Nataša Erjavec / Kristina Devčić

Accommodation Capacity, Trade Openness and International Tourism Demand in Croatia: Evidence from a Dynamic Panel Model

Abstract

This paper investigates the determinants of international tourism demand in Croatia, a country whose economy is heavily dependent on tourism. A particular focus is placed on the role of accommodation capacity and trade openness, two demand drivers that have been rarely examined in combination. Using the difference GMM estimator, a dynamic panel model of international tourism demand in Croatia is estimated, employing annual data for 16 tourism generating countries from 2007 to 2019. The results show that the lagged dependent variable, income, accommodation capacity, and exchange rate have a positive effect on international tourism demand, while the impact of relative prices and trade openness prove to be irrelevant in the Croatian context.

Keywords: international tourism demand, dynamic panel model, difference GMM estimator, accommodation capacity, trade openness, Croatia

1. Introduction

As one of the major industries, tourism is gaining increasing importance both in the world and in the Croatian economy since it positively impacts employment, production, investments, and the economy altogether. Tourism has flourished in recent decades. According to the World Bank, the number of tourist arrivals worldwide increased from 1.652 billion in 2007 to 2.280 billion in 2019, i.e., in 13 years, the number of tourist arrivals has increased by 38%. In Croatia, the number of arrivals in 2007 was 52.27 million, and in 2019 60.021 million, which is an increase of 15% (World Bank, 2021).

Table 1
Number of overnight stays of international tourists (2007 and 2019) in Croatia and annual average growth rates (%)

Countries	Number of overnight stays (2007, in 000)	Number of overnight stays (2019, in 000)	Share in total international overnight stays (2007) in %	Share in total international overnight stays (2019) in %	Annual average growth rates (in %)
Germany	10,849	19,945	21.88	23.70	5.205
Slovenia	5,690	7,503	11.48	8.92	2.33
Austria	4,245	7,057	8.56	8.39	4.33
Poland	1,834	5,861	3.70	6.97	10.17
Czech Republic	4,395	4,985	8.87	5.92	1.06
Italy	5,452	5,141	10.98	6.11	-0.49
Great Britain	1,276	4,327	2.57	5.14	10.71
Netherlands	2,030	2,883	4.09	3.43	2.97
Slovakia	1,832	2,817	3.70	3.35	3.65
Hungary	1,985	3,043	4.00	3.62	3.62

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Table 1 *(continued)*

France	1,665	2,228	3.36	2.65	2.46
Sweden	664	1,426	1.34	1.69	6.58
BIH	1,147	1,834	2.31	2.18	3.99
Belgium	509	917	1.03	1.09	5.03
Russia	1,289	845	2.60	1.00	-3.46
Spain	305	668	0.62	0.79	6.75
others	4,407	12,655	8.89	15.04	9.29

Source: Authors' calculation.

Table 1 shows the number of overnight stays of international tourists in Croatia and their share in the total number of international overnight stays in 2007 and 2019. It can be seen that most international tourists come from Germany. However, the six most important generating countries make up 66% (in 2007) and 60% (in 2019) of all international overnight stays. In the analyzed period (from 2007 to 2019), the number of overnight stays of international tourists increased by 69.71%. Great Britain has the highest annual growth rate while Russia has the lowest.

The tourism industry is one of the major sources of economic growth in Croatia. The factors that can significantly impact international tourism demand have been a subject of many analyses. The most notable are tourists' income, exchange rate, prices in the destination, travel costs, prices in competing countries, trade openness, transport and accommodation infrastructure, population, level of education, level of health care, and various specific events.

In addition to the key variables commonly used in empirical research, in this paper, special attention is paid to the analysis of the impact of accommodation capacity and trade openness on international tourism demand in Croatia. Accommodation capacity (counted as bed-places) shows how many persons can be accommodated in a destination establishment at the same time. The higher the accommodation capacity, the more tourists it is possible to accommodate. International trade flows are often associated with international tourism, especially with business travels. If business activity between countries is high, more business travels between the countries will ultimately increase overall international tourism between those countries.

