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The impact of the economic policy uncertainty and geopolitical risks on tourism demand of Mexico

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Abstract. *The aim of this study is to determine the effects of geopolitical risk, representing macropolitical factors that may affect number of inbound tourists, and economic policy uncertainty, representing macro-level events, and exchange rates, on inbound tourists to Mexico over the period January 1996 - December 2018 by using Fourier ARDL and Fourier Toda Yamamoto causality tests. The ARDL analysis showed that inbound tourists to Mexico decrease in the long-run as economic policy uncertainty increases and increase in the long-run as geopolitical risk and real exchange rates increase. Causality tests revealed unidirectional causality running from economic policy uncertainty to inbound tourists.*

Keywords: Mexico, international tourist arrivals, geopolitical risk, economic policy uncertainty.

JEL Classification: C32, D81, Z32.

Introduction

Tourism has been a fast-growing global industry. With the increase of household welfare in emerging economies such as Brazil, Russia, India, China and South Africa (BRICS), and with the faster circulation of locational knowledge, intensified word-of-mouth through electronic means and, more and more people have been engaging in transnational tourism. A recent report states that the number of international tourist arrivals worldwide reached 1.4 billion in 2018, and the global tourism exports have been growing at higher rates than the merchandise exports in the last seven years (WEF, 2019). The industry accounted for 10.4% of the global Gross Domestic Product (GDP) and 10% of worldwide employment in 2018 (WTTC, 2019). Tourism is an important sector for many economies, especially in developing countries and small island states (McElroy, 2006; Singh, 2008). However, tourism is also very sensitive to changes and disturbances in the political environment and macroeconomic conditions (Akadiri et al., 2019). International tourists want to be safe and secure from any harm in their planned destination. In this respect, risk perceptions of the tourists about the destinations are important determinants of inbound tourism demand (Seabra et al., 2013). Tourists tend to perceive developing countries and regions, such as Africa, full of risks (Lepp and Gibson, 2011), and this may lead to decreased tourist demand towards these countries. Safety and security concerns, including any event that may possess a risk to the tourist's well-being, such as armed conflict, high crime rates, epidemics, or environmental issues, may result in a diversion of tourism demand (Hall, 2010). Diverted tourist flows as a result of such negative developments in global politics may be harmful to those developing and emerging countries where international tourism receipts have a considerable share in the economy. If there is uncertainty about the outcomes of the political events, this can amplify the effects of the geopolitical risks.

Political uncertainty can be defined as the lack of strict determination or the lack of certainty in political life (Cioffi-Revilla, 1998). Economic policy uncertainty, on the other hand, may be referred to as the sentiment of unclarity about the decision-makers (*who*), policies to be implemented (*what*) and timing of execution (*when*) and the outcomes or *effects* of these policies (Baker et al., 2016). Economic policy uncertainty can increase expected costs in the economy and result in a decrease in long-term investment (Jeong, 2002). Especially in developing countries, entrepreneurs act rationally cautious about reacting to policy changes and increasing investment in line with political reforms unless the economic policy risk is eliminated or its effect is reduced (Rodrik, 1991, p. 230). Such a slowdown in the economy may hamper the growth of the tourism sector as well as other sectors, since gains from growth are reinvested in tourism and other sectors (Perles-Ribes et al., 2017). Thus, this situation prevents further investments in the tourism sector, which result in decreased service and infrastructure quality due to the low level of investments and the establishment of new tourism capacity, which consequently causes a decrease in receipts from international tourism.

The exchange rate is also an important criterion in the destination choice of the international tourist, and the effects of exchange rates on inbound international tourism are well-documented in the literature (Uysal and Crompton, 1984; Var et al., 1990; Icoz et al., 1998; Dritsakis, 2004; Patsouratis et al., 2005; Quadri and Zheng, 2010; De Vita and Kyaw, 2013;

Ongan et al., 2017; Dogru et al., 2017, among others). The exchange rate is of great importance for developing economies since fluctuations in the exchange rates can have adverse effects in a developing economy. In the case where tourism is a significant export commodity, changes in exchange rates may result in the loss of foreign currency receipts for the destination economies.

Although the literature on the determinants of international tourism demand is ripe with studies on exchange rates, the literature on the relationship between geopolitical risk and tourism and between economic policy uncertainty and tourism is rather developing. Geopolitical risk, together with economic and political uncertainty, may have negative effects on the economy that can stay within the economy for a long time (Carney, 2016). In this respect, it is important to study global uncertainty, represented by geopolitical risk, and uncertainties in the economic responses of governments to changes in macro and global environments in order to formulate macroeconomic and sectoral policies for coping with the effects of such shocks. Thus, this study is conducted to contribute to the still-developing literature by investigating the relationships between geopolitical risk, economic policy uncertainty, exchange rates, and international tourist arrivals in the backdrop of Mexico, an emerging economy with a significant tourism sector offering diversified products. In this way, better tourism policies may be recommended for such emerging and developing economies by a thorough analysis of the effects of geopolitical risks and economic policy uncertainty on tourism.

