INTERSECTORAL IMPACTS OF TOURISM IN THE STATE OF SERGIPE: AN INTER-REGIONAL APPROACH

LUIZ CARLOS DE SANTANA RIBEIRO
PhD Candidate at Development Center and Regional Planning (CEDEPLAR) - Federal University of Minas Gerais (UFMG) - Brazil. Email: luizribeiro@cedeplar.ufmg.br.

GLÁUCIA POSSAS DA MOTTA
PhD Candidate at Development Center and Regional Planning (CEDEPLAR) - Federal University of Minas Gerais (UFMG) - Brazil. Email: gpmotta@cedeplar.ufmg.br.

ABSTRACT: The aim of this paper is analyze the intersectoral impacts of tourism investments from the Ministry of Tourism of Brazil, through the National Program of Tourism Development (National PRODETUR) in the state of Sergipe. To this end, it is used the inter-regional Input-Output Matrix of Northeast and States, prepared by Northeast Bank in partnership with the Institute of Economic Research (FIPE), base year 2004. From this it was possible to simulate the impacts of these investments on output, employment and income in the state, as well as analyze the spillovers effects for the Northeast and the rest of Brazil. The impact will be approximately R$ 402.96 million on the Brazilian economy, and of this total, R$ 197.11 million (48.9%) are retained within the state, which corresponds to 1.62% of state GDP-2004, R$ 39.04 million (9.7%) leaks into other states in the Northeast region and R$ 166.81 million (41.4%) go to the rest of Brazil. The Program also can generate 15,448 new jobs in the Brazilian economy, with 1,148 jobs will be created in Sergipe, 1,937 in other states in the Northeast region and 3,366 in the rest of Brazil.

Keywords: Tourism; National PRODETUR; Sergipe; Input-output.

JEL classification codes: C-67; L-83.

INTRODUCTION

Tourism is an activity that has most distinguished itself in recent times, not only contribute significantly to world's economy growth, but also provides development for the various regions that take advantage of their potential. It promotes as well the appreciation of culture and thus develops the local economy. Some authors, such as Amaral Filho (1995), consider tourism as an activity that most closely matches to the paradigm of sustainable endogenous development.

In Brazil, especially in the academic field, discussions concerning tourism's economic impacts began to take shape over the last two decades, with pioneering articles of Ablas (1992) and Azzoni (1993). As a method to estimate the economic impacts of tourism, we should highlight the paper of Casimiro Filho and Guilhoto (2003) that organize the first Input-Output Matrix (IOM) of tourism in Brazil. On the other hand, in the governmental sphere, there are very few studies that are able to indicate the economic impacts of investments in tourism. This kind of information is crucial for tourists´ destinations wishing to adopt tourism as an important industry in the development agenda.

In Sergipe, the State Government, through the Secretary of State for Tourism, is finalizing a contract with the Interamerican Development Bank (IDB), related to a external financing to deploy a series of investments worth approximately U$ 100 million, bringing composing National PRODETUR of Sergipe.

In this regard, the aim of this paper is to measure the intersectoral impacts of tourism investments from National PRODETUR in the state of Sergipe. To this end, it will be used the inter-regional IOM of Northeast and States, developed by Northeast Bank in partnership with the Research Institute Foundation (FIPE), base year 2004. From this it is possible to simulate the impacts of these investments on output, employment and income in the state, as well as analyze the spillovers effects for the Northeast region and the rest of Brazil. In order to capture imbalances in the system will be constructed and analyzed the Hirshman-Rasmussen Connection Indexes and Pure Connection Index. Thus, the results may support the policies makers in developing and implementing public policies that aim to induce economic development through tourism.

Besides this introduction, this paper is divided into four sections. The first section presents the National PRODETUR investments in Sergipe. The second section discusses some methods of analysis applied to tourism, especially the input-output models. The third section describes the database and methodology for impacts´ simulation on the productive structure of Sergipe. The fourth section presents the results and discussions. Finally, the concluding remarks.

2 INVESTMENTS OF NATIONAL PRODETUR IN SERGIPE

The last experience of the state of Sergipe with external financing for tourism occurred in the late 1990s, with the Northeast PRODETUR I. Problems of tax and (in) capacity to prepare projects, rejected the state of Northeast PRODETUR II. Unlike PRODETUR NE I, which focused investments in infrastructure, the new strategy of Sergipe in National PRODETUR includes some aspects that were previously neglected by public policy of tourism such as: marketing and professional training; areas essential to increase the competitiveness of any tourist destination.

The investments are distributed among the different municipalities of the "*Velho Chico* Pole", which encompasses the cities bordering the San Francisco River, and "*Costa dos Coqueirais* Pole", which encompasses the coastal cities and major historical cities such as São Cristovão and Laranjeiras. The strategy of investment in these poles consists, besides consolidating tours enshrined as the Canyon of Xingó, optimize the tourist attractions in these regions, enabling the creation of new routes, resulting in increase in average stay of tourists in the state, and improve the distribution of economic impacts, still largely concentrated in Araracaju, capital of the State. Figure 01 shows the main interventions of the National PRODETUR in Sergipe.