The contribution of this study to the existing literature is that we elaborate on the previous studies considering additional explanatory variables, such as accommodation capacity and openness of trade. The variables are not often used in the analysis of international tourism demand, especially for Croatia. Furthermore, a dynamic panel demand model is employed to shed new light on the key determinants of international tourism demand in Croatia. Compared to previous studies focusing on the Croatian case, we employed additional explanatory variables and a significantly larger dataset covering tourism generating countries that account for almost 90% of international tourism demand in Croatia.

The remainder of the paper is structured as follows. In the next section, a brief review of the most relevant literature is provided. Section 3 gives an overview of the main determinants of international tourism demand in Croatia. The applied methodology and dataset employed in the empirical analysis are explained in section 4. Empirical results of model assessments are presented and discussed in section 5. Finally, section 6 concludes with a summary of key findings and directions for future research.

2. Literature review

In addition to the time dimension, the spatial dimension is included in the analysis, providing more reliable analysis results by applying the panel methodology. The possibility of using a large number of observations enables more degrees of freedom in the estimation process. This approach also reduces the problem of multicollinearity (Brida & Risso, 2009). Applying a panel allows us to use annual data and avoid the problems

TOURISM
An International Interdisciplinary Journal

Nataša Erjavec / Kristina Devčić
Accommodation Capacity, Trade Openness and International Tourism Demand, Croatia
Vol. 70/ No. 1/ 2022/ 43 - 52

44

of seasonality (Brida & Risso, 2009). Due to all benefits of the panel methodology, a growing number of researchers are analyzing the tourism demand by applying this technique.

Garín-Muñoz and Amaral (2000) show that the number of per capita overnight stays in Spain is positively affected by the persistence of habits, real per capita tourists' income, exchange rate, while the impact of prices is negative, as well as the impact of the Gulf War. Analyzing the relative number of tourist arrivals from ten EU-15 member states, Rey et al. (2011) find a positive impact of low-cost airlines on Spanish international tourism. Furthermore, they obtained the positive relationships between tourists' income and the persistence of habits and Spanish tourism demand. Tourism in Madrid was analyzed by Garín-Muñoz (2004). The study shows that tourists' income and trend positively affect the number of overnight stays, while relative prices have a negative effect. The negative impact of the Gulf War is also confirmed by Garín-Muñoz and Montero-Martin (2007). The authors confirm that the persistence of habits and tourists' income are positively related to the number of overnight stays in the Balearics, as opposed to prices, travel costs to the destination, and the terrorist attack on the USA for which the relationship is negative. Ledesma-Rodríguez et al. (2001) prove the positive impact of the persistence of habits, tourists' income, and exchange rate on the number of international tourist arrivals in Tenerife, while the impact of travel costs is negative. Similar results are obtained by Garín-Muñoz (2006) for the entire Canary Islands. Leitao (2015) proves that in addition to the persistence of habits and tourists' income, prices, government consumption, and human resources also positively impact tourism demand in Portugal. Leitao and Shahbaz (2012) show that the shock of immigration, among other determinants, has a positive impact on Portuguese tourism. Brida and Risso (2009) reveal that the persistence of habits and tourists' income have a positive impact, and prices and travel costs have a negative impact on the international tourism demand of German tourists in South Tyrol. In contrast, Aslan et al. (2009) prove a negative impact of prices in Turkey on international tourism demand and a positive of the persistence of habits. Eryiğit et al. (2010) point out that there is a positive effect of a tourism climate index and a negative effect of earthquakes on Turkish international tourism demand. Apart from per capita tourists' income and relative exchange rate, globalization positively affects the demand for tourism in Turkey, while the effects of consumer price index, violence/terrorism, household debt level and bilateral distance between Turkey and the origin country are negative, (Ulucak et al., 2020).

