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Preliminary statement

THE CONTRIBUTION OF TOURISM TO THE CROATIAN ECONOMY: AN IO APPROACH

In order to understand the contribution of tourism to the economy and the effects of possible structural changes during the tourism boom that Croatia is currently facing, the article focuses on the place and role of tourism in the Croatian economy and its impact on the output of the most relevant industries. The aim of the paper is to estimate the contribution of tourism to the gross domestic product of Croatia and to measure the multiplicative effects of tourism consumption on the different industries of the economy during a nine year period, based on a specific methodological framework, which integrates tourism satellite and input-output models in three different years. The analysis has provided an approximation of the total tourist industry contribution to the national economy, ranging from 14.2 to 16.3 percent of the gross value added of the whole of the economy. It concludes that tourism consumption has a positive effect on both tourism and non-tourism products and activities. Improvement of the quality of the research within the input-output framework requires the process of the fractionalization of input-output tables but also a more precise extraction of activities characteristic of tourism than there has previously been.

Key words: tourism satellite account, input-output tables, contribution of tourism, structural inter-sectoral changes, Croatia

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1. Introduction

Croatia is heading slowly in the direction of economic recovery after six years of consecutive decline in economic activity and of a continuing fall in GDP. At the same time, Croatian tourism has recorded steady growth, becoming an important factor, substituting for weakened domestic demand and stimulating the growth of the economy (Inchausti-Sintes, 2015), although the relationship between tourism and the growth of the economy is both complex and multidimensional. The connection between tourism and economic growth, analyzed in many different models, econometric techniques and with varying data, has been for a long time one of the most important topics of the tourism economics literature (Pablo-Romero & Molina, 2013). The tourism-led growth hypothesis (e.g. Payne & Mervar, 2010) and the contrary hypothesis that tourism does not necessarily increase a country's competitiveness or its economic welfare (e.g. Tkalec & Vizek, 2016) are among the main topics. Also, much of the research has been directed toward understanding inter-sectoral linkages and the assessment of the economic impact of tourism based on statistical and model approaches (Song, Dwyer, Li & Cao, 2012).

Having in mind the tourism boom Croatia faces now, the effects of possible structural changes in and the de-industrialization of an economy (Nowak & Sahli, 2007) are of special interest and there is an ongoing necessity to understand the size of the tourism industry and its contribution to the economy. This article has two goals: (i) an estimation of the contribution of tourism to the economy, and (ii) an analysis of structural changes in the economy due to increased tourism activity. In order to answer these two research questions, a specific methodological framework has been applied based on the application of an integrated tourism satellite and input-output model. For an explanation of the dynamics of structural changes, the method of comparative statics is used, analyzing changes at three points of time during the period from 2005 to 2013. The paper has six parts. After the introductory remarks, the second section focuses on the problems of the measurement of the direct and indirect contributions of tourism to the economy based on the tourism satellite account [TSA] and the input-output [IO] model. The third section deals with relevant data sources for Croatia in the TSA and IO framework. Part four reveals changes in inter-sectoral relationships of the tourism activity in Croatia while the main topic of the fifth part is the calculation of structural changes and the total contribution of tourism. The last part of the paper gives the main conclusions and recommendations for further research.

2. Literature review on methodological approaches applied in the measurement of the contribution of tourism to the national economy

Tourism is demand driven, unlike other, 'regular', economic activities, which are defined on the basis of inputs, technologies or outputs. In this sense tourism consists of all activities that place their outputs to visitor consumption. Therefore tourism is one of the activities that refer to groupings of industries implying the usage of the satellite account approach (European Commission et al., 2009).

The tourism satellite account sets up the basis for quantifying the direct effects of tourism in the form of reliable and internationally harmonized accounts (Alhert, 2007; Frechtling, 2010) conceived in the 2008 Tourism Satellite Account: Recommended Methodological Framework (United Nations et al., 2010). Building on the framework and methodology of the standard System of National Accounts (SNA), a TSA is composed of 10 tables relating to monetary and non-monetary indicators of tourism expenditure and consumption, output, employment, gross fixed capital formation and government administrative expenditures associated with tourism, and five macro-aggregates as indicators of the size of tourism in a national economy (Ivandić & Marušić, 2017).

Apart from an estimation of the direct contribution of tourism to an economy, a more complete insight implies an analysis of links among sectors directly selling services and products to tourists and the sectors serving those sectors (the indirect effects of tourism) as well as an analysis of the impact of income connected to tourist consumption on an economy (induced effects of tourism), but also measurement of the negative effects of tourism on other sectors. Among the numerous stochastic and deterministic methods that can be used to estimate the economic contribution of tourism (Hara, 2008), the models based on input-output models and computable general equilibrium [CGE] models are most common (Song, Dwyer, Li & Cao, 2012; Dwyer, 2015; Frechtling, 2013).

Input-output tables are a relevant means of analysis of the direct and indirect contributions of tourism to the national economy (Jurčić, 2000) and despite their recognized methodological limits related to the assumption of fixed prices, fixed coefficients and the measurement of only positive effects (Blake, 2009), provide a sufficiently good approximation, especially over a longer time period and when connected with a statistically founded framework such as a satellite tourism account.

Construction of tourism activity in an input-output environment assumes the extraction of those parts of outputs that end in tourism consumption. Such a procedure is called fractionalization, in terms of matrix algebra, or desegregation, in terms of national accounts. The process of fractionalization of outputs in all activities starts from an analysis of the structure of tourism consumption by products and services. The values of those extracted parts of outputs, together with

accompanying inputs, are separated into new vectors of ‘tourism activities’ and after that vector components of tourism activity are aggregated into a new ‘tourism industry’. An alternative approach, which is used in this paper, is based on the multiplication of matrix multiplier based on domestic intermediaries and a vector column of domestically produced internal tourism consumption in basic prices. Such a procedure gives the same results as the procedure of the desegregation of outputs and inputs into tourism and non-tourism parts under the condition that desegregation of the consumption vector linearly transfers to related outputs and inputs (Državni zavod za statistiku, 2002).

