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Investigating the effect of inbound tourism on FDI: The importance of quantile estimations

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Abstract
The current study investigates the asymmetric effect of inbound tourism on foreign direct investment (FDI) in the world's top tourist destinations based on monthly data for the period between 1995 and 2017. The quantile-on-quantile (QQ) approach introduced by Sim and Zhou was adopted for this study, because it assesses how various quantiles of inbound tourism affect different quantiles of FDI. Thus, the QQ approach gives a more detailed explanation of the general dependence of inbound tourism and FDI than traditional approaches, such as ordinary least squares or quantile regression. Further, the test of Granger causality in quantiles proposed by Troster et al. was also applied in this study to check the causal relationship between inbound tourism and FDI. The empirical outcomes explain that the relationship between inbound tourism and FDI is mostly positive for all countries except Mexico and Russia on low and middle quantiles, although there are significant differences throughout the nations and across all quantiles of inbound tourism and FDI.

Keywords
FDI, Granger causality in quantiles, inbound tourism, quantile-on-quantile approach

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Introduction

Economic dynamics keep changing with the time, new directions, and ideas emerge as the fundamental pillar to boost the economic growth of the countries. In the last few decades, foreign direct investments (FDIs) have appeared to be a substantially beneficial source to enhance the economic growth in both developed and developing countries (Makiela and Ouattara, 2017). FDI plays a pivotal role to not only strengthen the technical knowledge and improve labor skills but also enhance the business opportunities and create employment in host countries in recent years (Pegkas, 2015; Rasheed et al., 2019). Global FDI in 2015 increased by 38% as compared to 2014 and reached 1.76 trillion US dollars, which is the highest level since the outbreak of the global financial crisis in 2008. However, global FDI totaled 1.2 trillion in 2018, down 19% year-on-year, the lowest level since 2009; expected to rebound in 2019 (UNCTAD, 2019a), whereas 80% of global trade is being completed through a global value chain led by multinational companies. The expansion of the global industrial chain of multinational corporations is achieved by FDI, and FDI has become an essential indicator of the global economy (UNCTAD, 2019b).

In the international literature, various factors found, which affect FDI. For example, Iamsiraroj (2016) examined the causal relationship between economic growth and FDI. Castellani et al. (2016) indicated that market size, population density, human capital, wages, and per capita gross domestic product (GDP) are significant determinants of FDI in a country. Bekhet and Al-Smadi (2015) studied the effect of financial development, economic openness, inflation, and GDP on FDI. Villaverde and Maza (2015) investigated the impact of competitiveness, labor regulation, technological progress, labor market characteristics, and economic potentials on FDI. Lucke and Eichler (2016) used institutional quality, education, population, inflation, trade openness, infrastructure, and natural resources as determinants of FDI. Moreover, Tang et al. (2007) found a positive relationship between tourism and FDI. Yazdi et al. (2017) explored the relationship between tourism and FDI. They found that the tourism sector should be given priority regarding its effect on FDI. However, the current study used tourism as a significant determinant of FDI, because there are scarce studies on the relationship between tourism and FDI.

Concerning that, the relationship between tourism and FDI has recently become a hot research topic. The available literature presents different dimensions of the dependency between these two components of the economy (Bezić and Radić, 2017; Fereidouni and Al-mulali, 2012; Li et al., 2018; Tang et al., 2007; Yazdi et al., 2017). Samimi et al. (2017) found that tourism leads to FDI and acts as an engine of economic growth. Tomohara (2016) explored the relationship between tourism and FDI using dynamic panel models. The findings of the study confirmed that inbound tourism enhances the FDI of Japan. Moreover, various studies concluded that an increase in tourism leads to a rise in tourism-related FDI, such as improvement in infrastructure, in tourism facilities, in transportation, and in accommodation. Increasing tourism means an increase in economic growth through FDI (Katircioglu, 2011; Selvanathan et al., 2012). Thus, tourism has a mutually positive relationship with FDI. However, the effect of tourism is not only limited to tourism-led FDI. On the contrary, tourism affects FDI as a whole.

Hence, this study aims to investigate the relationship between tourism and FDI in the top tourist destination countries. Since these previous studies have an obvious flaw in the phase of the econometric techniques (that discussed below in the literature). Furthermore, the previous studies used time-series methodologies and that have unable to quantify the precise dependency relationship between tourism arrivals and FDI inflows at lower and higher quantiles of the time-series data. Additionally, most of the research on tourism-FDI modeling assumes a linear relationship

between tourism and FDI. However, there are various issues with linear models. For example, structural breaks and short-term volatilities cannot be accommodated using linear econometrical models (Po and Huang, 2008). Anoruo (2011) warned that in the practical life, macroeconomic variables behave nonlinear, while the linear econometrical models force macroeconomic variables to be linear, which leads to misleading results. However, other studies showed a nonlinear relationship between FDI and macroeconomic variables (Ali et al., 2018; Ucal et al., 2016). Moreover, Mishra et al. (2019), Sharif et al. (2019), and Smeral (2012) found that tourism also shows asymmetric behave. Therefore, the traditional time-series–driven cointegration approach may mislead the government and policymakers of the high tourism consuming nations, particularly at the time of tourism and FDI policymaking. This situation gives rise to a research question that, what type of dependence for most of the tourist destinations we have when we examine the relationship trend on both lower and higher quantile of data set? There is a scope to reevaluate the tourism-FDI relationship by employing advance estimation techniques, which is the main contribution of this study other than giving policy guidelines to the top tourist destination countries. In this vein, the present study contributes to the literature of tourism and FDI in three ways. The first we consider the importance of nonlinearity and dependency pattern between tourism and FDI of top 10 tourist countries by employing quantile-on-quantile (QQ) method recently introduced by Sim and Zhou (2015). This technique caters for structural breaks in data, performs well in the nonlinear/asymmetric environment, and examines the relationship between lower and high quantiles of series. It can investigate all these effects as it incorporates distribution-to-distribution changes, which have not been explored so far (Saidi et al., 2017; Shahzad et al., 2017; Sharif et al., 2019). Our second, novelty originates from having top 10 popular tourists destination countries within a time series framework, that is, China, Russia, the United States, Spain, Mexico, Italy, Germany, France, Turkey, and the United Kingdom. The world's international tourist arrivals in these countries accounted for 50.6 million.[1] To the best of author's knowledge, no previous work has employed the QQ framework to investigate tourism and FDI relation. The analysis results can provide useful insight to guide policymakers to devise tourism-FDI friendly policies and increase both tourism and FDI for sustainable economic growth in top 10 tourism consuming nations. Third innovation of this article uses the Granger causality in quantiles test suggested by Troster et al. (2018) to examine the causal connection in all quantiles of the conditional distribution. Another objective is to investigate a causal relationship on the quantiles of the conditional distribution. By applying this methodology, we can differentiate among the causality influencing the tails of the distribution and the median. Also, it gives an adequate situation for Granger causality when all quantiles are focused. Moreover, the methodology of Troster et al. (2018) is reliable over a range of quantiles, and it focuses on the nonlinear condition in a quantile regression model.

