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THE IMPACT OF TOURISM DEMAND ON REGIONAL INFLATION IN TURKEY

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Abstract: The main purpose of this study is to examine the effects of total tourism demand as well as the effects of both foreign and domestic tourism demand (measured by overnight stays) on regional inflation in Turkey based on the Nomenclature of Territorial Units for Statistics regions classified by Turkish Statistical Institute. To obtain the region-specific effects of tourism demand on inflation, we used the Random Coefficient Regression developed by Swamy by using the annual panel data over the period between 2004 and 2013. Before estimating Swamy Random Coefficients Regressions, we first tested the existence of cross-sectional dependence among the regions of Turkey. And then, based on the results of these tests, we examined the stationarity properties of variables by using second-generation panel unit root tests. The results of the study indicate that there are significant differences in regional effects of different forms of overnight stays on regional inflation. Also, the results show that the contribution of domestic overnight stays to overall and regional inflation is greater than that of foreign overnight stays. Thus, the findings of the study have significant importance in Turkey for designing tourism, industrialization, and monetary policies, particularly aiming to reduce the inflation by adopting inflation targeting regime.

Keywords: Turkey; tourism demand; inflation; random coefficient regression; cross-sectional dependence

Introduction

The majority of the studies aiming to analyze the contributions of tourism to the economies of different countries focuses on the positive contributions of tourism sector to growth, employment, and balance of payments. But, there is still a limited number of studies examining the adverse effects of tourism demand, such as inflation. Thus, investigating the effect of tourism demand on inflation seems to be crucial, since as is mentioned in Shaari, Ahmad, and Razali (2018), tourism can be considered as a potential factor for increasing the inflation.

There are two sources of inflation: demand-pull inflation and cost-push inflation. An inflation that results from increases in aggregate demand is called demand-pull inflation. Any factor that increases aggregate demand, such as a cut in the interest rate, an increase in the quantity of

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money, an increase in government expenditure, a tax cut, an increase in exports, or an increase in investment stimulated by an increase in expected future profits can cause the start of demand-pull inflation. On the other hand, an inflation that begins with an increase in costs, such as an increase in the wage rate and an increase in the price of raw materials, like oil, is called cost-push inflation. As indicated by Gee, Makens, and Choy (1997), the increases in demand for the goods and services at a tourism destination caused by the rising expenditures of tourists can lead to inflation. Also, a sudden and significant devaluation of national currency of the tourist destination country can cause quick increase in prices, especially in the short-run, because it might create a perception on tourists that the destination country is a "paradise of cheapness"; thus, it stimulates tourists' spending on domestic products. On the other hand, domestic sellers will show a tendency to raise their product price in terms of domestic currency, since they know that this rise in prices will not discourage tourists to buy domestic products. Therefore, this rise in goods and services prices will quickly spread to other regions of the country and cause a constant increase in inflation. As mentioned in Vellas and Bécherel (1995), not only the people living in the tourists' destinations, but also people living in other parts of the country will be affected by the price rise.

According to Tribe (2011), the increase of tourist and recreational activities leads to the increase in not only the prices of goods and services but also to the prices of real estates. Likewise, Gee et al. (1997) indicated that land prices would rise with the development of tourism, which would contribute significantly to the increase in inflation. Furthermore, they indicated that the development of tourism activities would eventually lead to the improvement of infrastructure and superstructure, which would in turn lead to the increase of real estate and tax bases will put additional burden on the consumers. Also, Coltman (1989) indicated that the residents' costs of living would increase for some communities as a result of the development of tourism sector. For example, if there were not enough supply of agricultural products locally, the price of these products may increase continuously and significantly. In addition to this, the same author indicated that the increase in prices might be further accelerated when these products are imported. Moreover, as argued in Gee et al. (1997), the demand for goods and services would rise due to the increase in individual incomes because of multiplier effects of tourism.

As is mentioned in Vellas and Bécherel (1995), the impact of tourism sector on the general level of prices in a country depends on the sector's contribution to the national income. Also, the authors emphasized that price increases would be higher particularly in the tourist regions of developing countries and in products intensely demanded by tourists because of frequently seen imperfections and imbalances in these markets especially in less developed countries. Although the impacts may vary based on the country's development level, the degree of sectoral relations and pass-through and whether or not the products demanded by tourism sector are produced sufficiently within the country, it is fair to conclude that there is a potential of tourism sector toward increasing domestic prices.