3. Methodological framework, definitions and data sources

3.1. Methodological framework and definitions

Assessments of the contribution of tourism in this paper are based only on domestic flows (Državni zavod za statistiku, 2002). Transformation of total flows into domestic flows starts with equation (1):

$$\mathbf{X} = \mathbf{A} \mathbf{X} + \mathbf{Y} \quad (1)$$

where:

- \mathbf{X} = vector of outputs in basic prices,
- \mathbf{A} = coefficient matrix for intermediate consumption (domestic and imported flows)
- \mathbf{Y} = vector of final demand which includes domestic and imported products and services and consists of consumption expenditures, gross capital formation and net exports.

Equation (1) expressed in a more decomposed form looks like this:

$$\mathbf{X} = (\mathbf{A}^d + \mathbf{M}^{id})\mathbf{X} + (\mathbf{Y}^d + \mathbf{Y}^m - \mathbf{M}) \quad (2)$$

where:

- \mathbf{A}^d is the coefficient matrix of domestic intermediate demand
- \mathbf{M}^{id} is the coefficient matrix of imported intermediate demand

- Y^d is the vector of domestically produced final demand products
- Y^m is the vector of imported final demand products
- M is the vector of all (intermediate and final demand) imported products.

The term in the brackets in equation (2) represents the vector of total final consumption (including domestic and imported products), which multiplies total production and via it gross value added. In order correctly to measure the contribution of domestically produced final consumption it is necessary to extract total imports from both final consumption of domestic origin and final consumption of foreign origin.

In an attempt to best measure the impact of domestically produced final consumption (Y^d) on aggregate production (Gross Domestic Product) it is necessary to transform equation (2). Transformation goes through the permutation and association of different terms of equation (2), which gives the following equation:

$$X = A^d X + Y^d + (M^{id} X + Y^m - M) \quad (3)$$

As the term $(M^{id} X + Y^m - M)$ equals 0, the remaining equation appears:

$$X = A^d X + Y^d \quad (4)$$

Rearrangement of equation (4) gives:

$$X = (I - A^d)^{-1} Y^d \quad (5)$$

where:

- $(I - A^d)^{-1}$ is the matrix multiplier in which each element shows how much gross output in industry i is generated by the final domestic delivery of industry j .

Under the assumption of equal structure for non-tourism and tourism industries, equation (5) is a basis for the estimation of tourism-generated production when transformed into equation (6), which represents the segment of the total production of the economy generated by internal tourism consumption:

$$X^T = (I - A^d)^{-1} Y^{dT} \quad (6)$$

where:

- X^T is the vector of outputs in basic prices generated by tourism activity
- Y^{dT} is the vector of domestically produced internal tourism consumption in basic prices.

Calculation of gross value added of tourism [GVA^{dT}] in disaggregated form (Babić, 1982), as basis for the calculation of tourism's contribution to the economy, is performed with the following equation:

$$\mathbf{GVA}^{dT} = \hat{\mathbf{d}}[\mathbf{I} - \mathbf{A}^d]^{-1} \mathbf{Y}^{dT} = \mathbf{H} \mathbf{Y}^{dT} = \dots \quad (7)$$

where:

- GVA^{dT} is the vector of tourism gross value added of each industry (in basic prices) generated by domestically produced internal tourism consumption in basic prices
- $\hat{\mathbf{d}}[\mathbf{I} - \mathbf{A}^d]^{-1} = \mathbf{H}$ as product of diagonalized matrix of gross value added coefficients ($\hat{\mathbf{d}}$) and matrix multiplier; \mathbf{H} consists of elements that represent the production of gross value added in industry i generated by unit of internal tourism delivery of industry j .

Understanding of the terms and concepts related to tourism consumption and expenditures used in this paper calls for delineation of the following concepts (United Nations, World Tourism Organization, Eurostat – Commission of the European Communities & Organisation for Economic Co-operation and Development, 2010; paragraphs 2.25. and 2.30):

- Tourism consumption vs. tourism expenditure: the concept of tourism consumption used in the tourism satellite account goes beyond that of tourism expenditure; together with acquisitions included in tourism expenditure it includes services associated with vacation accommodation on own account, tourism social transfers in kind and other imputed consumption;
- Domestic tourism consumption: the tourism consumption of a resident visitor within the economy of reference.
- Inbound tourism consumption: the tourism consumption of a non-resident visitor within the economy of reference.
- Outbound tourism consumption: the tourism consumption of a resident visitor outside the economy of reference.
- Internal tourism consumption: the tourism consumption of both resident and non-resident visitors within the economy of reference, the sum of domestic tourism consumption and inbound tourism consumption.
- National tourism consumption: the tourism consumption of resident visitors, within and outside the economy of reference. This is the sum of domestic tourism consumption and outbound tourism consumption.

3.2. Data sources for Croatia

The longstanding attempts to assess the direct and total contribution of tourism to the economy in Croatia (e.g. Radnić, 1990; Ivandić & Radnić, 1997; Radnić & Ivandić 1999) have been hampered by inadequate tourism statistics and/or nonaligned methods. However, this situation has significantly changed in the last twenty years with efforts to compile input-output tables and satellite accounts for Croatia followed by the application of input-output models to tourism (Jurčić, 1998, Jurčić 2000; Šutalo, Ivandić & Marušić, 2011).

