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UDK: 338.48(497.5)
Preliminary communication

Received: March 28, 2018
Accepted for publishing: May 29, 2018

PORTFOLIO ANALYSIS OF FOREIGN TOURIST DEMAND IN CROATIA

Abstract

Tourism is currently one of the most important sectors for the economic development of the Republic of Croatia. It mainly focuses on foreigners from within the EU. Because of the dynamic and very competitive tourist market, it is hard to forecast foreign tourism demand nowadays. It can vary over time among tourists of different nationalities. Stability of inbound tourist demand forms an important condition for the development of tourism and foreign currency income. Considering that tourism policy-makers must distribute available resources to different tourism markets for use in promotion, the purpose of this study is to analyze, by country of origin, the number of overnight stays by inbound foreign tourists in accommodation establishments as well as their average daily spending in Croatia and to construct an optimal mixture of tourists of different nationalities that will help tourism policy-makers to optimize or maximize tourism revenues at a certain level of risk. The main idea of this research is to apply financial portfolio theory to Croatian tourism demand and to construct an optimal mixture of foreign inbound tourists when there is an infinite number of possibilities. Several optimal mixes were calculated with different risk/return options to show on which foreign tourist markets Croatia must focus. For example, to achieve the mixture of foreign tourists that provides the highest level of tourist consumption expenditures, tourism authorities should increase their resources on the German, Slovenian, Italian and Austrian markets. The results of this research can easily be modified according to policy maker's risk/return preferences.

Keywords: Croatian tourism, portfolio theory, tourism demand, optimal market mix, inbound tourism

1. Introduction

Tourism has become one of the fastest growing economic sectors in the world over the last sixty years, and it plays a very important role in the economic development of many countries. The relationship between tourism and economic growth has been the subject of a variety of research papers for decades (Sinclair, Tsegaye, 1990; Sinclair, 1998; Briedenhann, Wickens, 2004; Kim et al., 2006; Payne, Mervar, 2010; Tang, Tan, 2015; Chou, 2013; Antonakakis et al., 2015; Gunduz, Hatemi-J, 2005). Being one of

the important areas in tourism research, tourism demand modelling and forecasting have attracted a great deal of attention from both academics and practitioners (Song, Li, 2008). The creation of jobs, improvements in local infrastructure and export revenues are just some of the many advantages provided by tourism. According to UNWTO (2017: 3)[1] in 2016 the tourism industry accounted for 10% of the world GDP and 7% of global exports. In many developing countries tourism ranks as the first export sector. International tourist arrivals (overnight visitors) hit a record of 1,235 million worldwide in 2016, up from 1,184 million in 2015. Demand continued to be strong in most source markets and destinations, despite ongoing geopolitical, economic and health challenges in some parts of the world. "The degree to which a country can benefit from its tourism sector depends largely on this sector's competitive position in the international tourist market" (Gomezelj, Mihalic, 2008: 294).

Currently, one of the most important sectors for Croatian economic growth is tourism, as it affects the Croatian economy both directly and indirectly. "Since the early 2000s, the country has become a major European tourist destination thanks to sunshine and sea" (Arnaud, 2016: 1). Today Croatia is trying to differentiate itself from other sun-and-sea destinations by emphasizing its shift towards a product that offers both beach and culture (Hughes, Allen, 2005). Croatia has achieved solid growth compared to the previous year, with more than 13.8 million international tourist arrivals in 2016 and 72.2 million international tourist nights spent in the tourist establishments according to the Statistical Yearbook of the Republic of Croatia (Croatian Bureau of Statistics, 2017)[2].

According to the World Travel and Tourism Council (2017)[3] the direct contribution of travel and tourism to the GDP was 10.7% in 2016, and the total contribution according to the same source was 24.7% in the same year, while the direct contribution to employment was 10% and the total contribution of the travel and tourism sector to employment was 23.4%. Visitor exports generated in the travel and tourism sector amounted to 38% of total exports.

Because of these key facts, Croatia has placed much emphasis on the tourism sector as an engine for economic prosperity in recent years. Economic development and many businesses in Croatia depend on the state of international tourism demand. Therefore, an accurate forecast of the international tourism demand is fundamental for future planning of economic (tourism) development. According to Song et al. (2009: 2) conditions that relate to the quantity of tourism demand include tourism prices for the destination, tourists' living costs at the destination, potential consumers' incomes, advertising expenditures, consumers' tastes in the origin (generating) countries, and other social, cultural, geographic and political factors.

Tourism demand is volatile from year to year, and it varies among tourists of different nationalities. There are many reasons why international tourism demand is unstable, for instance: prices, promotional activities, political reasons and many others. Different tourist nationalities have different levels of volatility or risk, as measured by the variations in demand (Jang, Chen, 2008; Zhang et al., 2016). Policy-makers may aim to avoid the adverse effects which can result from variations in demand by means of measures such as the selective use of an advertising budget to attract a distribution of tourists by nationalities so that the total level of variations in tourist expenditure is minimized (Board et al., 1987: 124).