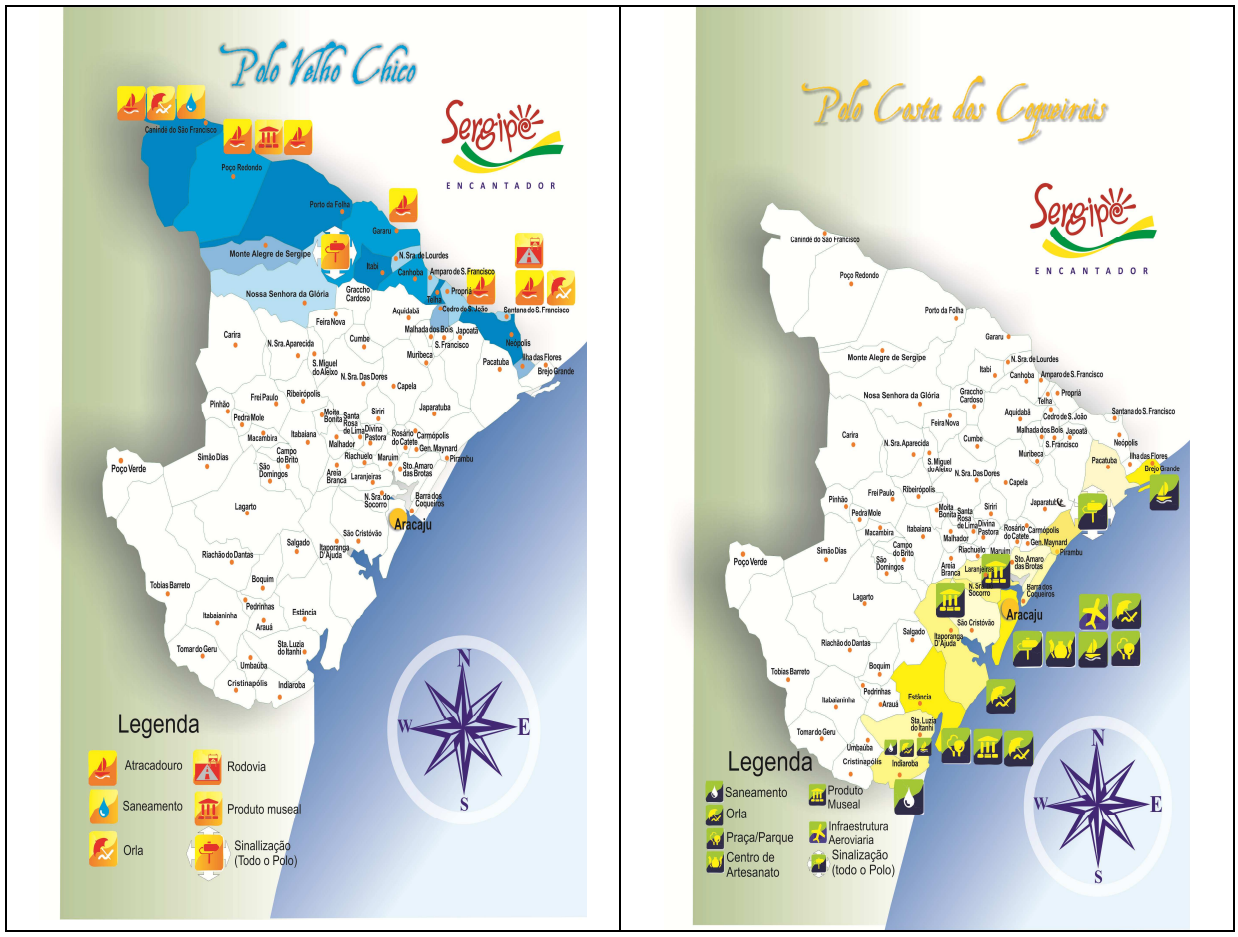

Figure 01 - Sergipe - Investment´s Location of National PRODETUR
Source: UCP - National PRODETUR Sergipe.

The National PRODETUR distributes investments on five major components, namely:

1. Product Strategy Tourism - investments in actions/ infrastructure typical of tourism as road signs, professional training etc.;
2. Marketing Strategy - Comprehensive marketing plan for tourism;
3. Institutional Strengthening - tourist information system, strengthening of municipal management in tourism, touristic destinations management plans etc.;
4. Infrastructure and Basic Services - Sanitary infrastructure in tourist areas, razing of the hill of gravel, the work required to expand the runway of the airport of Aracaju etc;
5. Environmental Management - Studies of carrying capacity of tourist destinations, environmental education etc.

The total investments of National PRODETUR to be held in Sergipe is broken down in Table 01, according to the tourist components. It is clear highlight of this total, 60% use external financing from the Inter-American Development Bank (IDB) and the remaining 40% is counterpart funding.

Table 01: Investments of National PRODETUR in the State of Sergipe[1], by component

TOURIST COMPONENTS	Total (in U$ thousand)	%
1 Strategy of the Product Tourism	35,105.85	38.17
2 Marketing Strategy	11,771.02	12.80
3 Institutional Strengthening	1,319.06	1.43
4 Infrastructure and Basic Services	38,769.58	42.16
5 Environmental Management	4,999.15	5.44
Total investments	91,964.65	100.00
Auditing, contract fees, management, supervision and contigency reserves	6,189.75	-
GRAND TOTAL	98,154.40	-

Source: Project Coordination Unit of the National PRODETUR in Sergipe, 2012.
Exchange rate: U$ 1.00 = R$ 1.7713 (31.12.2007).