It is hard to argue that there is a rich literature examining the relationship between tourism demand and inflation. Arbel and Strebel (1980) can be considered as the first study examining the relationships between inflation and tourism demand investigating the relations between inflation, room prices, occupancy rate and profitability by using regression analysis. They found strong connections between room prices and nominal profitability and inflation. However, they found no significant relations between "occupancy rate and real profit" and inflation. Yong (2014) studied the relations between tourism demand, innovations, and inflation for 14 European countries and found positive relations between innovations, and tourism demand. The study indicated that although inflation costs caused long-term adverse impact on tourism sector, innovations would enable tourism sector to become sustainable. So, the study indicated adverse effects of inflation on tourism sector. Tang (2011) investigated the relations among tourism demand, inflation, unemployment, and crime rates for Malaysia using annual data over the period between 1970 and 2008 by employing Cointegration and Granger Causality analyses. The results of the study indicated long-term relations between the variables. Tourist demand, inflation, and unemployment rate Granger caused crime rates. Also, the variance decomposition and impulse-response analyses showed that inflation and unemployment rate had the impact on crime rates. Atay Kayış and Aygün (2016) reached a conclusion that there is a long-term relation between tourism income and inflation by using VAR analysis for annual data of Turkey for the period between 2003 and 2011.

Based on the existing studies related to the effects of tourism on inflation, it is fair to conclude that there is a limited number of studies examining the effects of tourism demand on inflation and none of them is about examining its regional effects on inflation. Thus, investigating the regional effects of tourism on inflation will be an important contribution to tourism research literature. Besides this, we contribute to the literature on tourism research by using the Random Coefficients Regression model developed by Swamy (1970) instead of using methods such as computable general equilibrium models or time series unit-root and co-integration models. To examine the effects of tourism on regional inflation, we study the regions with Nomenclature of Territorial Units for Statistics-level 2 (NUTS2) classification determined by Turkish Statistical Institute (TurkSTAT). Besides, we focused not only on international inbound tourism, but also on the domestic and the total tourism demand. Thus, once again these additional regional analyses should be taken as a main contribution of the paper along with its first attempt to analyze these relationships for Turkey, to the best of our knowledge.

Based on the TurkSTAT (2020) data, the annual CPI inflation rate in Turkey in 2019 was 15.18%. There were five regions where inflation rates were below the overall inflation rate. These regions were first Region-İstanbul (TR10) with 14.61% inflation rate; eighth region—Kocaeli, Sakarya, Düzce, Bolu, Yalova (TR42) with 14.78% inflation rate; ninth Region—Ankara (TR51) with 12.41% inflation rate; sixteenth Region—Zonguldak, Karabük, Bartın (TR81) with 15.13% inflation rate, and twenty-second Region—Malatya, Elazığ, Bingöl, Tunceli (TRB1) with 15.07% inflation rate. The remaining regions' inflation rates were above Turkey's average. Twenty-fifth region—Şanlıurfa, Diyarbakır (TRC2) had the highest inflation rate of 17.66% followed by twenty-third Region—Van, Muş, Bitlis, Hakkari (TRB2) with 17.61% inflation rate. According to data published by the Republic of Turkey Ministry of Culture and Tourism (2020), the total number of overnight stays in 2019 was 159.1 million, which consisted of 112.2 million foreign and 49.9 million domestic overnight stays. The most attractive region for tourists in terms of overnight stays was the eleventh region of Antalya, Isparta, Burdur followed by first region of Istanbul and fifth region of Aydın, Denizli, Muğla.

The rest of the study is organized as follow: we first explained the methodology and data used in the study and then presented and discussed the results of the study and provided the conclusions.

Methodology

To examine the relationships between inflation and the number of total, domestic, and foreign tourists' stays by using Random Coefficients Regression (RCR) for the panel data of the regions of Turkey, we used NUTS2 regional classification determined by TurkSTAT. To carry out the empirical analysis, we first tested the existence of cross-sectional dependence and then carried out the appropriate second generation panel unit root tests of CIPS developed by Pesaran (2007). After determining the existence of cross-sectional dependence and the degree of integration of variables in the study, we estimated the regional effects of tourism demand on inflation by using Random coefficient regression. Finally, we portrayed the regional differences in effects of tourism demand on inflation by using the map of Turkey. Thus, we have given the summary information about the methods we used in the study.

