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A BI-REGIONAL INPUT-OUTPUT MODEL FOR GALICIA AND THE REST OF SPAIN: ESTIMATING SPILLOVER AND FEEDBACK EFFECTS OF TOURISM.

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A BI-REGIONAL INPUT-OUTPUT MODEL FOR GALICIA AND THE REST OF SPAIN: ESTIMATING SPILLOVER AND FEEDBACK EFFECTS OF TOURISM.

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Abstract:

The main particularity of Tourism is to be defined from the demand side, instead from the supply side like the other economic activities. For this reason, Tourism impact studies are usually performed with demand models based on input output (IO) methodology. Moreover, these types of models allow us to identify the direct and indirect effects of changes in final demand.

Originally, the applications of the classic Leontief model were undertaken at national level, but the important disparities in regional specialization resulted in the development of input-output tables at more disaggregated level. Nevertheless, one-region models do not recognize all the interdependencies between regions, i.e. each region appears isolated from the others. This is a really hard assumption in the regional analysis since exchange of workers and trade of goods with the rest of the country is much important at this level.

Therefore, the aim of this paper is to compare the results obtained with the classic demand model with a two-region model. Using the bi-regional model, it is possible to measure the existence and significance of outflows or "leakages" and inflows or "gains" in the production process, whether from trade or use of non-resident workers. For practical purposes, we estimate the economic impact of Tourism for a Spanish region, Galicia. In this way, we can consider the peculiarities of its productive structure and its relation with the Rest of Spain taking into account the spillover (outflows) and the feedback effects (inflows).

Keywords: Interregional Input-Output Models, Tourism Demand, Feedback Effects.

INTRODUCTION

It is very common to read that tourism is one of the engines of the Spanish economy; nevertheless its contribution to the GDP or the employment is not clear. When visitors consume goods and services in Galicia[1], they are not only stimulating those industries that produce them, but indirectly also those that are supplying the necessary inputs to them. In other words, touristic expenditures are not only important because of the production or employment they directly generate, but also for the effect they have on the rest of the economy. Thus, the suppliers of primary and intermediate inputs (production factors) necessary for the development of tourism are also an essential part of the consequences of tourism on an economy. To account for all the importance of tourism in Galicia we should not only measure the direct effects, but also its indirect effects.

Consequently, at that point some questions could arise: what is the impact of tourism on the Galician economy? Has this tourism an effect on the other Spanish regions? What kind of models can we use to measure these macroeconomic impacts? The aim of this paper is to provide an adequate response to these and other similar questions.

Undoubtedly, tourism is currently representing a strategic subject for the economy in Galicia and in a large number of countries and regions, not only for its quantitative dimension, but also for being a heterogeneous activity that is composed by a diverse set of productive sectors with the purpose of satisfying touristic demand. This heterogeneity is not a result of the nature and characteristics of the commodity, but to the circumstances of the consumer, i.e to determine when some good or service is tourism, it is subject to the subjectivity of who demands those goods and services and how. Therefore, the definition of tourism must not be considered from its content (as the other economic activities) but from the recipients of it, the visitors.

In fact, the economic analysis of tourism can be divided into two groups, from the supply or demand perspective. The first group, which can be considered as the more traditional core, treats tourism as another economic sector or industry (like agriculture

[1]Galicia is the northwestern one of the 17 regions of Spain. It has a population of 2.797.653 inhabitants in 2010 (5,95% of the Spanish population).

or construction) restricted to those activities directly related with the stay and movement of visitors, i.e., hospitality and travel arrangements. The second group is inclined to strictly use as a demarcation principle, the behavior of tourists and excursionists, which also includes other activities that are consumed by visitors during their stay. Thus, this viewpoint dominates the debate since the World Conference on "Measuring the Economic Impact of Tourism" that took place in Nice in 1999 and the subsequent publication of the methodological document of Tourism Satellite Accounts (United Nations, 2001).