The trend of tourism in selected top 10 countries

In 2017, France received nearly 89 million foreign tourists, which accounted for 8% of the total GDP and provided about 2 million fixed jobs (WTTC, 2018). Mexico's tourism economy grew by USD21.3 billion during 2017, thus becoming the third largest source of development of the Mexican economy and an essential source of employment and social welfare (OECD, 2018). The data indicate that tourism increased by 1.7% in Germany in 2017. China saw an increase in tourism by 9.8%, the United Kingdom by 6.2%, and Spain[2] by 7% in 2017. It implies that Germany is lagging behind other countries in promoting tourism (Makarov, 2018). Tourism is a pillar industry and an economic indicator for Turkey. Since 2017, with the improvement of the security situation,

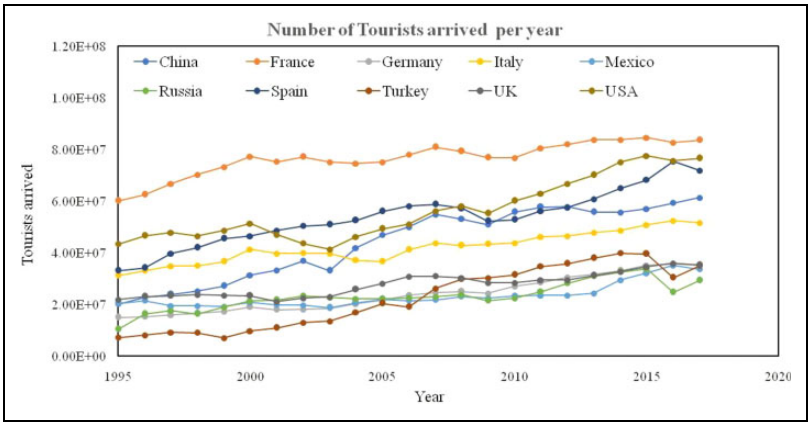

Figure 1. Trend of tourist arrivals.

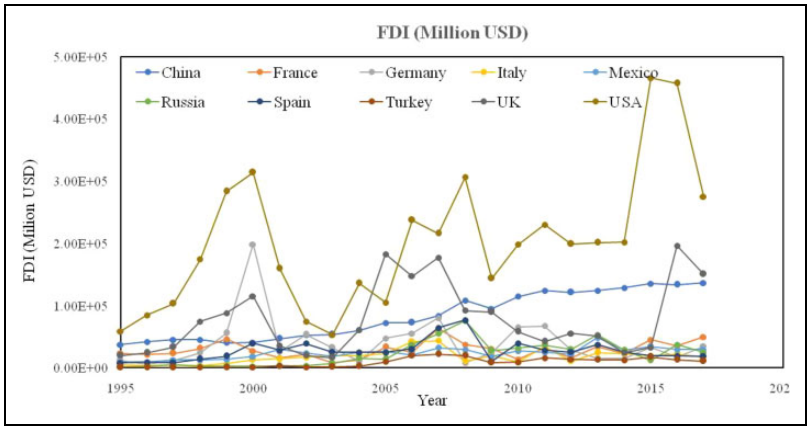

Figure 2. Trend of inward FDI. FDI: foreign direct investment.

the tourism industry has shown signs of recovery with annual tourism revenue of US$26.3 billion in Turkey (WTTC, 2018). However, according to the National Tourism Administration, the number of international tourists in the United States in 2017 fell sharply by 4%. Part of the reason is that many potential foreign visitors are resentful of the current political environment and Trump politics (WTTC, 2018). The Russian tourism industry increased by 3.2% with 4.8% GDP growth in 2017 (WTTC, 2018). Figures 1 and 2 present the trend of tourism arrivals and FDI inflows in the selected economies.

The analysis of this empirical study reveals that tourism enhancement increase FDI in the host countries. In this respect, in few states, such as France, Germany, Italy, the United Kingdom, and the United States, the most prominent relationship among tourism activities and FDI inflows were observed merely during the time of deep economic recession. However, the negative nexus between tourism and FDI is noticed in some quantiles for China, Russia, Mexico, Spain, and Turkey, possibly because of the limited direct impact of tourism to the particular markets of these

mentioned countries. Therefore, various vital policies should be implemented to enhance tourism lead FDI relationship.

The rest of the article is organized as follows: The second section provides a thorough analysis of the existing literature. The third section presents the methodology of the QQ framework, followed by presenting the empirical results and their discussion in the fourth section. The final fifth section concludes the study with some recommendations.

Literature review

Tourism is an industry with a high degree of marketization and broad prospects for development. Its high input and output ratio is exceptionally beneficial to attracting FDI. Tourism and FDI interlinkage has been a hot research topic. Lately, there are various theoretical and empirical studies. At present, the scale of tourism has increased year by year in developed and developing countries (Endo, 2006; Subbarao, 2008). FDI improves tourism in any host country in that the investments coming from outside provide the boost to services associated with tourism and increase its capacity. This is a direct result of activities involving building more hotels and tourist spot, including theme parks. It also improved transport facilities accommodate more tourists and the circuit eventually increasing tourism activity (Craigwell and Moore, 2007; Sharif et al., 2017).

Various empirical studies discussed the FDI-tourism relationship with other economic determinants. For example, Fereidouni and Al-Mulali (2012) examined the FDI in the real estate sector and international tourism in selected countries of the Organisation for Economic Co-operation and Development (OECD). The findings suggest that bidirectional causal relationship existed between tourism and FDI in real estate. Moreover, Garcia-Flores et al. (2008) examined the relationship between FDI, tourism growth, and environment during the period of 1982–2007. The results indicate that FDI and tourism growth have a positive relationship. Tang et al. (2007) conducted an empirical study on the causal relationship between FDI, economic growth, and tourism by employing error correction method throughout 1970–2005 in China. The findings specified that unidirectional causality runs from FDI to tourism. This means that FDI attraction leads to growth in the tourism industry in China. Similarly, Chen (2010) investigated the FDI influence in China's tourism sector by considering the inequality in the process of development in the inland region and across the coastal areas during the period between 1978 and 2008. The findings indicate that FDI affects the tourism industry in the coastal area more than inland. Because of political interactions and FDI inflows, more tourism growth and economic development have been achieved in the coastal zone. Heri Bezić and Maja Nikšić Radić (2017) evaluated the causal relationship between FDI in tourism and tourism gross value added in Croatia between 2000 and 2001 and between 2012 and 2004. Results show that all variables are cointegrated and have a long-run relationship. Similarly, Yazdi et al. (2017) studied the relationship between FDI and tourism in European countries between 1995 and 2014. The results indicate that FDI shows a tremendous impact on the expansion of tourism in European countries. The relationship between FDI and the tourism sector has been the subject of many studies in different countries around the world.

Furthermore, few researchers investigated the impact of tourism on FDI. Selvanathan et al. (2012) examined the dynamic relationship between the tourism sector and FDI in India by using quarterly statistics data and the vector autoregression model during 1995–2007. The findings revealed that there is a unidirectional causality association from FDI to tourism. Furthermore, the same study explained that this unidirectional causality association is because FDI attraction led to faster growth in international tourism during the last decade in the economy of India. Tomohara

(2016) claimed that in Japan, tourism leads to an increase in FDI tourism sector. Yazdi et al. (2017) examined the relationship among tourism, FDI, and economic growth in Iran between 1985 and 2013 by using autoregressive distributed lag (ARDL) and the error correction model (ECM). The study shows that FDI has a significant impact on tourism growth in developing countries' economies. However, Chen (2017) found that the tourism sector not only enhances the tourism-sector-related FDI but also increases FDI other than tourism sectors. Tomohara (2016) carried a panel study and found that tourism leads to an increase in FDI.