The rest of the paper is organized as follows: A review of the relevant literature is provided in the next section. Econometric methodology and the data used in the study are given in the third and fourth sections, respectively. Empirical results are presented in the fifth section, which is followed by the concluding section.

Literature review

The literature on the determinants of tourism demand is ripe with research on many economic and non-economic factors. Exchange rates are usually investigated in such studies since they provide potential tourists with an easily-comprehensible indicator of the cost of living in their potential destinations. Lee et al. (1996) argue that while income and exchange rates are important determinants of expenditures of inbound tourists to South Korea, universal events such as the oil crisis and 1988 Olympic Games are insignificant. In fact, exchange rate volatility may have negative effects on the tourist flows to countries with considerable tourism potential (Agiomirgianakis et al., 2015). On the other hand, empirical findings of Eilat and Einav (2004) suggest that the exchange rates are only significant for tourism demand to developed countries. This may be true as the currencies of the developed countries tend to be more valuable when compared to developing nations. Cheng et al. (2013) also argue that while the U.S. tourism receipts increase in case of a decrease in exchange rates, American tourists are not sensitive to such decreases. Martins et al. (2017) use an extensive data set to find that increase in global per capita GDP and depreciation of national currencies have tourism-boosting effects, both in terms of tourist arrivals and tourism receipts.

Economic policy uncertainty, as well as geopolitical risk, has recently become a topic of interest in the research on international tourism demand. Economic policy observed by a country may be effective in sustaining demand from the main tourist markets (Kim et al., 2018). The effects of economic policy uncertainty on tourism may occur as changed travel decisions. An increase in economic policy uncertainty may deter potential tourists, and increases in prices and exchange rates under uncertainty may result in cancellations and delays, which may be extremely harmful for MICE (Meetings, Incentives, Conferences and Exhibitions) sector in particular. Besides its effects on international tourism, economic policy uncertainty also have the potential to cause considerable decreases in domestic tourism spending in the long run (Gozgor and Ongan, 2017). Guizzardi and Mazzocchi (2010) state that business cycles might affect travel and stay decisions through substitution of destinations and reported that cyclical changes in the inbound tourism demand occur as a delayed response to business cycles. Balli et al. (2018) report that global and domestic economic policy uncertainty affects international tourist flows, possibly through increased precautionary savings or decreased trust of the tourists about service quality and local conditions. Ongan and Gozgor (2018) use Economic Policy Uncertainty Index to study the effects of policy uncertainty on the tourism demand of Japanese tourists to the U.S. and report that the number of Japanese tourists to the U.S. decreases both in the short- and-long-run as policy uncertainty in Japan increases. Wu and Wu (2019) conclude that there is unidirectional causality from economic policy uncertainty to international tourism receipts in the short-run, while the relationship is bidirectional in the long-run. Yet, growth in tourism receipts due to increased tourist arrivals might as well create economic policy uncertainty, most likely through increased spending to curb negative externalities caused by increased tourism activity (Akadiri et al., 2019). Testing this hypothesis in a panel of 12 countries over the period 1995-2015, Akadiri et al. (2019) report mixed results; however, they also find evidence of international tourist arrivals explaining variations in economic policy uncertainty in 7 countries of the panel. Demir and Gozgor (2017) show that EPU has a negative impact on outbound tourism as well.

Risk and uncertainty are often confused with each other and used interchangeably. However, these two have different meanings. While the probability of occurrence of events can be determined in case of a risk, it is not even possible to determine these probabilities in case of uncertainty (Levy, 2002). Uncertainty turns into risks as far as the conditions that may occur in the future can be defined, and their probabilities can be calculated (Pike and Neale, 2006). Although the geopolitical risk is used to denote a wide range of events, such as terrorism, climate change, political and economic crises, including multiple actors that may have global repercussions, we refer to geopolitical risk as all "risk associated with wars, terrorist acts, and tensions between states that affect the normal and peaceful course of international relations" following Caldara and Iacoviello (2018, p. 6). Geopolitical change can affect the size, structure, and direction of international tourist flows (Webster and Ivanov, 2015) through altering tourism resources and infrastructure and by changing the social and spatial behavior of the tourists (Neacşu et al., 2018). It is also argued that the effects of geopolitical risk on tourism demand may differ as to the tourism supply of a country, and the impacts of shocks to geopolitical risk level may continue longer in some emerging economies (Balli et al., 2019).