Using the panel methodology, the impact of trade openness was analyzed for several destinations. Proenca and Soukiazis (2005) show that the persistence of habits, tourists' income, and accommodation capacity positively impact international tourism demand in Portugal. Similarly, Leitao (2010) points out that both trade openness and population, in addition to the persistence of habits and tourists' income, can be considered key determinants of international tourism demand in Portugal.

Ibrahim (2011) finds that the number of tourist arrivals is positively related to the tourists' income, trade openness, and competitive prices and is negatively affected by prices and exchange rates in Egypt. The number of tourist arrivals in Romania is positively influenced by trade openness, population size, and tourists' income, while the impacts of prices in Romania and the travel distance between tourists' origin country and Romania are negative, but at a smaller scale (Surugiu et al., 2011). Sfakianakis and Agiomirgianakis (2014) examine the determinants of Greek international tourism demand. The authors show that real tourists' income, relative real effective exchange rate, competitor's real effective exchange rate, and openness positively affect tourism demand, while the effect of oil price and economic crisis dummy prove to be negative.

However, only a few studies have examined the impacts of both trade openness and accommodation capacity on international tourism demand. For example, Gormus and Gocer (2010) prove that the influence of tourists' income, trade openness, prices, exchange rate, accommodation capacity, and financial crisis on Turkish international tourism demand is positive, while country distance, competitive prices and the Gulf War negatively affect tourism in Turkey.

TOURISM
An International Interdisciplinary Journal

Nataša Erjavec / Kristina Devčić
Accommodation Capacity, Trade Openness and International Tourism Demand, Croatia
Vol. 70/ No. 1/ 2022/ 43 - 52

45

As for Croatia, the country analyzed in this paper, previous empirical research on international tourism demand is relatively scarce. So far, only a few studies have used panel methodology. For example, Dumičić et al. (2017) found that the financial crisis has introduced changes in the impact of key determinants on Croatian international tourism demand. Moreover, using dynamic panel models, Devčić (2019) examines the determinants of international tourism demand in Croatia and five competing countries. In her study, the author concludes that the persistence of habits, tourists' income, relative prices, the distance between countries, and prices in competing countries are the main determinants of Croatian international tourism demand. However, the available scientific literature on the topic points out that there is no analysis of the impact of trade openness and accommodation capacities on international tourist demand in Croatia.

3. Tourism demand in Croatia

In Croatia, a large part of tourism demand relates to international tourism demand with a share of international tourists of about 91.51% in the period from 2007 to 2019. In the same period, the largest number of overnight stays in Croatia was realized by guests from Germany (23.6%), followed by guests from Slovenia (10.27%), Austria (8.76%), Italy (7.77%) and the Czech Republic (7.3%), Figure 1. The average annual growth rate of the number of overnight stays in the observed period was 4.76%. According to the criteria of the highest representation in the total number of overnight stays of international tourists, a total of 16 countries are included in the analysis: Austria, Belgium, Bosnia and Herzegovina, Czech Republic, France, Germany, Hungary, Italy, Netherlands, Poland, Russia, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom. With this sample, 88.87% of all international overnight stays are included in the analysis.

Figure 1
Shares of overnight stays of international tourists by country of origin, 2007 and 2019
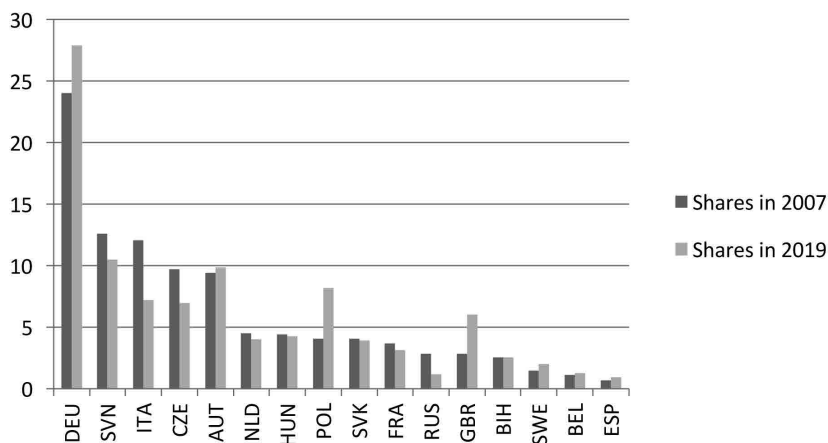
Source: Authors' calculation.