Once submitted the areas that suffer intervention of National PRODETUR investments and, in a summary way, the strategy adopted by the State of Sergipe, the next section reviews some methods of analysis applied to tourism, especially the input-output models.

2 METHODS OF ANALYSIS AND TOURISM

According to Stynes (1997), there are many methods of analysis that can support decision making in terms of tourism planning, such as: Economic Impact Analysis, Fiscal Impact Analysis, Financial Analysis, Demand Analysis, Cost-Benefit Analysis, Feasibility Studies, Environmental Impact Assessment and Economic Impact Assessment. The input-output models are inserted in the first group.

The economic model proposed by Leontief (1966) allows the construction of IOM, for which it is possible to portray the diverse relationships between industries of a given economy, which contributes to the economic planning of the governments in their various spheres (MILLER and BLAIR, 2009.) In other words, the input-output technique is a linear model of production which represents the economic system in a simplified manner by means of tables of intersectoral flows of goods and services, demonstrating the different inter-industrial relations and reproducibility of the production (PRADO, 1981). This structure is intended to meet the intermediate consumption of industries or final demand in the economy (STONE, 1966).

This technique has limitations and assumptions. The input-output models are simple versions of computable general equilibrium models (HILGEMBERG and GUILHOTO, 2006) that adopt constant returns to scale, implicitly assume perfectly elastic supply and assume that the technical coefficients do not change over time, which means that any effects are not

[1] The array of investment has not yet been approved by the IDB, it can still change.

considered in terms of prices change neither of technological advances, while projected changes are derived only from exogenous changes in demand (MILLER and BLAIR, 2009). However, even with these limitations, the input-output technique is very important for development planning, especially regional development, because provides mechanisms for efficient allocation of economic resources in undeveloped areas. In this regard, puts in evidence the importance of structural relationships of the economy, which should receive due attention of policy makers (PRADO, 1981).

Thus, over time, economists have been improving the input-output technique as a way to make the models more realistic, so they could offer coherent answers on the national and regional economic structures.

With regard specifically to tourism, it is known that in Brazil is produced by the Brazilian Institute of Geography and Statistics (IBGE) a Research on Economics of Tourism which contributes to the development of an integrated system of statistics with a view to constructing a Satellite Account of Tourism in Brazil. The list of activities and products characteristic of tourism, which is an annex of the Economics of Tourism Research, detailing the activities that are part of the tourism economy and in summary are: 1. Accommodation services; 2. Food and beverages; 3. Transportation of passengers 4. Services of travel agencies, Tour operators and tour guides; 5. Cultural services; 6. Recreation and other entertainment services; 7. Various tourist services.

In the international literature, there are some studies that used input-output models to measure effects of tourism on job and income creation. Vozikis and Mescon (1985) estimated at U$ 546 million the total economic impact in the county of Dade (Florida) caused by the cruise industry. Frechtling and Horváth (1999), from an input-output model with 38 regional industries (one related to tourism), analyzed the multiplier effects of tourist spending in Washington and noted that tourism has a relatively high in terms of production and generation of jobs and they suggest policy directions for growth and development of the city.

In Brazil, can still be considered scarce in the literature that attempt to explain the economic potential of tourism through an intersectoral approach to the economy. The paper of Teixeira *et al* (1998) evaluated the cost of investments from Northeast PRODETUR in the state of Maranhão concerning to the generation of output, employment and income through a regional model. The results exceeded expectations and the industry most impacted point of view of employment generation was the industry of Construction, which accounted for more than 50% of jobs created.

Casimiro Filho and Guilhoto (2003) developed an input-output matrix for the Brazilian tourist economy for the base year 1999. For this purpose, the authors draw on information System of National Accounts and disaggregate tourism activities in 12 industries, in order to analyze their intersectoral relationships to subsidize the development and implementation of pubic policies to promote national and/or regional growth through tourism.

Takasago *et al* (2008) estimate the IOM of the tourism economy for the year 2004 in order to measure and analyze intersectoral relations and importance in job creation in the Brazil. The authors conclude that investments in tourism would generate a large induced multiplier effect and therefore benefits to all industries of the system not only to industries directly linked to the tourist complex in Brazil. In another study, Takasago *et al* (2010) identified that recreational and cultural activities and activities incidental to water transportation of

passengers were highlighted as potential income-generating industries and recreational and cultural activities, food, housing and road transport municipal passengers as potential generators of employment. Furthermore, they concluded that the Brazilian tourism activities had a participation of 5% of National GDP in 2006.

In addition to the input-output models, other methods are used in the literature to assess the role of tourist activities on a particular region. Azzoni and Menezes (2008) use an econometric model to calculate cost indicators relating to visitors of important countries of origin of tourists. Dwyer *et al* (2004) argue that the input-output technique is widely used to measure impacts of tourist spending, however the authors point out its limitations and defend the use of Computable General Equilibrium (CGE) models, which are widespread in Australia, UK and Canada. The Tourism Regional Economic Impact Model (TREIM), for example, prepared by the Centre for Spatial Economics at the request of the Ontario Ministry of Tourism. The objective is to predict the economic impact of tourism events and tourist facilities (THE CENTRE FOR SPATIAL ECONOMICS, 2008).

