency of long-run and short-run parameters among the variables of interest across quantiles, it shows linear and symmetric relationships among the associations. Overall, the null hypothesis for ρ is rejected in the model. Further, the results of our study show that the Wald test rejects null hypotheses across all variables such as GDP, tourism, financial development, and globalization in long-run parameters. In the case of short-term parameters, the Wald test rejects the null hypothesis for all variables, i.e. EFP, TOUR, and GLOB, except for the GDP and financial development in which the Wald test fails to reject the null hypothesis. It shows that our exogenous variables, i.e., GDP, tourism, and globalization, along with the EFP, the dependent variable, depict nonlinear and asymmetric association; however, GDP, FEDV, and GDP^2 is found to be insignificant as per short-term dynamics of the Wald test.

Discussion

In previous studies a number of scholars have examined the determinants of EFP in Turkey, but the relationship of the variables used in this study has not yet been studied so far by keeping in view the QARDL methodology. This study entailed the various variables such as tourism, financial development, globalization, and GDP to measure EFP in Turkey. The time series data were analyzed from 1986 to 2018. At first, descriptive statistics were analyzed for all the variables along with the normality test through Jarque-Bera. The stationarity and non-stationary characteristics of variables were measured through ADF and ZA tests. Further, the long-term and short-term association between independent and dependent variables were determined by using the QARDL model at different levels of quantiles. Lastly, we have also employed the WALD test to check the parameter dependence of the constructs.

The findings of the QARDL are unique as compared with previous researchers as it offers the influence of FDEV, GLOB, and tourist arrivals on EFP according to the intensities of EFP. Outcomes reveal that tourism, globalization, and FDEV significantly impact the EFP in Turkey. All of these variables have a positive effect on EFP, i.e., in the case of tourism and globalization; it is at the lowest and highest intensity of EFP, i.e., 0.05–0.10 and 0.90–0.95, whereas in the case of FDEV, it is only at the highest intensity of EFP, i.e., 0.80–0.95. It shows that due to an increase in FDEV, GLOB, or tourist arrivals in the country, the EFP is also likely to increase. Further, all the null hypotheses across long-run parameters were rejected; however, for the short-run parameter, all null hypotheses were rejected except for financial development, GDP, and its square in which the WALD test fails to reject the null hypothesis.

Table 4 Results of the Wald test for the constancy of parameters

Variables	F statistics (*P* value)
ρ*	7.492*** [0.000]
β_{GDP}	11.539*** [0.000]
$\beta_{GDP}{}^2$	4.684*** [0.000]
β_{TOUR}	17.482*** [0.000]
β_{FDEV}	9.491*** [0.000]
β_{GLOB}	0.291 [0.982]
$\sigma GDP^2{}_0$	0.999 [0.513]
σEFP_1	2.290** [0.013]
σGDP_0	0.860 [0.568]
$\sigma TOUR_0$	7.039*** [0.000]
$\sigma FDEV_0$	0.510 [0.885]
$\sigma GLOB_0$	1.899** [0.049]

Source: authors' estimation

Conclusion and policy suggestions

The study fills the gap which was not addressed by previous researchers, i.e., earlier studies have shown the influence of TOUR, FDEV, and GLOB on EFP on a cumulative basis, whereas the prevailing study has identified the influence of said variables according to the magnitude of environment. The results of the study suggested that the variables used in this study are found to be possible determinants of EFP. Keeping in view the empirical results, the policymakers must invest in strategies to improve the tourist guides especially from those countries that are more responsible for increasing EN_DEG. The Turkish officials should take necessary actions in limiting energy consumption and its usage because of the fact that non-renewable energy consumption deteriorates environmental conditions. By limiting the usage of non-renewable energy, environmental conditions can be improved in the long-run. Renewable energy can be used to replace the consumption of fossil fuels. It is also observed that renewable energy is helpful in reducing the dependence on energy imports while improving environmental footprints (Kahia et al. 2017).

Further, ecosystems offer a broad range of beneficial services that enhance the standard of the human way of life and welfare. Their efficient administration is subsequently a crucial concern for avoiding the loss of species and habitats. Governing bodies and investors must emphasize on the activities that biodiversity assures for the social and economic advancement of the specific country along with the advancement of all nations in common. So the need to assess the services rendered by ecosystems is getting more apparent. Careful

control of natural capital and services furnished by ecosystems direct to enhanced economic and social sustainability both locally and globally (Nikolova and Jebril, 2019).