Data used in this paper come from three supply and use tables [SUT] tables followed by three input-output tables and two tourism satellite accounts for Croatia:

- SUT and input-output tables for 2004 (Croatian Bureau of Statistics, 2013) - input-output tables are in the 60 activity/product division level format according to the National Classification of Activities – NKD 2002 and Classification of Product by Activities in the Republic of Croatia – KPD 2002.
- SUT and input-output tables for 2010 (Croatian Bureau of Statistics, 2015) - input-output tables are in the 65 activity/product division level format according to the National Classification of Activities – NKD 2007 and Classification of Products by Activities in the Republic of Croatia – KPD 2008.
- SUT and input-output tables for 2013 (Mikulić, 2017) - input-output tables are in the 65 activity/product division level format according to the National Classification of Activities – NKD 2007 and Classification of Products by Activities in the Republic of Croatia – KPD 2008.
- Experimental tourism satellite account for Croatia 2005 (Ivandić et al., 2008) – estimation of inbound and domestic expenditure and consumption, production of tourism activities and calculation of tourism macro aggregates; products/activities included in TSA tables are: accommodation and food and beverage services, passenger transport services, travel agencies and other reservation services, cultural, sports and recreational services and other (non-tourism) products and services (retail trade, tolls, other).
- Tourism satellite account for Croatia 2011 (Ivandić et al., 2014.) - estimation of inbound and domestic expenditure and consumption, production of tourism activities, employment in tourism activities and calculation of tourism macro aggregates; products/activities included in TSA tables are: accommodation and food and beverage services, passenger transport services, travel agencies and other reservation services, cultural, sports and

recreational services and other (non-tourism) products and services (retail trade, tolls, other).

4. Results

4.1. Changes in inter-sectoral relationships of tourism activity in Croatia

With respect to the differences in the formats of input-output tables and TSA tables, this paper is based on an aggregation of input-output tables approximately in the TSA format. Adjustment of the IO framework to the TSA format is done by aggregation of 65x65 (60X60) matrices to matrices of dimension 7x7 that include following products/activities: 'Hotels and restaurants', 'Land and pipeline transport', 'Water transport', 'Air transport', 'Recreational, sport and cultural activities', 'Wholesale and retail trade' - except trade in motor vehicles and 'Other' products/industries as residual. This format of the adjusted IO table is approximately like the TSA format with the exception that two hospitality activities (hotels and restaurants) are aggregated into one, and travel agencies' activity was joined with other activities/products because in the IO table for 2004 it does not exist as a separate sector despite its technology necessarily differing from the technology of the sector Other. Additionally, the sector of 'Wholesale and retail trade' has been specifically emphasized, although the TSA does not consider it a characteristic tourism product/activity. Furthermore, it should be accentuated that although TSA transport activities (only passenger transport) are narrower than transport activities in the input-output environment (passenger and goods transport), this does not necessarily influence the quality of the results.

Calculated elements (r_{ij}^d) of the matrix multiplier $(\mathbf{I} - \mathbf{A}^d)^{-1}$ for 2004, 2010 and 2013 for Croatia are shown in table 1, in which the sum of each column represents output generated in the whole economy (i.e. of all industries) by the unit final delivery of that sector. That industry output multiplier consists of direct and indirect impacts. Direct impact is expressed by a diagonal element ($r_{ij}^d, i=j$), while indirect impact is obtained by the vertical summation of the non-diagonal elements ($\sum_i r_{ij}^d, i \neq j$ for $\forall j$) of matrix $(\mathbf{I} - \mathbf{A}^d)^{-1}$. It should be stressed that the vertical sums of elements of matrix multipliers for the three years considered are very volatile, indicating that SUT/IO requires further refinement.