Previous papers have mostly used the portfolio theory in the context of tourist arrivals. Tourist overnight stays are a much more important indicator, especially when they are multiplied by the average daily tourist consumption expenditure per country. According to the portfolio theory, it is possible to calculate combinations of various tourist nationalities which will maximize revenues at a certain level of risk. "Portfolio analysis provides a useful additional concept for planners and policy makers within the tourism sector" (Kennedy, 1998: 125). The effect of reducing risk by using a combination of tourists of different nationalities is called diversification (cf. Ivanovic et al., 2013). "Diversification is one of the most promising strategies for tourism firms" (Andreu et al., 2010: 7).

2. *Overview of the Croatian economy and tourism*

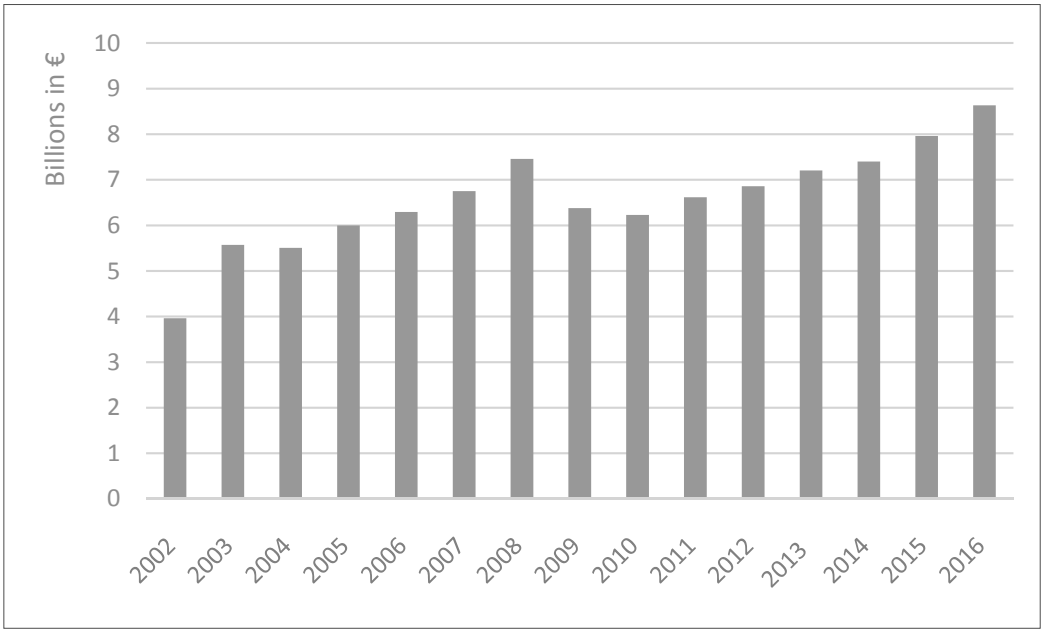
Prior to the global financial crisis (2000-2007), the Croatian economy annually grew by 4-5%. This growth was led by tourism and credit-driven consumer spending. During the same period the Croatian currency was stable and inflation remained quite tame. Everything changed in 2008, the year of transition from economic growth to a period of recession. From 2009 until 2015 the Croatian eco-

nomy was stagnant or negative each year. Finally, after six long years (2009–2015), Croatia came out of the recession. During that period Croatia had to face a high unemployment rate, uneven regional development, reduced foreign investments and lower exports. From 2008 to 2014 GDP dropped by more than 9.8%, but later, in the period from 2014 to 2016, GDP started to recover with a growth rate of 6.9% according to the data provided by Eurostat. During the recession period the unemployment rate reached its peak in 2013, when it reached 17.4%, but by November 2017 it had dropped to a level of 12.1% according to data from the Croatian Bureau of Statistics (2017)[4]. However, the Croatian economy is still facing low performance, the manufacturing sector in Croatia is not fully integrated in global supply chains, Croatia's goods exports have suffered from lost competitiveness and delayed integration in the EU, and the brightest point in Croatian economy is currently tourism. Croatia is often called a tourism-oriented country with a tourism-dependent economy. The tourism industry plays an important role in offering employment opportunities and generating income and foreign exchange revenues. It tends to combine the large surplus in services with large deficits in merchandise trade. Because of this tourism-dependent economy, policy-makers have a great responsibility to attract a range of different nationalities, which will minimize the volatility of international tourism demand. More reliance on tourism implicates bigger adverse effects on the economy if there is a fall in international tourist arrivals. A decrease in international tourism demand can result in increasing unemployment, falling tax revenues, decreasing levels of income and many other negative long-term effects.

3. International tourism demand for Croatia

According to the number of tourist arrivals and overnight stays, Croatia is continuously breaking records. In 2016 there were 15.6 million tourist arrivals and 78.05 million overnight stays. Whereas the growth of the aforementioned indicators in the tourism sector has been significant, financial recovery since the recession has not followed suit.