In this respect, political conflicts, especially those with a violent tone, negatively affect tourist flows and may also increase regional and global political risk (Neumayer, 2004). Tourism includes microeconomic decision-making of the individual tourist, and risk perceptions by the tourist may change as to many factors, including the social, demographic, and economic background of the travelers (Park and Reisinger, 2010). Although some tourists prefer to visit “dark tourism” sites, i.e. destinations that have backgrounds of violent events or natural disasters (Korstanje and Ivanov, 2012), such as tours to Chernobyl nuclear disaster area, every potential tourist tries to formulate the safest travel plan for himself/herself to avoid harm to his/her physical health or property. Eilat and Einav (2004) report that destination risk is a decisive factor for the tourist’s choice of destination, both for the developed and developing markets. Galia and Fuchs (2006) analyze risk perceptions by the tourists traveling into Israel and report that “human-induced risks” which include crime, terrorism, political unrest, cultural differences, and crowded tourism sites, is an essential factor. Ghaderi et al. (2017) use Failed States Index in a GMM model to investigate the effects of security concerns on tourism demand to find that while increasing inbound tourism demand is associated with increased security levels in the developed countries, increasing security in the developing countries is associated with a decreasing number of tourists over the period 2006-2012. Violent political conflict in the form of terrorism may also have regional spillover effects as the occurrence of terrorism in a country can negatively affect tourist flows to other countries in a region (Bassil et al., 2019). Moreover, violent terrorist attacks in base markets or developed countries may decrease the number of international tourists in developing or emerging markets as a result of safety concerns. Ghosh (2019) also reports a significant impact of terrorism and economic policy uncertainty on tourism in France, Greece, and the U.S.

Political conflicts that contain human rights violations and altering of freedoms may be harmful to inbound tourism. Civil liberties and economic freedom positively affect inbound tourism by decreasing local risk and increasing the tourist’s sense of safety (Saha et al., 2016). Tiwari et al. (2019) examine how geopolitical risks affect the arrival of tourists in India and report that the impact of geopolitical risks is stronger than that of economic policy uncertainties. Besides, geopolitical risks have long-term effects, while economic policy uncertainties have short-term consequences for inbound tourism. Thus, Tiwari et al. (2019) argue that a national security and peace protocol should be provided; otherwise, the drop in tourism demand may hinder a country's economic growth in the long-run. Balli et al. (2019) report that the effects of shocks to geopolitical risk might be short-living in some emerging countries due to relatively rich tourism endowment of these countries, i.e. the inbound tourists choose to visit tourist attractions in the face of geopolitical risk. However, for Mexico, Malaysia, and South Korea, there is a negative and significant impact of geopolitical risks to inbound tourist flows both in short- and- long-run. Demir et al. (2019) also report a negative effect of geopolitical risk on tourism in their analysis of the impact of geopolitical risk on incoming tourism in a panel of 18 countries. Using quarterly data over the period 1985-2017, Akadiri et al. (2020) also report a unidirectional causality running from geopolitical risk to the number of inbound tourists for Turkey.

Changes in the global political conditions may be reflected in the economies through exchange rate fluctuations, which may have adverse effects for emerging economies oriented on service and commodity exports. Because the exchange rates are determined in the market like commodity prices, their stability is both a cause and a result in terms of ensuring economic stability. Thus, increasing geopolitical risk may increase economic policy uncertainty through exchange rates if governments can not formulate sound policies to cope with the geopolitical changes and consequent fluctuations. Such externalities may have a negative impact on the economic sustainability of the tourism sector.

Econometric methodology

Fourier unit root test

As emphasized by Perron (1989), ignoring existing structural changes when examining the stochastic properties of a series produce biased results. Following the milestone study of Perron (1989) several unit root tests have been introduced to the literature that considers structural breaks in data generation process (see Zivot and Andrews, 1992; Perron, 1997; Lumsdaine and Papell, 1997; Lee and Strazicich, 2003, 2013; and Narayan and Popp, 2010, among others) while testing the stationarity of the series. There are mainly two shortcomings of these studies; first, these studies assume that the number of structural changes is known a priori. Second, these unit root tests use dummy variables to capture structural changes, so presume that structural breaks occur suddenly, but as mentioned in Hyndman (2014), "most things change slowly over time". Thus, in this study, we test the stationarity of the variables using the Fourier Augmented Dickey-Fuller (FADF) unit root test suggested by Enders and Lee (2012).

FADF unit root test uses a Fourier function to accommodate an unknown number of structural changes that occur in unknown locations. We employ the following equation to apply for FADF unit root test:

$$\Delta y_t = \alpha + \phi t + \beta y_{t-1} + \delta_1 \sin\left(2\pi kt/T\right) + \delta_2 \cos\left(2\pi kt/T\right) + \varepsilon_t \quad (1)$$

Where, $\pi = 3.1416$, T and k show the number of observations and number of frequencies in the Fourier function. The usage of the Fourier function is because of considering the effect of the unknown nature of structural breaks. By following the suggestion of Ludlow and Enders (2000), we use a single frequency, since a single frequency is enough for structural break determination.

To find the optimal frequency, we estimate Equation 1 for values of k in the interval of [0.1, 0.2, 0.3, …, 5] and choose the value that yields the smallest residual sum of squares (RSS). As implied by Christopoulos and Leon-Ledesma (2011), an integer frequency is evidence that the breaks are temporary while fractional frequencies are able to capture permanent breaks. After determining the optimal k, we test whether the Fourier function is significant or not by performing the usual F test for the null. Non-rejection of the null leads us to use standard unit root tests such. But in the case of the rejection of the null, we compute the t-statistic for $\beta = 0$ to test the null hypothesis of a unit root.