In this study, the dependent variable *international tourism demand* is approximated by the number of overnight stays of international tourists (Garín-Muñoz & Perez-Amaral, 2000; Garín-Muñoz, 2004; Roget & Rodríguez González, 2006; Garín-Muñoz, 2007; Brida & Risso, 2009; Garín-Muñoz, 2009). Data are obtained from the Croatian Bureau of Statistics and are expressed in thousands.

The independent variable *accommodation capacity* is approximated by the number of beds available for rent to guests, and the data are from the Croatian Bureau of Statistics. When the country offers more rooms and beds for guests to rent, the tourist capacity of the country is higher. That results in a more competitive tourist sector that can offer lower prices, *ceteris paribus* (Naude & Saayman, 2005). A positive impact of accommodation capacity on Croatian international tourism demand is expected.

TOURISM
An International Interdisciplinary Journal

Nataša Erjavec / Kristina Devčić
Accommodation Capacity, Trade Openness and International Tourism Demand, Croatia
Vol. 70/ No. 1/ 2022/ 43 - 52

46

Trade partners can be important contributors to tourism growth (Leitao, 2009, 2010). Countries with more open markets provide opportunities for international trade, which increases business tourism demand (Kulendran & Wilson, 2000). The model includes trade openness as an additional independent variable to analyze the impact of trade between Croatia and the tourist country of origin. Trade openness is calculated as the sum of imports and exports between Croatia and the tourist origin country divided by the GDP of Croatia (Habibi & Abbasinejad, 2011). Data comes from the Croatian Bureau of Statistics. A positive relationship between trade openness and the number of overnight stays of international tourists in Croatia is expected.

In addition to the two focal variables in this study, *the tourists' income, prices*, and *exchange rates* are further included in the model.

The independent variable *disposable income of tourists* is approximated by the GDP per capita of the tourist origin countries and is expressed in US dollars at constant prices (2010 = 100; data obtained from the World Bank). The increase in tourists' income is associated with the increase in the number of overnight stays in Croatia, and consequently, a positive impact of income on international tourism demand is expected.

Since tourists react to changes in prices in the destination and make a decision accordingly, the model also includes independent variable *prices* (prices in the destination). Prices in Croatia are calculated as the ratio of the consumer price index in Croatia and the consumer price index of the tourist origin countries (data are obtained from the World Bank; 2010 = 100). The negative impact of prices on international tourism demand is expected.

In addition to prices, *costs in a destination* are also an important factor in explaining tourists' demand. The variable is usually approximated by the exchange rate between the destination and the tourists' country of origin. In this study, the exchange rate variable is added to the model as an independent variable with an expected positive impact on Croatian tourism demand. Data for the exchange rate variable were obtained from the Croatian National Bank and the Central Bank of Bosnia and Herzegovina.

The main descriptive indicators of the variables employed in the study are presented in Table 2.

Table 2
Descriptive indicators of variables used in the empirical analysis

Variables	Mean	Standard deviation	Minimum	Median	Maximum	Number of observations
Number of overnight stays (TOS_{it})	3,483.038	3,570.751	305	2,274	19,984	208
Income (Y_{it})	31,457.91	15,632.56	4,635.51	33,542.2	58,112.44	208
Prices (P_{it})	0.9832604	0.0641318	0.6384055	0.9931712	1.240693	208
Exchange rate (EXR_{it})	5.341024	3.071378	0.1013833	7.336019	10.73154	208
Accomomodation capacity (AC_{it})	1,019,548	150,699	878,312	932,706	1,319,000	208
Trade openness (TO_{it})	0.000166	0.0001614	0.0000221	0.000166	0.0006477	208

Source: Authors' calculation.