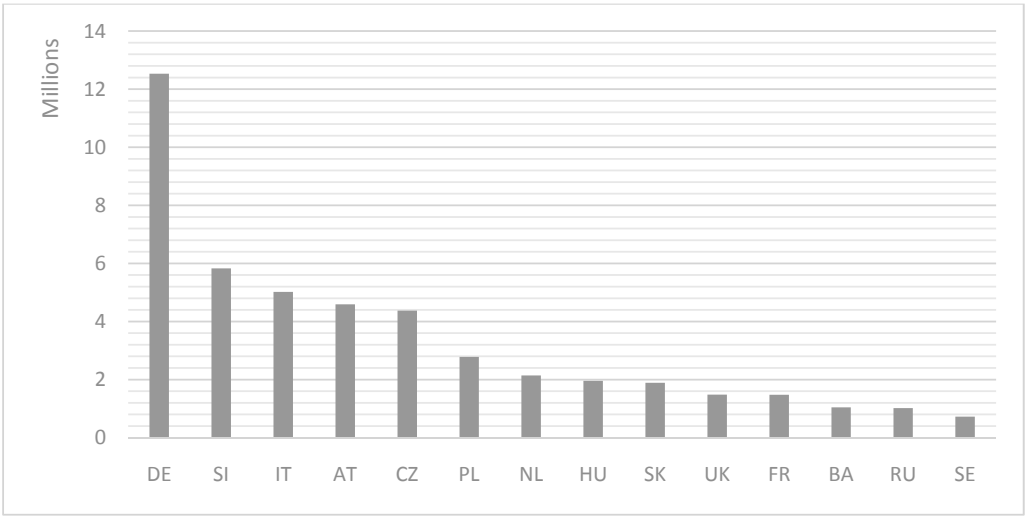
Figure 1 Tourism revenues in Croatia from 2002 to 2016



Source: Croatian National Bank, Balance of Payments 2017[5]

By looking at Figure 1, one notices that tourism revenues grew until 2008, when they started to fall. In 2010, they bottomed out and started to recover in 2011. In 2015 tourism revenues exceeded the 2008 level, and 2016 was record-breaking for Croatia. The number of foreign tourist arrivals in Croatia increased from 6,944,000 in 2002 to 13,809,000 in 2016 and the number of tourist overnight stays rose from 39,711,000 in 2002 to 72,193,000 in 2016 according to the data from the Statistical Yearbook of the Republic of Croatia (Croatian Bureau of Statistics, 2017 and 2007)[6,7].

Figure 2 Average number of tourist nights spent in Croatia by country of residence in a period from 2002 to 2016



Source: Statistical Yearbook of the Republic of Croatia 2017

Figure 2 shows the 14 European countries with the largest average number of tourist overnight stays in Croatia in the period 2002–2016 for which average daily consumption data were available. These countries are presented by ISO 3166-1 alpha-2 codes (DE Germany, SI Slovenia, IT Italy, AT Austria, CZ Czech Republic, PL Poland, NL Netherlands, HU Hungary, SK Slovakia, UK United Kingdom, FR France, BA Bosnia and Herzegovina, RU Russia and SE Sweden). The 14 countries observed together constitute 85.5% of the total number of foreign tourist overnight stays in Croatia in 2016. The most loyal guests come from Germany. The average share of German tourists in this sample of 14 countries is 26.7%. Ranked second and third, respectively, are Slovenian tourists with 12.4%, and Italian tourists with 10.7%, followed by Austrians with 9.8%, Czechs with 9.3%, Polish tourists with 5.9%, Dutch tourists with 4.6%, Hungarians with 4.2%, Slovaks with 4%, Britons with 3.2%, French tourists with 3.2%, Bosnians with 2.2%, Russians with 2.2% and tourists from Sweden with 1.5%.

Several reasons could be pointed out why Germans are the most frequent guests according to the number of nights spent in Croatia. More than 332,000 Croats live in Germany according to the Population and Employment Report (Federal Office of Statistics in Germany, 2016)[8]. Besides Croatia's natural beauty and its cultural heritage, when it comes to purchasing power, Croatia may be a favorable destination for Germans, since their average gross monthly salary exceeds the Croatian salary by approximately three times. Table 1 presents two important datasets for this research. The first refers to the *gross average monthly wages* in EUR and the second to *average daily tourist spending in Croatia*.