Cross-sectional dependence tests

Prior to determining the degree of the integration of variables used in the analysis, we need to determine whether or not there is a cross-sectional dependence among the regions. The cross-sectional dependence refers to the presence of common shocks and unobserved components. It is a type of correlation arising from common shocks with heterogeneous impacts across different countries, for instance, the oil price shock in the 1970s and the global financial crisis in 2007. It also refers to the result of local spillover effects between regions or countries. Apart from this, spatial effects, omitted common effects or interactions within socio-economic networks might be the reasons of cross-correlated errors (Atasoy, 2017). A set of four tests is constructed in order to check this property: The Breusch and Pagan (1980) Lagrange Multiplier (BP_{LM}) test, the Pesaran (2004) Cross-sectional Dependence (CD) test, the Pesaran, Ullah, and Yamagata (2008) Bias-adjusted LM (LM_{adj}) test and Baltagi, Feng, and Kao (2012) Bias-corrected scaled LM (LM_{BC}) test. Starting from BP_{LM}, we will explain them briefly by using Equation (1):

$$y_{it} = \alpha_i + \beta_i' x_{it} + u_{it} \tag{1}$$

In Equation (1), where x_{it} represents explanatory variables at $k \times 1$ dimension; α_i represents constant term and β_{it} represents the slope coefficients. The error term ($u_{it} = u_{1t},\dots,u_{Nt}$) is assumed to have zero mean with constant variance, which means $u_{it} \sim IID\,(0, \sigma^2_{iu})$.

Pesaran (2004) indicated that in cases of $N < T$, the LM test developed by Breusch and Pagan (1980) (BP_{LM}) may be utilized. To compute the sample value of the test statistics, the following expression is used:

$$BP_{LM} = T \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij}^2 \tag{2}$$

where $\hat{\rho}_{ij}$ represents the correlation coefficient between the residuals obtained for each cross-section after estimating the Equation (1) and is calculated as below (Pesaran, 2004):

$$\hat{\rho}_{ij} = \hat{\rho}_{ji} = \frac{\sum_{t=1}^{T} e_{it}\, e_{jt}}{(\sum_{t=1}^{T} e_{it}^2)^{½} (\sum_{t=1}^{T} e_{it}^2)^{½}} \tag{3}$$

BP_{LM} test has asymptotic χ^2 distribution at $N(N–1)/2$ degrees of freedom. Null and alternative hypotheses are expressed as below.

H_0: $cov\,(u_{it}, u_{jt}) = 0$ or $\sigma_{ij} = 0$ and $i \neq j$'dir. (There is no cross-section dependence)

H_1: $cov\,(u_{it}, u_{jt}) \neq 0$ or $\sigma_{ij} \neq 0$ (There is cross-section dependence)

However, Pesaran (2004) (CD_{lm}) modified the test as below for the case where $N \to \infty$ and $T \to \infty$:

$$CD_{lm} = \sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \left(T\hat{\rho}_{ij}^2 - 1\right) \tag{4}$$

The test statistic in Equation (4) has standard normal distribution, i.e. $CD_{lm} \sim N(0, 1)$.

Pesaran (2004, p. 5) (CD) also modified LM test for the cases where $N > T$:

$$CD = \sqrt{\frac{2T}{N(N-1)}} \left(\sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij} \right) \tag{5}$$

As Baltagi (2013) mentioned, $E(T\hat{\rho}_{ij}^2 - 1)$ does not go to zero in the case where T is small and $N \to \infty$. Since standard normal distribution will not occur in this instance, CD_{lm} test statistic will provide incorrect results. Hence, Pesaran et al. (2008) added the mean term μ_{Tij} and the variance term v_{Tij} to the test statistic within the formula through which the sample value of CD_{lm} test statistic is calculated, thus developing a new cross-section dependence test statistic:

$$LM_{adj} = \sqrt{\frac{2}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \frac{(T-k)\hat{\rho}_{ij}^2 - \mu_{Tij}}{v_{Tij}} \tag{6}$$

Baltagi et al. (2012) argued that the abovementioned cross-section dependence tests are valid only for heterogeneous panels, and developed a new scaled cross-section dependence test statistic taking into account the fixed effect homogenous panel data models. The reason behind this is the fact that in case there are fixed effects in the panel data model, the above tests may provide incorrect results. The modified test statistic is shown as below (Baltagi et al., 2012):

$$LM_{BC} = \sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \left(T\hat{\rho}_{ij}^2 - 1\right) - \frac{n}{2(T-1)} \tag{7}$$

This test statistic also has standard normal distribution; i.e. $LM_{BC} \sim N(0, 1)$. For all the cross-sectional dependence tests, to reject the null hypothesis, the sample value of the calculated test statistic should be greater than the table critical value.

Pesaran Panel unit root test

Pesaran (2007) Panel unit root test is one of the second-generation panel unit root tests taking into account cross-section dependence. This test is the version of the conventional Augmented Dickey-Fuller (ADF) unit root test adapted to panel data. Test equation is expressed as below (Pesaran, 2007):

$$\Delta y_{it} = \alpha_i + b_i y_{i,t-1} + c_i \bar{y}_{t-1} + d_i \bar{y}_t + e_{it} \tag{8}$$

y included into Equation (8) shows the variable subject to unit root investigation. In the context of this test, ADF test statistic (t_i) is calculated for each cross-section *i*, and named as $CADF_i$. The hypotheses of the test are expressed as below:

H_0: $b_i = 0$ for all *i*. (Variable has unit root; i.e. not stationary.)