4. Model specification

To estimate common relationships across countries, the panel methodology is used. The applied methodology allows controlling for each country's specific characteristics, i.e., individual heterogeneity that cannot be measured with the variables included in the model. According to many studies, tourist destination reputation and habit formation influence international tourism demand. Thus, to capture the dynamic structure of Croatian tourism demand, we used a dynamic specification of the panel model (Alvarez & Arellano, 2003; Baltagi, 2013), where the dynamic nature of a dependent variable is introduced by incorporating its lagged value y_{it-1} as an additional regressor in the model:

$$y_{it} = X'_{it}\beta + \gamma \cdot y_{it-1} + \alpha_i + \varepsilon_{it}, \quad i = 1, \dots, N, t = 1, \dots, T. \tag{1}$$

TOURISM
An International Interdisciplinary Journal

Nataša Erjavec / Kristina Devčić
Accommodation Capacity, Trade Openness and International Tourism Demand, Croatia
Vol. 70/ No. 1/ 2022/ 43 - 52

47

The index i denotes a tourist origin country, and index t denotes time. y_{it} is a dependent variable, x_{it} is the matrix of independent variables, α_i is the unobserved individual effect, and ε_{it} is the error (idiosyncratic) term with $E(\varepsilon_{it})=0$, and $E(\varepsilon_{it}\varepsilon_{js})=\sigma^2_\varepsilon$ if $j=i$ and $t=s$ and $E(\varepsilon_{it}\varepsilon_{js})=0$ otherwise.

To check the robustness of the obtained results, two dynamic models of international tourism demand are estimated. The first (Model A) is defined by

$$TOS_{it} = \gamma \cdot TOS_{i,t-1} + \beta_1 Y_{it} + \beta_2 P_{it} + \beta_3 EXR_{it} + \beta_4 AC_{it} + \beta_5 TO_{it} + \alpha_i + \varepsilon_{it} \qquad (2)$$

where TOS_{it} was a number of overnight stays of tourists coming from the country i, Y_{it} was income of tourists coming from the country i, P_{it} were prices, EXR_{it} was exchange rate, AC_{it} was accommodation capacity of Croatia, TO_{it} was trade openness between Croatia and country of origin i. All variables except accommodation capacity are expressed in logs; therefore, the estimated parameters can be interpreted as demand elasticity coefficients.

Model B is the same as model A except that the variable relative prices P_{it} is excluded from the model as it proved to be insignificant. The impact of the 2008 world economic and financial crisis is also considered. However, the crisis dummy variable turned out to be statistically insignificant and was eliminated from the model.

The lagged dependent variable included in the model controls the role of tourist destination reputation and habit formation and allows modeling a partial adjustment mechanism. However, the inclusion of lagged dependent variable induces a correlation between the dependent variable and the error term. Due to the observed correlation, standard estimation methods such as LSDV (Least Squares Dummy Variables) or GLS (Generalised Least Squares) produce biased and inconsistent estimators. To overcome the problem, the difference GMM estimator (GMM-DIFF) proposed by Arellano and Bond (1991) is applied. The method uses the lags of endogenous variables in differences as instruments to deal with unobserved heterogeneity of the tourist origin countries and the endogeneity of the variables of the model.

Two main drawbacks of applying the GMM in the estimation are the proliferation of instruments (overidentification problem) and the serial autocorrelation of errors. The problems are more severe in the case of panels with a large time period and a smaller number of individuals. To avoid an overidentification problem that can arise as a consequence of too many instrumental variables, the number of instruments was reduced by using only the first lags in differences as instrumental variables (Hansen, 1982). The Hansen test is applied to verify whether the number of instruments is adequate and does not produce overidentification (Roodman, 2009).