Table 1 Gross average monthly wages in EUR and average daily tourist spending in Croatia in EUR

Country	Gross average monthly wages (in EUR)	Average daily tourist spending in Croatia (in EUR)
DE	3193.5	62.1
SI	1897.3	53.0
IT	2427.4	66.1
AT	3453.5	72.2
CZ	1023.9	53.3
PL	915.7	61.7
NL	3894.5	65.5
HU	833.2	63.2
SK	1050.2	61.3
UK	3473.8	121.8
FR	3069.0	94.8
BA	665.0	60.2
RU	496.0	98.6
SE	3522.0	114.6
HR	1029.6	50.5

Source and notes: United Nations Economic Commission for Europe (UNECE)[9] data for gross average monthly wages (in 2016) were denominated in US $. For comparison purposes, data was converted to EUR according to an average euro reference exchange rate of 0.9039 in 2016 according to the ECB. Average daily tourist spending in Croatia was retrieved from the Institute for Tourism Croatia. Tomas—Attitudes and Expenditures of Tourists in Croatia 2014

According to Table 1, only four countries have lower gross average monthly wages than Croatia. Therefore, most of the countries sampled have higher gross average monthly wages, which makes Croatia more affordable for tourists from those countries. All foreign tourists from the sample have a higher average daily spending rate at their destination compared to domestic tourists in Croatia. The correlation coefficient between gross average monthly wages and average daily tourist spending is 0.46. This value shows a positive moderate relationship between the two values observed. Some countries, like Russia, have lower gross average monthly wages, but they have high average daily tourist spending levels. German tourists enjoy higher gross average monthly wages than most of the countries observed, but they have a lower daily spending rate at their destination compared to countries which have lower gross average monthly wages, like Italy, France and Hungary, but spend more at their destination.

4. Financial portfolio theory

Financial portfolio theory has its origins in financial analysis and attempts to maximize a portfolio's return for a given level of risk or to minimize risk for a given level of return. This theory offers investors the possibility to construct portfolios according to their own risk preferences. In finance, risk represents the possibility of a variation compared to the expected utility of the investor (Goncalves, Ratsimbanierana, 2012). Although financial portfolio theory is a specific part of financial analysis, it can be applied to tourism. International tourism demand is volatile, like stocks. Policy-makers must use their resources wisely to attract tourists of different nationalities, just like fund managers must use their resources wisely to choose and buy the best combination of stocks for a well-constructed diversified stock portfolio. The beginning of *modern* portfolio theory is considered to be 1952, when Harry Markowitz, who is often called the father of modern portfolio theory,

published the article "Portfolio Selection". Later, in 1959, he expanded his research into a book-length study called "Portfolio selection: Efficient Diversification of Investments". By using this theory, an investor can construct an efficient frontier of optimal portfolios which offer the maximum expected return for a given level of risk. There are two basic rules for choosing a portfolio on the efficient frontier:

$$E(r_{pA}) \geq E(r_{pB}),\ \sigma_{pA} < \sigma_{pB} \quad (1)$$

$$E(r_{pA}) > E(r_{pB}),\ \sigma_{pA} \leq \sigma_{pB} \quad (2)$$

According to the first rule (1), Portfolio A has priority over Portfolio B if the return is equal or higher, and if the risk (standard deviation) is lower than for Portfolio B. According to the second rule (2), Portfolio A has an advantage over Portfolio B if the return is higher and if the risk (standard deviation) is lower than or equal to that of Portfolio B. Over the years, the mean-variance approach has come to dominate the portfolio selection process, at least academically (Uysal et al., 2001). Portfolio analysis enables strategic assessments to be made concerning multiple strategic business units and their future resourcing requirements (McKercher, 1995). Besides business units, modern portfolio theory can be applied to optimal foreign tourist market mixes. According to Laimer and Weiss (2009: 29), "potential users of portfolio analysis are all groups interested in tourism-related statistical data, those who are decision-makers in the tourism industry such as local tourism managers relying on profound statistical data". There are several studies which have applied financial portfolio theory to the tourism sector. Board et al. (1987) used a portfolio theory model to calculate the risk-minimizing distribution of accommodation nights by tourists of different nationalities in hotels and hostels in Málaga over the period from 1966 to 1985. Chen et al. (2011) applied portfolio theory to Japan's inbound tourist markets and proposed optimal market shares by nationality. They highlighted diversification in tourism markets and offered tourism policy-makers in Japan explicit guidelines for the long-term development of the country's tourism industry. Kennedy (1998) applied financial portfolio theory to the Irish tourism industry so he could calculate which range of nationalities would minimize the volatility of tourism demand. Águas et al. (2000) concluded in their paper that market portfolio analysis is an essential tool for tourist destination management. Calantone and Mazanec (1991) applied portfolio analysis to tourism by plotting countries of origin markets to a destination according to growth rates and relative market shares. Loi and Tou (2013) suggested a portfolio analysis model using the risk (fluctuation patterns of tourist arrivals) and return (per capita expenditure of tourists). They analyzed the tourist destination of Macao, but their model can be applied to any other tourist destination as well. Botti et al. (2011) applied financial portfolio theory to rationalize destination management's decision-making. Ratsimbanierana et al. (2013) analyzed Moroccan destination performance by using the mean-variance shortage function approach. Smeral and Witt (2002) highlighted the importance of the analysis of destination country portfolios, which is essential for evaluating the overall competitive position of tourist destinations.

This paper has applied the portfolio theory model to the Croatian inbound tourism industry to determine market shares that will suggest to Croatian policy-makers how to distribute available resources in order to minimize the volatility or maximize tourist consumption expenditure at a certain level of risk.

