

SELECTED DETERMINANTS OF TOURISM DEMAND – PANEL COINTEGRATION ANALYSIS

Tomáš Jeřábek

Abstract: *The aim of the paper is to investigate the effect of income of tourists, tourism price, trade openness and international outbound tourists in tourism origin countries on the tourism demand to the Czech Republic as well as to South Moravia Tourist Region of the Czech Republic from tourists coming from thirteen different countries is analysed. This paper applies panel co-integration analysis through a common correlation effect model (CCE). According to the obtained estimation results, income and trade openness have a significant positive influence on international arrivals to the Czech Republic, while for tourism price the results indicate that it has a negative influence on inflows, as expected. The effect of international outbound tourists on tourism demand in the Czech Republic is negative, against expectations, but it is not statistically significant. For tourism demand in the SMT region, income has a significant positive influence on international arrivals to the South Moravia tourist region, as it regards relative price, the negative sign of the coefficient is the same as the expected one. The effects of trade openness and international outbound tourists on tourism demand in the SMT region have expected positive signs but they are not statistically significant.*

Keywords: *Tourism Demand, Panel Cointegration Analysis, Real Exchange Rate, Gross Domestic Product, Trade Openness, International Outbound Tourists.*

JEL Classification: *F14, F47, Z3.*

Introduction

Modelling and forecasting tourism demand has a long history. However, due to the development of a mixed autoregressive model (ARIMA) for the analysis of one-dimensional time series, it has started more pronounced since the 1970s. In the 1990s, ARIMA models added more advanced techniques for analysing multidimensional time series, namely vector autoregressive (VAR) models, error correction models (ECM), and vector ECM (VECM). One of the main advantages of these techniques is the ability to analyse causal relationships between the tourism demand as a dependent variable and its influential factors - explanatory variables. The applications of all these models can be seen in studies of the last decade. For example, Bonham et al. (2009) apply VECM to predict tourism in Hawaii. Chaiboonsri et al. (2009) through VECM seek to find short-term and long-term relationships between foreign tourists traveling to Thailand and economic variables such as international arrivals, gross domestic product, goods and services, transport costs and exchange rates. Gautam (2014), using cointegration techniques and the VECM model, examines long-term relationships between economic growth and tourism development in Nepal.

The above studies explore data in the form of time series that are capable of delivering a large number of results, but many observations remain hidden, such as more complicated spatial dependencies. The solution is to use so-called panel data. Panel data is spatial data that is repeatedly retrieved over multiple time periods. The

exploration of long-term relationships within panel data is the main purpose of this text. The paper represents a little-used approach to tourism demand analysis based on panel cointegration analysis. For example, Falk (2015) applied a panel ECM model to analyse the impact of the euro's depreciation on the Swiss overnight stays in selected Austrian ski resorts. The author confirms the higher sensitivity of tourism demand to the development of the analysed exchange rate, in other words, Swiss visitors to Austrian ski resorts are strongly affected by CHF/EUR exchange rates. Ongan et al (2017) investigates the effects of real exchange rates and income on tourist arrivals from seven countries to the USA. According to the test results, the effect of income as a measure of GDP as well as the effect of RER on the number of tourists arriving in the USA is positive.

The aim of the paper is to investigate the effect of income of tourists, tourism price, trade openness and international outbound tourists in tourism origin countries on the tourism demand to the Czech Republic as well as to South Moravia Tourist Region of the Czech Republic by foreign tourists arriving from selected European, Asian and American countries. The rest of the text is divided into four parts. The first part provides a short problem statement. The second part presents the model apparatus used in the paper. In the third part, empirical model and results are presented. The fourth part provides discussion of results.