Moreover, these types of analysis may be directed to countries (Bull, 1991; Blake, 2000; Kweka et al., 2003), regions (Polo and Valle, 2002; Castañón et al., 2007), cities (Fuller, 1995; Fretchling and Horváth, 1999) or a particular cultural event (Blake, 2005; Kasimati, 2003) and they are used to provide information to public and private policy makers (Fretchling, 1994). More specifically, depending on the ultimate goal of the study, the available variables can be more or less adequate. Therefore, in order to measure the weight of tourism in an economy such indicators are used: the share of the GDP or the number of generated jobs, both in absolute or relative values, as was proposed by the Spanish Tourism Satellite Account (CSTE) methodology. The "Touristic GDP" or the share of the GDP is obtained as the total impact of demand on the Aggregated Gross Value plus taxes on products.

In general, these studies are usually conducted with demand models based on input-output (IO) (Fletcher, 1989; Fletcher, 1994; Archer, 1982; Balaguer et al., 2002; Capó et al., 2007) or computable general equilibrium models (CGE) (Blake, 2008; Dwyer et al., 2006). In this paper we use IO analysis to examine the impact of tourism on a regional economy like Galicia[2].

Nevertheless, one-region models do not recognize the interdependencies between regions, i.e. each region appears isolated from the others. This is a really hard assumption in the regional analysis since the openness to trade of a regional economy is much higher than national economies, among other things, because of the border effect

[2] Despite the fact that some limitations appear with this Leontief model implementing a CGE model is quite complicated because they need an important amount of information. Furthermore, it should be noted that estimations appear to be lower using CGE models than IO (Zhou et al., 1997), due to the reallocation and substitution of resources and because input-output does not allow prices to fall.

(Anderson and van Wincoop, 2003). Thus, since the exchange of workers and trade of goods with the rest of the country is much important at this level, we have to take into account their possible linkages. As a result, the interregional approach allows us to account by the possible outflows and inflows in the production process. Furthermore, we are able to identify where these outflows goes or, in our case, which part of the total outflows goes to the Rest of Spain and which part to the Rest of the World.

This paper is divided into four sections. In the first one we analyze the fundamentals of two different input-output models and their limitations. In the second section the objective is to identify the concept of tourism, focusing on explaining terms like tourism, tourist or types of tourism, among others. The next section explains the steps to do the simulations and the variables to measure the economic impact of tourism. The fourth section presents the results obtained for Galicia in 2005 with the four different models. Finally, the last section mentions the main conclusions reached through this paper.

1. THE INPUT-OUTPUT APPROACH.

Our goal in this first section is to present the fundamentals of different input-output models. More concretely, we are going to explain the mechanism of the classical demand model (Leontief model), and, considered as a more advanced model, a two-region model (interregional model).

Input-output was the name given to the analytical framework developed by W. Leontief and presented in 1936 in *"Quantitative Input-Output Economics Relations in the Economic System of the United States"*. It is defined as an accounting framework that presents the interdependence in the production structure and allows us to implement simulation and prediction models, such as the demand model, the most traditional one. The essential premise is to consider that an economy can be divided into homogeneous industries with mutual and stable relations over time, expressed through *"technical coefficients"*.

Thus, the main advantage of this type of model (over partial equilibrium models) is that it takes into account economic interdependence, i.e. the mutual dependence of two or more industries in the production process. This interdependence of the flows of the

industries means that, changes in final demand in some specific products of one industry will affect other associated sectors of the economy and, sequentially, also those industries associated with them.

The classic demand model

As shown in *"The Structure of American Economy 1919-1939",* the initial goal of Leontief was conducting a study on the interrelationships between different parts of an economy. Thus, more specifically, the process is to simplify the walrasian scheme of general equilibrium, first, aggregating the products, so each sector offers one output and then, adopting the linear form for the production equations. Therefore, designing an economy separated into *n* sectors, where the level of output in each sector will depend on the level of others (Dorfman, 1954).

As a result, knowing the final demand for a particular moment in time we obtain the value of required output for each industry to satisfy it. In other words, it can be used to examine how the production changes in response to a change in final demand.

$$X = (I - A)^{-1}D$$

Beyond the traditional limitations of the Leontief model: no assumption of supply constraints (even workers), constant return to scale, fixed commodity input structure or homogeneous sector output (Hara, 2008; Miller and Blair, 1985); there are others that can be solved through more advanced input-output based models, for example, introducing another regions.

The interregional model

Originally, the applications of input-output model were undertaken at national level, but the growing interest in trying to identify the economic impacts that are more geographically disaggregated resulted in input-output tables being developed at regional level, too. In this way, we can consider the peculiarities of a sub-national productive structure. The national intermediate coefficients are somehow an "average" of flows of individual producers who are located in specific regions, and the structures of these regions can be identical or differ considerably.