Furthermore, some scholars considered tourism and FDI modeling in a nonlinear framework. Ketteni and Kottaridi (2019) found a nonlinear relationship between FDI and other macroeconomic variables. Ali et al. (2018) analyzed the nonlinear relationship between economic growth and FDI using nonlinear ARDL model. Fareed et al. (2018) found a nonlinear relationship between tourism, terrorism, and economic growth in Thailand. Meo et al. (2018) and Sharif et al. (2017) also found that there is a nonlinear relationship between tourism and macroeconomic variables in Pakistan. Kahniman and Tversky (1979) highlighted the importance of asymmetries and found that it is common that human behavior involves nonlinearity. Bildirici and Turkmen (2015) found that nonlinear models have higher power than linear econometrical models. Therefore, the relationship between tourism and economic variables as a nonlinear has also found in the literature.

However, after a careful survey of the literature, it was found that previous research studies ignored the nonlinear relationship between tourism and FDI. Katrakilidis and Trachanas (2012), Raza et al. (2016), and Sharif et al. (2019) claimed that ignoring intrinsic nonlinearities leads to misleading outcomes. However, keeping in mind the importance of the asymmetries, this study is carried in a nonlinear framework. Based on the literature review, it has confirmed that this is the first study employing QQ approach and the Granger causality in quantiles test to check the asymmetric effect of inbound tourism and FDI inflows in top 10 tourist destinations. Therefore, the present study formulates the following hypothesis between tourism and FDI.

H_0: There is no nonlinear relationship between tourism and FDI at lower and higher quantiles in the top ten tourist destinations.

H_1: There is a nonlinear relationship between tourism and FDI at lower and higher quantiles in the top ten tourist destinations.

Methodology

The QQ method newly suggested by Sim and Zhou (2015) is explained below along with model specifications. The QQ technique is a more general form of standard quantile regression. This technique allows for exploring the effect of a quantile variable over the other conditional quantile variable. These methods combine the quantile regression and nonparametric estimations. They employ quantile regression to examine the effects of one parameter of dependent variables' different quantiles.

Koenker and Bassett (1978) proposed a regression method based on the conditional distribution of the explanatory variables. They considered the classical linear regression to be a linear relationship between limited mean and independent variables of fitted dependent variables. However, the quantile regression was performed by estimating the dependent variable by taking different quantiles. Compared with the ordinary least squares estimation, the quantile regression model has four advantages: (1) it is especially suitable for models with heteroscedasticity; (2) the

characterization of conditional distribution is more detailed, and the parameter estimates given under different quantile points may also have further significance; (3) the quantile regression does not require strong distribution hypothesis, in the case of random perturbation nonnormal distribution quantile. The regression estimator may be more efficient than the least squares estimator; and (4) the estimator is not susceptible to outliers and is, therefore, more robust. The quantile regression method in panel data combines the advantages of a panel data model and the quantile regression. On the one hand, it can effectively use time and cross-sectional data to increase data variability, thus reducing multicollinearity between variables. Also, having a higher degree of freedom makes the parameter estimation of the model more reliable. On the other hand, it can make a comprehensive characterization of each level of the data and can find some information difficult to see in the mean regression.

In the present study, the QQ approach is proposed to analyze the contribution of FDI inflows to the growth of the tourism industry of a country using quantiles of variables. The basis of this approach is the nonparametric quantile regression model.

$$\mathrm{FDI}_t = \beta^{\theta}(\mathrm{TOUR}_t) + u_t^{\theta} \tag{1}$$

where FDI_t denotes the FDI inflows (USD millions) of a country at period t, TOUR_t represents the tourism arrivals in a country at given period t, θ is the θth quantile of the conditional distribution growth of FDI inflows, and u_t^{θ} is the quantile residual term whose conditional θth quantile is supposed to have zero value. $\beta^{\theta}(\cdot)$ is not known because no a priori information on interlinkages between tourism and FDI is available.

These quantile regression methods help to analyze the empirical effects of the FDI growth across different quantiles of tourism arrivals for the world's top 10 tourist destinations. This regression technique is flexible, because it evaluates the functional dependence between FDI and tourism in the countries under study. The main benefit of the specification is its flexibility, because no previous hypothesis exists regarding the functional relationship between FDI and tourism growth. However, the quantile regression cannot capture the dependence between these two variables in their entirety, which is a limitation of this analysis. In this regard, the quantile regression model does not incorporate the behavior of tourism shock and its effect on tourism and economic growth. Such is the case of massive positive tourism shock and small-posited tourism shock, which may have very different outcomes. Also, the asymmetric impact of FDI can react positive as well as negative tourism arrival shocks.

In that case, to determine the link between the q_{th} quantile of FDI inflows and the t_{th} quantile of tourism arrival specified by TOUR_t, equation (1) is investigated in the neighborhood of TOUR_t, by using local linear regression. Thus $\beta^{\theta}(\cdot)$ is unknown, and this method is estimated by first-order Taylor expansion near a quantile TOUR_t, for example:

$$\beta^{\theta}(\mathrm{TOUR}_t) \approx \beta^{\theta}(\mathrm{TOUR}^T) + \beta^{\theta'}(\mathrm{TOUR}^T)(\mathrm{TOUR}_t - \mathrm{TOUR}^T) \tag{2}$$

where $\beta^{\theta'}$ is the partial derivative of $\beta^{\theta}(\mathrm{TOUR}_t)$ for TOUR, characterized it as a response as well as a marginal effect. However, it emulates a similar explanation to the slope coefficient in a linear regression framework model. The main characteristic of equation (2) is that it recognizes the θ and τ both as double indexed and that parameters are indicated as $\beta^{\theta}(\mathrm{TOUR}_t)$ and $\beta^{\theta'}(\mathrm{TOUR}_t)$. Furthermore, $\beta^{\theta}(\mathrm{TOUR}_t)$ and $\beta^{\theta'}(\mathrm{TOUR}_t)$ as a function of τ, therefore, it confirms that both $\beta^{\theta}(\mathrm{TOUR}_t)$ and

$\beta^{\theta'}(\mathrm{TOUR}_t)$ are a function of θ and τ. Besides, $\beta^{\theta}(\mathrm{TOUR}_t)$ and $\beta^{\theta'}(\mathrm{TOUR}_t)$ can be affirmed as $\beta_0(\theta, \tau)$ and $\beta_1(\theta, \tau)$, respectively. According to that, equation (2) is represented as follows:

$$\beta^{\theta}(TOUR_t) \approx \beta_0(\theta,\tau) + \beta_1(\theta,\tau)(TOUR_t - TOUR^T) \tag{3}$$

By substituting equation (3), equation (4) is obtained, which is represented as follows:

$$\mathrm{FDI}_t = \underbrace{\beta_0(\theta,\ \tau) + \beta_1(\theta,\ \tau)(\mathrm{TOUR}_t - \mathrm{TOUR}^{\tau})}_{(*)} + u_t^{\theta} \tag{4}$$

As depicted in equation (4), the part (*) shows q_h conditional quantile function of FDI inflows. In contrary to the standard conditional quantile function, this formula reflects the interlinkage between the θth quantile of FDI inflows and the θth quantile of tourism arrivals growth due to the double index of β_0 and β_1 in θ and τ. These variables may change with changing the quantile value of FDI and quantile value of tourism. There is no linear relation considered between these variables. Hence, it is inferred that equation (4) depicts the overall link between FDI inflows and tourism arrivals through their distributions.