1 Statement of a problem

Knowledge of factors influencing the tourism demand in the Czech Republic is crucial for both managers and policy makers. The best known determinants are income and price variables. Income is a key variable in demand models. As an income measure, Gross Domestic Product (GDP) and Gross National Product, in nominal or real terms and in their per capita form, can all be considered, see Song and Li (2008). Important price variable is the exchange rates between the origin country and alternative destinations. The real exchange rate (RER) is defined as the ratio of the price level abroad (the Czech Republic) and the domestic (tourism origin country) price level, where the foreign price level is converted into domestic currency units via the current nominal exchange rate; see Li et al. (2005) or Seo et al. (2009) for RER applications in demand tourism models. Compared to previous similar studies, the harmonized consumer price index (HCPI) for hotels and restaurants is used to derive the real exchange rate instead of the general CPI that may not capture the price level of products and services that tourists often encounter.

For the Czech Republic, econometric models were applied in the studies of Babecká (2013) and Indrová et al. (2017). International tourism demand was measured in both studies through attendance at collective accommodation facilities. Babecká (2013) analyses the international tourism demand in the Czech Republic through the gravity model. Real GDP of tourism origin countries, real exchange rate and the distance of origin country from the Czech Republic and five dummy variables were considered as the tourism demand determinants. Indrova et al. (2015) monitored the impact of the development of income and price variables on the tourism demand in the Czech Republic. For this purpose, they used a dynamic panel with Arellano-Bond GMM estimator. Real GDP per capita for origin countries, RER, trade openness,

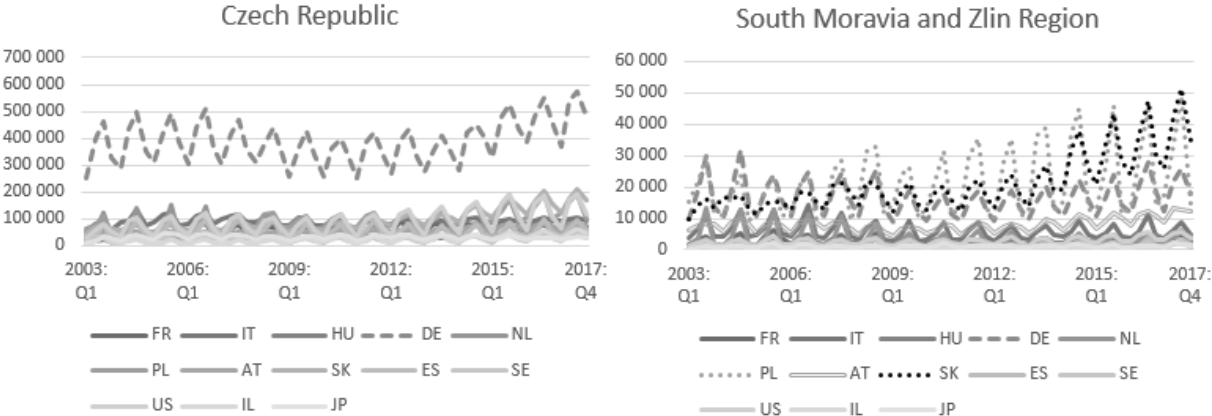
lagged value of tourism demand as dependent variable and two dummy variables are considered as determinants.

The previous papers did not take into account the cross-sectional dependences, i.e. unobserved time-specific heterogeneity which makes error terms contemporaneously correlated. In tourism demand context, the cross-sectional dependence can be induced by the presence of common shocks affecting tourism demand from observed countries and this can lead to different country-specific responses to these shocks. This approach has not been used in the tourism literature where cross-sectional dependence is usually ignored. However, cross-sectional units are almost certainly influenced by national or global shocks such as business cycles or national fiscal and monetary policies. Ignoring cross-sectional dependence of errors can have serious consequences.

This study examines the effect of four determinants on tourism demand from the France (FR), Austria (AT), the Netherlands (NL), Germany (DE), the Slovak Republic (SK), Spain (ES), Italy (IT), Sweden (SE), Israel (IL), Japan (JP), USA (US), Poland (PL) and Hungary (HU) to the Czech Republic and to the South Moravia Tourist (SMT) region in 2003:Q1- 2017:Q4, i.e. from the first quarter of 2003 to the last quarter of 2017. These countries were included in the selection by meeting two conditions, such as availability of data and a greater number of visitors from the country.