Table 1.
MATRIX MULTIPLIER $(I - A^D)^{-1}$ BASED ON DOMESTIC INTERMEDIATE FLOWS
FOR CROATIA IN 2004, 2010 AND 2013

	2004							2010							2013									
	Hotels and restaurants	Land and pipeline transport	Water transport	Air transport	Recreational, sport and cultural activities	Wholesale and retail trade	Other	Total	Hotels and restaurants	Land and pipeline transport	Water transport	Air transport	Recreational, sport and cultural activities	Wholesale and retail trade	Other	Total	Hotels and restaurants	Land and pipeline transport	Water transport	Air transport	Recreational, sport and cultural activities	Wholesale and retail trade	Other	Total
Hotels and restaurants	1.0155	0.0053	0.0030	0.0096	0.0079	0.0057	0.0040	1.0510	1.0036	0.0019	0.0011	0.0018	0.0058	0.0035	0.0034	1.0211	1.0052	0.0033	0.0050	0.0082	0.0068	0.0048	0.0043	1.0375
Land and pipeline transport	0.0120	1.1714	0.0116	0.0207	0.0174	0.0302	0.0220	1.2853	0.0100	1.0178	0.0137	0.0162	0.0078	0.0123	0.0120	1.0899	0.0184	1.0576	0.0815	0.0846	0.0168	0.0397	0.0212	1.3198
Water transport	0.0008	0.0014	1.0011	0.0013	0.0045	0.0012	0.0021	1.0125	0.0042	0.0081	1.0989	0.0039	0.0029	0.0030	0.0040	1.1249	0.0017	0.0036	1.0181	0.0022	0.0018	0.0026	0.0024	1.0323
Air transport	0.0001	0.0001	0.0008	1.0072	0.0008	0.0002	0.0003	1.0097	0.0014	0.0013	0.0019	1.0021	0.0012	0.0013	0.0019	1.0112	0.0009	0.0012	0.0009	1.0027	0.0028	0.0014	0.0013	1.0112
Recreational, sport and cultural activities	0.0044	0.0005	0.0005	0.0005	1.1974	0.0016	0.0009	1.2057	0.0660	0.0633	0.0975	0.0751	0.0411	1.0768	0.0736	1.4935	0.0057	0.0012	0.0010	0.0008	1.0586	0.0011	0.0010	1.0693
Wholesale and retail trade	0.0474	0.0260	0.0545	0.0439	0.0385	1.0461	0.0522	1.3086	0.4035	0.5612	0.3870	0.7056	0.4402	0.4879	1.4256	4.4109	0.0542	0.0609	0.0470	0.0691	1.0629	0.0580	0.0580	1.3814
Other	0.4946	0.4732	0.6298	0.8238	0.5050	0.5569	1.5413	5.0247	0.4799	0.5538	0.6323	0.9197	0.4134	0.5048	1.5055	5.0095	1.5749	1.6778	1.7014	1.9071	1.7715	1.6420	1.6228	1.5210
Total multiplier of the activity																								
Hotels and restaurants	1.0036	0.0019	0.0011	0.0018	0.0058	0.0035	0.0034	1.0211	1.0036	0.0019	0.0011	0.0018	0.0058	0.0035	0.0034	1.0211	1.0052	0.0033	0.0050	0.0082	0.0068	0.0048	0.0043	1.0375
Land and pipeline transport	0.0100	1.0178	0.0137	0.0162	0.0078	0.0123	0.0120	1.0899	0.0100	1.0178	0.0137	0.0162	0.0078	0.0123	0.0120	1.0899	0.0184	1.0576	0.0815	0.0846	0.0168	0.0397	0.0212	1.3198
Water transport	0.0042	0.0081	1.0989	0.0039	0.0029	0.0030	0.0040	1.1249	0.0042	0.0081	1.0989	0.0039	0.0029	0.0030	0.0040	1.1249	0.0017	0.0036	1.0181	0.0022	0.0018	0.0026	0.0024	1.0323
Air transport	0.0014	0.0013	0.0019	1.0021	0.0012	0.0013	0.0019	1.0112	0.0014	0.0013	0.0019	1.0021	0.0012	0.0013	0.0019	1.0112	0.0009	0.0012	0.0009	1.0027	0.0028	0.0014	0.0013	1.0112
Recreational, sport and cultural activities	0.0018	0.0002	0.0001	0.0004	1.0129	0.0003	0.0004	1.0161	0.0660	0.0633	0.0975	0.0751	0.0411	1.0768	0.0736	1.4935	0.0057	0.0012	0.0010	0.0008	1.0586	0.0011	0.0010	1.0693
Wholesale and retail trade	0.0660	0.0633	0.0975	0.0751	0.0411	1.0768	0.0736	1.4935	0.4035	0.5612	0.3870	0.7056	0.4402	0.4879	1.4256	4.4109	0.0542	0.0609	0.0470	0.0691	1.0629	0.0580	0.0580	1.3814
Other	0.4035	0.5612	0.3870	0.7056	0.4402	0.4879	1.4256	4.4109	1.4903	1.6538	1.6003	1.8051	1.5119	1.5851	1.5210	5.0095	1.5749	1.6778	1.7014	1.9071	1.7715	1.6420	1.6228	1.5210
Total multiplier of the activity																								
Hotels and restaurants	1.0052	0.0033	0.0050	0.0082	0.0068	0.0048	0.0043	1.0375	1.0052	0.0033	0.0050	0.0082	0.0068	0.0048	0.0043	1.0375	1.0052	0.0033	0.0050	0.0082	0.0068	0.0048	0.0043	1.0375
Land and pipeline transport	0.0184	1.0576	0.0815	0.0846	0.0168	0.0397	0.0212	1.3198	0.0184	1.0576	0.0815	0.0846	0.0168	0.0397	0.0212	1.3198	0.0184	1.0576	0.0815	0.0846	0.0168	0.0397	0.0212	1.3198
Water transport	0.0017	0.0036	1.0181	0.0022	0.0018	0.0026	0.0024	1.0323	0.0017	0.0036	1.0181	0.0022	0.0018	0.0026	0.0024	1.0323	0.0017	0.0036	1.0181	0.0022	0.0018	0.0026	0.0024	1.0323
Air transport	0.0009	0.0012	0.0009	1.0027	0.0028	0.0014	0.0013	1.0112	0.0009	0.0012	0.0009	1.0027	0.0028	0.0014	0.0013	1.0112	0.0009	0.0012	0.0009	1.0027	0.0028	0.0014	0.0013	1.0112
Recreational, sport and cultural activities	0.0009	0.0009	0.0009	0.0008	1.0586	0.0011	0.0010	1.0693	0.0009	0.0009	0.0009	0.0008	1.0586	0.0011	0.0010	1.0693	0.0009	0.0009	0.0009	0.0008	1.0586	0.0011	0.0010	1.0693
Wholesale and retail trade	0.0542	0.0609	0.0470	0.0691	1.0629	0.0580	0.0580	1.3814	0.0542	0.0609	0.0470	0.0691	1.0629	0.0580	0.0580	1.3814	0.0542	0.0609	0.0470	0.0691	1.0629	0.0580	0.0580	1.3814
Other	0.4799	0.5538	0.6323	0.9197	0.4134	0.5048	1.5055	5.0095	0.4799	0.5538	0.6323	0.9197	0.4134	0.5048	1.5055	5.0095	0.4799	0.5538	0.6323	0.9197	0.4134	0.5048	1.5055	5.0095
Total multiplier of the activity																								

Source: Authors' calculations

Under IO tables adjusted to TSA format, in 2013 the largest vertical sum of column elements of matrix multiplier ($\sum_i r_{ij}^d$, for $\forall j$) as backward technological linkage is in 'Air transport' and it amounts to 2.0873, meaning that unit delivery of 'Air transport' generates 2.0873 units of total output in the whole economy (in all sectors). Also, 'Air transport' has the largest backward influence on the economy in all analyzed years.