Estimating equation (4) required to replace TOUR_t and TOUR^{τ} with their estimated counterpart $\widehat{\mathrm{Tour}}_t$ and $\widehat{\mathrm{TOUR}}^{\tau}$ in that order. The linear regression solves for variables b_0 and b_1 by obtaining a solution to the following optimization problem:

$$\min_{b_0,\ b_1} \sum_{i=1}^{n} \rho\theta[\mathrm{FDI}_t - b_0 - b_1(\widehat{\mathrm{TOUR}}_t - \widehat{\mathrm{TOUR}}^{\tau})] \times K\left(\frac{F_n(\widehat{\mathrm{TOUR}}_t) - \tau}{h}\right) \tag{5}$$

where $\rho\theta(u)$ is the quantile loss function, specified as $\rho\theta(u) = u\Big(\theta - I(u < 0)\Big)$ and I stands for the common indicator function. $K(\cdot)$ represents the kernel method, and h is the bandwidth parameter of the kernel method. The widely used Gaussian kernel method is the most simple computational and efficient in the field of applied economics and for the financial applications, and it is used to evaluate the observations in the neighborhood of TOUR^{τ}.

The Gaussian distribution is symmetric with zero mean and low variance, so it assigns less value to observation farther away. In the present study, these values are inversely proportional to the distance between the empirical distribution of tourism and the corresponding quantile of tourism. The nonparametric estimation method analysis makes the bandwidth choice highly critical. Since the bandwidth method usually indicates the neighborhood size near the target point, therefore bandwidth controls the smoothness of the estimated results. More specific, a larger bandwidth in estimations shows a stronger bias, while smaller bandwidth indicates the high variance in evaluations. Hence, for the present study, the bandwidth choice is highly significant, because it mostly produces balance among bias and variance. A bandwidth parameter $h = 0.05$ is used for this study by following Sim and Zhou (2015).

Data analysis and discussion

The dataset in this study consists of two variables, that is, FDI inflows (million USD) and tourism arrivals in numbers (millions). For this empirical study, quarterly time-series data are used for the most visited tourist countries (China, the United States, Russia, Spain, Mexico, Italy, Germany, France, Turkey, and the United Kingdom) for the period between 1995Q1 and 2017Q4, that is, 224 total observations quarterly. The yearly data have taken from UNCTAD database.

Table 1. Results of descriptive statistics.

	Mean	Minimum	Maximum	Standard deviation	Jarque–Bera	Probability
Panel A: tourist arrivals						
China	43,898,652	18,276,877	62,039,199	13,725,732	30.351	0.000
France	76,430,609	59,475,972	84,768,934	6,490,130	48.969	0.000
Germany	23,802,196	14,763,150	35,602,734	6,842,465	23.667	0.000
Italy	41,808,391	30,143,711	52,505,819	5,931,736	9.603	0.008
Russia	23,188,043	18,506,378	35,322,649	4,656,265	109.429	0.000
Mexico	22,969,174	6,212,145	35,271,233	5,415,313	23.145	0.208
Spain	53,547,261	32,632,299	75,897,604	10,663,473	0.708	0.702
Turkey	22,283,935	6,687,134	41,096,375	11,763,638	28.287	0.000
United Kingdom	27,553,261	20,806,115	35,926,441	4,534,661	17.986	0.000
United States	56,306,630	40,814,786	77,777,724	11,693,776	28.959	0.000
Panel B: foreign direct investment						
China	83,241.8	35,396.3	1,38,836.9	36,751.7	31.905	0.000
France	29,178.0	6562.0	66,417.6	13,343.1	26.817	0.000
Germany	40,186.6	2.7	211,620.4	40,730.0	949.063	0.000
Italy	17,863.4	3422.3	48,941.8	11,107.0	37.471	0.000
Russia	23,767.1	8680.8	50,523.6	9104.0	13.636	0.001
Mexico	22,322.5	1953.3	80,044.6	20,339.0	39.277	0.000
Spain	27,798.4	4650.4	84,796.2	16,721.0	161.113	0.000
Turkey	8758.0	531.5	22,410.8	7300.4	23.242	0.000
United Kingdom	77,792.8	3322.8	213,062.8	57,730.4	35.877	0.000
United States	203,369.9	44,316.7	506,934.9	112,301.3	34.716	0.000

Source: authors' estimation.

The annual data are transformed into quarter series with the help of quadratic match sum method. This method adjusts seasonal variations in data by reducing point-to-point variations when data are transformed from low to high frequency (Cheng et al., 2012; Sbia et al., 2014; Shahbaz et al., 2017). This quadratic match sum method is also advantageous because of its easy application (Shahbaz et al., 2017). The descriptive statistics of the FDI and tourism data for each country for the whole sample period are presented in Table 1.

Descriptive statistics

The results of both variables growth in all countries show positive mean value. The highest tourism growth is observed in France (76.43 million), which varies across 59.47 million to 84.76 million, which indicates that France is a highly attractive tourist destination with a range of 59.47 million to 84.76 million. Similarly, the mean value of the United States and Spain is also high at 56.30 million that fluctuate from 40.81 million to 777.77 million. China and Italy also have a high rate of tourism, with growth values are 43.89 million and 41.80 million, respectively. In contrast, Mexico, Turkey, the United Kingdom, and Germany show the lowest mean values 22.96 million, 22.28 million, 27.55 million, and 23.80 million, respectively.

Table 2. Results of correlation analysis.

Countries	Correlation	Probability
China	0.823	0.000
France	0.882	0.000
Germany	0.969	0.000
Italy	0.860	0.000
Russia	0.892	0.000
Mexico	0.901	0.000
Spain	0.921	0.000
Turkey	0.910	0.000
United Kingdom	0.953	0.000
United States	0.972	0.000

Source: authors estimation.

Concerning FDI inflows, the United States shows the highest FDI inflows 203,369.9 million, followed by China 83,241.8 million, the United Kingdom 77,792.8 million, and Germany 40,186.6 million. It means that during the last 25 years, China, the United Kingdom, and Germany had the highest FDI inflows. While the lowest FDI inflows are noted in Turkey (8758.0 million) that varies from 531.5 million to 22,410.8 million. The value of standard deviation for Spain also shows volatile FDI inflows 27,798.4 million, followed by Mexico 22,322.5 million and Russia 23,767.1 million. The Jarque–Bera statistics test is also showing significant in all countries for the departure of normality in tourism arrival, except for Spain, where tourism arrival has distributed normally.

Correlation coefficients

The correlation coefficients' value shows that the FDI and tourism arrivals are correlated and highly positive among all the selected countries. The United States found highly correlated with 0.972, followed by Germany (0.969), the United Kingdom (0.953), Spain (0.921), Turkey (0.910), and Mexico (0.901). The correlated value is relatively high in Russia (0.892), Italy (0.860), France (0.882), and China (0.823). These findings imply that FDI inflows and tourism arrivals in all the countries are correlated highly. These correlation figures are statistically significant as these p values are less than 0.01 and signify 1% of significance. The correlation values have importance in statistical terms. Since p value of correlation coefficients is less than 1%. Table 2 represents the correlation coefficients among FDI inflows and tourism arrival for all the countries.