Fourier ARDL cointegration test

Since neglecting structural breaks also can cause the obtained biased results in cointegration tests (see Gregory and Hansen, 1996; Hatemi-J, 2008; Maki, 2012, among others), we employ a recently introduced Fourier Autoregressive Distributive Lag

(FARDL) cointegration test by Yilanci et al. (2020). The FARDL cointegration test has several attractive properties. First, the regressors can be either I(0) or I(1); secondly, the test allows endogenous multiple smooth structural breaks; thirdly, the FARDL procedure can also provide effective and reliable results in small samples.

To investigate the determinants of tourism demand, we employ the following model:

$$lnTA_t = \beta_1 + \beta_2 EPU_t + \beta_3 GPR_t + \beta_4 REER_t + u_t \quad (2)$$

Where TA shows the international tourist arrivals (TA) to Mexico as a proxy for tourism demand, EPU stands for economic policy uncertainty, GPR indicates geopolitical risk, and the REER is real exchange rates (REER).

We can rewrite Eq. (2) in an unrestricted error correction representation, as in Eq. (3), to apply the FARDL test:

$$\Delta LTA_t = d(t) + \beta_2 LTA_{t-1} + \beta_3 EPU_{t-1} + \beta_4 GPR_{t-1} + \beta_5 REER_{t-1} + \sum_{i=1}^{p} \alpha_i' \Delta LTA_{t-i} + \sum_{i=0}^{q} \delta_i' \Delta EPU_{t-i} + \sum_{i=0}^{w} \varphi_i' \Delta GPR_{t-i} + + \sum_{i=0}^{v} \phi_i' \Delta REER_{t-i} + e_t \quad (3)$$

where Δ and p are the first difference operator and lag length respectively. $d(t)$ is a deterministic term that can be defined as

$$d(t) = \beta_0 + \gamma_1 \sin\left(\frac{2\pi kt}{T}\right) + \gamma_2 \cos\left(\frac{2\pi kt}{T}\right)$$

where $\pi = 3.1416$, k is a particular frequency that is used for approximating structural breaks and t and T show the trend term and sample size, respectively. We determine optimal lag lengths and value of k that is in the interval k = [0.1, ..., 5], employing Akaike Information Criteria (AIC).

Following Pesaran et al. (2001) and McNown et al. (2018), we tested the null hypothesis of no cointegration relationship using F-test (F_A), t-test (t), and F-test (F_B) as:

$$H_{0A}: \beta_1 = \beta_2 = \beta_3 = 0, \quad H_{0t}: \beta_1 = 0, \quad H_{0B}: \beta_2 = \beta_3 = 0.$$

Testing results of F_A, F_B, and t produced four different cases:

- Case 1: Cointegration occurs when F_A, F_B, and t are significant.
- Case 2: No cointegration occurs when F_A, F_B, and t are insignificant.
- Case 3: Degenerate case #1 occurs when F_A and F_B are significant but t is not significant.
- Case 4: Degenerate case #2 occurs when F_A and t are significant but F_B is not significant.

All cases except Case 1 imply that there is no cointegration among the variables. Since the critical values are computed using bootstrap simulations, they are based on the specific integration properties of the empirical data; thus, the possibility of inconclusion about the hypotheses using traditional ARDL bounds test is eliminated. In contrast, the performance of the bootstrap test is better in terms of power and size than the asymptotic test (e.g. the ARDL bounds test), as described by McNown et al. (2018).

Fourier causality test

Structural changes are generally ignored in causality testing (see Granger, 1986; Toda and Yamamoto, 1995; Hacker and Hatemi-J, 2006; and Hatemi-J, 2012 among others). Fortunately, Enders and Jones (2016) introduce a new causality test by using a variant of the Flexible Fourier Form (FFF) to cope with the possibility of multiple smooth breaks that are present in the vector autoregressive model, so they avoid biased results in the causality relationship due to ignoring structural breaks. Since the Flexible Fourier Form Causality test of Enders and Jones (2016) based on a VAR model, one first tests the stationarity of the variables before testing the causality, and in the case of nonstationary variables, one must make data stationary by taking differences. However, taking differences of the variables cause long-run information loss. By using the methodology introduced by Toda and Yamamoto (1995), this problem can be resolved. The causality test of Toda and Yamamoto (1995) is based on a lag augmented VAR (LA-VAR) model by the maximal integration levels of the variables. Nazlioglu et al. (2016) suggest to incorporate a Fourier function to the VAR models as follows:

$$Y_t = \beta_0 + \beta_1 \sin\left(\frac{2\pi kt}{T}\right) + \beta_2 \cos\left(\frac{2\pi kt}{T}\right) + \sum_{i=1}^{l+d\max} \theta_i Y_{t-i} + \sum_{i=1}^{l+d\max} \phi_i X_{t-i} + u_t$$

$$X_t = \delta_0 + \delta_1 \sin\left(\frac{2\pi kt}{T}\right) + \delta_2 \cos\left(\frac{2\pi kt}{T}\right) + \sum_{i=1}^{l+d\max} \varphi_i Y_{t-i} + \sum_{i=1}^{l+d\max} \theta_i X_{t-i} + v_t$$

where l is the optimal lag length of the VAR model that is chosen by using information criteria such as Akaike or Schwarz, $d\max$ denotes the maximal integration level of the variables that determined by employing a unit root test. We search the optimal frequency in the interval of [0.1, 0.2, 0.3, …, 5], and choose the *k* that produces the minimum sum of squares residuals. We refer to this test as the Fractional Frequency Flexible Fourier form Toda Yamamoto (FFFFF-TY) causality test. We test the null hypothesis of $\phi_l = 0,\ \forall_i = 1,2,...,l$, using the Wald statistic and obtain critical values through bootstrap simulations.