Recently in Brazil, Haddad *et al* (2010) used a inter-regional CGE model, the EFES (Equilibrium Economic Forecasting System) integrated into a general equilibrium macroeconomic dynamic model for evaluate the National PRODETUR investments in the state of Rio de Janeiro. To do so, you need a large database and a strong apparatus to perform computational simulations and projections of the impact. The results are evaluated from the trajectory deviations of the variables of interest (eg GDP) compared to baseline.

This paper advances in the input-output methodology to measure impacts of tourism investments, because is used an inter-regional model, which allows the identification of spillover effects of investments for other regions. Furthermore, the model in question has a degree of opening tourism industries which favors the analysis.

3 DATABASE AND METHODOLOGIES

This section is reserved for the presentation of the database used in this study, description of inter-regional input-output model as well as the definition of indexes and multipliers that will be used in impact analysis.

3.1 Database

Data are used from Inter-Regional Input-Output Matrix of Northeast and States, the base year of 2004, issued by the Northeast Bank (BNB), in partnership with the Institute of Economic Research (FIFE). According to Guilhoto *et al* (2010), due to extensive amount of data needed to develop an interstate input-output model for the Brazilian and the Northeast economy. The year 2004, at the time of the survey, was the year latest available and therefore was used as the base year.

The breakdown of the array of products and services from the original Production Matrix went from 111 to 169 goods of the estimated Production Matrix for Northeast region. The industries, in turn, were broken down in sections 55 to 111 originals (GUILHOTO, *et al* 2010), which enables more detailed analysis of results.

Being an inter-regional model, this type of IOM structure allows the researcher to measure the spillovers effects to other regions of the country. In other words, it is possible to identify the magnitude of the multiplier effects of investments that stay in the Sergipean economy, as well as the overflows to the Northeast region and the rest of Brazil.

3.1 An Inter-regional Input-Output Model

The basic structure of an inter-regional input-output model of two regions is as follows: the model has two regions, three productive industries in the region L and two productive industries in the region M (MILLER and BLAIR, 2009).

$$Z = \begin{bmatrix} Z^{LL} & \vdots & Z^{LM} \\ \cdots & \cdots & \cdots \\ Z^{ML} & \vdots & Z^{MM} \end{bmatrix} \tag{1}$$

In wich:
Z^{LM} - inter-regional flows (e. g. exports of the region L) and;
Z^{LL} - intra-regional (e. g. trade within the region L).

As affirmed at the beginning of the section, the economic basis can be explicitly represented (Z^{LM} *e* Z^{ML}, in this example). With this, it may be to capture the role of interactions (interdependence) space on regional growth. The equation of distribution of production of industry *I* can be defined by:

$$X_i = Z_{i1} + Z_{i2} + ... + Z_{ii} + ... + Z_{in} + Y_i \tag{2}$$

It is noteworthy that one of the elements of Y_i are exports. In the inter-regional model they are removed from the final demand and are specified explicitly. So in the example of this subsection the production industry *1* in the region *L* is expressed by:

$$X_i = \underbrace{Z_{11}^{LL} + Z_{12}^{LL} + Z_{13}^{LL}}_{\text{Intra-regional trade}} + \underbrace{Z_{11}^{LM} + Z_{12}^{LM}}_{\text{Inter-regional trade}} + \underbrace{Y_1^L}_{\text{Final demand}} \tag{3}$$

Therefore, the coefficients of flow of investments are:

$$\text{Intra-regional: } a_{ij}^{MM} = \frac{Z_{ij}^{MM}}{X_j^M} \tag{4}$$

$$\text{Inter-regional - } a_{ij}^{LM} = \frac{Z_{ij}^{LM}}{X_j^M} \tag{5}$$

Substituting (4) and (5) in (3), which has:

$$X_1^L = a_{11}^{LL} X_1^L + a_{12}^{LL} X_2^L + a_{13}^{LL} X_3^L + a_{11}^{LM} X_1^M + a_{12}^{LM} X_2^M + Y_1^L \quad (6)$$

Rearranging terms, we have:

$$(1 - a_{11}^{LL}) X_1^L - a_{12}^{LL} X_2^L - a_{13}^{LL} X_3^L - a_{11}^{LM} X_1^M - a_{12}^{LM} X_2^M = Y_1^L \quad (7)$$

The solution of the model is given by Equation 8:

$$X = (I - A)^{-1} Y \quad (8)$$

Where $(\mathbf{I} - \mathbf{A})^{-1} = \boldsymbol{L}$ is the Coefficients Direct and Indirect Matrix, or simply the Leontief Inverse Matrix. So, the advantage of using this model is that it captures the magnitude of the effects in each industry and each region, and interregional interdependencies are explained by both industries in the region and supplier industries of the region by the demandant.