H_1: $b_i < 0$ for at least 1 *i*. (Variable does not have unit root; i.e. stationary.)

Moreover, Pesaran (2007) developed the CIPS unit root test statistic that takes into account the entire panel belonging to the variable. This test statistic has asymptotic standard normal distribution and the sample value of the test statistic is calculated through the formula below:

$$CIPS = \bar{t}_i = \overline{CADF}_i = N^{-1} \sum_{i=1}^{N} t_i(N,T) \tag{9}$$

Swamy Random coefficients regression

To estimate the region-specific coefficients, we use Random Coefficients Regression developed (RCR here after) by Swamy (1970). To explain the Swamy regression, we start with the following Equation (10):

$$y_{it} = X_{it}\beta_i + u_{it} \tag{10}$$

where y_i is the dependent variable; X_i represents the independent variable; u_i is the model's error term. β_i in Equation (10) represents the coefficients vector at $k \times 1$ dimension for each cross-sectional unit and defined as follow:

$$\beta_i = \beta + \delta_i, E(\delta_i) = 0 \text{ and } E(\delta_i\delta_j') = \Sigma = \begin{cases} \Delta, \text{ if } i = j \\ 0, \text{ if } i \neq j \end{cases} \tag{11}$$

By using information in Equation (11), we can rewrite the equation as:

$$yi = X_{it}(\beta_i + \delta_i) + u_i = X_{it}\beta + (X_{it}\delta_i + u_i) = X_{it}\hat{\beta} + \theta_i' \tag{12}$$

Since the variance of the error term θ_i is dependent on both u_{it} and $X_{it}\delta_i$ because of Equation (12), it is not stationary and expressed as follows:

$$E(\theta_i\theta_i') = E\left\{(X_{it}\delta_i + u_i)(X_{it}\delta_i + u_i)'\right\} = E(u_iu_i') + X_iE(\delta_i\delta_i')X_i' = \sigma_i^2 I + X_i\Sigma X_i' \tag{13}$$

Thus, the variance for each cross-section is calculated as below:

$$\hat{\sigma}_{ii}^2 = \frac{(y_i - X_i\hat{b}_i)'(y_i - X_i\hat{b}_i)}{T_i - k} \tag{14}$$

where *T* represents time dimension and *k* represents the number of variables. $\hat{b}_i$ values are obtained for each cross-section by using OLS estimator, which is $\hat{b}_i = (X_i'X_i)^{-1}(X_iy_i)$.

Although the method of estimation of model coefficients deserves a great deal of care and is important, what is more important is to determine whether or not the coefficients vary from cross-section to cross-section, which means 'region to region' in the context of this study. To determine parameter determinacy, we use the following test statistic developed by the study of Swamy (1970):

$$H_{\beta} = \sum_{i=1}^{N} \frac{(b_i - \hat{\beta})' x_i' x_i (b_i - \hat{\beta})}{\sigma_{ii}^2} \quad (15)$$

H_{β} test statistic has asymptotic χ^2 distribution with k (N – 1) degree of freedom. To test whether the regions have a single common coefficient, we test the following hypotheses:

H_0: $\beta_1 = \beta_2 = \cdots \beta_N = \hat{\beta}$ (All regions have a single common coefficient)

H_1: $\beta_1 \neq \beta_2 \neq \cdots \beta_N \neq \hat{\beta}$ (Every region has a different coefficient)

When the calculated H_{β} statistic is greater than the table critical χ^2 value, we reject the null hypothesis and conclude that each region has a different coefficient.

Mapping of random coefficients regression results

We also present region-specific effects of the total tourist overnight stays, foreign tourist overnight stays, and domestic tourist overnight stays on inflation by using the map of Turkey and choropleth mapping method. For the mapping process, MapInfo software (version 12.5) was used. When establishing spacing, median values were obtained by taking into consideration the averages of coefficients and the standard errors of these coefficients. The values over and below standard errors were divided into two equal parts and the quinary spacing values were calculated. On the choropleth maps, the impacts of the number of overall tourists' overnight stays are displayed with brown tones. While darker tones represented the highest coefficients of impacts, lighter tones represented the lowest coefficients of impacts. The impacts of the number of foreign tourists' overnight stays are displayed with a transition from red to dark blue (bipolar coloring methodology), where red represents the highest coefficients of impact and blue represents the lowest coefficients of impact. The impacts of the number of foreign tourists' overnight stays are mapped by shading method, where thick textures represented the highest impact and sparse textures represented the lowest impact.