Quantile unit root test

The null hypothesis is that $H_o = \beta(\pi) = 1$ in equation (1) for the entire grid of five quantiles including [0.05, 0.25, 0.50, 0.75, to 0.95]. The results of the quantile unit root test explain that tourism and FDI are nonstationary at a 5% level of significance for all quantiles of the conditional distribution. The empirical results of the quantile unit root test confirm that variables, that is, tourism and FDI, are nonstationary at a 5% level of significance for the highest quantiles of conditional distribution in all countries. Table 3 presents the outcomes of the quantile unit root test.

Table 3. Quantile unit root test.

	China				France				Germany				Italy				Mexico			
	TOR		FDI		TOR		FDI		TOR		FDI		TOR		FDI		TOR		FDI	
Quantile	$\alpha(\tau)$	*t*-stats	$\alpha(\tau)$	*t*-stats	$\alpha(\tau)$	*t*-stats	$\alpha(\tau)$	*t*-stats	$\alpha(\tau)$	*t*-stats	$\alpha(\tau)$	*t*-stats	$\alpha(\tau)$	*t*-stats	$\alpha(\tau)$	*t*-stats	$\alpha(\tau)$	*t*-stats	$\alpha(\tau)$	*t*-stats
0.05	1.001	0.058	0.971	−0.128	0.922	−1.559	0.988	−0.292	0.972	−0.583	0.9925	−0.114	0.980	−0.369	0.978	−0.250	0.973	−1.748	1.001	0.674
0.10	1.001	0.174	0.979	−0.166	1.010	0.379	0.989	−0.354	0.979	−2.027	1.0013	0.031	0.985	−1.619	0.984	−0.824	0.986	−2.446	1.000	0.904
0.15	0.998	−1.298	0.972	−0.865	1.000	0.012	0.988	−2.252	0.980	−2.383	0.996	−0.375	0.990	−1.950	0.995	−0.362	0.986	−2.044	1.000	1.274
0.20	0.998	−1.343	0.968	−2.582	0.991	−1.007	0.990	−2.435	0.978	−2.564	0.994	−0.724	0.988	−2.059	0.995	−0.503	0.983	−1.979	1.000	1.594
0.25	0.999	−0.740	0.969	−2.516	0.989	−1.559	0.992	−2.569	0.979	−2.595	0.9973	−0.423	0.987	−2.170	0.991	−0.951	0.991	−2.206	1.000	1.889
0.30	1.000	−0.447	0.974	−2.390	0.985	−1.916	0.993	−2.582	0.979	−2.355	0.9975	−0.474	0.991	−1.846	0.991	−1.304	0.994	−2.153	0.998	1.613
0.35	0.999	−0.618	0.983	−2.135	0.987	−1.474	0.997	−1.513	0.980	−1.808	0.9977	−0.666	0.993	−1.569	0.989	−1.668	0.995	−2.104	0.999	1.267
0.40	0.999	−1.241	0.985	−2.011	0.986	−1.703	0.997	−1.540	0.980	−2.209	0.9976	−1.205	0.994	−1.852	0.990	−1.970	0.995	−1.770	0.999	0.845
0.45	0.999	−1.665	0.986	−2.232	0.985	−1.801	0.997	−1.430	0.980	−2.318	0.9973	−2.340	0.995	−1.794	0.989	−2.249	0.995	−2.001	0.999	0.219
0.50	0.999	−1.754	0.986	−2.259	0.985	−1.575	0.997	−1.134	0.980	−2.374	0.9972	−2.593	0.995	−1.918	0.989	−2.380	0.995	−2.006	0.998	−0.707
0.55	0.998	−1.936	0.986	−2.484	0.984	−1.929	0.998	−1.158	0.981	−2.358	0.9972	−2.194	0.994	−2.434	0.989	−2.251	0.995	−1.757	0.997	−1.506
0.60	0.998	−1.463	0.984	−2.482	0.983	−1.604	0.998	−1.050	0.981	−1.135	0.9971	−1.277	0.989	−2.001	0.988	−1.974	0.995	−2.071	0.996	−1.561
0.65	0.998	−1.312	0.978	−2.351	0.982	−1.291	0.996	−1.488	0.982	−1.445	0.9949	−1.252	0.990	−1.906	0.988	−1.705	0.995	−2.394	0.993	−1.954
0.70	0.998	−2.199	0.974	−2.393	0.979	−1.914	0.997	−1.068	0.982	−1.507	0.9948	−0.954	0.988	−1.957	0.988	−1.887	0.995	−2.199	0.992	−1.025
0.75	0.998	−2.296	0.964	−2.570	0.974	−2.265	0.997	−0.833	0.983	−1.852	0.9957	−0.580	0.987	−2.204	0.989	−1.549	0.993	−2.279	0.990	−0.687
0.80	0.998	−2.023	0.945	−1.409	0.960	−1.981	1.001	0.404	0.983	−1.669	0.9942	−0.719	0.990	−1.955	0.988	−1.159	0.984	−2.333	0.986	−0.458
0.85	0.998	−0.670	0.934	−1.137	0.958	−1.474	1.005	1.759	0.980	−2.439	0.9883	−1.295	0.993	−1.879	0.989	−0.694	0.983	−2.215	0.966	−0.682
0.90	0.999	−0.115	0.924	−0.807	0.979	−0.475	1.004	0.154	0.973	−1.973	0.9774	−0.773	0.984	−0.803	0.996	−0.137	0.982	−0.974	0.888	−1.976
0.95	0.991	−0.690	0.864	−1.057	0.981	−0.280	1.000	−0.010	0.969	−0.668	0.9725	−0.439	0.980	−0.551	0.950	−0.398	0.984	−0.674	0.760	−1.957

Quantile	Russia				Spain				Turkey				UK				USA			
0.05	1.003	0.066	0.984	−0.241	0.975	−0.638	0.978	−0.393	0.977	−0.439	1.001	0.014	0.970	−0.736	0.952	−0.631	1.010	0.331	0.985	−0.090
0.10	1.002	0.215	0.985	−1.460	0.994	−0.740	0.990	−1.390	0.976	−1.174	1.018	0.354	0.975	−1.000	0.957	−1.454	1.009	0.746	0.993	−0.410
0.15	1.002	1.913	0.990	−1.515	0.994	−0.854	0.990	−2.075	0.979	−1.996	1.000	−0.010	0.975	−1.141	0.965	−1.895	1.004	1.118	0.991	−0.545
0.20	1.002	0.915	0.993	−1.025	0.995	−0.972	0.992	−2.273	0.977	−2.084	1.000	0.048	0.976	−1.200	0.962	−1.842	0.999	−0.224	0.992	−0.659
0.25	1.001	0.842	0.990	−1.449	0.995	−1.003	0.997	−1.458	0.980	−1.989	1.002	0.182	0.977	−1.947	0.959	−1.481	0.997	−0.904	0.992	−0.731
0.30	1.001	0.608	0.993	−1.206	0.995	−1.211	0.997	−1.510	0.983	−1.709	1.002	0.290	0.977	−1.814	0.967	−1.659	0.996	−1.679	0.994	−1.063
0.35	1.000	0.106	0.994	−1.205	0.996	−1.188	0.997	−1.581	0.986	−1.760	1.003	0.560	0.985	−2.360	0.985	−1.838	0.996	−1.762	0.994	−1.463
0.40	1.000	−0.199	0.995	−1.846	0.997	−1.583	0.997	−1.785	0.989	−1.938	0.997	−0.632	0.993	−1.986	0.989	−2.011	0.996	−2.115	0.993	−1.707
0.45	0.997	−1.151	0.995	−1.986	0.998	−1.328	0.998	−2.482	0.989	−2.192	0.995	−1.031	0.996	−2.290	0.990	−1.870	0.996	−2.204	0.993	−1.986
0.50	0.997	−1.418	0.995	−2.321	0.999	−0.400	0.998	−2.421	0.987	−2.094	0.995	−0.936	0.996	−1.624	0.991	−2.434	0.995	−1.890	0.993	−1.540