3.3 Impacts Multipliers

Overall, the impact multipliers are used to evaluate the impact of exogenous changes on output, income, employment, value added, among others. Thus, it is possible to observe how changes in final demand affect the economy, and especially how these effects are distributed among the industries. Thus, it is not only the direct effect on the production industry, but the indirect effects generated as a result of intersectoral relationships of supply and demand for inputs. In the present study are calculated multipliers on production, employment and income.

The multiplier of the product of industry *j* (mp_j) can be defined as the total required production of all industries, to meet the change in a monetary unit of the total demand of industry j (MILLER and BLAIR, 2009), and can be expressed by:

$$Mp_j = \sum_{i=1}^{n} b_{ij} \quad (9)$$

The higher the multiplier product, the greater the effects of increase in final demand from one industry to the economy as a whole in terms of gross value of production. The result of the product multiplier can be transformed in terms of generating a job by the coefficient of use of the *i* ($\boldsymbol{e_i}$), defined by:

$$\mathbf{e_i} = \frac{\mathbf{w_i}}{\mathbf{x_i}} \quad (10)$$

In what w_i is the number of workers employed in industry *i*.

Thus simple employment multiplier of industry *j* (me_j) is the number of jobs created throughout the economy, when an increase in currency demand of industry j. This multiplier is represented by:

$$Me_j = \sum_{i=1}^{n} e_i \, b_{ij} \tag{11}$$

The income multiplier which seeks to determine the impacts of changes in final demand spending on income received by households (labor supply) instead of calculating the impact on al output. These coefficients are interpreted as the income received by households by value of the product industry. In other words, we would be weighting the Leontief Inverse Matrix by the input coefficients for the families. Mathematically we have that:

$$H_j = \sum_{i=1}^{n} a_{n+1,i} \, \alpha_{ij} \tag{12}$$

Thus, while the criterion of the multiplier product is quantitative, that is, taken as the main indicator of growth, employment and income multipliers are the main inducers of economic development, becoming thus in qualitative terms to the economy (RIBEIRO and LEITE, 2011).

3.4 Connection Indexes and Pure Connection Index (GHS)

The indexes of pure connection forward and backward[2], and the indexes of Hirschman-Rasmussen (1958), allow us to evaluate the key sectors of the economy[3]. According to Miller and Blair (2009, p.559-560), the industries can be classified into four types, depending on the results of the indices: (a) independent (or less related to) other industries, where both indexes binding to less than 1; (b) dependent on (or closely related to) other industries, if both indexes are higher than one, which also denotes **key sectors** for the economic growth, (c) dependent on the inter supply, if only the back binding rate is greater than 1 (d) inter-dependent demand, only the forward link rate is greater than 1.

Considering the elements l_{ij} of the Matrix L and being defined L^* as the average of all the elements of L and L_{*j} the sum of a column of L, one can obtain the backward Hirschman-Rasmussen linkage:

$$BL_j = \left(L_{*j} / n\right) \Big/ L^* \tag{13}$$

To obtain the forward linkage index, in turn, is part of the Coefficient Matrix Line (F) obtained from the consumption Matrix Intermediate (Z), as shown in equation 13.

$$F = \hat{x}^{-1} \cdot Z \tag{14}$$

Similarly the Leontief Inverse Matrix, it appears to Ghosh Matrix (G), with elements g_{ij}:

$$G = (I - F)^{-1} \tag{15}$$

[2] To see the formalization: Guilhoto e Sesso Filho (2005), Miller e Blair (2009) e Liu *et al*. (2010).
[3] The issue of key s is analyzed by McGilvray (1977), which takes into account their integration within a broader objective of economic policy.

Considering G^* the average of all the elements of G and G_{i*} the sum of the elements of each line, there is the forward Hirschman-Rasmussen linkage:

$$FL_i = \left(G_{i*}/n\right)/G^* \tag{16}$$

Importantly, however, that these indices do not consider the different levels of production in each , i. e. the size of the industry in the economy, which is performed by the GHS Model Guilhoto, Hewings and Sonis, which uses two methods: the focus of key sectors and focus on pure links (GUILHOTO *et al*, 2005). This model results in a series of decomposition of the inverse matrix Leontief. Such indices are called PBL and PFL.

$$PBL = \Delta_r A_{rj} \Delta_j Y_j \tag{17}$$

$$PFL = \Delta_j A_{jr} \Delta_r Y_r \tag{18}$$

The impact of PBL indicates the total output of industry *j* on the rest of the economy, free demand for inputs that industry *j* produces for himself and the rest of the economy returns to the industry *j* and vice versa. The PFL, in turn, points to the impact of the value of total production from the rest of the economy on the industry *j*. One can also obtain pure total content of the links (PTL) by the sum of the PBL and the PFL, expressed as current values:

$$PTL = PBL + PFL \tag{19}$$

Regarding the index Pure, PBL, indicates the impact of the total output of industry *j* on the rest of the economy, free from the demand for inputs that the industry already produces for himself and the rest of the economy returns to the industry *j* vice versa. It is decomposed into PFL and PTL. The PFL, in turn, points to the impact of the value of total production from the rest of the economy on the industry *j*. One can also obtain pure total content of the links (PTL) by the sum of the PBL and the PFL, expressed in current values.