The main problem is that the one-region models do not recognize all the interdependencies between regions. In other words, each region appears as if were disconnected from the others. The first model that considers the possible inter-regional linkages was shown by Isard in 1951 with the "*Interregional and Regional Input-Output analysis: A Model for a Space Economy*." During later years, this extension of the Leontief model was called the "Isard model".

So, using *L* and *M* as two sub-regions of *R* (Miller and Blair, 1985), the new intermediate consumption matrix can be identified as:

$$Z = \begin{bmatrix} Z^{LL} & Z^{LM} \\ Z^{ML} & Z^{MM} \end{bmatrix}$$

Where Z^{LL} and Z^{MM} represent the intra-regional flows, and Z^{ML} and Z^{LM} the inter-regional flows. Thus, while the elements of the Z^{ML} correspond to intermediate exports from *M* to *L*, at the same time they also represent intermediate imports that come from *L* to *M*, and vice versa with the elements of Z^{LM}. Consequently, the bi-regional model can be described in a matrix structure, considering also that the sum of X^L and X^M equal to the total output of the region R (X^R):

$$\begin{bmatrix} Z^{LL} & Z^{LM} \\ Z^{ML} & Z^{MM} \end{bmatrix} \begin{bmatrix} D^L \\ D^M \end{bmatrix} \begin{bmatrix} X^L \\ X^M \end{bmatrix}$$
$$\begin{bmatrix} IP^L & IP^M \end{bmatrix}$$
$$\begin{bmatrix} X^L & X^M \end{bmatrix}$$

The major advantage of this extension is that if we consider an increase in final demand for the product produced by sector *i* in region *L,* some of the inputs to make it will come from industries outside the region, for example, in our case from region *M*. Therefore, this causes a stimulus of production in *M,* which will cause, through an inter-regional chain effect, a greater demand for new products in the region *L* and so on, until the marginal effect is practically zero. Thus, there is a feedback effect in these types of models, since there is a connection between *L* and the region itself through *M*. For this reason, the only way to measure the possible gains or inflows in the economy due to some change in final demand is implementing this kind of models.

There appear only a few applications based on the model described by Isard due to the amount of information necessary to conduct it. Probably the most ambitious attempt to implement this model was done by Japan in 1960 using surveys to producers for nine different regions. Moreover, the data for the matrix should be updated every five years, becoming even more expensive and difficult. Another example is the model of three regions compiled by the Netherlands (Oosterhaven, 1981).

In order to compare the results that offer this type of analysis with the traditional of Leontief, we developed a model of two regions, Galicia (*G*) and Rest of Spain (*RE*), for the year 2005. Therefore, we are able to calculate the impact of tourism on *G* and its effects in the second region *RE,* and for the total (Spain), taking into account the previously mentioned feedback effects[3].

The main assumptions for developing this model were: considering that the sum of intermediate flows, final demands, primary inputs and the total output of the economy of *G* and *RE* must be equal to the symmetric input-output table for the interior of Spain (without foreign imports) for 2005, published by the National Statistical Institute (INE). Likewise, therefore, the productive structure of Galicia is given by the symmetric interior table, published in 2005 by the Galician Statistics Institute (IGE) and the structure of the Rest of Spain is given by a subtraction of the previous intermediate flows.

2. CHARACTERISTICS OF TOURISM AS AN ECONOMIC ISSUE

The fact that the term tourism comprises a whole set of heterogeneous activities that involve several sub-complex relationships between each, causes that appears some very different definitions. Among them all, in order to clearly delimit this field, we will

[3] Briefly, to simplify the model of Isard we will apply the formulation of Riefer and Tiebout (1969) consisting, like Batten and Martellato (1985) explain, in combining the classical approach of Isard in the intra-regional flows and the formulation of Chenery-Moses (1953, 1955) for the inter-regional ones. As it was explained before, Isard's model considers that there is information available to the entire matrix of intermediate flows, including those who go from any sector of the region *L* to another of the region M, which complicates and increases the cost of this methodology. Simplification of the Chenery-Moses approach means to consider that each of the four sub-matrices of *Z* is diagonal. Combining both as was proposed by Riefer and Tiebout only and are diagonal which in our case is more appropriate, taking into account that we have information of the input-output symmetric matrices for Galicia and Spain for the same year, 2005.

select one established at 1991 by the World Tourism Organization in the Ottawa Conference on Travel and Tourism Statistics where the concept of tourism was defined as:

> "*The activities of persons traveling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes*".

