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DETERMINANTS OF TOURISM DEMAND IN CZECH REPUBLIC

The paper provides an empirical analysis of the determinants of international tourism demand to Czech Republic from 38 countries representing the largest share of all foreign arrivals into the country. The paper investigates the period between 2000 and 2012. The analysis is based on the estimation of a dynamic panel data model which accounts for the effects of previous consumption (repeated visits). The results show that tourism demand to Czech Republic is income and price inelastic both in the short and long run. Small responsiveness of tourism demand to fluctuations of income and price variables suggests that tourism demand to Czech Republic is not very dependent on economic situation in the countries where the majority of tourists come from.

Keywords: international tourism; tourism demand; dynamic panel data; consumer behavior; Czech Republic.

JEL classification: C01, D12, L83.

Ярміла Індрова, Вадім Стрелковскі, Яна Венцовська ДЕТЕРМІНАНТИ ТУРИСТИЧНОГО ПОПИТУ: НА ПРИКЛАДІ ЧЕХІЇ

У статті представлено емпіричний аналіз детермінант попиту у міжнародному туризмі на прикладі туристичних потоків з 38 країн до Чехії. Для аналізу обрано країни з найбільшою кількістю туристів, що обирають Чехію. Період дослідження – 2000–2012 роки. Розраховано модель динамічних панельних даних, яка враховує ефект повторного споживання (повторні візити до країни). Результати аналізу продемонстрували, що туристичний попит на Чехію залежить від чинників прибутків та ціни, як у коротко-, так і довгостроковій перспективі. Однак, при цьому ж економічна ситуація у самих країнах, з яких прибувають туристи, не має суттєвого впливу на туристичні потоки до Чехії.

Ключові слова: міжнародний туризм; туристичний попит; динамічні панельні дані; споживча поведінка; Чехія.

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Ярмила Индрова, Вадим Стрелковски, Яна Венцовска ДЕТЕРМИНАНТЫ ТУРИСТИЧЕСКОГО СПРОСА: НА ПРИМЕРЕ ЧЕХИИ

В статье представлен эмпирический анализ детерминант спроса в международном туризме на примере туристических потоков из 38 стран в Чехию. Для анализа выбраны страны с наибольшим количеством туристов, выбирающих Чехию. Временной отрезок исследования – 2000–2012 годы. Просчитана модель динамических панельных данных, которая учитывает эффект повторного потребления (повторные визиты в страну). Результаты анализа показали, что туристический спрос на Чехию напрямую зависит от факторов прибылей и цены, как в кратко-, так и в долгосрочной перспективе. Однако, при этом экономическое положение в самих странах, из которых прибывают туристы, не имеет существенного влияния на туристические потоки в Чехию.

Ключевые слова: международный туризм; туристический спрос; динамические панельные данные; потребительское поведение; Чехия.

Introduction. Tourism research represents one of the most important areas of contemporary economic science (Miandehi and Masrouri, 2013). However, there are

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hardly any studies that use econometric models for estimating the effects of various determinants on tourism demand in Czech Republic.

Very recently, Babecka (2013) analysed the impacts of several macroeconomic and geographical factors on tourism demand to Czech Republic from 21 countries for the period 2000–2012. For this analysis, a gravity model was used. Tourism demand was measured by the number of tourists registered at hotels or spa centers. The determinants estimated were real gross domestic product (GDP) of tourism origin, real exchange rate (RER), the origin country, the distance of an origin country from Czech Republic and 5 dummy variables – landlocked, common border, Slavic language and the EU membership. Poisson regression with robust standard errors and random effects were used to estimate the determinants. Babecka (2013) concluded that GDP and the area of a country have positive effect on the number of foreigners registered at accommodation facilities. On the contrary, RER and distance have negative effects. Neighbouring countries account for more tourists and fewer tourists are coming from the countries that do not have access to seas, i.e. are landlocked. Similar language and EU membership both have positive impacts on tourism in Czech Republic.