Data

This paper aims to test the dynamic relationship among tourism, economic policy uncertainty, geopolitical risks, crime rates, and exchange rates. To this end, we employ monthly data from January 1996 to December 2018. We use international tourist arrivals (TA) to Mexico as a proxy for tourism demand. The TA data is obtained from the online database of Banco de Mexico. We obtained economic policy uncertainty (EPU) data from Baker et al. (2016) and geopolitical risk (GPR) data from Caldara and Iacoviello (2018). We computed real exchange rates (REER) using US dollars as foreign currency and obtained the data from open data service of the World Bank. We take logarithms of the TA series before proceeding to the analyses.

We first present the summary statistics of the series in Table 1 to get an insight into the data.

Table 1. *Summary statistics*

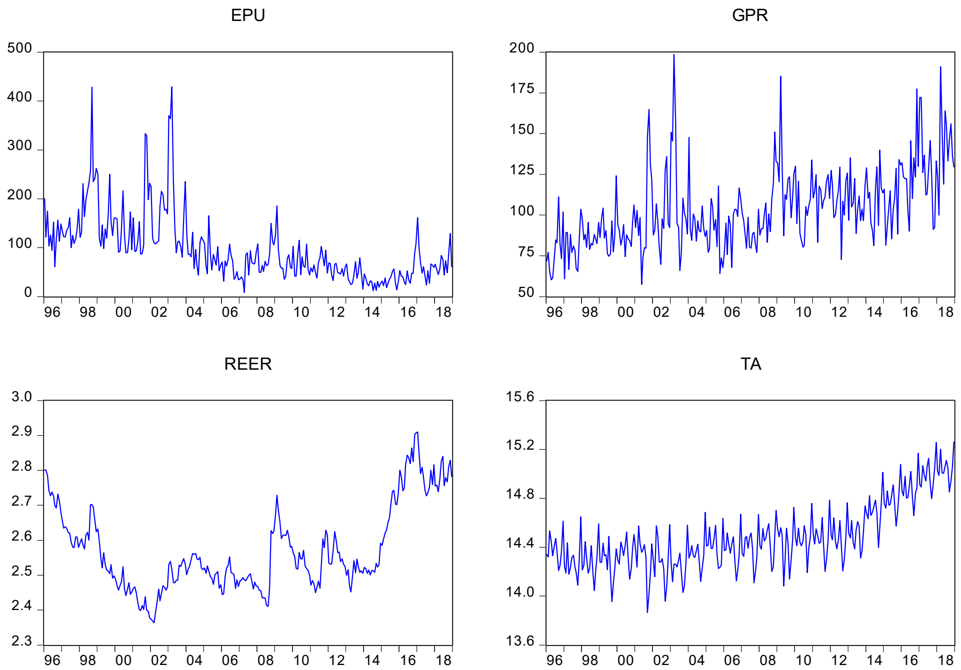
	EPU	GPR	REER	TA
Mean	97.110	103.640	2.574	14.485
Median	80.626	98.596	2.532	14.430
Maximum	428.725	198.554	2.910	15.260
Minimum	8.509	57.435	2.364	13.865
Std. Dev.	69.311	24.609	0.121	0.267
Skewness	1.870	0.957	0.807	0.706
Kurtosis	7.762	4.187	2.807	3.095
Jarque-Bera	421.664*	58.302*	30.405*	23.001*

Note: * shows the statistically significance at the 1% level. Critical value for Jarque-Bera test at the 1% level is 9.21.

The results in Table 1 show that while the mean of the EPU is below the mean of the GPR. The GPR series is valued between 57.43 and 198.55, while the EPU series is valued between 8.51 and 427.73. On the other hand, all series are distributed as non-normal according to the results of the Jarque-Bera test.

To see the movements of the variables in the analysis period, we present the time paths of the series in Figure 1.

Figure 1. *The time series paths of the variables*



While the EPU appears to tend to decrease over time, the remaining variables show an increase during the analysis period. On the other hand, one or more smooth breaks exist in all series in the analysis period. Actually, this is the reason why we applied for Fourier tests.

Empirical results

To determine the maximal integration of the series, we first test the stationarity levels of the series using the Fourier ADF unit root test and present the results in Table 2.