Apart from the overidentification problem, another problem that can arise in endogenous models is the serial second-order autocorrelation of residues indicating that the instruments are not consistent. To test whether there is a serial correlation between residuals, the Arellano and Bond test is used (Arellano & Bond, 1991.).

5. Empirical results

GMM-DIFF estimates with robust standard errors for both models are presented in Table 3. The diagnostic tests of dynamic panel data analysis indicate that there is no autocorrelation between differenced residuals of the second-order, confirming the adequacy of the model. The validity of the instruments selected for the evaluation of the model is tested using the Hansen J test. The Hansen test for over-identifying restrictions in both models does not reject the null hypothesis, indicating that instrumental variables are valid. Additionally, the number of instruments does not exceed the number of cross-sections, so the properties of the estimators are not violated.

TOURISM
An International Interdisciplinary Journal

Nataša Erjavec / Kristina Devčić
Accommodation Capacity, Trade Openness and International Tourism Demand, Croatia
Vol. 70/ No. 1/ 2022/ 43 - 52

48

Table 3
Estimates for the dynamic models of tourism demand, 2007-2019 [1]

Variables	Model A	Model B
$TOS_{i,t-1}$	0.6679273 [0.204]***	0.6555687 [0.169]***
Y_{it}	0.5077747 [0.299]*	0.5402385 [0.254]**
P_{it}	-0.130036 [0.242]	-
EXR_{it}	0.7206059 [0.181]***	0.6440968 [0.176]***
AC_{it}	0.3305927 [0.142]**	0.3308492 [0.13]**
TO_{it}	0.0450316 [0.035]	0.0514835 [0.036]
AR (1)	-1.56 (0.120)	-1.67 (0.094)*
AR (2)	-1.50 (0.134)	-1.57 (0.115)
F-test	103.86 (0.000)***	39.05 (0.000)***
Hansen (J test)	13.30 (0.157)	13.06 (0.16)
C test	3.31 (0.507)	9.28 (0.098)
	9.81 (0.081)	3.78 (0.436)
No. observation	176	176
No. instruments	16	15
No. groups	16	16

Source: Author's calculation.
Note: TOS_{it} (number of overnight stays), Y_{it} (income), P_{it} (prices), EXR_{it} (exchange rate), AC_{it} (accommodation capacity), TO_{it} (trade openness); standard errors in [] brackets; p-values in () parentheses.
***, **, * denote rejection of the null hypothesis at the 1%, 5% and 10% level; *AR (1)*, *AR (2)* - first and second order residual autocorrelation tests, Hansen (J test) - instrument validity test, C test - instrument subset validity test.

In both models, the values of estimated parameters are very similar, indicating the robustness of the results. The parameter of the lagged dependent variable is statistically significant at the 1% level and can be interpreted as high consumer loyalty to the destination. Its high values (0.67, 0.65) show that the impact of the mouth-to-mouth effect is quite large, which confirms the role of positive reputation and the formation of tourist habits. The coefficient of tourists' income has an expected positive sign (0.51, 0.54), pointing out that tourism demand can be considered income inelastic in the short run. As expected, the exchange rate has a positive, statistically significant, and inelastic impact on international tourism demand (0.72, 0.64). The coefficients of prices are not statistically significant, which means that tourism in Croatia is not very sensitive to prices indicating that tourists do not perceive Croatia as an expensive destination and rising prices in Croatia will not change their decision to travel. Finally, tourism demand in Croatia depends on accommodation capacities in Croatia. Significant values of estimated parameters (0.33, 0.331) suggest that there is a positive impact of accommodation capacities on tourism demand, and investments in accommodation facilities would increase Croatia's ability to receive more tourists. Small and insignificant coefficients for trade openness (0.05) indicate that trade openness between countries does not affect Croatian international tourism demand. Increasing trade between Croatia and tourist-generating countries may in the future have a positive impact on tourism demand, and there is certainly room for further progress in this area.