The structure of this paper is as follows. The first part describes the selected measures of the dependent variable (i.e., tourism demand and contemplate on its main characteristics). The second part is devoted to a brief description of the explanatory variables chosen to influence tourism demand to Czech Republic. The third section provides an overview of possible forms of econometric models used in tourism demand literature and its appropriate estimation methods. And finally, the last section presents the results of the empirical model and its discussion.

Measuring tourism demand. In accordance with similar research (Babecka, 2013; Yang, 2010), it has been decided to use the number of guests registered in collective accommodation establishments (CAE) as a measure of the number of tourist arrivals, i.e. tourism demand. The data have been collected on the monthly basis by Czech Statistical Office and are available for the period 2000–2012.

In order to avoid seasonality problems and due to unavailability of some data concerning explanatory variables, the annual numbers of guests will be used for the analysis. For the sake of the following sections let us assume that the terms "tourists", "tourists' arrivals", "foreign visitors" and "international guests" are interchangeable.

The number of international guests collected by the way of registration at accommodation establishments has some limitations as it does not account for the visitors that stay at their relatives' or friends' houses or for those who are just visiting during the day time. The second limitation is that it is not possible to distinguish between different types of tourism that is leisure, business etc. (Marzuki, 2011). This is not very relevant, since the aim of this paper was to analyze the determinants of tourism demand to Czech Republic as a whole that can be driven by all purposes. Over 45 mln guests have registered in CAE during the analysed period of 13 years. Their number rose by 7% on average each year.

Overall, it can be noted that there were two significant increases in the numbers of foreign arrivals. The first one after the year 2001 with the 12.26% drop in numbers, which might have occurred as a result of the 9/11 events. Another possible reason is that the early 2000's economic recession affected some of the countries that generate

a large share of international guests. The world economic and financial crisis that started in 2008 can probably be responsible for the 9.28% decline in 2009. However, its negative effects did not last long and since 2010 the number of arrivals continued on with its previous steady growth.

Another change in the number of guests that strikes the eye is the abrupt rise that occurred in 2004. The number rose by 19.42%, i.e. over 1 mln more international guests arrived in 2004 as compared to 2003.

When having a closer look at the evolution of tourist arrivals from 38 countries, the most positive evolution is noted for Ireland, followed closely by Russia with the annual average growth rates (AAGR) of 20.39% and 18.54% respectively. On the other hand, Denmark and Israel show the most negative evolution in numbers with the AAGRs of -3.94% and -3.53% respectively. Overall, there are 6 most important origin countries in terms of share in the total tourist arrivals – Germany, Russia, Slovak Republic, Poland, USA and UK. In 2012, they were responsible for more than half of all tourist arrivals.

Explanatory variables and hypotheses formulation. According to the classical economic theory, tourism demand is expected to be influenced mainly by income and price factors. In addition, various other geographical or economic factors were proven to be significant in influencing the tourism demand volume. Based on the overview of the most used determinants of tourism demand and data availability, the following variables will be incorporated in our model.

I – *Income*: The measure of income is the gross domestic product (GDP) of each country of tourism's origin expressed per capita.

P – *Price*: Tourism prices express the cost of goods and services at destination.

TO – *Trade openness*: International arrivals are said to be determined by the level of business activities among the destination and the country of origin.

D2001, *Drecession* – dummy variables: The following dummy variables will be included in the model, in order to account for the one-off events that could possibly have affected the volume of tourism demand during the sample period.

TA_{t-1} – *lagged value of dependent variable*: This variable will be included among the regressors in order to account for the effect of WoM, eWoM and repeated visits as a result of habit formation.

Finally, in order to reduce error variances across all the countries of tourism's origin, the population variable is going to be included in the model serving as a scale variable. That means that not only GDP, but also the dependent variable and its lagged value will be expressed in per capita terms. This allows for comparability across the countries (Song et al., 2010).

Methodology and model specification. For the purposes of running our empirical estimation, we have employed a balanced panel data set of annual data. There are several advantages that stem from working with panel data. The first one is that they offer a large number of observations, resulting in more degrees of freedom reducing collinearity among explanatory variables, and thus improving the estimates' efficiency. Moreover, using this type of data allows measuring the effects of variables that vary little within countries and a lot across countries (Hsaio, 2003). At the beginning of this section we give an overview of two main forms of models used in estimating pooled datasets – static and dynamic.