The monitored time series of dependent variables (tourism demand for Czech Republic and tourism demand for SMT region) are presented in Fig. 1. There can be seen a similar development of most of the series, i.e. it can be assumed the existence of long-term relationships. Furthermore, in the crisis period, the number of tourists is decreasing, indicating possible long-term relationships between the number of tourists and some macroeconomic indicators.

Fig. 1: Occupancy (in log) in CAE by selected countries in the Czech Republic



Source: Czech Statistical Office, elaborated by author.

In view of the aim of this paper, the explanatory (independent) variables are income as the gross domestic product (GDP) per capita at constant 2010 prices in the local currency. Tourism price as the real exchange rate (RER) based on the harmonized consumer price index (HCPI, 2010=100) for restaurants and hotels. Trade openness as the ratio of exports plus imports to GDP. In addition to determinants above, international outbound tourists as variable is used. International outbound tourists (IOT) are the number of departures that people make from their country of usual residence to any other country for any purpose other than a remunerated activity

in the country visited. The effect of departures number changes in tourism origin countries is important to analyse. None of the tourism studies do not consider this variable. Some of the studies consider total population of the tourism origin country. However, the population tends to be highly correlated with income. To take into account the cross-sectional dependence between units, unobserved dynamic common shocks are approximated using the method proposed by Pesaran (2006). This approach have the benefit that it do not require selection of a set of observed proxies. Source of data for the number of tourists was the Czech Statistical Office, real GDP per capita, nominal exchange rates as well as consumer price indices were obtained through the FRED database, administered by the Federal Reserve Bank of the USA. The data on exports and imports were collected from World Bank data source as well as international outbound tourists data. All time series were seasonally adjusted using the X-13ARIMA-SEATS software developed by U. S. Department of Commerce, U. S. Census Bureau. All statistical analysis were performed using Gretl and Eviews 8. Data were logarithmically transformed for further analyses.

Four hypothesis were formulated to study the effects of variables to interantional tourism demand in the Czech Republic and in the SMT region: (1) It is expected that income (as the real GDP per capita) has a positive impact on the number of tourists (as tourism demand). (2) If RER is greater than one, it means that foreign (Czech) goods are actually more expensive, i.e. the foreign (Czech) price level is higher than the price level in the origin destinations of the monitored tourists. Thus, it can be expected a negative relationship between price level and tourism demand which follows the law of demand. (3) The positive effect of trade openness between the Czech Republic and tourism origin countries is expected. (4) An increasing number of departures from destinations can be seen as an increase in the interest of tourists from these countries to travel. Furthermore, if this increase also leads to an increase in the number of tourists from these countries to the Czech Republic, this is evidenced by the attractiveness of the Czech Republic for these tourists. Given the choice of the tourism origin countries, it can be assumed that the number of departures from these countries will have a positive effect on tourism demand.

2 Methods

This paper applies panel cointegration analysis through a common correlation effect model (CCE). In panel analysis, it is first important to test the independence of individual panels and homogeneity of the estimated coefficients. For this purpose, we consider a standard panel data model, see Banerjee and Carrion-i-Silvestre (2017), for instance.

Cross-sectional dependence means the correlation between residuals across all cross-section units. The reason for analyzing cross-sectional dependence is the fact that its existence (or non-existence) affects the specific choice of test to determine the presence of the unit root within the variables, see Sharif and Hamzah (2015). Information about the presence of a unit root is important in cointegration analysis, which is one of the focus of this paper.

Two test statistics are used to verify the above hypotheses. Specifically, LM statistic proposed by Breusch and Pagan (1980) and CD statistic proposed by Pesaran (2004). It is also necessary to determine whether the slope coefficients in panel data

model are homogenous. We are interested in whether these coefficients are the same (homogenous) or different (heterogenous) across cross-section units. Standard for this purpose is the test procedure provided by Swamy (1970), which works with the assumption of a relatively small number of cross-sectional units. For this reason, the extension of the given procedure provided by Pesaran and Yamagata (2008) is applied here, specifically, both delta statistics (Δ and Δ_{adj}) are used.