The impacts of domestic and foreign tourists on inflation are displayed on column chart maps, where red columns represent the impact of foreign tourists and green columns represent the impact of domestic tourists on inflation.

By intersecting the maps drawn through choropleth method and those drawn through column chart method, we will have a chance to analyze the impacts of both total tourist overnight stays, and foreign tourist overnight stays and domestic tourist overnight stays on inflation variables may be observed as a whole.

Data

Our dataset is at the annual frequency and extracted from TurkSTAT. It consists of Consumer Price Index, (base year is 2003) (LNCPI), Total Number of Tourist Overnight stays (LNTOTTOUR), Number of Foreign Tourist Overnight stays (LNFORTOUR), and Number of Domestic Tourist Overnight Stays (LNDOMTOUR). In Table 1, we give the details of the NUTS2 regional classification.

Table 1
NUTS2 regional classification

Groups	Group Code	Group Name
1	TR10	Istanbul
2	TR21	Tekirdağ, Edirne, Kırklareli
3	TR22	Balıkesir, Çanakkale
4	TR31	İzmir
5	TR32	Aydın, Denizli, Muğla
6	TR33	Manisa, Afyon, Kütahya, Uşak
7	TR41	Bursa, Eskişehir, Bilecik
8	TR42	Kocaeli, Sakarya, Düzce, Bolu, Yalova
9	TR51	Ankara
10	TR52	Konya, Karaman
11	TR61	Antalya, Isparta, Burdur
12	TR62	Adana, Mersin
13	TR63	Hatay, Kahramanmaraş, Osmaniye
14	TR71	Kırıkkale, Aksaray, Niğde, Nevşehir, Kırşehir
15	TR72	Kayseri, Sivas, Yozgat
16	TR81	Zonguldak, Karabük, Bartın
17	TR82	Kastamonu, Çankırı, Sinop
18	TR83	Samsun, Tokat, Çorum, Amasya
19	TR90	Trabzon, Ordu, Giresun, Rize, Artvin, Gümüşhane
20	TRA1	Erzurum, Erzincan, Bayburt
21	TRA2	Ağrı, Kars, Iğdır, Ardahan
22	TRB1	Malatya, Elazığ, Bingöl, Tunceli
23	TRB2	Van, Muş, Bitlis, Hakkari
24	TRC1	Gaziantep, Adıyaman, Kilis
25	TRC2	Şanlıurfa, Diyarbakır
26	TRC3	Mardin, Batman, Şırnak, Siirt

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Results and discussion

In this part of study, we present the results of cross-sectional dependence, panel unit root tests, and RCR estimates. After interpreting the RCR estimates, we will also display the results of RCR estimates by using Turkey's map.

Cross-sectional dependence test results

Table 2 presents the results of cross-sectional dependence tests.

Table 2
The results of cross-sectional dependence test

Name of Variable	LNTOTTOUR		LNFORTOUR	
Test	Statistic Value	Prob.	Statistic Value	Prob.
Breusch-Pagan LM (BP_{LM}) test	2396.01*	.000	1872.81*	.000
Pesaran CD-LM (LMadj) test	80.21*	.000	59.69*	.000
Bias-corrected scaled LM (LM_{BC}) test	78.76*	.000	58.24*	.000
Pesaran CD test	48.53*	.000	41.32*	.000
Name of Variable	LNDOMTOUR		LNCPI	
Test	Statistic Value	Prob.	Statistic Value	Prob.
Breusch-Pagan LM (BP_{LM}) test	2135.73*	.000	3243.72*	.000
Pesaran CD-LM (LMadj) test	70.00*	.000	113.46*	.000
Bias-corrected scaled LM (LM_{BC}) test	68.55*	.000	112.07*	.000
Pesaran CD test	45.06*	.000	56.95*	.000

Note. *Significant at 1% level of significance.

According to the results in Table 2, there is cross-sectional dependence among the regions of Turkey, since for each region we rejected the null hypothesis of absence of cross-sectional dependence. The existence of cross-sectional dependence has some implications on the methods one should use to carry out econometric exercises adopted in this paper. First of all, we should use second generation panel unit root test to investigate the stationarity of each variable. Secondly, the existence of cross-sectional dependence implies that there is a transmission of inflation shocks among the regions of Turkey.

Pesaran Panel unit root test results

Table 3 shows the results of panel unit root test. The panel unit root test results in Table 3 indicate that all the variables are at level stationary implying that we satisfy the conditions to estimate RCR.