This definition[4] allows us to highlight some important conditions in order to identify when and how the visitors acquire the status of travelers for touristic purposes. It is relevant if we take into consideration that they transform in tourism their travels and their expenditures. Following the WTO, we can define different concepts, taking into account the viewpoint of the destination place:

Traveler: any person, resident or not, who moves in or out his usual environment for any reason and by any kind of transport. Travelers include the categories of visitors and other travelers.

Visitor: anyone who moves to a different place from their usual environment, either inside or outside their country of residence, for a duration of less than twelve months, whose primary purpose is not having a paid job in the visited place (the concept of pay does not include benefits to the costs of transport and subsistence). The notion of tourist is divided into two distinct categories: tourists and excursionists. This division depends on the criterion of staying in or not for at least one night.

Tourist: temporary visitor in a country that remains at least 24 hours for personal or business purposes[5], i.e., the tourist must stay at least one night in ahotel or a similar site for accommodation at the visited place.

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[4] We can draw some interest conclusions about this as: tourism is not only equivalent to leisure or vacations; people who travel and take vacations within their usual environment are not visitors; those who are continuously traveling on vacation for more than one year are not visitors or among others, also excluded are those travelers who are paid at the destination place as immigrants, guest speakers or artists.

[5] In general, the vulgarization of the term tourist results that it is understood as visitors traveling for pleasure or on holidays. Of course, tourists are not only visitors with recreational purposes, but also people who travel for other reasons, mainly business and other visits when they sleep at the destination. In this sense, following the reason of the travel perspective we can divide the visitors in: visitors for personal reasons, which would include leisure travel, kinship or friendship, education and training, health, religion, shopping and others, and visitors for business purposes, which includes people who move as a result of

Excursionist: temporary visitor who remains in a site less than 24 hours also for personal or business reasons, without having any overnight stay in the visited place. Within it are also included cruise passengers who sleep on the ship, and, consequently, owners and passengers of yachts and other private ships.

From another point of view, following the perspective of residence and destination of the travel, we obtain the classification of tourist flows (Table 1). This will helps us to define the concepts of internal tourism, outbound tourism, inbound tourism, interior tourism, national tourism and international tourism. Thus, it identifies the tourism trade with different trade flows.

Table 1 - Tourism flows.

		Destination territory		
		Inside the same economic territory	Outside the economic territory	TOTAL
Residential territory	Resident	**INTERNAL TOURISM**	**OUTBOUND TOURISM**	*NATIONAL TOURISM*
	Non residents	**INBOUND TOURISM**		
	TOTAL	*INTERIOR TOURISM*		

Source: Methodological rules of the Spanish Tourism Satellite Account (2002).

Internal tourism is that made by the residents of the country as visitors who travel only within the same country. The *inbound tourism* is the tourism made by non-residents traveling within the country they chose, and the *outbound tourism* is made by the residents of the country since they travel to another country.

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their occupation, and to attend conventions and conferences or make some purchases, sales or other activities related to their business.

The distinction between business tourists and leisure tourists is relevant for two main reasons. First, they form two distinct market segments. Second, because their levels of expenditure at the destination are different. While visitors for holidays are more in volume than the visitors for business, the last ones are those with a higher per capita spending at the destination. Moreover, while holiday travel can be considered as final demand, business travel is a derived demand, i.e. an input in the production of other goods and services. Finally it is obvious that holiday tourism has a seasonal component much more relevant than the business tourism.

The previous tourism flows can be combined in different ways in order to show three new categories of tourism: *Interior tourism*, which includes internal tourism and inbound tourism, *national tourism*, includes internal tourism and outbound tourism, and finally, *international tourism* which is the sum of the *inbound tourism* and the *outbound tourism*.

3. COMPOSING THE FINAL DEMAND VECTOR

As was shown above when we explained the fundamentals of the models, the next step is to prepare the final demand vector for Galicia. We need to obtain the *interior tourism consumption*, i.e. the multiplication of 1) the number of internal and inbound visitors, 2) their daily expenditure and 3) the number of days that they stay in the territory.