The lowest backward multiplier in 2004 and 2010 is in 'Hotels and restaurants', amounting to 1.5749 and 1.4903 respectively, while in 2013 the lowest backward multiplier appears in 'Recreational, sport and cultural activities', amounting to 1.5295 followed by the 'Hotels and restaurants' industry, amounting to 1.5660. This is result of the fact that 'Hotels and restaurants' and 'Recreational, sport and cultural activities' are among sectors with the highest share of gross value added in total output (Table 2) as a reflection of high capital intensity and/or high employment. As 'Hotels and restaurants' is one of the sectors with lowest share of intermediaries in total output it is expected that this product/activity draws more weakly the other industries.

Table 2.

TECHNICAL COEFFICIENTS OF GROSS VALUE ADDED [GVA] (SHARE OF INDUSTRY GROSS VALUE IN INDUSTRY OUTPUT) AND SHARE OF SECTORS GROSS VALUE ADDED IN TOTAL GROSS VALUE ADDED FOR CROATIA IN 2004, 2010 AND 2013

	Hotels and restaurants	Land and pipeline transport	Water transport	Air transport	Recreational, sport and cultural activities	Wholesale and retail trade	Other
	2004						
Technical coefficient of GVA	0.560	0.546	0.451	0.331	0.451	0.504	0.474
Share of sector GVA in total GVA of economy	0.040	0.032	0.007	0.002	0.016	0.107	0.795
	2010						
Technical coefficient of GVA	0.538	0.423	0.362	0.310	0.523	0.517	0.504
Share of sector GVA in total GVA of economy	0.057	0.023	0.008	0.003	0.015	0.105	0.788
	2013						
Technical coefficient of GVA	0.560	0.444	0.426	0.233	0.570	0.486	0.493
Share of sector GVA in total GVA of economy	0.053	0.031	0.005	0.001	0.013	0.133	0.765
	2004 to 2013						
Change in share of sector GVA from 2004 to 2013, in %	30.9	-3.3	-33.0	-43.0	-20.8	23.6	-3.8

Source: Authors' calculations

Considering the ten year period from 2004 to 2013, only two sectors show a growth in share of gross value added in total gross value added of the whole economy. These two sectors are 'Hotels and restaurants' with a share increase of 30.9% and 'Wholesale and retail trade' with an increase of 23.6% (Table 2). This can be considered as something of a weakness of the Croatian economy because, in the analyzed format, the 'Hotels and restaurants' sector stimulates the whole economy the least, while 'Wholesale and retail trade' also belongs to products/activities with the lowest level of backward impact in terms of output. At the same time, the share of gross value added of the sector with the highest backward impact 'Air transport' decreased the most. This throws special light on the structural process generated by foreign demand for the services of a rent industry like 'Hotels and restaurants', and also partly 'Wholesale and retail trade', through indirect de-industrialization generated by the technology characteristics (low backward effects) of the mentioned sectors.

The analysis of tourism industries' potential to generate GVA is based on the calculation of matrix H (equation 7) in which each element (h_{ij}^d) represents the GVA in delivering sector i generated by unit final delivery of receiving sector j , meaning that sum of the columns' elements of matrix H represents the total economy GVA generated by unit final delivery of sectors j . In other words, the sum of columns' elements of matrix H describes the backward linkage of any specific industry to GVA, while the sum of non-diagonal elements of columns ($\sum_j h_{ij}^d$, for $\forall i \neq j$) show backward linkage of one sector to GVA to the rest of the economy.

Table 3.

MATRIX COEFFICIENTS MULTIPLIER OF GVA IN DIS-AGGREGATED FORM $H = \hat{d}[I-A^d]^{-1}$ FOR CROATIA IN
2004, 2010 AND 2013

	Hotels and restaurants	Land and pipeline transport	Water transport	Air transport	Recreational, sport and cultural activities	Wholesale and retail trade	Other
2004							
Hotels and restaurants	0.569	0.003	0.002	0.005	0.004	0.003	0.002
Land and pipeline transport	0.007	0.639	0.006	0.011	0.010	0.016	0.012
Water transport	0.000	0.001	0.452	0.001	0.002	0.001	0.001
Air transport	0.000	0.000	0.000	0.334	0.000	0.000	0.000
Recreational, sport and cultural activities	0.002	0.000	0.000	0.000	0.540	0.001	0.000
Wholesale and retail trade	0.024	0.013	0.027	0.022	0.019	0.527	0.026
Other	0.234	0.224	0.298	0.390	0.239	0.264	0.730
Total GVA multiplier of activity j	0.836	0.880	0.786	0.763	0.815	0.812	0.772
GVA multiplier of activity j to the rest of the economy ($\sum_{i \neq j} h_{ij}^d$, for $\forall i \neq j$)	0.267	0.241	0.334	0.430	0.275	0.285	0.042
	2010						
Hotels and restaurants	0.540	0.001	0.001	0.001	0.003	0.002	0.002
Land and pipeline transport	0.004	0.431	0.006	0.007	0.003	0.005	0.005
Water transport	0.002	0.003	0.398	0.001	0.001	0.001	0.001
Air transport	0.000	0.000	0.001	0.311	0.000	0.000	0.001
Recreational, sport and cultural activities	0.001	0.000	0.000	0.000	0.530	0.000	0.000