The rates of pure standard connection consider the weight of each industry as demandant or supplier in its economy and its relative size, thus allowing to analyze the importance of the industry. In these indexes, you can see the pure impact of an industry on the rest of the economy, and due to normalization, we can do a comparative analysis with the Rasmussen-Hirschman indexes presented. The PBLN considers the industry as plaintiff, ie, assesses the industry in the economy. The PFLN analyzes the industry as the supplier, ie, it analyzes how the economy that depends on this industry.

4 RESULTS AND DISCUSSIONS

To work on the same basis, i.e., in the year 2004, the National PRODETUR investments were deflated by the General Price Index - Internal Availability, calculated by the Getúlio Vargas Foundation (FGV) and published by the Institute of Applied Economic Research (IPEA), see Table 02.

Table 02: Deflation of National PRODETUR Investments (in R$ million)

Industries	at prices of 2012	at prices of 2004
78 Civil Construction	114.26	80.10
101 Maintenance and Repair Services	2.00	1.40
104 Business Services	52.61	36.88
108 Public Education	5.00	3.51
TOTAL	173.86	121.88

Source: Developed by the authors.

The National PRODETUR investments were first classified within the subclass of the National Classification of Economic Activities - CNAE 2.1 which is the highest level of disaggregation of activities within the National Commission on Classification and then be translated into CNAE 1.0 and then to Array System National Accounts in order to match investments with the IOM to calculate the multiplier impacts of production, employment and income. Thus, investments were aggregated into four industries, namely: 78 – Civil Construction, 101 - Maintenance and Repair Services, 104 - Business Services and 108 - Public Education.

From these values, it was possible to calculate the magnitude of direct, indirect impacts and induced effects that these investments will have on the product, employment and income of the Sergipean economy. Table 03 shows the results relative to the multiplier output.

The direct impact on production is logically equal to the amount of investments in this industry, i.e., the direct production multiplier is always equal to 1, for example, the table 03 says that the direct investment of R$ 80.10 million in the industry 78 - Civil Construction, generates an increase of R$ 59.75 million indirect production in other industries. This direct and indirect increase R$ 139.85 million in the economy causes the creation of new jobs and the consequent increase in income of households who come to consume other products, increasing more R$ 124.67 in all industries of the economy, which ultimately results in a total multiplier of R$ 264.52 (GUILHOTO *et al*, 2010).

Table 03 - Impact on production at 2004 prices, by industry (values expressed in R$ million).

N	Industries	Composition effect on Direct, Indirect and Induced				Regional Composition		
		Direct	Indirect	Induced	Total	SE	NE	RBR
78	Civil Construction	80.10	59.75	124.67	264.52	124.32	26.45	113.74
101	Maintenance and Repair Services	1.40	0.45	2.87	4.72	2.31	0.42	1.98
104	Business Services	36.88	12.38	71.18	120.45	63.84	10.84	45.77
108	Public Education	3.51	0.78	8.99	13.28	6.64	1.33	5.31
	GRAND TOTAL	121.88	73.37	207.71	402.96	**197.11**	39.04	166.81

Source: Developed by the authors, from data of Guilhoto *et al* (2010).

The National PRODETUR investments generate approximately R$ 402.96 million in products and services in the Brazilian economy, and of this total, R$ 197.11 million (48.9%) are retained within the Sergipe, which corresponds to 1.62 % of state GDP in 2004, R$ 39.04 million (9.7%) leaks into other states in the Northeast and R$ 166.81 million (41.4%) go to the rest of Brazil. The Civil Construction industry accounts for 65.6% of the total impact, followed by Business Services (29.9%), Public Education (3.3%) and Maintenance and Repair Services (1.2%).

From the point of view of job creation, the impact of these investments will be responsible for creating 15,448 new jobs in the Brazilian economy, with 10,148 jobs will be created in Sergipe, 1,937 in other states in the Northeast region and 3,366 jobs in the rest of Brazil. The Civil Construction industry will be responsible for creating 63.2% of these jobs, followed by: Business Services (31%), Public Education (4.1%) and Maintenance and Repair Services (1.7%), see Table 04.

Table 04 - Impact on employment at 2004 prices, by industry.

N	Industries	Composition effect on Direct, Indirect and Induced				Regional Composition		
		Direct	Indirect	Induced	Total	SE	NE	RBR
78	Civil Construction	3,909	1,111	4,740	9,760	6,246	1,269	2,245
101	Maintenance and Repair Services	137	7	113	257	195	23	41
104	Business Services	1,673	304	2,819	4,796	3,261	576	959
108	Public Education	255	22	359	635	445	70	121
	GRAND TOTAL	5,974	1,444	8,030	15,448	**10,148**	1,937	3,366

Source: Developed by the authors, from data of Guilhoto *et al* (2010).

The program will generate R$ 214.77 million of additional income in the Brazilian economy, and of this amount, R$ 126.86 (59.1%) will be generated in Sergipe, which corresponds to 1.04% of state GDP of 2004, R$ 19.12 million (8.9%) overflows to other states in the Northeast region and R$ 68.79 million (32%) leaks into the rest of Brazil. The Civil Construction industry will be responsible for creating 62.1% of the total, followed by: Business Services (32.9%), Public Education (3.7%) and Maintenance and Repair Services (1.3%), see Table 05.

Table 05 - Impact on income at 2004 prices, by industry (values expressed in R$ million).