Thus, for the calculation of *inbound touristic consumption*, we chose to use official data from the Galician Statistics Institute (IGE), and more specifically, from the Input-Output framework of 2005 (MIOGA 05) where we got the data about the non-residents' consumption, 1.838.809.000 €. Based on our own estimations derived from different sources like the Hotel Occupation Survey (EOH) published by the National Statistical Institute (INE) and surveys such as Frontur, Familitur and Egatur from the Institute of Tourism Studies (IET), we can get the *internal tourism consumption*, which is 1.319.937.595 €. As a result, adding this two concepts we obtain the total *domestic or interior tourism consumption*, i.e.3.158.746.595 €.[6]

After that, following the analysis, we need to know the composition of the expenditure, that is, the products in which the visitor or types of visitors spent their budget. Here, we can choose between two scenarios to calculate the *internal tourism*: in the one hand, to assume that residents consume in the same way when they are in their country of residence than when they are demanding activities related to tourism, and in the other hand, to assume that their consumption behavior is similar to non-residents (*inbound tourism*). Both options are unsatisfactory and we should work in a more disaggregated scheme that allows us to divide the consumers into the maximum possible number of groups (tourists and excursionist, pilgrims, different visitors by residential territory,

[6]There is a problem in this region, with the tourism sources and the information that can be found. It is very difficult to obtain reliable statistics related to these issues (number of visitors, daily expenditure or number of days of the stay) mainly, because we are taking into account a territorial point of view (destination) and not an industrial perspective.

etc.) because the consumer profile is certainly different. For the structure of non-residents' consumption, the best information we are able to use is the one published in the Input-Output framework of Galicia for 1998 (MIOGA 98), a pioneer analysis in Spain. Instead, for the residents consumption expenditure structure, that is offered by Input-Output framework of Galicia for 2005 (MIOGA 05), to be precise the structure of final consumption expenditure in domestic households. To avoid compromising the results due to the used assumption, we present both possibilities in the following tables:

Table 2 - Composition of the expenditure (Thousands of €). Hypothesis 1.

	Inbound touristic consumption	**Internal touristic consumption**	**Composition of the expenditure**	**Total tourist expenditure**
Restaurants	663.636	476.365	36.09%	1.139.991
Accommodation	519.288	372.750	28.24%	892.030
Real estate activities	196.939	141.365	10.71%	338.301
Recreational, cultural and sporting activities	155.014	111.271	8.43%	266.282
Post and telecommunications	40.271	28.907	2.19%	69.176
Manufacture of coke, refined petroleum products and nuclear fuels	24.824	17.819	1.35%	42.643
Renting of machinery and equipment without operator and of personal and household goods	22.434	16.103	1.22%	38.536
Land transport; transport via pipelines	20.779	14.915	1.13%	35.693
Other service activities	19.492	13.991	1.06%	33.482
Manufacture of food products and beverages	18.388	13.199	1.00%	31.587
Other activities	157.588	113.119	8.57%	270.704
Total	**1.838.837**	**1.319.938**	**100.00%**	**3.158.747**

Source: Own elaboration from data of MIOGA 98 and MIOGA 05.

As can be clearly seen the composition of the total tourist expenditure varies considerably depending on the chosen hypothesis. When residents and non-residents consume in the same way, the main expenditures are the restaurants, accommodation, real estate activities and recreational and cultural activities. Among them these add up to 83.47% of total spending. Instead, in the second case, the incidence of these activities descends to 66.52%, mainly due to the structure of final consumption expenditure of the resident households. In fact, in this structure they are entering many other sectors that

previously did not form part on the vector, as they can be the wholesale and the retail trade, health activities or the sale and repair of motor vehicles.

Table 3 - Composition of the expenditure (Thousands of €). Hypothesis 2.