(continued)

Table 3. (continued)

	China				France				Germany				Italy				Mexico			
	TOR		FDI		TOR		FDI		TOR		FDI		TOR		FDI		TOR		FDI	
Quantile	$\alpha(\tau)$	*t*-stats	$\alpha(\tau)$	*t*-stats	$\alpha(\tau)$	*t*-stats	$\alpha(\tau)$	*t*-stats	$\alpha(\tau)$	*t*-stats	$\alpha(\tau)$	*t*-stats	$\alpha(\tau)$	*t*-stats	$\alpha(\tau)$	*t*-stats	$\alpha(\tau)$	*t*-stats	$\alpha(\tau)$	*t*-stats
0.55	0.996	−1.522	0.995	−2.187	1.000	−0.183	0.998	−2.122	0.983	−2.499	0.993	−1.132	0.996	−1.315	0.991	−2.343	0.994	−1.564	0.993	−1.789
0.60	0.996	−2.485	0.995	−2.153	1.001	0.245	0.998	−2.079	0.981	−2.467	0.990	−2.053	0.996	−1.638	0.993	−2.247	0.994	−1.977	0.993	−2.192
0.65	0.998	−1.172	0.995	−1.640	1.000	−0.156	0.998	−1.408	0.973	−2.470	0.987	−2.253	0.996	−1.667	0.992	−1.989	0.993	−1.798	0.993	−2.461
0.70	0.998	−0.590	0.994	−1.172	0.998	−0.557	0.998	−1.285	0.969	−2.103	0.986	−2.437	0.989	−1.639	0.987	−2.507	0.993	−1.569	0.992	−1.392
0.75	0.995	−0.977	0.993	−1.040	0.998	−0.474	0.998	−0.552	0.970	−2.349	0.977	−2.140	0.988	−1.644	0.986	−2.490	0.992	−1.599	0.991	−1.123
0.80	0.991	−1.027	1.001	0.136	0.994	−1.456	0.998	−0.270	0.970	−1.941	0.975	−2.211	0.987	−1.705	0.984	−2.266	0.986	−2.143	0.987	−1.108
0.85	0.975	−2.363	1.002	0.192	0.995	−1.109	1.001	0.096	0.971	−1.702	0.978	−2.004	0.991	−2.249	0.973	−2.066	0.982	−2.099	0.984	−1.052
0.90	0.960	−1.002	0.990	−0.503	0.999	−0.064	0.986	−0.939	0.971	−1.961	0.974	−0.370	0.993	−0.364	0.965	−0.788	0.984	−0.671	0.970	−1.083
0.95	0.934	−1.242	0.972	−0.294	0.999	−0.023	0.996	−0.187	0.966	−1.010	0.974	−0.236	0.994	−0.159	0.945	−0.826	0.976	−0.819	0.934	−0.597

Source: authors' estimation.

Note: TOR: tourist arrivals; FDI: foreign direct investment.

Table 4. Quantile cointegration test results.

Model	Coefficient	$\text{Sup}_\tau \lvert V_n(\tau)\rvert$	CV1	CV5	CV10
China					
FDI_t versus TOR_t	β	65,457.201	59,468.472	58,405.398	57,856.934
	γ	2565.968	1588.426	1556.705	1540.242
France					
FDI_t versus TOR_t	β	8137.248	5392.375	4431.084	3954.339
	γ	185.836	107.637	55.920	41.219
Germany					
FDI_t versus TOR_t	β	4485.929	3788.256	2452.830	2054.072
	γ	128.927	107.886	64.067	51.567
Italy					
FDI_t versus TOR_t	β	6486.235	3329.038	2514.601	2054.622
	γ	185.719	84.179	59.668	52.727
Mexico					
FDI_t versus TOR_t	β	41,726.074	36,747.502	35,608.314	35,087.671
	γ	1193.947	1003.952	975.479	967.592
Russia					
FDI_t versus TOR_t	β	33818.945	23371.383	22679.330	21848.225
	γ	993.672	646.612	588.503	564.427
Spain					
FDI_t versus TOR_t	β	77197.930	65989.222	57169.076	47647.052
	γ	5746.855	5422.017	2503.122	2104.861
Turkey					
FDI_t versus TOR_t	β	2938.212	2268.543	1974.792	1734.655
	γ	251.276	163.480	133.851	105.088
United Kingdom					
FDI_t versus TOR_t	β	3463.561	2740.086	2084.019	1688.804
	γ	317.806	261.875	198.947	128.176
United States					
FDI_t versus TOR_t	β	7552.786	4938.142	3972.859	2643.357
	γ	673.394	396.853	225.181	170.100

It displays the persistence values represented by $\beta(\pi)$ and the *t*-statistics of tourism and FDI for top 10 tourist destinations

Quantile cointegration

The quantile co-integration analysis introduced by Xiao (2009) was utilized here to rectify that the cointegration association between tourism and FDI fluctuates over the quantile distribution. Table 4 displays the results of the quantile cointegration for all countries. It indicates that a supremum norm value of β and α coefficients and CV1, CV5, and CV10 are the critical values of statistical significance at 1, 5, and 10%, respectively. In Table 4, it is found that supremum norm value β and α coefficients are greater than all the critical values at 1, 5, and 10% levels of significance, which indicates that there is a significant long run relationship between tourism and FDI. The empirical results confirm the presence of a nonlinear long-run relationship between tourism and FDI in top 10 tourist destinations.

QQ regression

The empirical findings of QQ analysis for tourism and FDI are presented for the world's different tourist destinations. Figure 3 displays the plots of the slope coefficient $\beta_1(\theta, \tau)$, as shown in equation (1). This parameter depicts the effect of ascertaining quantile of tourism and another specific quantile of FDI for different values for the said tourist destinations. These plots imply the inherent trend, the interaction between these two independent variables, and their effect on the slope coefficient. The scale shown on the right side with a color range from blue to red indicates the value of the slope coefficient with blue being the lowest and red being the highest value.

Some direct inferences can be drawn from these graphs at a glance, which is detailed below. Afterward, discussion on country-specific plots is presented. The relationship between tourism and FDI is mostly positive over the range of quantiles of both variables for all countries. These findings are consistent with the recent literature and confirmed that tourism and FDI have a positive relationship; countries can acquire more FDI inflows with the arrival of tourists (such as Bezić and Radić, 2017; Endo, 2006; Fereidouni and Al-Mulali, 2012). This implies that the interaction between the two variables is proportional. The trend of the slope coefficient is nonzero.

Moreover, a flat behavior for most of the countries is shown for the middle part of the graphs. This stationery behavior is not present for some exceptions, which are shown for France, etc. The variation and trends or the heterogeneity present in these graphs for different countries may be attributed to the significant differences across these nations regarding the relative importance of tourism and the other outstanding playing economic variables, which affect the FDI, tourism, and the overall economy. Another significant observation with the most pronounced effect is observed in the extreme values of quantiles or the edges of the graphs. These regions show the highest and the lowest values of slope coefficient generally. This signifies that the culmination of FDI and tourism have both interacted with each other in a positive or negative sense for slope coefficient value. In this section, a discussion on the graphs for different countries is presented.