More precisely, it can be said that the TOUR industry must invest in those activities which may be beneficial both for the industry itself and the environment. By ignoring environment protection, the TOUR industry can lose its opportunities and true essence of recreational purpose. As far as GLOB is concerned, it is the result of actions and guidelines in numerous spheres (e.g., international finance, trade, communication, and transport,) and through various political scales (i.e., locally and globally). Hence, there is no sole area in which GLOB and its outcomes can be exclusively addressed. So with respect to GLOB, policymakers should take into consideration both social and economic associations more seriously when deliberating and addressing sustainable growth (Rudolph & Figge 2017). It was also found that in the case of Turkey, a U-shaped EKC hypothesis was valid, i.e., at the initial stage, an upsurge in economic growth leads to the improvement of the environment, but after a threshold stage, a further rise in GDP deteriorates the environment. This issue can be addressed by taking certain actions by creating awareness for the general public to use renewable energy resources in lieu of non-renewable energy. Moreover, an important finding was stated by Baloch et al. (2019) from the point of view of policymakers that FDEV can decrease EFP. So considering the negative role of FDEV in Turkey, it could be said that FDEV can play a vital role in encouraging people of Turkey to buy goods (e.g., automobiles, and washing machines) that consume less energy. As the financial sector plays an important role in providing funds for utilizing green technology and replacing the obsolete technology, it is required by the policymakers to adopt certain policies regarding public awareness so that people may use renewable energy products rather than adopting more energy consumption activities. By informing consumers about this possibility of consuming renewable energy, they are more likely to purchase energy-efficient and environment-friendly products. The above policies can be introduced in the curriculum of environment, renewable energy, and energy efficiency at school and university levels as well as by creating public awareness through broadcastings. This may improve the ecological footprint of the country in the long-run.

References

Abbasi F, Riaz K (2016) CO2 emissions and financial development in an emerging economy: an augmented VAR approach. Energy Policy 90:102–114

Ahmed Z, Wang Z, Mahmood F, Hafeez M, Ali N (2019) Does globalization increase the ecological footprint? Empirical evidence from Malaysia. Environ Sci Pollut Res 26(18):18565–18582. https://doi.org/10.1007/s11356-019-05224-9

Alola AA, Eluwole KK, Alola UV, Lasisi TT, Avci T (2019) Environmental quality and energy import dynamics: the tourism perspective of the coastline mediterranean countries (CMCs) 34

Akadiri SS, Lasisi TT, Uzuner G, Akadiri AC (2019) Examining the impact of globalization in the environmental Kuznets curve hypothesis: the case of tourist destination states. Environ Sci Pollut Res 26(12):12605–12615. https://doi.org/10.1007/s11356-019-04722-0

Akadiri SS, Lasisi TT, Uzuner G, Akadiri AC (2020) Examining the causal impacts of tourism, globalization, economic growth and carbon emissions in tourism island territories: bootstrap panel Granger causality analysis. Curr Issue Tour 23(4):470–484. https://doi.org/10.1080/13683500.2018.1539067

Anatasia V (2015) The causal relationship between GDP, exports, energy consumption, and CO2 in Thailand and Malaysia. Int J Econ Perspect 9:37–48

Aslan A, Destek MA, Okumus I (2018) Bootstrap rolling window estimation approach to analysis of the environment Kuznets curve hypothesis: evidence from the USA. Environ Sci Pollut Res 25(3):2402–2408

Arain H, Han L, Sharif A, Meo MS (2020) Investigating the effect of inbound tourism on FDI: the importance of quantile estimations. Tour Econ 26(4):682–703

Bakhat M, Rosselló J (2011) Estimation of tourism-induced electricity consumption: the case study of Balearics Islands, Spain. Energy Econ 33(3):437–444

Baloch MA, Zhang J, Iqbal K, Iqbal Z (2019) The effect of financial development on ecological footprint in BRI countries: evidence from panel data estimation. Environ Sci Pollut Res 26(6):6199–6208. https://doi.org/10.1007/s11356-018-3992-9

Batool R, Sharif A, Islam T, Zaman K, Shoukry AM, Sharkawy MA, Gani S, Aamir A, Hishan SS (2019) Green is clean: the role of ICT in resource management. Environ Sci Pollut Res 26(24):25341–25358