In order to check for the presence of cointegration relationships between the variables, it is important to test whether the variables contain unit root and therefore they are non-stationary, and are denoted as $I(1)$. If the variables do not contain the unit root, they are stationary, $I(0)$. In the panel analysis, two types of unit root tests can be applied, see Hurlin and Mignon (2007). The first type tests, sometimes referred to as the first generation tests, when the cross-correlation is not confirmed, for example, the Im-Pesaran-Shin test proposed by Im et al. (2003). For the second generation of panel unit root tests, the presence of cross-sectional dependence among the error terms is allowed within the panel, for example, the cross-sectionally augmented IPS test proposed by Pesaran (2007).

Following the determination of the stationary of the variables, the long-term cointegration relationship between the variables can be analysed by using the Durbin-Hausman (D-H) panel cointegration test proposed by Westerlund (2008). This test possible to conduct cointegration analysis in case the independent variables are $I(1)$ or $I(0)$, but dependent variable must be non-stationary in the sense of $I(1)$. The test works with two statistics, Durbin-Hausman Group (DHG) and Durbin-Hausman Panel (DHP). In DHG, Westerlund (2008) allows the cointegration coefficients to differ between cross-sections, while the coefficients are considered to be the same for all cross-sections, in DHP. For these statistics, it is tested that there is no cointegration between variables in the null hypothesis. The alternative hypothesis for DHG indicates that there is cointegration relationship for at least some cross-sections. Rejection of the null hypothesis for DHP implies that there is a cointegration relationship for the whole of the panel, see Westerlund (2008).

Following the finding of cointegration between the variables, cointegration coefficients are estimated by using the Common Correlated Effects (CCE) method proposed by Pesaran (2006). One of the advantages of the CCE method is that cointegration coefficients can be estimated for each horizontal section unit. This makes an opportunity to individual interpretations cointegration coefficients for each section unit (country), see Banerjee and Carrion-i-Silvestre (2017).

3 Problem solving and results

The cross-sectional dependence was analysed for individual variables across the countries analysed as well as the whole model. The results of the cross-sectional dependence are presented in Tab. 1. Since, in all cases, the p-value is less than 0.01, the null hypothesis of the cross-sectional dependence was rejected at 1% significance level. Hence, it was concluded that there is cross-section dependence among the countries constituting the panel. In other words, the shock to one of the monitored countries is likely transmitted to the other countries.

Furthermore, Tab. 1 presents the homogeneity test of the estimated coefficients. According to the results, since the p-values of the tests were smaller than 0.01, null hypothesis of homogeneity was rejected and alternative hypothesis was accepted. Thus, it can be considered heterogeneous, in other words, it makes sense to look for their estimates for all cross-section units.

Tab. 1: Cross-sectional dependence test and homogeneity test

| Cross-sectional dependence test | | | | | | | | |
|---------------------------------|----------------|-----------|-----------|-----------|------------|-----------|------------|-------------|
| Tests | lnTD_cz | lnTD_smt | lnRER | lnGDP | lnTO | lnIOT | Model (CZ) | Model (SMT) |
| LM | 182.61*** | 193.24*** | 264.85*** | 263.48*** | 243.61*** | 196.93*** | 1270.17*** | 1277.21*** |
| CD | 18.10*** | 15.12*** | 13.08 | 13.90*** | 16.74*** | 15.02*** | 122.85 | 122.24*** |
| Homogeneity test | | | | | | | | |
| Tests | Czech Republic | | | | SMT Region | | | |
| Δ | 9.08 | | | | 8.99 | | | |
| Δ_{adj} | 9.97 | | | | 9.12 | | | |

*** - statistically significant at 1% level, ** at 5% level, * at 10% level.

Source: Own elaboration.