For China, the QQ relation for slope coefficients is on the lower side around zero or negative for most of the quantile. The highest value acres are on lower quantiles for both FDI and tourism, and the magnitude for the slope coefficient is just 0.3 less than unity. This implies that tourism and FDI in China are not well interrelated according to the data. China tourism industry shows unbalanced, because most of the development is made in coastal regions, not in the inland regions. The coastal region achieved more growth in tourism and economic development by political interference and more FDI inflows. Although there is a more natural beauty in the inland zone, the government paid less attention to it (Chen, 2010).

In the case of France, the slope coefficient has a higher value for the lower quartile of tourism. This trend is consistent for all quantile range of FDI. The slope coefficients are minimum and flat for quantiles of tourism ranging from 0.2 to 0.7 for all range of quantile of FDI. After that, the graph shows the peak of the highest values of tourism and FDI. An interesting inference can be concluded from this behavior is that for a broad range of tourism quantiles, the slope coefficient is flat depicting change. Lower quantiles of tourism have high slope coefficient, but here FDI plays no part and, the graph is again unchanging for all quantile range. The value of high slope coefficient is achieved with the most upper quantiles of both tourism and FDI.

For Germany, the trend is high and flat for increasing the value of both tourism and FDI. The visually attaches over 15 and remains above 8 for most of the graph; the coefficient value takes a dip at the high end of tourism quantile and lower value of FDI. It signifies that the variables have a high level of interaction for most quantiles, and it is generally consistent.

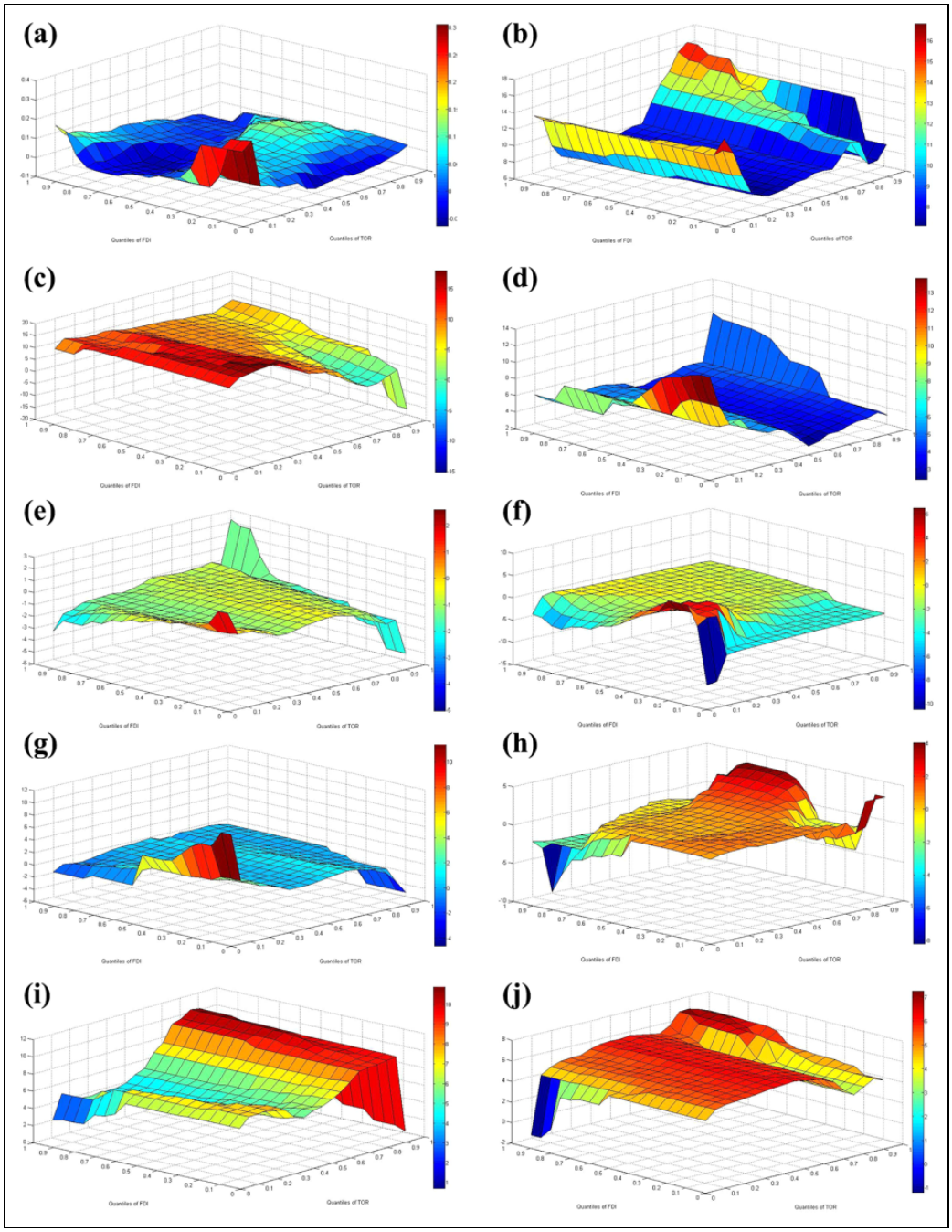

Figure 3. QQ estimates of slope coefficient, $\hat{\beta}_1(\theta, \tau)$: (a) China, (b) France, (c) Germany, (d) Italy, (e) Mexico, (f) Russia, (g) Spain, (h) Turkey, (i) United Kingdom, and (j) the United States. The graphs show the estimates of the slope coefficient $\beta_1(\theta, \tau)$ in the *z*-axis against the quantiles of FDI in the *y*-axis and the quantiles of tourist arrivals in the *x*-axis. QQ: quantile-on-quantile; FDI: foreign direct investment.

For Italy, the graph is again flat for quantile values of tourism greater than 0.5, and it is unaffected by FDI quantiles in this region. The slope coefficient value remains around 3–5 in this region. Some high hilly trend is observed for high quantile values of both tourism and FDI at the farthest corner of the graph. However, a significantly high-value region is observed for lower values of both tourism and FDI, where the slope coefficient value reaches a maximum of the graph around 113. It can be concluded that the graph is majorly flat and unchanging with low interlinkage between tourism and FDI with occasional peaks of high interlinkage value.

In the case of Mexico, the graph is flat and attains lower values around zero. It has a peak value on the lower quantile range of both tourism and FDI, which is around 2 for the slope coefficient. Otherwise, it stays around zero or negative. This implies that FDI and tourism are largely independent for the case of Mexico, and even their interlinkage is negative as observed for gathered data. For the instance of Russia, the trend for slope coefficient is mostly flat and less than zero. It has a negative dip for the lower quartile of tourism and FDI. A negative region is also observed for all quantiles of quantiles with lower quantiles of FDI. A somewhat similar trend is also observed for quantiles of FDI for lower quantiles of tourism.

For Spain, the graph is mostly flat, showing a peak at low quantiles of tourism and FDI. The slope coefficient shows a dip toward high quantile of tourism. For Turkey, the slope coefficient graph is flat in the middle region of the quantile range. It shows a dip for lower quantile range of tourism and a high quantile range of FDI. A hilly trend is observed for high quantile range of tourism and middle quantile range of FDI. The peak value attained is around 4, whereas the lowest value is -8. The flatbed has a slope coefficient value of approximately 1.