Models, specified in static form were used in tourism demand studies mainly during the second half of the 20th century. Static panel model is represented by the equation:

$$Y_{it} = \alpha + \beta_i x_{it} + \varepsilon_{it}, \quad i = 1, \dots, N, \quad t = 1, \dots, T, \quad \varepsilon_{it} = \mu_i + u_{it}, \quad (1)$$

where N is the total number of countries; t is the time period; Y_{it} is the dependent variable; x_{it} is the vector of all independent (explanatory) variables; ε_{it} is the zero mean residual. The unobservable time-invariant individual effects, like tourist preferences, are denoted by μ_i (Ledesma-Rodriguez et al., 2001).

As pointed out by (Witt and Song, 2000), static models can suffer from a number of problems, for example, spurious regression, structural instability and lastly, do not account for the effect of changing tourists' preferences.

These problems can be overcome by dynamic specification of the model, characterized by the inclusion of a lagged dependent variable among regressors. Dynamic panel model is represented by equation (Baltagi, 2005):

$$Y_{it} = \delta Y_{i,t-1} + \beta_i x_{it} + \varepsilon_{it}, \quad i = 1, \dots, N, \quad t = 1, \dots, T, \quad \varepsilon_{it} = \mu_i + u_{it}. \quad (2)$$

In our case $Y_{i,t-1}$ is the lagged value of tourism demand and measures the habit persistence or changing preferences of tourists. However, there is a problem resulting from the inclusion of a lagged dependent variable. Because Y_{it} is the function of μ_i , then so is its lagged value. That means $Y_{i,t-1}$ is correlated with the error term. Thus, if performing the ordinary least squares (OLS) technique to estimate the model, it would result in biased and inconsistent estimators.

Due to the ability of producing consistent and efficient estimates, the Arellano and Bond's GMM estimator has been used in vast majority of tourism demand studies that specified their model in a dynamic form. The dynamic form was implemented by Garin-Munoz and Montero-Martin (2007), who identified the habit formation to play an important role in the formation of international tourism demand to Balearic Islands. Both Leitao (2010) and Aslan et al. (2008) came to the same conclusion after analysing the main determinants of Portuguese and Turkish tourism demand respectively. Because we believe that the effect of habit formation on tourism demand to Czech Republic is worth exploring and might play a significant role in determining its volume, our model will be specified in a dynamic form, and will be estimated using the Arellano-Bond GMM estimation method. The model will take on a log-log form, so the parameters can be interpreted as elasticities:

$$\begin{aligned} \ln TA_{i,t} = & \alpha + \beta_1 \ln TA_{i,t-1} + \beta_2 \ln I_{i,t} + \beta_3 \ln P_{i,t} + \\ & \beta_4 \ln TO_{i,t} + \beta_5 D2001 + \beta_6 Drecession + v_{i,t}, \end{aligned} \quad (3)$$

$$i = 1, \dots, 38, \quad t = 2000, \dots, 2012,$$

where $v_{i,t} = \lambda_t + \mu_i + \varepsilon_{i,t}$ is the FE decomposition of the error term; λ_t is the unobserved time-invariant specific effect; μ_i is the unobserved country-invariant specific effect; $\varepsilon_{i,t}$ is the error term. The error term is assumed to be IID with $E(\varepsilon_{i,t}) = 0$ and $Var(\varepsilon_{i,t}) = \sigma^2 > 0$. In addition, $\varepsilon_{i,t}$ is also assumed to be uncorrelated with $\ln TA_{i,t}$ for $t = 2, \dots, T$ and with μ_i for any t (Garin-Munoz and Montero-Martin, 2007). It is important to note that the estimated parameters will be short-run demand elasticities. Long-run

elasticities can be obtained by dividing the estimated coefficients by $(1 - \beta_1)$ (Garin-Munoz, 2006).