	Hotels and restaurants	Land and pipeline transport	Water transport	Air transport	Recreational, sport and cultural activities	Wholesale and retail trade	Other
Wholesale and retail trade	0.034	0.033	0.050	0.039	0.021	0.557	0.038
Other	0.203	0.283	0.195	0.356	0.222	0.246	0.719
Total GVA multiplier of activity j	0.785	0.751	0.650	0.715	0.781	0.811	0.766
GVA multiplier of activity j to the rest of the economy ($\sum_{i \neq j} h_{ij}^d$, for $\forall i \neq j$)	0.245	0.320	0.253	0.404	0.251	0.255	0.047
2013							
Hotels and restaurants	0.563	0.002	0.003	0.005	0.004	0.003	0.002
Land and pipeline transport	0.008	0.469	0.036	0.038	0.007	0.018	0.009
Water transport	0.001	0.002	0.433	0.001	0.001	0.001	0.001
Air transport	0.000	0.000	0.000	0.234	0.001	0.000	0.000
Recreational, sport and cultural activities	0.003	0.001	0.001	0.000	0.604	0.001	0.001
Wholesale and retail trade	0.026	0.030	0.023	0.034	0.014	0.516	0.028
Other	0.237	0.273	0.312	0.453	0.204	0.249	0.742
Total GVA multiplier of activity j	0.838	0.776	0.808	0.764	0.834	0.788	0.784
GVA multiplier of the activity j to the rest of the economy ($\sum_{i \neq j} h_{ij}^d$, for $\forall i \neq j$)	0.275	0.307	0.374	0.530	0.231	0.271	0.042

Source: Authors' calculations

The matrices of GVA multipliers are just as volatile as the multiplier matrices, the high volatility of which has already been noted (Table 3). In 2013 the highest backward impact on GVA of the whole economy was found in ‘Hotels and restaurants’ (0.838) followed by ‘Recreational, sport and cultural activities’ (0.834). Also, ‘Hotels and restaurants’ was among the products/activities with the highest backward impact on GVA in 2004 and 2010. At the same time, the importance of the ‘Hotels and restaurants’ sector to the creation of GVA in the whole economy is completely different when only the impact on the rest of the economy is considered. Namely, its GVA multiplier on the rest of the economy throughout all the analyzed period is one of the lowest, indicating its relatively low impact on the creation of GVA in other industries except itself.

It is also worth mentioning that the sector ‘Other’ has a very low impact on the generation of GVA in characteristic tourism activities; when total GVA multiplier of product/activity ‘Other’ is diminished by own GVA creation, a very low share remains for characteristic tourism industries ranging between 0.042 in 2004 and 0.047 in 2010 (Table 3).

Table 4.

**RATES OF CHANGES OF THE GVA MULTIPLIERS
BETWEEN 2004 AND 2013 FOR CROATIA, IN %**

	Hotels and restaurants	Land and pipeline transport	Water transport	Air transport	Recreational, sport and cultural activities	Wholesale and retail trade	Other
Rates of changes of total GVA multiplier, in %	0.3	-11.8	2.8	0.1	2.4	-3.0	1.6
Rates of changes of rest of the economy GVA multiplier, in %	3.0	27.3	12.0	23.4	-16.1	-4.8	-0.2

Source: Authors’ calculations

Difference among rates of changes of the multiplicative influence of a particular sector (backward linkages) to the GVA of the total economy and the rest of the economy in the period from 2004 to 2013 are worthy of additional explanation, although they are also probably the result of non-aligned IO tables. For example, the

difference in sign and intensity of the rate of changes of GVA multipliers of 'Land and pipeline transport' is a reflection of the decrease of the GVA multiplier (Table 3) of the industry itself from 0.639 in 2004 to 0.469 in 2013 due to a decrease in the capacity of the sector to generate GVA (Table 2) from 0.546 in 2004 down to 0.444 in 2013. At the same time, 'Recreational, sport and cultural' activities increased own GVA multiplier from 0.540 in 2004 to 0.604 in 2013 (Table 3) in parallel with increased ability of GVA creation (i.e. growth of technological coefficient of GVA) from 0.451 in 2004 to 0.570 in 2013 (Table 2).

4.2. Structural changes and total contribution of tourism to Croatian economy

Tourism gross domestic product in basic prices (GVA^{dT}) is calculated as the product of matrix $H = \hat{d}[I - A^d]^{-1}$ (Table 3) and vector column of domestically produced internal tourism consumption in basic prices Y^{Td} (equation 7). The main source for the vector column of domestically produced internal tourism consumption in basic prices Y^{Td} is TSA table 4 and TSA table 6 for Croatia.

As noted before, availability of TSA and that of IO for Croatia are not fully harmonized in time. That is, the official published versions of IO are available for 2004 and 2010 while the 2013 edition has been compiled but is still in the process of preparation for publication. On the other hand, TSA is available for 2005 and 2011. So, the calculation of tourism GVA for Croatia for 2005 is derived from a combination of GVA multipliers for 2004 and internal tourism consumption for 2005, while GVA for Croatia for 2011 is derived from a combination of GVA multipliers for 2010 and internal tourism consumption for 2011, assuming that the one year shift does not impact the stability of GVA multipliers. For the needs of TSA assessment for 2013, an approximated vector of domestically produced internal tourism consumption in basic prices was used as a combination of structure of internal tourism consumption in 2011 and official statistical data on domestic and inbound tourism consumption for 2013, following the assumption that the structure of tourism consumption is stable enough over the short term.