The obtained results are in accordance with similar studies performed for Spain (Rey et al. 2011), Balearics (Garín-Muñoz & Montero-Martin, 2007), Tenerife (Ledesma-Rodríguez et al., 2001), South Tyrol (Brida & Risso, 2009), Portugal (Proenca & Soukiazis, 2005), and Turkey (Gormus & Gocer, 2010).

6. Conclusion

Tourism is a strategic sector of the Croatian economy. Therefore, the modeling of international tourism demand is increasingly occupying the scientific community. This research presents a panel model of key determinants of international tourism demand to Croatia, emphasizing the role of accommodation capacity

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[1] *Robust standard errors were calculated using Windmeijer finite-sample correction (Windmeijer, 2005).*

TOURISM
An International Interdisciplinary Journal

Nataša Erjavec / Kristina Devčić
Accommodation Capacity, Trade Openness and International Tourism Demand, Croatia
Vol. 70/ No. 1/ 2022/ 43 - 52

49

and trade openness. The dynamic panel model was employed to analyze international tourist overnight stays from the 16 most representative tourist-generating countries to Croatia between 2007 and 2019. One of the main conclusions of the study is the significant value of the lagged dependent variable, which emphasizes the importance of the mouth-to-mouth effect and confirms the crucial role of a positive reputation as well as the formation of tourist habits. Tourists who are satisfied with Croatia as a destination country will tell others about their positive experiences and return to Croatia, consequently increasing tourism demand. The Croatian tourism sector must continuously enhance tourism services as a prerequisite for tourists' satisfaction and positive word-of-mouth behavior to take advantage of this impact. The impact of tourists' income is positive and smaller than one, thus suggesting that tourism demand can be considered income inelastic in the short run, and international tourists do not consider Croatia a luxury good. We find a positive, statistically significant, and inelastic impact of exchange rate on international tourism demand, while tourism in Croatia appears not sensitive to prices. The impact of prices in Croatia relative to the cost of living in the tourist origin country proves to be insignificant, indicating that other variables are more important than prices when deciding which destination to visit. Accommodation capacity, one of the focal variables in this note, proves to be positively related to international tourism demand implying that further development of accommodation infrastructure would lead to a further increase in international tourism demand in Croatia. Conversely to findings of previous studies, trade openness, in turn, appears not to affect Croatia's international tourism demand. Future intensification of bilateral trade between tourist-generating countries and Croatia could, to some extent, increase the quantity of business-related travels, which would ultimately have a positive effect on international tourism demand.

Finally, in accordance with the obtained results and considering the importance of tourism as an economic sector, Croatia should strive for further development of tourism visibility in Europe as its main market. Given the significance of the mouth-to-mouth effect and the fact that satisfied tourists return to their destination, Croatia must make additional efforts to improve overall tourist satisfaction. Croatia is a tourist destination for tourists mainly from Europe with good or medium purchasing power. Therefore, additional investments in the highest quality accommodation capacities and the most diverse overall tourist offer would certainly increase tourist demand. Moreover, recognizing Croatia as a favorable tourist destination in trading partner countries would also motivate a larger number of tourists to choose Croatia as their destination.

Future research may improve the results of our model by further including prices in competing destinations, travel costs to destination, or costs of advertising Croatia as a destination. Moreover, if data on travel motives of international tourists were available (leisure, business trip, etc.), it would be interesting to apply the panel methodology for modeling disaggregated data to explore the differences in determinants regarding different categories of tourists.

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TOURISM
An International Interdisciplinary Journal

Nataša Erjavec / Kristina Devčić
Accommodation Capacity, Trade Openness and International Tourism Demand, Croatia
Vol. 70/ No. 1/ 2022/ 43 - 52

50

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Nataša Erjavec / Kristina Devčić
Accommodation Capacity, Trade Openness and International Tourism Demand, Croatia
Vol. 70/ No. 1/ 2022/ 43 - 52

51

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Vol. 70/ No. 1/ 2022/ 43 - 52

52