5. *Financial portfolio approach in modelling foreign tourism demand*

Considering that Croatia is a country with a large share of tourism in its GDP, a reduction in tourism demand would have serious effects on GDP, employment, capital investments, etc. To reduce the possible harm caused by a decline in tourist consumption expenditure (TCE), one of the priorities of tourism policy-makers is to control the volatility of TCE. According to UNWTO (1994: 21)[10] tourism expenditure is defined as "the total consumption expenditure made by a visitor or on behalf of a visitor for and during his/her trip and stay at destination". Thus, for this research the number of tourist overnight stays per country (Table 2) was multiplied by the average daily tourist spending per country (Table 1). The multiplication product represents the estimated tourist consumption expenditure for every country observed.

Using portfolio theory, policy-makers can optimize or maximize TCE for a certain level of risk. The first step in applying this theory was to decompose the number of foreign tourist overnight stays in Croatia by country of origin and to determine the average number of overnight stays per country (Table 2).

Table 2 Foreign tourist overnight stays in Croatia by country of residence (in '000)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
DE	10789	11056	10888	11001	10987	10849	10983	11451	11476	12487	13947	14435	14749	15770	17082
SI	4993	5208	5032	5099	5246	5690	5802	5635	5885	6389	6240	6159	6236	6678	7140
IT	4883	5323	5375	5699	5475	5452	5069	5135	4732	4995	4535	4396	4466	4800	4961
AT	3543	3585	3638	3757	4069	4245	4165	4515	4420	4836	5104	5208	5404	5902	6511
CZ	4560	4554	4173	4052	3921	4395	4122	4020	4170	4389	4520	4539	4600	4812	4770
PL	2186	1331	1286	1375	1612	1834	2512	2738	2895	3134	3408	4079	4078	4323	4964
NL	1204	1497	1690	1910	1938	2030	2335	2446	2244	2224	2566	2491	2415	2477	2661
HU	1733	1905	2092	2405	2196	1985	1934	1644	1605	1746	1630	1728	1931	2266	2528
SK	1223	1205	1101	1183	1428	1832	1927	2000	2084	2282	2294	2258	2383	2550	2606
UK	661	721	1015	1349	1366	1276	1223	1229	1173	1237	1505	1907	2102	2419	3027
FR	419	689	1242	1920	1708	1665	1635	1533	1464	1484	1539	1644	1658	1709	1886
BA	787	848	755	829	948	1147	1199	1079	1048	1061	1066	1002	1091	1300	1481
RU	505	510	605	695	937	1289	1447	1068	1376	1498	1578	1222	1045	740	739
SE	166	271	457	690	719	664	722	644	637	652	730	972	1032	1070	1405
OE	1503	2026	2468	3192	3477	4048	4355	4279	4574	4912	5159	5606	5598	5984	6990
O	556	594	699	831	995	1173	1195	1085	1209	1425	1701	2034	2536	3062	3443
Σ	39711	41323	42516	45987	47022	49574	50625	50501	50992	54751	57522	59680	61324	65863	72193

Source: Croatian Bureau of Statistics, Statistical Yearbook of the Republic of Croatia 2017[11]
Note: OE–Other European countries, O–Other world countries

Table 2 shows the analysis of foreign tourist overnight stays in Croatia. In spite of the global financial crisis, Croatia has enjoyed steady growth in tourist nights spent in accommodation establishments, except in 2008. Although the number of tourist overnight stays increased over the 15-year period, the growth of each market varied. During the period observed, German visitors spent more than one-fifth of the total realized tourist nights in accommodation establishments in Croatia.

Considering that the aim of this research was to help tourism policy-makers to optimize or maximize TCE at a certain level of risk, the second step was to determine the risk of tourist markets individually. The authors observed the estimated TCE over this period of 15 years (2002-2016).

Table 3 Volatility and mean value of estimated tourism consumption expenditure (in '000 in EUR)

	DE	SI	IT	AT	CZ	PL	NL	HU	SK	UK	FR	BA	RU	SE
Mean	777,736	308,633	331,954	331,836	233,089	171,698	140,250	123,491	115,918	180,315	140,335	62,781	100,246	82,732
Volatility	126,082	33,063	25,175	62,130	14,407	71,307	26,800	17,701	31,457	74,815	37,894	11,427	35,384	34,401
Min	669,673	264,379	290,707	255,946	208,989	79,320	78,838	101,372	67,513	80,497	39,738	45,459	49,783	19,019
Max	1,060,280	378,037	376,875	470,383	256,479	306,173	174,240	159,658	159,777	368,587	182,093	89,165	155,559	161,026
Coeff. of variance	0.16	0.11	0.08	0.19	0.06	0.42	0.19	0.14	0.27	0.41	0.27	0.18	0.35	0.42