Following the above mentioned time adjustment of available IO and TSA data, internal tourism consumption in basic prices Y^{Td} in absolute values for 2005, 2011 and 2013 (Table 5) is derived as follows:

2005 & 2011	<p>To achieve harmonization between the TSA format and the format of adjusted IO tables (Table 1 to Table 3) corrections of the TSA format were made as previously explained.</p> <p>Extraction of ‘Wholesale and retail trade’ from item ‘Other’ was based on data from SUT Valuation matrices for 2004 and 2010, as they contain whole and retail trades’ margins distributed by product groups.</p> <p>Taxes on products were extracted from internal tourist consumption based on the ratio of the tax on a product in total supply in market prices per product groups from SUT Valuation matrices for 2004 and 2010.</p> <p>For assessment of final product imports in basic prices generated by internal tourism consumption, the ratio of total imports in total supply in basic prices from IO tables for 2004 and 2010 was used.</p>
2013	<p>Approximation of Y^{dt} for 2013 is carried out by using the structure of the Y^{dt} for 2011 by products and data for inbound tourism expenditure for 2013 from Balance of Payments for 2013 (Croatian National Bank, 2017) and data of domestic tourism consumption for Croatia for 2013 from Survey of Touristic Activity of Croatian Population in 2013 (Marušić & Ivandić, 2014).</p>

Based on the set methodological framework, domestically produced internal tourism consumption in basic prices (Y^{dt}) in 2013 was approximately 55.8 billion kuna (Table 5), 39% more than in 2005. The structure of internal tourism consumption by key tourism sectors during that period remained relatively stable, except for ‘Hotels and restaurants’, the share of which dropped from 56% in 2005 to 48% in 2013 (Table 5). In other words, as important characteristic of the improvement of the quality of the Croatian tourism product (Čorak et al., 2009; Marušić et al., 2015), the growth of internal tourism consumption is primarily located in tourism-specific and non-specific industries, apart from the ‘classic’ tourism ‘Hotels and restaurants’ industry. For example, internal tourism consumption of ‘Recreational, sport and cultural’ activities grew by 148% in the period from 2005 to 2013 (Table 5). The decrease in internal tourism consumption in ‘Land and pipeline transport’ is probably the result of massive subsidies made to the railway industry, as a negative tax from products was noticed in the valuation matrix for 2004.

Table 5.

DOMESTICALLY PRODUCED INTERNAL TOURISM CONSUMPTION IN
 BASIC PRICES Y^{DT} IN MILLION KUNA FOR 2005, 2011 AND 2013

	2005		2011		2013		Rate of change of 2013/2005 in %
	In million kuna	Total Y^{DT} =100	In million kuna	Total Y^{DT} =100	In million kuna	Total Y^{DT} =100	
Hotels and restaurants	22.409	56	24.826	48	27.008	48	20.5
Land and pipeline transport	896	2	718	1	781	1	-12.8
Water transport	282	1	501	1	545	1	93.5
Air transport	1.214	3	1.636	3	1.780	3	46.6
Recreational, sport and cultural activities	1.046	3	2.387	5	2.597	5	148.3
Wholesale and retail trade	3.148	8	6.520	13	7.093	13	125.3
Other	11.176	28	14.746	29	16.042	29	43.5
Total	40.170	100	51.334	100	55.845	100	39.0

Source: Authors' calculations

The total contribution of tourism to the national economy measured in tourism gross value added (GVA^{DT}) amounts to 32.7 billion kuna in 2005, 40.0 billion kuna in 2011 and 45.4 billion kuna in 2013 (Table 6). Observed in terms of percentage, the contribution of tourism to the total economy changed from 14.3% in 2005, to 14.2% in 2011 and grew to 16.3% in 2013. The change in the contribution of tourism to the economy was predominately generated by the growth of domestically-produced internal tourism consumption (Table 5), but also by a decrease of the capability of GVA generation in the hospitality and transportation industries in 2011 (Table 2) as well as GVA dynamics of overall economy (Table 6).

Equally interesting are changes in the sectoral structure of tourism GVA as reflection of increased quality of Croatian tourism supply mirrored by changes in inter-sectoral relationships as well as by growth of non-hospitality services. Namely, the sector 'Other' gains the largest and growing share in total tourism GVA^{DT} . In 2005 the product/activity 'Other' took a share in total tourism GVA^{DT} of 46.6%, in 2011 of 46.7% and in 2013 of 48.0%. At the same time, the 'Hotels and restaurants' activity, the second sector according to size of tourism generated GVA, recorded a 5.4 percentage point decrease in share, from 39.1% in 2005 to 33.7% in 2013.

Table 6.

**TOURISM GROSS VALUE ADDED AT BASIC PRICES (GVA^{dt})
IN MILLION KUNA, TOTAL ECONOMY GVA IN MILLION KUNA
AND SHARE OF TOURISM GVA^{dt} IN TOTAL ECONOMY GVA
IN % FOR 2005, 2011 AND 2013**

	2005		2011		2013		Rate of change of 2013/2005 in %
	In million kuna	%, 100= total GVA ^{dt}	In million kuna	%, 100= total GVA ^{dt}	In million kuna	%, 100= total GVA ^{dt}	
Hotels and restaurants	12,794	39.1	13,453	33.7	15,287	33.7	19.5
Land and pipeline transport	931	2.8	545	1.4	969	2.1	4.1
Water transport	151	0.5	272	0.7	284	0.6	87.6
Air transport	408	1.2	532	1.3	431	0.9	5.7
Recreational, sport and cultural activities	616	1.9	1,293	3.2	1,671	3.7	171.4
Wholesale and retail trade	2,554	7.8	5,200	13.0	4,958	10.9	94.2
Other	15,245	46.6	18,664	46.7	21,775	48.0	42.8
Total Tourism GVA^{dt}	32,699	100.0	39,959	100.0	45,376	100.0	38.8
Total economy GVA	228,657		285,707		277,805		21.5
Share of Tourism GVA^{dt} in total economy GVA in %	14.3		14.2		16.3		