For further analysis, it is necessary to determine the presence of unit roots in the panel data. Due to the existence of the cross-sectional dependence, the second generation test was used, namely CIPS test proposed by Pesaran (2007). The results in Tab. 2 shows that for all logarithmized variables, the null hypothesis was rejected at 1% level of significance. Thus, the variables contain the unit root, i.e. I(1). Furthermore, first differencing the time series removed the unit root, they were stationary, i.e. I(0). For these reasons, the cointegration analysis can be used.

Tab. 2: CIPS Unit Root Test Results

| Variable | lnTD_cz | lnTD_smt | lnRER | lnGDP | lnTO | lnIOT |
|----------------|----------------------------------|--------------|-----------|-----------|----------|---------|
| Constant | -2.07 | -2.01 | -2.19* | -1.91 | -2.02 | -1.63 |
| Critical value | 1%: -2.45; 5%: -2.25; 10%: -2.15 | | | | | |
| Constant+trend | -2.69* | -2.43 | -2.58 | -2.06 | -2.52 | -1.99 |
| Critical value | 1%: -2.93; 5%: -2.76; 10%: -2.66 | | | | | |
| Variable | dif_lnTD_cz | dif_lnTD_smt | dif_lnRER | dif_lnGDP | dif_lnTO | dif_lnD |
| Constant | -8.98*** | -7.76*** | -8.75*** | -6.11*** | -10.02 | -4.21 |
| Constant+trend | -9.05*** | -8.12*** | -8.86*** | -7.07*** | -10.25 | -5.19 |

Source: Own elaboration

In order to confirm the existence cointegration relationships, a D-H test is applied. It offers two statistics, namely group statistic (DHG) and panel statistic (DHP). Tab. 3 presents the results of both these statistics, including their significance represented by the p-values. For both Durbin-Hausman panel and Durbin-Hausman group cointegration tests, the null hypothesis was rejected at 1% level of significance. In this case, the alternative hypothesis assuming that there are cointegration relationships in some countries and throughout the panel is accepted. Thus, cointegration test results show that there are some long-run relationships between tourism demand and independent variables and these relationships may be different for different countries. After deciding that there are long-run relationships, cointegration coefficients can be estimated.

Tab. 3: Durbin-Hausman Cointegration Test Results

| | CZ (test statistic) | SMT (test statistic) |
|-------------------------|------------------------|-------------------------|
| Durbin-Hausman (DHG) | 7.84*** | 8.98*** |
| Durbin-Hausman (DHP) | 3.44*** | 4.21*** |

Source: Own elaboration.

Based on the above analysis, there are cointegration relationships between tourism demand (for the Czech Republic and for the SMT region) and GDP in the local currency (as income), real exchange rate, trade openness or international outbound tourists from tourism origin country.

The CCE results for the panel are reported in Tab. 4. The results show that the negative effect of the real exchange rate on the tourism demand is statistically significant, at 5% level. Thus, with the rising exchange rate, demand is decreasing, namely with 1% increase in the real exchange rate decreases tourism demand in the Czech Republic and the SMT region by 0.5% and 0.75%, respectively. The income effects as a measure of GDP on the tourism demand in the Czech Republic and SMT region are positive (0.85) at 10% level of significance and 5% level of significance, respectively. In other words, a 1% increase in GDP per capita in the tourism origin countries increases tourism demand by 0.85%. Trade openness is positively related to tourism demand in the Czech Republic, 1% increase in trade openness raises tourism demand by 0.066%. The results indicate that tourism demand is inelastic to bilateral trade and tourism demand is not very responsive to changes in trade volume between Czech Republic and respective countries. For tourism demand in the SMT region, trade openness is not statistically significant. Finally, the effect of international outbound tourists on tourism demand in the Czech Republic and SMT region, respectively is not statistically significant.

Tab. 4: CCE estimates for the Panel

| | lnGDP | lnRER | lnTO | lnIOT |
|---------------------------------|--------------------|---------------------|-------------------|-------------------|
| Czech Republic | 0.852* (0.166) | -0.500** (0.074) | 0.066* (0.029) | -0.039 (0.055) |
| South Moravia Tourist Region | 0.845** (0.137) | -0.747** (0.099) | 0.011 (0.081) | 0.107 (0.128) |

Standard deviations are in round brackets.