Table 3
The results of CIPS unit root test

Name of Variable	At CTM-Level	Result
LNCPI	–4.45*	I(0)
LNTOTTOUR	–5.93*	I(0)
LNFORTOUR	–10.02*	I(0)
LNDOMTOUR	–4.88*	I(0)
Level of Significance	CTM (constant and trend)[a]	
1%	–3.30	
5%	–2.94	
10%	–2.76	

Note. [a]Critical values for CTM were taken from "A simple panel unit root test in the presence of cross-section dependence" by M. H. Pesaran, 2007, *Journal of Applied Econometrics*, *22*(2), p. 281. Copyright 2007 by John Wiley & Sons, Ltd.
*Significant at 1% level of significance.

Random coefficients regression results

To obtain the effects of tourism demand on regions, we estimate the following Swamy RCR:

$$y_{it} = X_{it}\beta_i + u_{it} \tag{16}$$

where y_i is LNCPI and X_i represents LNTOTTOUR, LNFORTOUR, and LNDOMTOUR. u is error term and β_i the region-specific slope, which is the sum of common (β) and unit-specific (δ_i) components: $\beta_i = \beta + \delta_i$ and shows the effects of each component of tourism demand on regional inflation. In this part of the study, we will present and discuss the impacts of variables representing regional tourism demand on the regional inflation. Table 4 presents the results of coefficients estimates.

Table 4
Impacts of tourism demand on inflation

Results of Random Coefficients Regression between LNCPI and LNTOTTOUR				
LNCPI	Coefficient	Standard Error	*z* statistic	Prob.
LNTOTTOUR	.88*	.06	13.76	.001
constant	–6.99*	.99	–7.03	.001
Test of Parameter Constancy (Chi-square): 1702.34; Probability: .0000				
Wald Chi-square = 194.98; Probability: .0261				
Results of Random Coefficients Regression between LNCPI and LNFORTOUR				
LNCPI	Coefficient	Standard Error	*z* statistic	Prob.
LNFORTOUR	.56*	.06	8.96	.001
constant	–1.79***	.96	–1.86	.063
Test of Parameter Constancy (Chi-square): 805.31; Probability: .0000				
Wald Chi-square = 80.25; Probability: .0261				
Results of Random Coefficients Regression between LNCPI and LNDOMTOUR				
LNCPI	Coefficient	Standard Error	*z* statistic	Prob.
LNDOMTOUR	.88*	.07	11.61	.001
constant	–6.58*	1.07	–6.12	.001
Test of Parameter Constancy (Chi-square): 1252.57; Probability: .0000				
Wald Chi-square = 134.91; Probability: .0000				

Note. *Indicates statistical significance at 1%; ***indicates statistical significance at 10%.

The results in Table 4 indicate that the parameters across the regions are varying. In other words, they are not constant (shown by significant parameter constancy test) indicating that LNTOTTOUR variable has different impacts on LNCPI variable for each region defined within NUTS2 classification. According to parameter estimates in Table 5, for all the regions, 1% increase in LNTOTTOUR increases LNCPI by approximately 0.88%. Also, 1% increase that occurred in LNDOMTOUR increases LNCPI by approximately 0.88%, and 1% increase in LNFORTOUR increases LNCPI by approximately 0.56%. Finally, all the models are statistically significant, since Wald Chi-Square statistics are all significant.

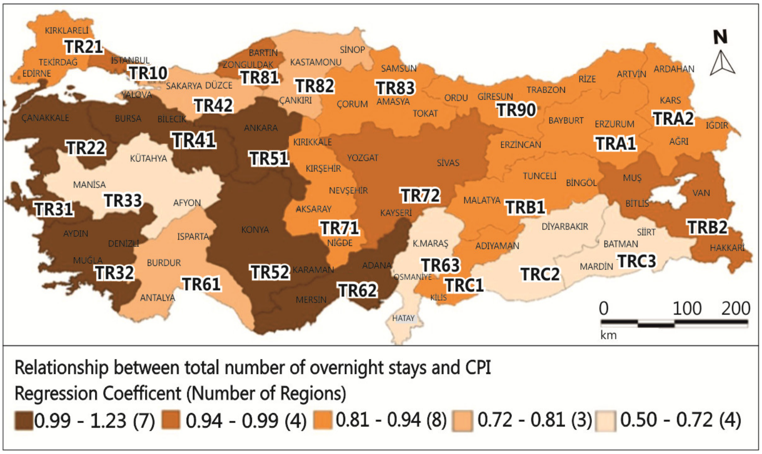

Figure 1. The relationship between the total number of overnight stays and inflation.