Table 2. *Results of the Fourier ADF unit root test*

	FADF Test Statistics	F Test Statistics
EPU	-7.226 (0.8) [1]*	13.134*
GPR	-6.942 (0.1) [3] *	10.807*
REER	-3.764 (0.1) [1]	6.209
TA	-2.317 (0.1) [15]	4.379

Note: *, **, and *** show the significance at the 1%, 5%, 10% levels respectively. Numbers in the parenthesis show the optimal frequency value, numbers in the brackets show the optimal lag-length chosen as using t-significance method of Campbell-Perron (1991). Critical Values for the FADF unit root test at the 1%, 5%, and 10% levels are -4.5, -3.9, and -3.6 respectively. Critical values for F test are 12.76, 9.85, and 8.50 at the 1%, 5%, %10 levels respectively.

Before testing the null of a unit root by using the FADF unit root test, we first check the significance of the Fourier function using the F-test. The second column of Table 2 shows that the function is significant for only the EPU and the GPR variables. So, we can analyze the stationarity of these variables using FADF test statistics. The results in the first column of Table 2 indicate that both of the variables are stationary at level; that is, they are both I(0). On the other hand, the optimal frequencies found as fractional, which is evidence of permanent structural changes.

Since the Fourier function is not significant, we can test the stationarity of the remaining variables, by implementing the ADF unit root test and reported the results in Table 3.

Table 3. *Results of the ADF unit root tests*

	Level	First Differences
REER	-1.121 (0.708) [14]	-5.223* (0) [13]
TA	1.438 (0.999) [13]	-5.544* (0) [12]

Note: The number in the parenthesis show the p-values, while numbers in the brackets show the optimal lag lengths. *, and *** denote the significance at the 1%, and 10% levels.

The results in Table 3 show that all the series are stationary at the first differences; that is, they are all *I(1)*.

To test the long-run relationship among the variables, we employ the FARDL cointegration test and provide the results in Table 4.

Table 4. *Results of FARDL cointegration test*

Selected Model		k	AIC	
FARDL (3, 1, 3, 3)		1	-1.103	
Test Statistics		**Bootstrap Critical Values**		
		0.9	0.95	0.99
F_A	6.065611**	4.317735	4.951821	6.374577
t	-4.72454*	-2.80124	-3.19986	-3.86539
F_B	5.108722*	3.101431	3.843418	5.233396
*, ** indicate significance at 1%, and 5% levels, respectively. We performed 5000 simulations to obtain the critical values.				

The results of the FARDL test show that all the test statistics are higher than the bootstrap critical values at the traditional levels, so we conclude that there is a cointegration relationship among the variables. Next, we estimate long- and short-run coefficients and present the results in Table 5.

Table 5. *Long- and short-term coefficients*

Panel (a)	**Long-term coefficient based on FARDL procedure**	
Variables	coefficients	p-value
EPU	-0.002037*	0.0000
GPR	0.006061*	0.0000
REER	0.420716***	0.0532
Constant	12.97802*	0.0000
Panel (b)	Short-term coefficient based on FARDL procedure	
Variables	coefficients	p-value
D(TA(-1))	0.079709	0.1892
D(TA(-2))	-0.234819*	0.0000
D(EPU)	-0.000684*	0.0006
D(GPR)	0.000902**	0.0387
D(GPR(-1))	-0.001843*	0.0001
D(GPR(-2))	-0.001523*	0.0003
D(REER)	-0.158791	0.5826
D(REER(-1))	0.304681	0.2821
D(REER(-2))	0.740744*	0.0097
ECT (-1)*	-0.49828*	0.0000

Note: *, ** and *** show the significance at 1%, 5% and 10% levels, respectively.

The results in Table 5 show that in the long-run, an increase in EPU decreases TA, while an increase in each GPR and REER increases the TA. The results in Panel B show the results of the error correction model. First, we should examine the coefficient of error correction term (ECT). As seen in the lower part of the table, the ECT is statistically significant and has a value that lies between 0 and -1, which indicates a deviation from the long-term equilibrium will be corrected in the long-run. On the other hand, other part of the error correction model shows that EPU has a negative effect on TA also in the short-run, GPR has an increasing effect, but lagged values of the GPR has a decreasing effect while REER lagged by two periods has an increasing effect on TA.

According to our analysis, an increase in REER increases TA to Mexico in the long-run. This result is not in agreement with the literature (Uysal and Crompton, 1984; De Vita and Kyaw, 2013; Agiomirgianakis et al., 2015; Ongan et al., 2017, Irandoust, 2019, among others); as real exchange rates increase in a country, tourist arrivals to that country decreases, since real exchange rates provide a more realistic overview of domestic prices in the country in question. Although daily exchange rate has a negative impact on arrivals, exchange rate volatility may have a positive or negative impact on arrivals. However, data frequency and the selected regional aggregation of research may affect the outcome of the analysis (Chang and McAleer, 2012). Moreover, the effects of volatility may change depending on the statistical definition of volatility (De Vita and Kyaw, 2013). Therefore, a possible explanation for our unexpected finding might be resulting from the volatility of the Mexican currency against the dollar. The Mexican Peso has not shown very drastic up-and-downs against the U.S. dollar, except for 1996-2000 and post-2014 of the studied period. Besides, since the primary market of Mexico is North America, such low volatility in the Mexican peso may not be discouraging the potential North American tourists. Although this result is opposite to the theory as the results of the long-run analysis, it is possibly caused by stickiness in prices or by previously made reservations. As explained above, the low level of fluctuations in the Mexican Peso may also have little impact on the vacation and spending plans of mostly North American tourists. Another interesting short-run result is that TA lagged by two periods has a decreasing effect on the current TA, which, together with the behavior of other variables in the short-run, may be interpreted as the "word-of-mouth" effect, i.e. tourists discouraging potential short-run tourists by sharing undesirable experiences due to EPU, GPR or changes in REER.