N	Industries	Composition effect on Direct, Indirect and Induced				Regional Composition		
		Direct	Indirect	Induced	Total	SE	NE	RBR
78	Civil Construction	44.55	26.58	62.28	133.41	73.37	13.34	46.69
101	Maintenance and Repair Services	1.13	0.18	1.44	2.75	1.76	0.19	0.80
104	Business Services	28.34	6.69	35.67	70.70	46.66	4.95	19.09
108	Public Education	2.97	0.43	4.51	7.91	5.06	0.63	2.22
	GRAND TOTAL	76.99	33.88	103.90	214.77	**126.86**	19.12	68.79

Source: Developed by the authors, from data of Guilhoto *et al* (2010).

Dwyer et al (2004) makes an alert concerning construction hypothesis of input-output models, which among other things, assumes unlimited supply of factors and, therefore, may result in some degree of results´ overestimation.

Table 6 shows the connection indexes of Hirschman-Rasmussen forward and backward, and pure backward linkage and forward linkage for each industry studied. As mentioned in the theoretical section, one can classify industries as key sectors, offering inter-dependent industries, demand inter-dependent, or even relatively independent of other industries.

Table 06 - Connection Indexes and Pure Connection Index (GHS), by industry

N	Industries	Pure backward linkage (PBL)		Pure forward linkage (PFL)		HR backward linkage		HR forward linkage	
		Value	Rank	Value	Rank	Value	Rank	Value	Rank
78	Civil Construction	7.056	2	3.121	9	0.871	90	0.971	35
101	Maintenance and Repair Services	0.171	76	1.164	25	0.755	110	1.050	26
104	Business Services	0.218	69	12.807	1	0.874	88	3.253	2
108	Public Education	2.987	9	0.023	102	0.793	108	0.682	110

Source: Developed by the authors, from data of Guilhoto *et al* (2010).

In this sense, within the industries analyzed, none can be identified as a key sector of the economy. Similarly, but in the opposite direction, the relatively independent of other industries (which have both indices smaller than 1) we have Civil Construction and Public Education. Furthermore, among these sections there is no strongly dependent inter supply, (backward linkage greater than 1). Since the inter-dependent demand, (forward linkage greater than 1) are Maintenance and Repair Services and Business Services.

Since the pure connection indexes, as explained above, consider the weight of each industry as demandant or supplier in its economy and its relative size, thus allowing to analyze the importance of the industry. In these indexes, you can see the pure impact of an industry on the rest of the economy, and due to normalization, we can do a comparative analysis with the Rasmussen-Hirschman indices presented earlier.

Can be noted among the industries studied, Construction and Public Education, which have a high pure backward linkage. These industries have a high impact of the pure value of their production, requiring an expressive way of the other industries of the economy. With respect to the pure forward linkage, Business Service is either has a greater significance in the economy as suppliers, followed by Civil Construction and Maintenance and Repair Services. In other words, are the industries that generate output for the rest of the economy.

Adding to the indexes pure backward and forward, we can analyze the joint impact on the economy of each industry as demandant and the supplier. Since then the index pure total binding is possible to define the key sectors such as those that sometime in the period under review has an absolute value greater than one (1). All industries detailed in Table 6 exhibit this behavior.

FINAL CONSIDERATIONS

The aim of this study was to calculate and analyze, through the input-output analysis, the economic impact of the National PRODETUR investments on the production structure of Sergipe and the spillovers effects for the Northeast region and the rest of Brazil. For this purpose, we used information from the Inter-Regional Input-Output Matrix of Northeast and States (GUILHOTO *et al*, 2010) to estimate the multiplier effects into the Sergipean economy.

The PRODETUR investments generate approximately R$ 402.96 million in products and services in the Brazilian economy, and of this total, R$ 197.11 million (48.9%) are retained within the Sergipe, which corresponds to 1.62 % of state GDP in 2004, R$ 39.04 million (9.7%) leaks into other states in the Northeast and R$ 166.81 million (41.4%) go to the rest of Brazil. From the point of view of job creation, the impact of these investments will be responsible for creating 15,448 new jobs in the Brazilian economy, with 10,148 jobs will be created in Sergipe, 1,937 in other states in the Northeast region and 3,366 jobs in the rest of Brazil.

The Civil Construction industry presented the best results regarding the impact on output, employment and income. It is noteworthy that, however, this industry will receive the largest share of investments (42.16%). Moreover, Civil Construction had good results for forward and backward´s in the pure linkage indexes, which also justifies its performance.

It follows therefore that the investments of the National PRODETUR will result in several benefits for the Sergipe´s population regarding the generation of employment and income, and especially the rise of the state in the tourist circuit local, regional and national levels.

The use of an inter-regional computable general equilibrium model is the next step to the methodological improvement of this paper, because these kinds of models have a larger amount of results, allowing in this way, different analyzes, interpretations and directions for the development and implementation of public policies.

REFERENCES

ABLAS, L. A. Efeitos do turismo no desenvolvimento regional. **Turismo e Análise**, vol.2, n.1, 1992.

AMARAL FILHO, J. Desenvolvimento Regional Endógeno: (Re) Construção de um Conceito, Reformulação das Estratégias. In: Revista Econômica do Nordeste, Fortaleza, v. 26, n. 3, p. 326-346, 1995.