Source: Authors

According to Table 3, Germany has the highest mean value, but also the highest volatility. Italy is in the second place according to the mean value accompanied by very low volatility, followed by Austria, Slovenia, the Czech Republic, the United Kingdom, Poland, etc. The coefficient of variance served as a measure that indicates the relative risk per TCE over the period of 15 years. The Czech Republic has the lowest coefficient of variance at 0.06, followed by Italy and Slovenia. After estimating the mean values of TCE per country, the next step was to calculate the portfolio rate of return $E(r_p)$, which is calculated as a weighted average of TCE in the portfolio, and the weights (w_i) are shares of different foreign markets in the portfolio. Tags found in subscript – p indicate the portfolio, while i and j indicate foreign tourist markets. The expected return for the portfolio can be expressed as:

$$E(r_p) = w_i E(r_i) + w_j E(r_j) \dots \dots \dots \dots w_n E(r_n) \quad (3)$$

or generally for n foreign markets in the portfolio

$$E(r_p) = \sum_{i=1}^{n} w_i E(R_i) \quad (4)$$

Every foreign market has to be assessed on the basis of expected return and risk contributions for the entire portfolio. The risk (volatility) of the portfolio return depends on the covariance of different international markets in the portfolio. The risk of the market portfolio can be expressed as:

$$\sigma_p = \sqrt{\sum_{i=1}^{n} w_i^2 \sigma_i^2 + 2 \sum_{i=1}^{n-1} \sum_{j=i+1}^{n} w_i w_j Cov\,(R_i, R_j)} \quad (5)$$

where σ_p is the standard deviation of portfolio return. Cov (R_i, R_j) stands for the covariance of the market returns. The portfolios that have the greatest expected return for each level of risk constitute the efficient frontier. A risk-averse investor would only choose portfolios that are on the efficient frontier because all available portfolios that are not on the efficient frontier have lower expected returns than an efficient portfolio with the same risk. The next step was to find diversification possibilities. According to the correlation matrix it can be concluded that most of the correlation coefficients are positive, 15 country pairs have a negative relationship and 14 coefficients have a weak positive relationship, which is considered good for reducing the instability of TCE.[12]

Every market participates in the portfolio under the following condition:

$$\sum_{i=1}^{n} w_i = 1 \quad (6)$$

The second condition was:

$$w_i \geq 0 \quad (7)$$

To make the results as realistic as possible, all the weights of the individual markets have additional constraints on their upper and lower limits. In other words, the authors of this research project decided to put upper and lower constraints on weights 30% above the highest estimated TCE in the observed period of 15 years and 30% under the minimal estimated TCE in the same period. The authors found ±30% constraints sufficient, according to growth rates in recent years.[13] Other constraints can be applied depending on the situation; individual constraints can also be applied to certain markets, if necessary.

The optimal mixture of inbound tourists has an infinite number of possibilities. In Table 4 several portfolio combinations are calculated with different return/risk options to determine towards which foreign tourist markets Croatia must be oriented.

Table 4 Optimal market portfolios

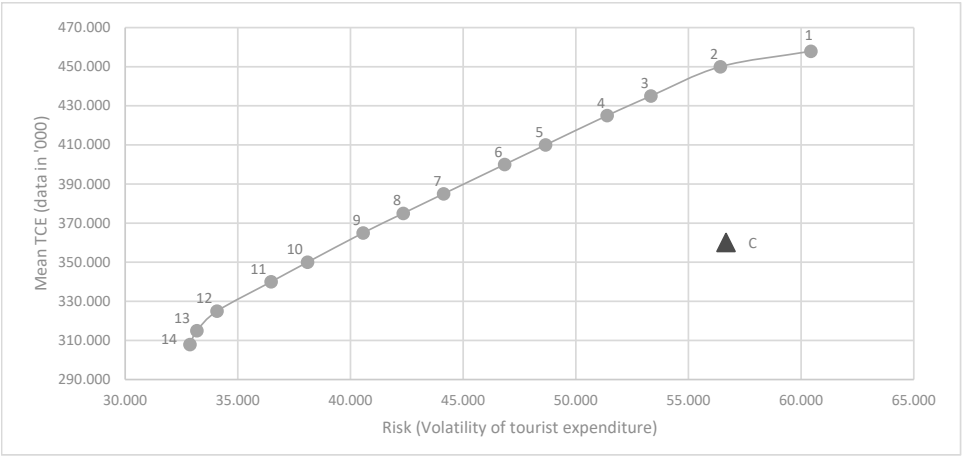
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	C
DE	0.36	0.36	0.33	0.31	0.29	0.28	0.25	0.24	0.22	0.20	0.19	0.16	0.16	0.16	0.25
SI	0.11	0.11	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.10	0.06	0.09
IT	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.08
AT	0.15	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.06
CZ	0.04	0.12	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.11
PL	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.07
NL	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.05	0.07	0.07	0.07	0.04
HU	0.02	0.02	0.02	0.03	0.05	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.04
SK	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.04
UK	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
FR	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.02	0.02	0.05	0.08	0.09
BA	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.03	0.04
RU	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.04	0.06	0.06	0.06	0.06	0.06	0.06	0.02
SE	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04
Σwi	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
$E(r_p)$	457,910	450,000	435,000	425,000	410,000	400,000	385,000	375,000	365,000	350,000	340,000	325,000	315,000	307,921	360,116
σ_p	60,432	56,415.6	53,331.4	51,389.2	48,658.1	46,841.7	44,133.1	42,340.0	40,557.9	38,091.0	36,479.0	34,077.3	33,185.1	32,872.5	56,665
TCERR E(rp)/σp	8.00	7.98	8.16	8.27	8.43	8.54	8.72	8.86	9.00	9.19	9.32	9.54	9.49	9.37	6.00