Our results for the long-run impact of EPU on TA for Mexico are in agreement with the literature stating EPU negatively affects TA (eg. Ongan and Gozgor, 2017; Gozgor and Ongan, 2017, Ghosh, 2019) or tourism receipts (Wu and Wu, 2019). A 1% increase in EPU decreases TA to Mexico by 2‰. Our findings differ from the results of Tiwari et al. (2019), who report that GPR has a stronger impact on TA than the EPU, and EPU has stronger impact in the short-run. Our analysis revealed a stronger negative impact of GPR in the short-run (please see below) and a positive impact in the long-run, and a stronger impact of EPU in the long-run. Singh et al. (2019) also report a stronger impact of EPU in both medium- and- long-run. Our analysis also revealed a significant but ignorable (-0.0007) short-run negative effect of EPU on TA.

As for GPR-TA nexus, our analysis revealed that a 1% increase in GPR increases TA to Mexico by about 6‰ in the long-run (Table 5). Although displaying a very small impact, this finding is not in agreement with the literature. Literature rather dominantly points out that a decrease in GPR results in an increase in TA (Eilat and Einav 2004; Ghaderi et al., 2017; Demir et al., 2019; Ghosh, 2019). Balli et al. (2019), on the other hand, report that both global and domestic GPR have a significant impact on tourist flows to Malaysia, Mexico and South Korea, while domestic GPR has limited effect in Indonesia, Thailand, Phillippines and South Africa and global GPR has a limited effect in Turkey. Bassil et al. (2019) also report that domestic terrorism may have tourism-diverting effects. Neumayer (2004) and Saha et al. (2016) report that domestic political stability and civil and economic liberties have a positive impact on TA as well. These findings are also supported by Alola et al. (2019), who report that insurgency significantly decreases tourist arrivals, and institutional quality (low levels of corruption) increases tourism receipts. The time period subjected in the study starts just in the aftermath of Zapatista crisis in Mexico in 1990s; thus, that may be a reason for our analysis failed to find a long-run negative impact of GPR on TA. There may be a few explanations for this: First of all, the tourists in the major inbound markets of Mexico with different plans might opt to travel to Mexico after GPR increases for their preferred destinations. It should also be noted there have been few coups or attempted coups in the Latin America region during the period of the study, and the effects of GPR thus may be negligible for the incoming tourists. Secondly, the tourists want to visit Mexico whatever the GPR is. A third explanation may be the individual preferences of the tourist. North America and emerging South American economies are the base markets for Mexico. If the tourists in these regions do not want to go anywhere in the world in where they think the geopolitical risk is high, or simply can not afford to go anywhere in any other part of the world, Mexico may be the first choice.

The results of the analysis for the short-run impact of GPR on TA are in agreement with the literature. Although minimal, lagged values of GPR have a negative impact on TA to Mexico, with one-period lagged GPR decreases TA by approximately 2‰, GPR lagged by two periods decreases TA by about 1.5‰ (Table 5). These findings are in agreement with the results reported by Demir et al. (2019), who also report that lagged values of GPR have a negative impact on the next year's TA. Our findings are partly in agreement with those of Balli et al. (2019); as the authors report a stronger short-run effect of domestic GPR on TA to Mexico, while a negative effect of both domestic and global GPR on TA to Malaysia and South Korea.

Now, we test the causality relationship between the variables using the FFFF-TY causality test since we have determined the stationarity levels of the variables. The results are presented in Table 6.

Table 6. *Results of the FFFFF-TY causality test*

Null Hypothesis	Wald Test Statistics	VAR Lag Length	dmax	Optimal Frequency
EPU ↛ TA	2.927 (0.088)***	1	1	0.8
TA ↛ EPU	0.004 (0.954)	1	1	0.8
GPR-->TA	0.831 (0.358)	1	1	0.8
TA ↛ GPR	0.007 (0.929)	1	1	0.8
REER ↛ TA	2.479 (0.290)	2	1	0.1
TA ↛ REER	3.692 (0.155)	2	1	0.1
GPR ↛ EPU	0.787 (0.369)	1	0	0.8
EPU ↛ GPR	14.385 (0.000)*	1	0	0.8
REER ↛ EPU	9.607 (0.002)*	1	1	0.8
EPU ↛ REER	0.399 (0.518)	1	1	0.8
REER ↛ GPR	6.767 (0.010)**	1	1	0.8
GPR ↛ REER	0.080 (0.779)	1	1	0.8

Note: Numbers in parenthesis show the bootstrap p-values. *, **, and *** show the significance at the 1%, 5%, and 10% levels, respectively. Critical values obtained using 5000 simulations.