The United Kingdom shows an increasing trend with tourism quantile range for slope coefficient data. This trend is almost constant for all range of FDIs, except at the high end of quantile range, where a dip is observed for slope coefficient plot. The graph attains the highest value of around 10 and the lowest value of 1.

For the United States, the graph of the slope coefficient is largely flat with high values for most of the quantile range. The maximum value attained is around 7. The lowest values occur at high quantile of FDI and lower quantiles of tourism around -1. The graph shows a positive, strong relation of tourism and FDI for most of the quantile ranges as depicted by the flat red area of the graph. Therefore, FDI policy should improve tourism efficiency, and others must be consistent with economic growth in the discussed countries. The citizens of these countries travel a lot, and they invest in travel destinations regarding sustaining existing infrastructure and building more (Işik, 2015).

Granger causality in quantiles

The Granger causality in quantiles test is also applied in this research. The test D_T is used over an equivalent grid of 19 quantiles, that is, [0.05, 0.15, 0.25, 0.35, 0.50, 0.65, 0.75, 0.85, to 0.95]. In all selected top 10 tourist destinations, the results of Table 5 show that the fluctuation in inbound tourism does Granger cause an increase in FDI at the 1% level of significance for all distribution quantiles. However, based on the significance value, it is found that FDI does Granger cause inbound tourism at the 1% level of significance. In general, a bidirectional causal relationship is found from inbound tourism and FDI in all distribution quantiles. The results of Granger causality in quantiles are presented in Table 5, which contains the significance value of D_T test for log series.

Table 5. Granger causality in quantile test results.

	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95
China																			
ΔTOR_t to ΔFDI_t	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ΔFDI_t to ΔTOR_t	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.759	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
France																			
ΔTOR_t to ΔFDI_t	0.528	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ΔFDI_t to ΔTOR_t	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Germany																			
ΔTOR_t to ΔFDI_t	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ΔFDI_t to ΔTOR_t	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.931	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Italy																			
ΔTOR_t to ΔFDI_t	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.829	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ΔFDI_t to ΔTOR_t	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.639	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mexico																			
ΔTOR_t to ΔFDI_t	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.255	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ΔFDI_t to ΔTOR_t	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.468	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Russia																			
ΔTOR_t to ΔFDI_t	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.949	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ΔFDI_t to ΔTOR_t	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.657	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Spain																			
ΔTOR_t to ΔFDI_t	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.042	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ΔFDI_t to ΔTOR_t	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.801	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Turkey																			
ΔTOR_t to ΔFDI_t	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.236	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ΔFDI_t to ΔTOR_t	0.759	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.065
United Kingdom																			
ΔTOR_t to ΔFDI_t	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.287	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ΔFDI_t to ΔTOR_t	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.954	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
United States																			
ΔTOR_t to ΔFDI_t	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.588	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ΔFDI_t to ΔTOR_t	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Source: authors' estimations.
Note: TOR: tourist arrivals; FDI: foreign direct investment.

Conclusion and recommendations

This research explores the asymmetric empirical relationship between tourism and inbound FDI for the world's top 10 tourist destinations using the QQ methodology proposed by Sim and Zhou (2015). This methodology provides details on how quantiles of tourism affect the quantiles of FDI and give information on the interlinkage between these two variables for a more precise and accurate manner. Our empirical findings show that the tourism and FDI relationship is mostly positive for all the countries, while every state has vast differences with others in quantile ranges of tourism and FDI. The difference trend in countries for the tourism and FDI relationship may be explained in terms of the difference in the volume of the tourism industry and the overall economic condition of the country. The scope of each economy, its production capacity, local business in the tourism industry, and any adverse external factors may attribute to this nexus. In specific, the negative link between tourism and FDI is noticed in some quantiles for China, Russia, Mexico, Spain, and Turkey, possibly because of the limited direct impact of tourism to the particular markets of these mentioned countries. Moreover, the noticeable difference across the quantiles of tourism and FDI specifies that the tourism-FDI association is not smooth; however, it depends on the level of the business cycle and also the size and sign of tourism shocks. In this respect, in few countries, such as France, Germany, Italy, the United Kingdom, and the United States, the most prominent relationship among tourism activities and FDI inflows were observed merely during the time of deep economic recession. Therefore, higher inbound tourism can ensure both infrastructural and institutional infrastructure of the host country, which finally plays a pivotal role in attracting FDI in any country. Finally, the results of the study can plan a significant role to the policymakers, such as government, regulators, and investors to take the vital measurement for increasing the positive nexus between tourism and FDI.

The finding of this work suggests several fundamental theoretical implications for policymakers. Such as, the tourism and FDI policy should be in coherence with the economic phase of a country. For example, tourism-friendly strategies may be more fruitful in attracting FDI during the period of the economic recession of a country. The plans should include such initiatives as the government's support for trade shows, exhibitions, and tourism websites maintenance, including cultural and heritage sites. Further actions include the government incentives and subsidy for foreign investors to bring their country's tourism potential and establish sources for these countries ecotourism. Implementation with the salary and leave system encourages agencies, groups, enterprises, and institutions to guide employees to arrange annual vacation time flexible. Moreover, there is a need to devise a national support policy for small- and medium-sized enterprises and small- and microenterprises. The implementation of the market-oriented operation focusing on large investment demand and integrated construction of tourism projects with excellent benefits and exemplary functions. These countries need to establish tourism industry funds. All localities should innovate tourism investment and investment methods, focus on and selectively promote the construction of tourism projects, and improve the national tourism investment project information system and national tourism investment statistics.

Furthermore, various practical policies need to encourage vigorously the creation of domestic tourism and leisure infrastructure and to strengthen the organization and development of domestic tourism and leisure products. It is necessary to increase policy support and gradually increase capital investment in the construction of tourism and leisure public service facilities. Besides, it is necessary to encourage social forces to invest in the development of tourism and leisure facilities and develop special tourism and leisure routes and quality tourism and leisure products. Hence, the

governments of these countries need to encourage tourism infrastructure (such as star hotels) and transport facilities and create new tourist attraction (such as theme parks, beach resorts, and historical museum) that will help to attract more tourism and also bring opportunities of FDI in the host countries. Additionally, it is necessary to strengthen the construction of the central and western regions, connect the construction of scenic roads, parking lots, tourist toilets, etc., and regulate the five contents of the tourism market price and business order.

Limitations of the study

Since the existence of a higher correlation between tourism and FDI in these countries, the policy should consider this aspect as a vital resource in increasing tourism led FDI. However, this study has some limitations, which help to provide a scope for future research in this field. Since, in this study, the data are collected from the top 10 popular tourist countries to treat the hypothesis, in the future, it may be taken from developing and fast-growing nations and should explore the dynamics of tourism and FDI in those countries with different outcomes by using a multivariate time-series method. Moreover, this work has taken aggregate FDI in a country for analysis purpose. In the future, FDI in a particular domain may also be analyzed with tourism, such as for residential, commercial, and industrial areas. Hence, this research also suggests that there is more room for further exploration in this unchartered domain of tourism–FDI nexus.

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Notes

1. These data are, for the year 2018, taken from the US World Bank Statistics.
2. These data are, for the year 2018, taken from the US World Bank Statistics.

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