Figure 1 displays the regional distribution of the impacts of the total number of overnight stays. According to this Figure, regions where a change in LNTOTTOUR increases LNCPI the most are TR22, TR31, TR32, TR41, TR51, TR52, and TR62 regions, followed by TR10, TR81, TR72, and TRB2 regions. The increase in LNCPI due to a change in LNTOTTOUR in TR21, TR71, TR83, TR90, TRA1, TRB1, TRC1, and TRA2 regions is close to Turkey's average, while TR42, TR82, and TR61 are regions where a change in LNTOTTOUR increases LNCPI slightly less than Turkey's average. Regions where an increase in LNTOTTOUR increases LNCPI the least are TR33, TR63, TRC2, and TRC3 regions.

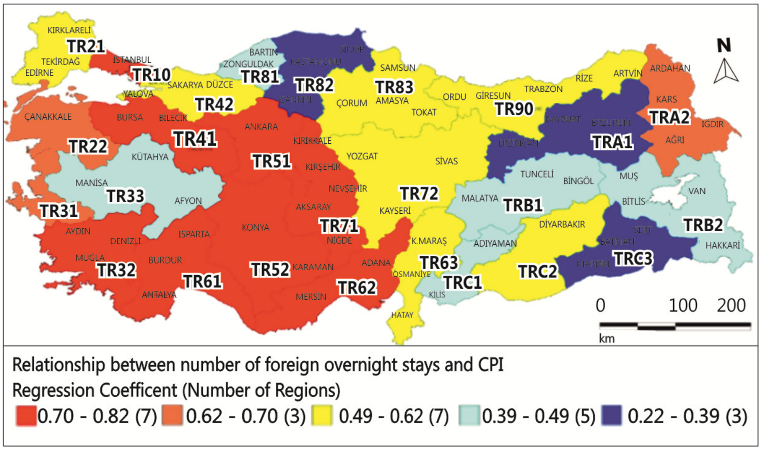

Figure 2. The relationship between the number of foreign overnight stays and inflation.

Figure 2 shows the regional distribution of the impacts of foreign overnight stays. According to Figure 2, regions where a change in LNFORTOUR increases LNCPI the most are TR10, TR32, TR41, TR51, TR52, TR61, TR62, and TR71 regions, followed by TR22, TR31, and TRA2 regions. The increase in TR21, TR42, TR83, TR72, TR63, TR90, and TRC2 regions is close to Turkey's average, while TR33, TR81, TRB1, TRC1, and TRB2 are regions where a change in LNFORTOUR increases LNCPI slightly less than Turkey's average. Regions where an increase in LNFORTOUR increases LNCPI the least are TR82, TRA1, and TRC3 regions.

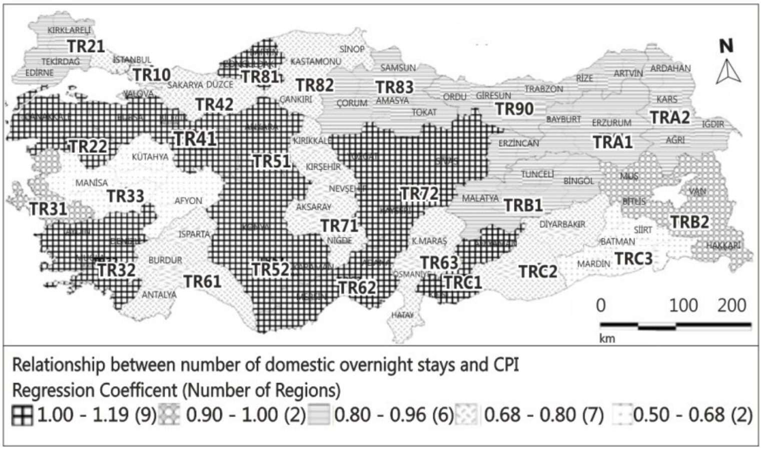

Figure 3. The relationship between the number of domestic overnight stays and inflation.

Figure 3 displays the regional distribution of the impacts of domestic overnight stays. According to Figure 3 the regions where a change in LNDOMTOUR increases LNCPI the most are TR22, T32, TR41, TR51, TR52, TR62, TR72, TR81, and TRC1 regions. These regions are followed by TR31 and TRB2 regions. The regions where a change in LNDOMTOUR increases LNCPI close to Turkey's average are TR21, TR93, TR90, TRA1, TRA2, and TRB1, while TR10, TR42, TR82, TR71, TR61, TR63, TRC2, TR33, and TRC3 are regions where the impact is less than Turkey's average.