Source: Authors

Note: The mean value of TCE [E(rp)] is in '000

Every portfolio has a different combination of market shares and a different mean value of TCE (expected return E_{rp}) and risk (standard deviation). Weights were estimated by quadratic programming, using the Solver program. The first portfolio has the highest possible mean TCE with the highest risk; it consisted mostly of the German, Slovenian and Austrian markets. It has a mean TCE of 457,910 and a standard deviation of 60,432. Extreme risk avoiders will choose Portfolio 14, which has minimal risk, but also a minimal value of expected mean TCE. It consists mostly of Italian (18%), German (16%) and Czech tourists (13%). There are approximately equal shares of Slovenian, Austrian, Dutch, Hungarian, French and Russian tourists. Portfolio 14 has the lowest expected mean value of TCE at 307,921, but also the lowest risk of 32,872.5. The portfolio with the largest value of tourist consumption expenditure reward ratio (TCERR) is Portfolio 12. TCERR (9.54) is calculated as a mean of TCE divided by standard deviation. This portfolio offers the best ratio between estimated mean TCE and risk. If policy-makers have a stronger preference for the high mean TCE, but high risk, they can choose Portfolios 1, 2 or 3, or they can choose Portfolios 12, 13 or 14 for the low mean TCE/low instability. All shown portfolios lie on the efficient frontier. Any investor who thinks rationally will choose the portfolio from the efficient frontier because it promises the best combination of risk and return.

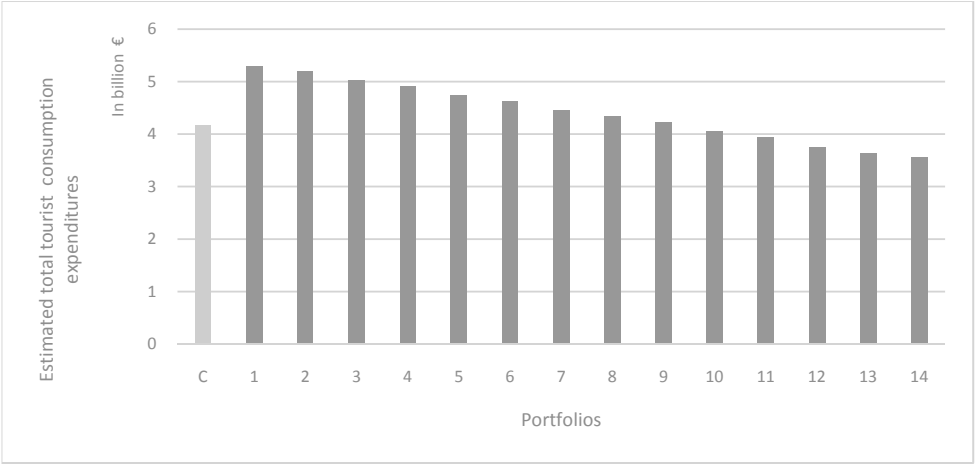
Figure 3 Efficient frontier



Source: Authors

The efficient frontier connects 14 market mixes. Every portfolio that lies on the efficient frontier has the least instability for a given level of estimated mean value of TCE. The current real results for Croatia in 2016 are shown in Figure 3 as Portfolio C. For approximately the same risk, policy-makers can choose Portfolio 2 and achieve much larger mean TCE value. For instance, Figure 4 shows the estimated total tourist consumption expenditures for each Portfolio, including the current real Portfolio C.

Figure 4 Estimated total tourist consumption expenditures



Source: Authors

All portfolios that lie above Portfolio 9 (Figure 3), have a higher estimated total TCE than Portfolio C. Portfolio 2 includes approximately the same risk as Portfolio C, but Portfolio 2 has a 25% higher estimated total TCE when compared with Portfolio C.