Becken S (2002) Analysing international tourist flows to estimate energy use associated with air travel. J Sustain Tour 10(2):114–131

Borhan HB, Ahmed EM (2012) Simultaneous model of pollution and income in Malaysia. Int J Econ Perspect 6(1):50–73

Bozkurt C, Akan Y, Okumus I (2016) Environmental Kuznets curve hypothesis. In: BRICTS: the role of tourism. Economic and Social Development, Book of Proceedings, pp 59–63

Brandt JS, Buckley RC (2018) A global systematic review of empirical evidence of ecotourism impacts on forests in biodiversity hotspots. Curr Opin Environ Sustain 32:112–118

Charfeddine L, Khediri KB (2016) Financial development and environmental quality in UAE: cointegration with structural breaks. Renew Sust Energ Rev 55:1322–1335

Charfeddine L, Mrabet Z (2017) The impact of economic development and social-political factors on ecological footprint: a panel data analysis for 15 MENA countries. Renew Sust Energ Rev 76:138–154

Cho JS, Kim T, Shin Y (2015) Quantile cointegration in the autoregressive distributed-lag modeling framework. J Econ 188(1):281–300

Costanza R (2000) The dynamics of the ecological footprint concept. Ecol Econ, 5

Destek MA, Sarkodie SA (2019) Investigation of environmental Kuznets curve for ecological footprint: the role of energy and financial development. Sci Total Environ 650:2483–2489

Dinda S (2004) Environmental Kuznets curve hypothesis: a survey. Ecol Econ 49(4):431–455

Dogan E, Seker F, Bulbul S (2017) Investigating the impacts of energy consumption, real GDP, tourism and trade on CO2 emissions by accounting for cross-sectional dependence: a panel study of OECD countries. Curr Issue Tour 20(16):1701–1719

Dogan E, Taspinar N, Gokmenoglu KK (2019) Determinants of ecological footprint in MINT countries. Energy Environ, 0958305X19834279

Doytch N, Uctum M (2016) Globalization and the environmental impact of sectoral FDI. Econ Syst 40(4):582–594

Dreher A, Gaston N (2008) Has globalization increased inequality? Rev Int Econ 16(3):516–536

Eluwole KK, Akadiri SS, Alola AA, Etokakpan MU (2020) Does the interaction between growth determinants a drive for global environmental sustainability? Evidence from world top 10 pollutant emissions countries. Sci Total Environ 705:135972. https://doi.org/10.1016/j.scitotenv.2019.135972

Erdogdu E (2010) Turkish support to Kyoto protocol: a reality or just an illusion. Renew Sust Energ Rev 14(3):1111–1117. https://doi.org/10.1016/j.rser.2009.10.020

Ewing BR, Hawkins TR, Wiedmann TO, Galli A, Ercin AE, Weinzettel J, Steen-Olsen K (2012) Integrating ecological and water footprint accounting in a multi-regional input–output framework. Ecol Indic 23:1–8

Frankel JA (2003) The environment and globalization. National Bureau of Economic Research

Glaesser D, Kester J, Paulose H, Alizadeh A, Valentin B (2017) Global travel patterns: an overview. J Travel Med, 24(4)

Godil DI, Sharif A, Agha H, Jermsittiparsert K (2020) The dynamic nonlinear influence of ICT, financial development, and institutional quality on CO2 emission in Pakistan: new insights from QARDL approach. Environ Sci Pollut Res 27:24190–24200

Gössling S, Peeters P, Hall CM, Ceron J-P, Dubois G, Scott D (2012) Tourism and water use: supply, demand, and security. An international review. Tour Manag 33(1):1–15

Grossman GM, Helpman E (1991) Trade, knowledge spillovers, and growth. Eur Econ Rev 35(2–3):517–526

Grossman GM, Krueger AB (1991a) Environmental impacts of a North American free trade agreement. National Bureau of Economic Research

Grossman GM, Krueger AB (1991b) Environmental impacts of a North American free trade agreement (no. w3914). Natl bur econ res, NBER working paper no. 3914. National Bureau of economic research, Cambridge

Habibullah MS, Din BH, Chong CW, Radam A (2016) Tourism and biodiversity loss: implications for business sustainability. Proc Econ Finance 35:166–172