AZZONI, C. R. Desenvolvimento do turismo ou desenvolvimento turístico:reflexões com base em duas regiões atrasadas de São Paulo. Turismo em Análise, vol.3, n.1, 1993.

AZZONI, C. R.; MENEZES, T. A. Estimating the cost competitiveness of international tourist destinations. In: **Anais 14º Encontro da Associação Portuguesa para o Desenvolvimento Regional**, Tomar, 2008.

CASIMIRO FILHO, F., GUILHOTO, J.J.M. Matriz de insumo-produto para a economia turística brasileira: construção e análise das relações intersetoriais. **Análise Econômica**, v.21, n.40, 2003.

DWYER, L.; FORSYTH, P.; SPURR, R. Evaluating Tourism's Economic Effects: New and Old Approaches. **Tourism Management**, v. 25, p. 307-317, 2004.

FRECHTLING, D. C.; HORVÁTH, E. Input-Output Model Estimating the Multiplier Effects of Tourism Expenditures on a Local Economy through a Regional. **Journal of Travel Research**, v. 37, 1999.

GUILHOTO, J. J. M., SONIS, M., HEWINGS G. J. D. Linkages and Multipliers in a Multiregional Framework: Integration of Alternative Approaches**. Australasian Journal of Regional Studies**, Vol. 11, pp. 75-89, 2005.

GUILHOTO, J. J. M.; SESSO FILHO, U. A. **Estimação da matriz insumo-produto a partir de dados preliminares das contas nacionais.** In Economia Aplicada, 9 (2), pp. 277-299, abril-junho 2005.

GUILHOTO, J. J. M., AZZONI, C. R., ICHIHARA, S. M., KADOTA, D. K., HADDAD, E. A. Matriz de Insumo-Produto do Nordeste e Estados: Metodologia e Resultados. Fortaleza: **Banco do Nordeste do Brasil**, 2010.

HADDAD, E. A., DOMINGUES, E. P. EFES – Um Modelo Aplicado de Equilíbrio Geral para a Economia Brasileira: Projeções Setoriais para 1999-2004. **Estudos Econômicos**, v. 31 n. 1, 2001.

HADDAD, E. A. *et al*. Estudo de impactos socioeconômicos potenciais dos investimentos do PRODETUR Nacional - Rio de Janeiro. **Relatório Final**. Fundação Instituto de Pesquisas Econômicas, 2010.

HILGEMBERG, E. M., GUILHOTO, J. J. M. Uso de combustíveis e emissões de Co2 no Brasil: um modelo inter-regional de insumo-produto. **Nova Economia**. v. 16, n. 1, 2006.

LEONTIEF, W. W. **The structure of american economy:** 1919-1939. 2.ed. New York: Oxford University, 1966.

LIU, H.; POLENSKE, K. R.; GUILHOTO, J. J. M. **China and Brazil Productive Structure and Economic Growth Compared: 1980's to 2000's**. Paper presented at 57th Annual North American Meetings of the Regional Science Association International. Denver, USA, November 10-13, 2010.

MCGILVRAY, J. W. Linkages, Key s and Development Strategy. In W. Leontief (ed.) **Structure, System and Economic Policy**. Cambridge: Cambridge University Press, pp. 49-56, 1977.

MESCON, T. S.; VOZIKIS, G. S. The economic impact of tourism at the port of Miami. **Annals of Tourism Research**, v. 12, n. 4, p. 515-528, 1985.

MILLER, R. E.; BLAIR, P. D. **Input-output analysis:** foundations and extensions. 2th ed. New York: Cambridge University Press, 2009.

PRADO, E. F. S. **Estrutura tecnológica e desenvolvimento regional**. São Paulo: USP, 1981. 230 p.

STONE, R. Input-output and demographic accounting: A tool for education planning. **Minerva**, IV, 3, p.365-380, 1966.

STYNES, D. J. **Economic impacts of Tourism: A handbook for tourism professionals**. Urbana, IL: University of Illinois, Tourism Research Laboratory, 1997.

TAKASAGO, M.; GUILHOTO, J. J. M.; MOLLO, M. L. R.; ANDRADE, J. P. O turismo e a economia brasileira: uma discussão da matriz de insumo-produto. In: **Anais 14º Encontro da Associação Portuguesa para o Desenvolvimento Regional**, Tomar, 2008.

_____. O potencial criador de emprego e renda do turismo no Brasil. **Pesquisa e Planejamento Econômico** (Rio de Janeiro), v. 40, p. 439-468, 2010.

TEIXEIRA, M.S.G., CASTELAR, L.I., SOARES, F.A. Impactos de gastos turísticos sobre produto, renda e emprego usando a matriz de insumo-produto estadual. **Textos para discussão**, nº173, CAEN, Universidade Federal do Ceará – Pós Graduação em Economia, 1998.

THE CENTRE FOR SPATIAL ECONOMICS. **The Ontario Tourism Regional Economic Impact Model (TREIM)**, Report prepared for Ministry of Tourism and Recreation, 2008. Disponível em: <http://www.tourism.gov.on.ca/english/research/treim/index.html>.