	Inbound touristic consumption	**Internal touristic consumption**	**Composition of the inbound expenditure**	**Composition of the internal expenditure**	**Total tourist expenditure**
Restaurants	663.628	275.471	36.09%	20.87%	939.099
Accommodation	519.346	34.186	28.24%	2.59%	553.532
Real estate activities	196.952	196.671	10.71%	14.90%	393.623
Recreational, cultural and sporting activities	155.032	59.925	8.43%	4.54%	214.957
Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods	0	157.997	0.00%	11.97%	157.997
Wholesale trade and commission trade, except of motor vehicles and motorcycles	0	72.729	0.00%	5.51%	72.729
Post and telecommunications	40.286	36.562	2.19%	2.77%	76.848
Health and social work	0	51.346	0.00%	3.89%	51.346
Sale, maintenance and repair of motor vehicles and motorcycles; retail sale services of automotive fuel	11.722	41.578	0.64%	3.15%	53.300
Land transport; transport via pipelines	20.693	22.175	1.13%	1.68%	42.868
Other activities	231.177	371.166	12.57%	28.12%	602.343
Total	**1.838.809**	**1.319.938**	**100.00%**	**100.00%**	**3.158.747**

Source: Own elaboration from data of MIOGA 98 and MIOGA 05.

4. RESULTS FOR GALICIA

Taking into account all these data we can make some simulations about the economic impact of tourism in the Galician region, using the methodology described in the second section. We begin by presenting the results of the models with the following indicators:

Total Output multiplier, Gross Value Added (GVA) multiplier and employment multiplier.

Total Output and GVA multipliers symbolize how many euros are directly and indirectly required to be produced in order to satisfy each initial euro of the touristic demand. Thus, 1,43€ of domestic production is needed to satisfy 1€ of the interior tourism demand and, 0,64€ of that amount is GVA production (the rest is intermediate consumption). In the case of employment multipliers, they are measured in number of jobs per million euros spent by the final demand.

Table 4 - Results for Galicia.

		Bi-regional model
Interior tourism H.1 (Leontief model)	Output multiplier	1,4289
	GVA multiplier	0,6357
	Employment multiplier	16,0179
Interior tourism H.2 (Leontief model)	Output multiplier	1,4295
	GVA multiplier	0,6359
	Employment multiplier	16,0247
Outflows to ROS (Spillover) H.1	Output multiplier	0,1540
	GVA multiplier	0,1159
	Employment multiplier	2,5489
Outflows to ROS (Spillover) H.2	Output multiplier	0,1413
	GVA multiplier	0,1142
	Employment multiplier	2,6190
Inflows (Feedback) H.1	Output multiplier	0,0336
	GVA multiplier	0,0824
	Employment multiplier	0,3008
Inflows (Feedback) H.2	Output multiplier	0,0335
	GVA multiplier	0,0670
	Employment multiplier	0,7513

As we can see in table 4, with the Leontief model there is not a big difference between scenarios. The significance of tourism in Galicia is between 4,67% and 4,68% of the Output and between 4,70% and 4,68% of the GVA in 2005, depending on the

hypothesis. In the case of the impact on employment, the classic demand model gives us between 50.596 and 50.717 equivalent jobs (between 4,75% and 4,90%).

However, relaxing the assumption of no more regions, we can present the results obtained with the Bi-regional model of Galicia-Rest of Spain. Once implemented, the highest difference between scenarios appears in the employment multiplier. With this model (open for the income of households), interior tourism has a total impact between 1,4625€ and 1,4630€ of Output (interior + feedback effects), between 0,7181€ and 0,7029€ of GVA and between 16,32 and 16,78 jobs.

The spillover effects, i.e. the outflows of tourism for the Galician economy that goes to the Rest of Spain (ROS) are remarkable. From every euro that a visitor spend in Galicia, between 0,15€ and 0,14€ of Output and between 0,116€ and 0,114€ of GVA goes away. In employment terms, between 8.049 and 8.270 jobs are generated in the Rest of Spain to satisfy the visitors demand in Galicia.

Moreover, the feedback effects can be calculated as the difference between the total effects for Galicia and those which were obtained without taking into consideration the second region (interior). For example, the gains of tourism from the ROS are 0,03€ of Output and between 0,08€ and 0,06€ of GVA per every euro. The employment per million euros grows between 0,30 and 0,75 jobs (in 2005 case between 947 and 2.368 jobs). This large difference in the employment appears due to the higher amount of imports in agricultural products of ROS from Galicia, which comes out with the second hypothesis. As a result, it can be highlighted that the more diversified the touristic vector is, the more employment will be required to satisfy each euro of touristic consumption.