Hafeez et al. (2018) Does globalization increase the ecological footprint? Empirical evidence from Malaysia | SpringerLink. https://link.springer.com/article/10.1007/s11356-019-05224-9

Hall CM, Gössling S (2013) Sustainable culinary systems: local foods, innovation, and tourism & hospitality. Routledge

Hassan ST, Xia E, Khan NH, Shah SMA (2019) Economic growth, natural resources, and ecological footprints: evidence from Pakistan. Environ Sci Pollut Res 26(3):2929–2938

Hill H (2008) Globalization, inequality, and local-level dynamics: Indonesia and the Philippines. Asian Econ Policy Rev 3(1):42–61

Istaiteyeh RMS (2016) Causality analysis between electricity consumption and real GDP: evidence from Jordan. Int J Econ Perspect 10(4):526–540

Jones A (2010) Globalization: Key thinkers (Vol. 1). Polity

Jovicic DZ (2019) From the traditional understanding of tourism destination to the smart tourism destination. Curr Issue Tour 22(3):276–282

Juan Z (2011) R&D for environmental innovation and supportive policy: the implications for new energy automobile industry in China. Energy Procedia 5:1003–1007

Jumadilova S (2012) The role of oil and gas sector for the economy of Kazakhstan. Int J Econ Perspect 6:295–303

Kahia M, Kadria M, Aissa MSB, Lanouar C (2017) Modelling the treatment effect of renewable energy policies on economic growth: evaluation from MENA countries. J Clean Prod 149:845–855. https://doi.org/10.1016/j.jclepro.2017.02.030

Kalayci S, Koksal C (2015) The relationship between China's airway freight in terms of carbon-dioxide emission and export volume. Int J Econ Perspect 9(4):60–68

Kapusuzoglu A (2014) Causality relationships between carbon dioxide emissions and economic growth: results from a multi-country study. Int J Econ Perspect 8(2):5–15

Karasoy A (2019) Drivers of carbon emissions in Turkey: considering asymmetric impacts. Environ Sci Pollut Res 26(9):9219–9231. https://doi.org/10.1007/s11356-019-04354-4

Katircioglu ST (2014) International tourism, energy consumption, and environmental pollution: the case of Turkey. Renew Sust Energ Rev 36:180–187

Katircioglu S (2017) Investigating the role of oil prices in the conventional EKCmodel: evidence from Turkey. Asian Econ Fin Rev 7(5):498–508

Katircioglu S, Gokmenoglu KK, Eren BM (2018) Testing the role of tourism development in ecological footprint quality: evidence from top 10 tourist destinations. Environ Sci Pollut Res 25(33):33611–33619

Katircioğlu S, Katircioğlu S (2018) Testing the role of urban development in the conventional environmental Kuznets curve: evidence from Turkey. Appl Econ Lett 25(11):741–746. https://doi.org/10.1080/13504851.2017.1361004

Katircioğlu ST (2014) Testing the tourism-induced EKC hypothesis: the case of Singapore. Econ Model 41:383–391

Kim TH, White H (2003) Estimation, inference, and specification testing for possibly misspecified quantile regression. Adv Econ 17:107–132

Kiráľová (2019) Sustainable tourism marketing strategy: competitive advantage of destination. In: Information Resources Management Association (USA) Sustainable tourism: breakthroughs in research and practice. IGI Global, pp 183–206

Kuznets S (1955) Economic growth and income inequality. Am Econ Rev 45(1):1–28

Lee JW, Brahmasrene T (2013) Investigating the influence of tourism on economic growth and carbon emissions: evidence from panel analysis of the European Union. Tour Manag 38:69–76

Lin W, Li Y, Li X, Xu D (2018) The dynamic analysis and evaluation on tourist ecological footprint of city: take Shanghai as an instance. Sustain Cities Soc 37:541–549

Lohmann G, Dredge D (2012) Tourism in Brazil: environment, management and segments. Routledge

Lv Z, Xu T (2018) Is economic globalization good or bad for the environmental quality? New evidence from dynamic heterogeneous panel models. Technol Forecast Soc Chang 137:340–343

Majeed MT, Mazhar M (2019) Financial development and ecological footprint: A global panel data analysis. Pakistan Journal of Commerce and Social Sciences (PJCSS) 13(2):487–514