Empirical results. The model given by equation (3) was estimated by the Arellano-Bond GMM estimation method using the STATA software. First, performing this estimation method resulted in having too many instrumental variables (71) compared to the cross-sectional sample size (in our case – 38). This represents a certain problem, because having too many instruments increases finite sample bias (Garin-Munoz, 2006). To prevent this from happening, we are going to limit the lag depth and use only the instruments lagged up to 3 periods. This reduces the number of instruments to 36. The estimation results are presented in Table 1.

Table 1. Arellano-Bond GMM estimation results, own results

Variable	Arellano-Bond estimator	Expected signs	Long-run parameters
lnTA(t – 1)	0.31 (4.44)***	+	
lnI	0.39 (2.27)***	+	0.56
lnP	-0.39 (-4.70)***	-	-0.56
lnTO	0.017 (0.39)	+	0.025
D2001	0.18 (-7.32)***	-	
Drecession	-0.02 (-1.70)*	-	
Sargan test	35.23 (0.197) d.f. 29		
Autocorrelation (2)	-1.02 (0.31)		
Wald test	1122.42 (0.00) d.f. 6		

Note: T – statistics are in parentheses. * statistically significant at 10% level; ** 5% level; *** 1% level; d.f. – degrees of freedom.

The results show that all the estimators have the expected signs. The lagged value of the dependent variable is significant and positive, which confirms the hypothesis that habit formation and WoM positively affect international tourism demand to Czech Republic. In fact, 31% of the total tourist arrivals consist of tourists that return to the country after having a pleasant experience and of the tourists attracted by means of WoM.

The estimated coefficients of income both in the short and long run show that tourism demand is income inelastic, i.e. income elasticity is positive but less than one. Especially in the short run, low value of the coefficient suggests that tourism demand to Czech Republic is not very dependent on economic situation in the countries of tourists' origin.

The estimation results show that tourism prices are a significant variable in explaining changes of tourism demand volume. Their effect is negative. In the short run a 1% increase in tourism prices leads to a 0.39% decrease in the number of tourist arrivals or vice versa. Similarly, in the long run a 1% increase leads to a 0.56% decrease in the number of tourist arrivals or vice versa. This finding is consistent with the demand theory which suggests that demand for international tourism is an inverse function of tourism prices.

Conclusions. It appears that the price and income variables have a common feature – their estimated elasticities are greater in the long run than in the short run. This suggests that tourists tend to be more influenced by the income and price changes in

the long run. These results are in line with those of Aslan et al. (2008), who estimated the effects of determinants of tourism demand for Turkey using the same econometric approach. They found out that international tourism demand to Turkey is both income and price inelastic, with higher elasticities detected in the long run. The similarity of tourism demand responsiveness to changes in income and price variables is supported by the fact that Turkey offers similar tourism products as Czech Republic and their tourists originate mainly from the same source markets.

The trade openness variable has an expected positive sign but it is insignificant in explaining tourism demand. Therefore, bilateral trade does not help to explain changes in tourism demand. This is in line with the results produced by the similar findings in other research papers (Zhidkoblinova, 2013; Zielinska, 2008).

Similarly, the Great Recession dummy variable has the expected negative sign and is significant, but only at the 10% level. This corresponds with our finding that tourism demand to Czech Republic is income inelastic. Therefore, poor economic conditions in tourism-generating countries had only a minor negative effect on the tourism level. The D2001 variable was included in the model in order to reflect the impacts of the 9/11 events. As suspected, the results show that the terrorist attacks had a significant negative impact on the number of arrivals.

Overall, our results showed that tourism demand to Czech Republic is income and price inelastic both in the short and the long run. The small responsiveness of tourism demand to fluctuations of income and price variables suggests that tourism demand to Czech Republic is not very dependent on economic situation in the countries of origin. This assumption was supported by the low and almost insignificant estimated coefficient of the Great Recession dummy variable.

The fear for one's safety while travelling after the 9/11 events was estimated to have a significant negative effect on tourism demand to Czech Republic. On the other hand, bilateral trade represented by the trade openness variable was found statistically insignificant. Moreover, one of the main conclusions of the analysis is the significant positive coefficient of the dependent variable, which suggests that 31% of the total tourist arrivals are attributable to habit formation and the word-of-mouth effect.

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