Source: Own elaboration

Tab. 5 presents country-specific CCE estimates. It is clear from the table that the expected positive relationships between the income of tourists and tourism demand in the Czech Republic and the SMT region are statistically significant for 11 countries (all except Japan and Hungary) and 7 countries (all expect France, the Netherlands, Spain, Israel, Japan and USA), respectively. The expected statistically significant negative relationship between RER and tourism demand in the Czech Republic and SMT region have been found for 11 countries (all expect Italy, Japan and Hungary) and for 10 countries (all expect Spain, Israel and Hungary), respectively. The effect of the trade openness on tourism demand for the Czech Republic is statistically significant and positive for France, the Netherlands, Germany, Spain, Italy and Hungary. The negative statistically significant effect have been found for Austria and

Japan. In the SMT region tourism demand, the negative statistically significant effect have been found for Spain and Hungary, the positive statistically significant effect for the Netherlands and Italy. The effect of international outbound tourists on tourism demand in the Czech Republic is negative statistically significant for France and Spain, the positive statistically significant for the Slovak Republic and Hungary. In the SMT region tourism demand, the effect of international outbound tourists is statistically significant for Spain (positive) and Italy (negative).

Tab. 5: CCE estimates for the Countries

| | Czech Republic | | | | South Moravia Tourist Region | | | |
|----|--------------------|----------------------|--------------------|---------------------|------------------------------|----------------------|-------------------|--------------------|
| | lnGDP | lnRER | lnTO | lnD | lnGDP | lnRER | lnTO | lnIOT |
| FR | 1.267* (0.235) | -0.416** (0.029) | 0.097* (0.019) | -0.476* (0.098) | 0.781 (0.993) | -1.437** (0.194) | -0.130 (0.158) | -0.170 (0.367) |
| AT | 1.470* (0.433) | -0.183* (0.046) | -0.148 (0.093) | -0.423 (0.240) | 2.047** (0.287) | -1.844** (0.088) | -0.009 (0.038) | -0.243 (0.150) |
| NL | 1.497* (0.283) | -0.783** (0.050) | 0.178** (0.023) | -0.016 (0.017) | 0.563 (0.437) | -1.225** (0.180) | 0.173* (0.043) | 0.777 (0.393) |
| DE | 0.900** (0.137) | -1.114** (0.051) | 0.280* (0.076) | 0.211 (0.254) | 1.270* (0.310) | -2.587** (0.188) | 0.343 (0.205) | -1.019 (0.725) |
| SK | 0.908* (0.221) | -0.793** (0.094) | 0.138 (0.133) | 0.387** (0.057) | 1.575*** (0.040) | -1.615*** (0.080) | 0.045 (0.023) | 0.040 (0.013) |
| ES | 1.541** (0.127) | -0.965** (0.068) | 0.098* (0.021) | -0.247** (0.030) | 0.490 (0.387) | 0.465 (0.156) | -0.238 (0.095) | 0.467* (0.087) |
| IT | 0.650* (0.140) | 0.035 (0.037) | 0.279** (0.028) | -0.037 (0.040) | 1.293** (0.160) | -0.485** (0.040) | 0.193* (0.038) | -0.223* (0.057) |
| SE | 0.007* (0.001) | -0.655* (0.187) | 0.095 (0.038) | 0.000 (0.000) | 0.577* (0.107) | -0.480** (0.040) | -0.002 (0.035) | -0.020 (0.017) |
| IL | 1.777* (0.407) | -1.885** (0.094) | -0.11 (0.046) | -0.403 (0.213) | 0.453 (0.383) | -0.130 (0.120) | -0.095 (0.045) | 0.513 (0.223) |
| JP | 0.003 (0.277) | 0.0401 (0.037) | -0.255 (0.080) | -0.167 (0.245) | -0.143 (0.293) | -0.395** (0.068) | 0.188 (0.083) | 0.630 (0.243) |
| US | 0.803** (0.127) | -0.202** (0.011) | 0.053* (0.015) | -0.027 (0.050) | 0.463 (0.363) | 0.415** (0.040) | 0.051 (0.049) | 0.237 (0.143) |
| PL | 0.722** (0.057) | -0.720*** (0.026) | -0.070 (0.048) | 0.023 (0.062) | 0.323** (0.060) | -0.345** (0.038) | -0.148 (0.050) | 0.080 (0.060) |
| HU | 0.473 (0.150) | -0.445 (0.161) | 0.220* (0.040) | 0.673** (0.100) | 1.293* (0.233) | -0.055 (0.026) | -0.233 (0.150) | 0.323 (0.153) |