According to the results of our analysis, there is no causality from GPR to TA, or vice versa, in Mexico (Table 6). In this respect, our results are different than those of Balli et al. (2019) who employ report a unidirectional causality running from domestic GPR to TA for Mexico and Akadiri et al. (2020) who report a unidirectional causality running from GPR to TA for Turkey. Results also indicate that there is a unidirectional causality that runs from EPU to TA. Our findings are in agreement with the results of Ongan and Gozgor (2018), Wu and Wu (2019), and Isik et al. (2019). Uzuner et al. (2020) also report a weak causality running from EPU to TA. On the other hand, Akadiri et al. (2019) report mixed results for the EPU-TA nexus with TA explaining EPU in 7 countries in their panel.

Our analysis revealed a unidirectional causality from EPU to GPR, supporting the findings of Das et al. (2019) and Lee (2019). The findings of our study do not suggest a unidirectional causality from REER to TA or vice versa. Belloumi (2010) also reports non-causality between exchange rates and international tourism receipts in the short-run for Tunisia. Gül and Özer (2017) report such a non-causality between REER and real tourism income for Turkey. More recently, Akadiri and Akadiri (2019) report unidirectional causality from exchange rates to tourist arrivals for a panel of small island states. However, our study also revealed unidirectional causality running from REER to EPU, and from REER to GPR. The results in Table 6 also show that the optimal frequencies are less than one, which is evidence of permanent structural changes in the causality relationship.

Conclusion

This study employed the Fourier ARDL cointegration test and Fourier Toda-Yamamoto causality test to investigate the effects of the dynamic relationship between tourism, economic policy uncertainty, geopolitical risks, and exchange rates in Mexico using monthly data from the period 1996:01 to 2018:12.

According to the results of the Fourier ARDL test, only EPU has a negative effect on TA in the long-run while GPR and REER increase TA in the long-run. The short-run effect of EPU on TA is negative as expected; however, lagged values of GPR have a decreasing effect on TA in the short-run. Interestingly, lagged values of REER still have an increasing effect on TA in the short-run, which may be caused by strong demand from base markets and low volatility of the Peso in the studied period. The lagged values of TA have a decreasing effect on TA in the short-run, and this may be a result of "word-of-mouth" effect.

In line with the literature, a unidirectional relationship from EPU to TA to Mexico is found in our study as well. It is most likely that players in the sector lower their investments for attracting tourists (such as advertisements, etc.) during increased economic uncertainty, which may reflect negatively on potential tourists. On the other hand, news of EPU may be perceived negatively by the potential tourist as an indicator of more economic deterioration and social unrest, which are both unwanted properties in a destination. While EPU decreases the flow of international tourists by affecting the supply side in the former case, it directly affects the demand in the latter by changing the perceptions of the tourists.

Our study also found a unidirectional causality relationship runs from EPU to GPR. In a global economy with high levels of interdependence, negative outcomes of the crisis caused by political uncertainty elsewhere, especially in developed and emerging economies, may be transmitted quickly to the others. EPU may increase GPR by deteriorating trust and political dialogue, which may cause political insurgency stemming from unfavorable regional or national economic conditions. In this case, conflict over territory, particularly over territories with rich resources, may result in increasing GPR. EPU may also result in mass movements of migrants across borders, and this may create economic and political problems for both giving and receiving countries. The unidirectional relationship from REER to EPU may be reflected on GPR through such a mechanism. Our study also revealed a unidirectional relationship running from REER to GPR. In this respect, it can be said that any effect of real exchange rates on inbound tourist flows is reflected through economic policy uncertainty or geopolitical risk.

As for policy recommendations, our study revealed a long-run effect of EPU on TA. Thus, governments should seek stability in decision making in order to have sustainable tourist flows; that is, institutional set-up of economic decision making must be designed to accelerate decision making and decrease uncertainties related to bureaucracy, data gathering, etc., especially in emerging economies like Mexico. Although our analysis signalled an increase in tourist flows in the presence of increasing geopolitical risk, this is rather because of the general political stability of Latin America in the studied period. There are few coups and violent claims to the territory between 1996-2018. Besides, geopolitical risk at other destinations may have been increasing Mexico's attractiveness for international tourists. In this respect, governments may follow policies that promote the safety and security of their destinations to attract international tourists bound for geopolitically risky regions. The results of our analysis for real exchange rates are not in line with the theory and the literature in general and should be interpreted cautiously, since the selection of data frequency and country-specific conditions may have a role in these results. However, our analysis suggests that real exchange rates may not have a negative effect in the short-run due to pre-planned vacations; however, pricing policies should be carefully designed to avoid decreases in tourist arrivals both in short- and long-run.

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