Source: Croatian Bureau of Statistics, Annual gross domestic product for 2015 (ESA 2010), First release, Number 12.1.4.; Authors' calculations

One important feature of inter-sectoral relationships in Croatia stems from the fact that the share of the sector 'Other' in total tourism GVA is more than 18 percentage points higher than its share in internal tourism consumption while the share of 'Hotels and restaurants' is more than 16 percentage points smaller (Tables 5 and 6). This difference implies that tourism consumption at this moment draws non-tourism sectors, like agriculture and manufacturing, much more strongly than a 'classic' tourism activity like 'Hotels and restaurants' indicating that tourism consumption has a more intensive multiplicative effect on the non-tourism sectors of the economy than on the tourism sectors. The ratio between tourism-generated GVA (Table 6) and domestically produced internal consumption in basic prices (Table 5) per each activity demonstrates that the sector 'Other' has the largest ratio, followed by 'Land and pipeline transport', while all other activities have much lower ratios (Table 7).

It should be mentioned that the implications of such an analysis are partly limited by the fact that the structure of internal tourism consumption is different from the structure of aggregate economy final demand, which is the theoretical premise of the Input-output model used (equation 7) as well as the highly aggregated item ‘Other’.

Table 7.

RATIO BETWEEN TOURISM-GENERATED GVA^{dt}
 AND DOMESTICALLY PRODUCED INTERNAL
 TOURISM CONSUMPTION Y^{dt} IN BASIC PRICES

	2005	2011	2013
Hotels and restaurants	0.57	0.54	0.57
Land and pipeline transport	1.04	0.76	1.24
Water transport	0.54	0.54	0.52
Air transport	0.34	0.33	0.24
Recreational, sport and cultural activities	0.59	0.54	0.64
Wholesale and retail trade	0.81	0.80	0.70
Other	1.36	1.27	1.36

Source: Author's calculation.

5. Conclusions

Starting from the approach of comparative statics, this paper deals with changes in the size and structure of tourism in Croatia in the period from 2005 to 2013. Not only is there a permanent need for measuring the contribution of tourism to the national economy, but the analyzed period was especially relevant for detecting the effect of the activity of tourism on the economy’s sectoral structure due to the boom in demand for tourism, the multiyear shrinking of overall economic activity and the increased quality of tourism product and supply. The paper has approached these problems using the input-output framework combined with insights provided from the tourism satellite account.

The analysis resulted in an approximation of the total tourist industry contribution to the national economy, ranging from 14.2 to 16.3 percent of tourism gross value added in total economy gross value added, which confirms the previously

recognized high importance of tourism to the Croatian economy (Jurčić, 1998, Šutalo, Ivandić & Marušić, 2011). At the same time, exploration of changes in inter-sectoral relationships showed that ‘Hotels and restaurant’ as ‘classic’ tourism sector shows strong growth, but draws the rest of the economy weakly, indirectly slowing down potential overall growth. On the other hand, changes in the sectoral structure of tourism GVA^{dT} showed that the ‘Other’ sector, which comprises non tourism products/activities like agriculture, industry, energy, construction and the like, gains the largest, and a growing, share in total tourism value added. This is an indicator that tourism demand positively influences the non-tourism part of the economy as result of overall inter-sector connections but also of the changed structure of the tourism product and supply. Therefore, despite the estimated high level of the contribution of tourism to the Croatian economy, which can raise the question of too high dependence on one type of demand, it can be concluded that internal tourism consumption still has a positive effect on both characteristic tourism and non-tourism products.

In order to improve the quality of the research within the input-output framework, particular attention should be given to the problem of the alignment of overall input-output and TSA structure. This involves taking into account more detailed internal tourism consumption than is given in the satellite account model and making an input-output framework more congruent to the specificity of tourism through the process of fractionalization but also a more precise extraction of tourism characteristic activities.

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DOPRINOS TURIZMA HRVATSKOM GOSPODARSTVU: IO PRISTUP

Sažetak

Polazeći od potrebe za spoznajom veličine i doprinosa turizma gospodarstvu, ali i razumijevanja učinaka mogućih strukturnih promjena tijekom turističkog buma s kojim se Hrvatska trenutno susreće, rad je usredotočen na sagledavanje mjera i uloge turizma u gospodarstvu Hrvatske uključujući i utjecaj na proizvodnju najvažnijih djelatnosti kao odraza povećane turističke potrošnje. Cilj rada je procjena doprinosa turizma stvaranju bruto domaćeg proizvoda Hrvatske i mjerene multiplikativnih učinaka turističke potrošnje na različite djelatnosti gospodarstva tijekom razdoblja od devet godina na temelju specifičnog metodološkog okvira koji povezuje satelitski račun turizma i input-output modela u promatrane tri različite godine. Analiza je rezultirala procenom ukupnog doprinosa turizma nacionalnom gospodarstvu u rasponu od 14,2 do 16,3% ukupne dodane vrijednosti, ali i zaključkom da turistička potrošnja još uvijek ima pozitivan učinak i na aktivnosti svojstvene turizmu, ali i na ostale tzv. neturističke aktivnosti. Unaprjeđenje kvalitete istraživanja u okviru input-output modela zahtjeva proces frakcionalizacije input-output tablica, ali, također, i preciznije izdvajanje turističkih karakterističnih aktivnosti nego što je to bio slučaj do sada.

Ključne riječi: Satelitski račun turizma, input-output tablice, doprinos turizma, međusektorske strukturne promjene, Hrvatska