Source: Own elaboration

According to the comparative elasticities of the variables, the income elasticity (for tourism demand in the Czech Republic) is above unity for France, Austria, the Netherlands, Spain, Israel, with the highest elasticity coefficient of 1.78 for Israel. Thus, the tourism demand in the Czech Republic from these countries is income elastic. While for Germany, the Slovak Republic, Italy, Sweden, USA, Poland is the tourism demand in the Czech Republic from these countries income inelastic (elasticity coefficients are less than one). Tourism demand in the SMT region is income elastic for Austria with highest elasticity coefficient of 2.05, i.e. a 1% increase in GDP per capita in the tourism origin countries increases tourism demand from

Austrian tourists by 2.05%. Further, for Germany (1.27%), the Slovak Republic (1.58%), Hungary (1.29%) and Italy (1.29%). Tourists from these countries are more sensitive to the change in their income. On the other hand, tourism demand in the SMT region is income inelastic for Sweden and Poland that have elasticity coefficients of 0.58 and 0.32, respectively. Tourists from remaining countries do not respond to GDP changes since their coefficients are non-significant.

As far as the RER is concerned, Germany and Israel have elasticity coefficients of -1.11 and -1.89, respectively. For instance, a 1% increase in the tourism prices decrease the number of tourists from these two countries to the Czech Republic by levels of 1.11% and 1.89%, respectively. Thus, the tourism demand in the Czech Republic from these countries is price elastic. In terms of tourism demand in the SMT region, this demand is price elastic from France, Austria, the Netherlands, Germany and the Slovak Republic with the highest elasticity coefficient of -2.59 for German tourists. On the other hand, the lowest elasticity coefficients of -0.18 and -0.35 belong to Austria (in the Czech Republic) and Poland (in the SMT region), respectively.

Tourism demand in the Czech Republic is inelastic to bilateral trade. The trade openness has been found to be significant for France, the Netherlands, Germany, Spain, Italy, USA and Hungary. While, Germany has the highest elasticity coefficients of 0.28, the lowest elasticity coefficient of 0.05 belongs to USA. In terms of tourism demand in the SMT region, the trade openness has been found to be significant for the Netherlands and Italy. While the Italy has the highest elasticity coefficient of 0.193, the Netherlands have elasticity coefficients of 0.173.

In terms of tourism demand in the Czech Republic, the number of the international outbound tourists for tourism origin countries has been found to be positive, as expected, and significant for Hungary and the Slovak Republic but negative and significant for France and Spain. While Hungary has the highest elasticity coefficient of 0.67, the elasticity coefficients for France and the Slovak Republic are -0.48 and 0.39, respectively. The lowest elasticity coefficient of -0.25 belongs to Spain. With regard to tourism demand in the SMT region, the number international outbound tourists for tourism origin countries has been found to be positive and significant for Spain but negative and significant for Italy. For instance, a 1% increase in the number of departures that Spanish tourists make from their country of usual residence to any other country increase the number of tourists from Spain to the SMT region by levels of 0.47%.