Managi S, Jena PR (2008) Environmental productivity and Kuznets curve in India. Ecol Econ 65(2):432–440

Martens P, Raza M (2010) Is globalisation sustainable? Sustainability 2(1):280–293

Mishra S, Sinha A, Sharif A, Suki NM (2019) Dynamic linkages between tourism, transportation, growth and carbon emission in the USA: evidence from partial and multiple wavelet coherence. Curr Issue Tour:1–23. https://doi.org/10.1080/13683500.2019.1667965

Naradda Gamage SK, Hewa Kuruppuge R, Haq IU (2017) Energy consumption, tourism development, and environmental degradation in Sri Lanka. Energ Source Part B: Economics, Planning, and Policy 12(10):910–916

Mostafa MM (2010) A Bayesian approach to analyzing the ecological footprint of 140 nations. Ecol Indic 10(4):808–817

Mrabet Z, Alsamara M (2017) Testing the Kuznets curve hypothesis for Qatar: a comparison between carbon dioxide and ecological footprint. Renew Sust Energ Rev 70:1366–1375

Nikolova M, Jebril L (2019) The need to evaluate ecosystem benefits retrieved from https://www.researchgate.net/publication/332190261_THE_NEED_TO_EVALUATE_ECOSYSTEM_BENEFITS

Ozatac N, Gokmenoglu K, Taspinar N (2017) Testing the EKC hypothesis by considering trade openness, urbanization, and financial development: the case of Turkey. Environ Sci Pollut Res 24(20): 16690–16701

Ozcan B, Ari A (2017) Nuclear energy-economic growth nexus in OECD countries: a panel data analysis. Int J Econ Perspect 11(1):138–154

Ozturk I, Al-Mulali U (2015) Investigating the validity of the environmental Kuznets curve hypothesis in Cambodia. Ecol Indic 57:324–330

Ozturk I, Al-Mulali U, Saboori B (2016) Investigating the environmental Kuznets curve hypothesis: the role of tourism and ecological footprint. Environ Sci Pollut Res 23(2):1916–1928

Park Y, Meng F, Baloch MA (2018) The effect of ICT, financial development, growth, and trade openness on CO 2 emissions: an empirical analysis. Environ Sci Pollut Res 25(30):30708–30719

Pata UK (2018) Renewable energy consumption, urbanization, financial development, income and CO2 emissions in Turkey: testing EKC hypothesis with structural breaks. J Clean Prod 187:770–779

Pırnar I, Günlü E (2012) Destination management and quality-of-life. In M. Uysal, R. Perdue, & M. J. Sirgy (Eds.), Handbook of tourism and quality-of-life research: enhancing the lives of tourists and residents of host communities (pp. 529–545). Springer Netherlands. https://doi.org/10.1007/978-94-007-2288-0_31

Qureshi MI, Elashkar EE, Shoukry AM, Aamir A, Mahmood NHN, Rasli AM, Zaman K (2019) Measuring the ecological footprint of inbound and outbound tourists: evidence from a panel of 35 countries. Clean Techn Environ Policy 21(10):1949–1967. https://doi.org/10.1007/s10098-019-01720-1

Rudolph A, Figge L (2017) Determinants of ecological footprints: what is the role of globalization? Ecol Indic 81:348–361

Sabir S, Gorus MS (2019) The impact of globalization on ecological footprint: empirical evidence from the South Asian countries. Environ Sci Pollut Res 26(32):33387–33398. https://doi.org/10.1007/s11356-019-064

Sadorsky P (2010) The impact of financial development on energy consumption in emerging economies. Energy Policy 38(5):2528–2535

Saenz-de-Miera O, Rossello J (2014) Modeling tourism impacts on air pollution: the case study of PM10 in Mallorca. Tour Manag 40:273–281

Salahuddin M, Ali MI, Vink N, Gow J (2019) The effects of urbanization and globalization on CO 2 emissions: evidence from the Sub-Saharan Africa (SSA) countries. Environ Sci Pollut Res 26(3): 2699–2709

Sarkodie SA, Strezov V (2019) Effect of foreign direct investments, economic development and energy consumption on greenhouse gas emissions in developing countries. Sci Total Environ 646:862–871

Shahbaz M (2013) Does financial instability increase environmental degradation? Fresh evidence from Pakistan. Econ Model 33:537–544