6. Conclusion

This study can help Croatian policy-makers to decide towards which foreign tourist markets Croatia must be oriented in line with their own risk preferences. As explained earlier, the stability of inbo-

und tourist demand represents a very important condition for tourism development, GDP growth, rise in employment and many other positive long-term effects, especially in Croatia, where travel and tourism made a 10.7% direct and 24.7% total contribution to GDP in 2016 (World Travel and Tourism Council, 2017)[14]. According to the same source, the total contribution of the travel and tourism sector to employment was 23.4%. Visitor exports generated in the travel and tourism sector amounted to 38% of total exports. For all these reasons, Croatia is often called a tourism-oriented country with a tourism-dependent economy. Policy-makers in Croatia have a great responsibility to use the available resources wisely and to attract a range of tourists of various nationalities, which will optimize or maximize tourism revenues at a certain level of risk. Applying portfolio theory to tourism provides policy-makers with different solutions in terms of setting goals, limiting risk and reallocating resources. This theory is well known in finance as an investment decision tool, but it has a wide range of applications. Using this theory, policy-makers can construct an optimal mix of international tourist markets, which will maximize the tourist consumption expenditure at a certain level of risk. For example, if policy-makers accept the currently estimated risk, they can choose Portfolio 2, which has approximately the same risk as Portfolio C, but with 24.96% higher estimated average tourism consumption expenditures. If policy-makers choose Portfolio 2 as a solution, they should focus more on the following markets: DE, SI, IT and AT. However, if policy-makers decide to choose a portfolio according to reward ratio, they should choose Portfolio 12 (TCERR=9.54) and increase following market weights: SI, IT, AT, CZ, NL, HU and RU. Although this research provides several solutions, they could easily be modified according to policy-makers' preferences.

7. Limitations and future research

Despite the theoretical and practical relevance of this paper, there are some limitations that give rise to future research suggestions. First, portfolio theory in tourism can only be used in the long run. On the stock market it is possible to replace stocks quickly (if conditions like liquidity, transaction costs and others are met). In tourism, it is not possible to adjust the market composition so quickly. Tourism requires long-term planning. Second, investors in stock markets increase the weights of higher return/risk assets and decrease the weights of lower return/risk assets in their portfolio to achieve an optimized portfolio. However, in tourism policy, the policy-makers always increase the number of tourist arrivals/nights spent in Croatia, regardless of where they come from, since every tourist is important, and the tourism policy-makers do not ignore them. Therefore, the application of financial portfolio theory to tourism issues should be considered carefully. Third, portfolio theory does not include trends which are present in the tourism industry. Fourth, the average consumption of tourists of different nationalities is presented on the basis of the research by the Croatian Institute for Tourism, which included a sample of 2,487 tourists. Data is not available for every year; the latest available data was from 2014. Such data must be considered with caution because the average tourist spending depends on the chosen accommodation (hotel, camp or private accommodation). The survey results also vary regarding the counties where tourists are surveyed, age of respondents, length of stay, degree of education, arrival motive and many other factors. The lack of detailed revenue data limits the informative value of the results. Fifth, the expected tourist consumption expenditure and risk (instability) are based upon historical mean values and standard deviation, which are not appropriate for future decision-making, since past performance cannot be a guarantee of future performance. The constraints can be modified or based on a more detailed analysis, including the current trends and growth rates related to foreign tourists. Future research should be based on the full sample of tourists that spend nights in Croatia. In light of the fact that tourist market trends often change, it would be advisable to include them in future research, because foreign tourism demand doesn't fully depend upon policy-makers activities.

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Portfolio analiza inozemne turističke potražnje u Republici Hrvatskoj

Sažetak

Turizam je trenutno jedan od najvažnijih sektora za ekonomski razvoj Republike Hrvatske te se uglavnom fokusira na strane turiste iz zemalja Europske unije. Zbog dinamičnog i vrlo konkurentnog turističkog tržišta, danas je vrlo teško predvidjeti turističku potražnju, koja varira u vremenu između turista različitih nacionalnosti. Stabilnost inozemne turističke potražnje čini važan preduvjet za razvoj turizma i devizne prihode. S obzirom da nositelji turističke politike moraju distribuirati raspoložive resurse na različitim turističkim tržištima u svrhu promocije Republike Hrvatske, svrha ovoga istraživanja je analizirati ostvarena noćenja stranih turista po zemljama podrijetla, jednako kao i njihovu ostvarenu prosječnu dnevnu potrošnju te konstruirati optimalnu kombinaciju turista različitih nacionalnosti u obliku portfelja, koji će pomoći nositeljima turističke politike u optimizaciji, odnosno u maksimizaciji ostvarivanja turističkih prihoda uz određenu razinu rizika. Glavni je cilj ovoga rada primijeniti financijsku teoriju portfelja na hrvatskoj turističkoj potražnji i konstruirati optimalnu kombinaciju inozemnih turista, te je bitno spomenuti da s obzirom na preferencije rizika i povrata postoji beskonačan broj mogućih kombinacija. U ovome istraživanju izračunato je nekoliko optimalnih kombinacija s različitim rizicima i povratima kako bi se utvrdilo na koje se strane turiste Republika Hrvatska mora fokusirati. Na primjer, kako bi se postigla kombinacija stranih turista koja pruža najvišu razinu turističke potrošnje, turističke vlasti trebale bi se više orijentirati na njemačko, slovensko, talijansko i austrijsko tržište. Rezultati ovoga istraživanja lako se mogu mijenjati prema kriterijima rizika / povrata turističke politike.

Ključne riječi: hrvatski turizam, teorija portfelja, turistička potražnja, optimalni tržišni miks, receptivni turizam