4 Discussion

The main contributions of this paper are as follows: First, the effect of the examined four determinants on international tourism demand in the Czech Republic taking the cross-sectional dependence presence into account have been found. Second, The effect of these determinants on tourism demand in the South Moravia Tourist Region of the Czech Republic have been found.

From the findings of this study, results revealed that tourism demand in the Czech Republic as well as in SMT region is significantly and positively affected by income of foreign tourists but low value of the coefficient show that tourism demand is slightly dependent on the economic situation of the generating countries. This is consistent with

the result of Indrová et al. (2015), Surugiu et al. (2014) or Ongan et al (2017) which indicated that as the country's income increases, more of its residents can afford to visit other countries, and therefore tourist arrivals are a positive function of income or directly related to income. In addition, our study shows that tourism demand in the Czech Republic and SMT region from some foreign tourists is income elastic.

As it regards relative price, the variable reduces the number of tourists to travel and the negative sign of the coefficient is the same as the expected one. The estimated price elasticity is suggesting that tourism demand is price inelastic. It holds for tourism demand in the Czech Republic as well as in the SMT Region. Different studies have used different measures of price explaining the differences in estimating price elasticities. As a standard, the real exchange rate adjusted by CPIs is used. In this paper, HCPI for hotels and restaurants is used to derive the real exchange rate instead of the general CPI. Found price inelasticity is consistent with the result of Indrová et al. (2015) or Yazdi and Khanalizadeh (2017). Eilat and Einav (2004) suggest that tourism demand to less developed countries is not very sensitive to fluctuation in prices, explained by the fact that prices in these countries are relatively low. However, this demand is price elastic from France, Austria, the Netherlands, Germany and the Slovak Republic.

As the empirical results suggest, increasing trade openness between Czech Republic and tourism origin countries has contributed to the increasing amount of tourists from these countries visiting the Czech Republic. Thus, the trade openness variable has an expected positive sign. Because of low coefficient elasticity, it is not very responsive to changes in trade volume between Czech Republic and tourism origin countries. These results are partly in agreement with Indrová et al. (2015) – they suggest that the trade openness is insignificant in explaining tourism demand. Statistically significant influence between the trade openness and tourism demand is confirmed by Surugiu et al. (2014). The effect of international outbound tourists on tourism demand in the Czech Republic and SMT region, respectively is not statistically significant.

Conclusion

The aim of the paper is to investigate the effect of income of tourists, tourism price, trade openness and international outbound tourists in tourism origin countries on the tourism demand to the Czech Republic as well as to South Moravia Tourist Region of the Czech Republic from tourists coming from thirteen different countries is analysed, namely France, Austria, the Netherlands, Germany, the Slovak Republic, Spain, Italy, Sweden, Israel, Japan, USA, Poland and Hungary over the period 2003:Q1-2017:Q4. This paper applies panel co-integration analysis through a common correlation effect model (CCE). LM and CD tests were used for testing cross-section dependence between the countries. The results showed existence of cross-section dependence between the countries. The stationarity of the series was tested using the CIPS unit root test. The cointegration relationships between the series were analysed by the Durbin-Hausman Cointegration Test which takes cross-section dependence into account.

According to the obtained estimation results, income and trade openness have a significant positive influence on international arrivals to the Czech Republic, while for tourism price the results indicate that it has a negative influence on inflows, as

expected. The effect of international outbound tourists on tourism demand in the Czech Republic is negative, against expectations, but it is not statistically significant. For tourism demand in the SMT region, income has a significant positive influence on international arrivals to the South Moravia tourist region, as it regards relative price, the negative sign of the coefficient is the same as the expected one. The effects of trade openness and international outbound tourists on tourism demand in the SMT region have expected positive signs but they are not statistically significant.

In order to get more specific results, the future research could to examine the dependence between tourism demand and selected determinants by using different approaches based on different copulas.

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Contact Address

Mgr. Tomáš Jeřábek, Ph.D., MBA

College of business and hotel management, Department of Economy and Management,

Bosonožská 9, 625 00 Brno

Email: jerabek@hotskolabrno.cz

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