As the last point, we would like to indicate that for the whole Spanish economy tourism in Galicia represents between 0,34% and 0,33% of the GVA and between 0,19% and 0,20% of the employment (between 59.587 and 61.261 jobs).

Similar simulations can be made using the Leontief model with total flows. The difference between total multipliers and interior multipliers is the amount of imports, i.e. the total outflows. In that way we can see which part of the total effect of tourism remains in Galicia. In fact, with the first hypothesis, the 73,31% remains in Galicia, the

11,80% goes to ROS and 14,89% to the Rest of the Economies. As we can observe in table 5, the effect on employment remains in a high percentage in this region (between 77,08% and 74,48%) while the outflows in production variables is close to 30%.

Table 5 - The outflows of Galician tourism and its destination.

		Total multiplier	Total Interior multiplier (interior + feedback)	Percentage (%)	Total outflows	To the Rest of Spain	To the Rest of the Economies
H.1	Output	2,0362	1,4625	71,83%	0,5737	0,1540	0,4197
	GVA	0,9795	0,7181	73,31%	0,2614	0,1159	0,1455
	Employment	21,1714	16,3187	77,08%	4,8527	2,5489	2,3038
H.2	Output	2,0251	1,4630	72,24%	0,5621	0,1413	0,4208
	GVA	0,9799	0,7029	71,73%	0,2770	0,1142	0,1628
	Employment	22,5244	16,7760	74,48%	5,7484	2,6190	3,1294

This total outflows could be divided into two possible destinations: the one that appear in our model (ROS) and the Rest of the economies of the World. Among them, they spread the around 0,57€ for every euro of the final demand and between 4,85 and 5,75 jobs per million euros. The results point out that the major piece of Output goes to the Rest of the Economies (close to 74%) as the same time as the employment is shared almost equitably.

5. CONCLUSIONS

With simple observation we can notice that tourism has reached such importance nowadays that it is hardly comparable with any other economic activity. It could be said that it is a phenomenon that became universal in the late twentieth century with improvements in quality of life but it is still under expansion. Nevertheless, the comparisons between different studies on this subject reflect an important problem of definition. In fact, when we talk about tourism in the strict sense we are considering it almost as a residual concept (what is not considered migration, or who does not receive wages, etc.). This causes differences between some outcomes and indicators, and sometimes comes to serious contradictions.

Despite this, as we have explained in the paper, the analysis of the economic impact of tourism should be based on expenditures made by visitors. But not only that, the fact of limiting the benefits of tourism to touristic consumption without accounting for the existence of indirect and induced impacts would be wrong. In other words, if we were trying to calculate what would happen to the Galician economy if the visitor arrivals disappear, we need to take into account all these effects. For this reason, these types of impact studies (and especially about the tourism phenomenon) are usually implemented through demand-based models of input-output (IO) or computable general equilibrium.

With this IO methodology, the results of the Leontief model indicate that tourism represents in Galicia between 4,70% and 4,68% of the GVA and between 4,75% and 4,90% of the jobs, i.e. between 50.596 and 50.717 equivalent jobs. However, implementing our bi-regional model the economic impact increases in 0,03€ of Output and between 0,08€ and 0,06€ of GVA per every euro. Additionally, the employment grows between 0,30 and 0,75 jobs per million euros (in 2005 case, between 947 and 2.368 jobs).

These results appear when not considering the spending on public tourism expenditure (for instance tourism promotion) or investment. This interval is marked by the difficulty to compose the final demand due to the deficiency of the information provided for the statistical data sources. In fact, we must choose between two structural hypotheses about the tourism expenditure of the residents in order to be able to estimate the model. On the one hand, we assume that its structure is equal to non-residents and, on the other hand, that is equal to residents in general, without taking into account that they are visitors. The difference between scenarios does not make many changes in the results for the GVA, but it appears to be significant in the case of dependent jobs or, in the employment multiplier.

Despite the fact that the main sectors of the final demand vector are considered for the literature as non-completely tradable (most of them are services), close to the 30% of the effect do not remain in the region. In other words, Galicia imports some foreign products for satisfying visitors' demand which means an important outflow in its production process. Possibly, we could explain these results through the border effect theory, i.e., since we are analyzing a region, the obtained outflows are higher than those at a national level.

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