Shahbaz M, Lahiani A, Abosedra S, Hammoudeh S (2018a) The role of globalization in energy consumption: a quantile cointegrating regression approach. Energy Econ 71:161–170

Shahbaz M, Zakaria M, Shahzad SJH, Mahalik MK (2018b) The energy consumption and economic growth nexus in top ten energy consuming countries: fresh evidence from using the quantile-on-quantile approach. Energy Econ 71:282–301

Shahbaz M, Khan S, Ali A, Bhattacharya M (2017) The impact of globalization on CO2 emissions in China. Singap Econ Rev 62(04):929–957

Shahbaz M, Shahzad SJH, Ahmad N, Alam S (2016) Financial development and environmental quality: the way forward. Energy Policy 98:353–364

Shahbaz M, Solarin SA, Mahmood H, Arouri M (2013) Does financial development reduce CO2 emissions in Malaysian economy? A time series analysis. Econ Model 35:145–152

Sharif A, Saha S, Loganathan N (2017) Does tourism sustain economic growth? Wavelet-based evidence from the United States. Tour Anal 22(4):467–482

Sharif A, Afshan S, Khan BS (2018) Does democracy embolden economic growth in Pakistan? Evidence from ARDL bound testing and rolling window analysis. Int J Econ Bus Res 15(2):180–203

Sharif A, Afshan S, Qureshi MA (2019) Idolization and ramification between globalization and ecological footprints: evidence from quantile-on-quantile approach. Environ Sci Pollut Res 26(11): 11191–11211. https://doi.org/10.1007/s11356-019-04351-7

Shin Y, Yu B, Greenwood-Nimmo M (2011) Modelling asymmetric cointegration and dynamic multipliers in a nonlinear ARDL framework. In Festschrift in honor of Peter Schmidt. Springer, New York, p 281–314

Solarin SA (2014) Tourist arrivals and macroeconomic determinants of CO2 emissions in Malaysia. Anatolia 25(2):228–241

Solarin SA, Al-Mulali U (2018) Influence of foreign direct investment on indicators of environmental degradation. Environ Sci Pollut Res 25(25):24845–24859

Tabatchnaia-Tamirisa N, Loke MK, Leung P, Tucker KA (1997) Energy and tourism in Hawaii. Ann Tour Res 24(2):390–401

Teixidó-Figueras J, Duro JA (2015) The building blocks of international ecological footprint inequality: a regression-based decomposition. Ecol Econ 118:30–39

Tovar C, Lockwood M (2008) Social impacts of tourism: an Australian regional case study. Int J Tour Res 10(4):365–378

Turkish Statistical Institute (2018) Greenhouse Gas Emissions Statistics, 2016. Retrieved August 8, 2018, from http://www.turkstat.gov.tr/PreHaberBultenleri.do;jsessionid=6h2ybpyZZPplp0972xtTsZXg9GBntVP2lSF3zKWTZ8T16hTlDJL1!1771578339?id=27675

Tutulmaz O (2015) Environmental Kuznets curve time series application for Turkey: why controversial results exist for similar models? Renew Sust Energ Rev 50:73–81

Uddin GA, Salahuddin M, Alam K, Gow J (2017) Ecological footprint and real income: panel data evidence from the 27 highest emitting countries. Ecol Indic 77:166–175. https://doi.org/10.1016/j.ecolind.2017.01.003

Ulucak R, Bilgili F (2018) A reinvestigation of EKC model by ecological footprint measurement for high, middle and low income countries. J Clean Prod 188:144–157

World Bank (2018) World Development Indicators. Retrieved January 17, 2020, from https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG

Xiao Z (2009) Quantile cointegrating regression. J Econ 150:248–260

Xuchao W, Priyadarsini R, Eang LS (2010) Benchmarking energy use and greenhouse gas emissions in Singapore's hotel industry. Energy Policy 38(8):4520–4527

Zee SML, Burford RL (2008) Explorations in estimation methodologies for a simplified model of residential demand for electricity with systematically varying coefficients. Int J Econ Perspect 2(2):94–103

Zhang L, Gao J (2016) Exploring the effects of international tourism on China's economic growth, energy consumption and environmental pollution: evidence from a regional panel analysis. Renew Sust Energ Rev 53:225–234