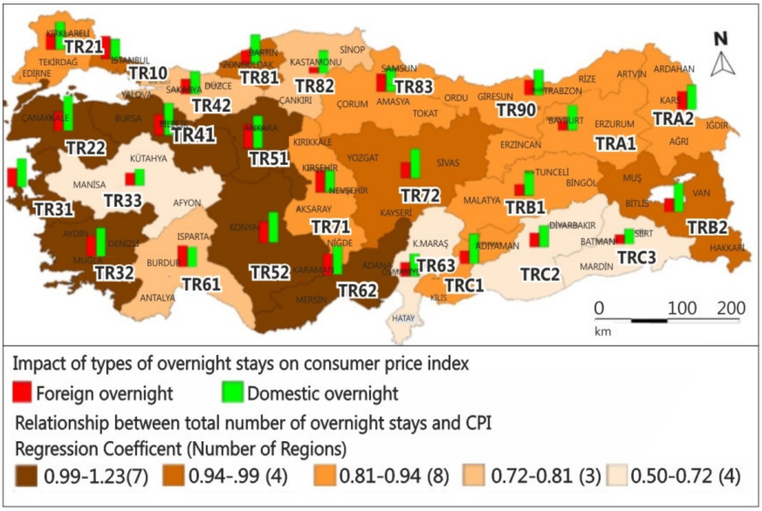

Figure 4. The comparison of the impacts of different types of overnight stays on inflation.

Figure 4 shows the different impacts of overnight stays of different groups. According to Figure 4 in all the regions except for TR10 and TR61, the impact of LNDOMTOUR on LNCPI is higher than that of LNFORTOUR. Also, Figure 4 indicates that these impacts increase in western regions except for TR33 region. In all the regions, the impact of the change in LNTOTTOUR has the highest, and the impact of LNDOMTOUR on LNCPI is greater than that of LNFORTOUR.

Based on the results of the study, it is fair to conclude that there are regional inflationary effects of tourism demand. But, this effect significantly differs between foreign and domestic overnight stays. The elasticities of price level with respect to the foreign overnight stays for regions are all less than one. But, some of the same elasticities with respect to domestic overnight stays are greater than one for the regions of TR22, TR32, TR41, TR51, TR52, TR62, TR72, TR81, and TRC1. Out of these regions, only TR32 regions can be considered foreign tourist attracting region. Others are mostly dominated by domestic overnight stays. But, when we consider the total number of overnight stays, there are five regions where the elasticities of price level with respect to the total overnight stays are greater than one. These are TR22, TR32, TR41, TR51, and TR62. Thus, these results should be taken seriously by policy makers, regional and city administrators as well as tourism authorities. Understanding and analyzing the pricing behavior of tourism and other firms especially in domestic overnight stays dominated regions and provinces within the regions will help to strengthen the power of monetary authorities especially to fight against long-lasting structural problem of inflation in Turkey. When designing the tourism policies in these regions, these adverse effects of tourism demand should be minimized to obtain the real contribution of industry.

Conclusion

In this study, we examined the impacts of different forms of overnight stays (total, domestic, and foreign) on inflation for the NUTS2 regions as listed in the classification defined by TurkSTAT by using the Random Coefficients Regression method developed by Swamy (1970) for the annual panel data over a period between 2004 and 2013.

Even though the main findings of the study indicate that all the forms of overnight stays are increasing both overall and regional inflation in Turkey, the impacts of different forms of overnight stays are varying across regions. According to the results, a 1% increase in overall overnight stays cause a 0.88% increase in overall inflation. The impact of an increase in domestic overnight stays (0.88%) is higher than that of foreign overnight stays (0.56%). These results indicate that domestic tourists are involved more in shopping in their destinations than foreign tourists. Since foreign tourists are using all-inclusive system and pre-purchased package tours to visit Turkey, they spend less money; thus, they create smaller effect on prices to increase. The number of domestic overnight stays increases inflation more for all the regions except for TR10 and TR61 regions. For 11 regions, the increase in overall overnight stays causes approximately 1% increase in inflation. In other regions, this increase is still not less than 0.5%.

Increase in inflation rates due to the rising tourism demand may cause declines in people's purchasing power, and therefore, a decline in tourism demand in the long term. Besides, knowing the fact there are many adverse effects of rising inflation, especially on income distribution, and rising inflation results from rising overnight stays has a potential endangering success of the fight against inflation, particularly of the inflation targeting regime, there will be a trade-off between subsidizing tourism sector and fighting against inflation. For this reason, policy makers should consider this inflationary effect of tourism demand when they design their industrialization policies as well as policies to be used to fight against inflation. At least, the inflationary effects of different types of overnight stays should be taken into account and policy makers should seek a balance between preventing inexorable expansion of domestic tourism activities and promoting the development of tourism to boost sector's contribution to economic growth.

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