

Impact of Tourism Consumption on GDP. The Role of Imports

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Summary

The aim of this paper is to analyse the effects of tourism consumption on imports. The basic idea is that conversion of tourism expenditure into value added and GP depends on the effect of the former on imports. Imports are leakages that reduce the economic impact of tourism in a destination and this seems to be especially important in the case of small islands. After finding some stylised facts about the evolution of tourism consumption and imports in the Canary Islands, the paper presents two different methodologies, Keynesian multipliers and input-output analysis. The Canary Islands are used as a case study for estimating the impact of consumption made by tourists on imports.

Keywords: Economic impact, Imports, Keynesian multiplier, Input-output model, Canary Islands

JEL Classification: L83, F10, R15

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1. INTRODUCTION

Tourism has become one of the main sources of income in the balance of payments of many countries. In fact, in some small countries highly dependent on tourism, the income included under the heading of tourism outweighs exports of goods. What is more significant still is the comparison in such countries of the sub-balances of goods and tourism, as deficits in the former are frequently compensated to a large extent by a surplus in the latter. Tourism can be considered as a determining factor in the trade deficit, or as a sector that makes a decisive contribution to its balance. This diversity of approaches highlights the close relationship between the two variables. This relationship is a crucial factor in the analysis of tourism's impact on GDP level and growth, because imports can be considered as leakages of the system.

The second section will show some stylised facts about the evolution of tourism consumption and imports in the Canary Islands. There will then be a presentation of the methodology used for estimating the relation between tourism consumption and imports. The fourth part will deal with the relationship between these two variables in the Canary Islands, based on input-output analysis. The paper ends with the main conclusions.

2. TOURISM DYNAMICS AND IMPORTS

The relationship between tourism consumption and imports is one of the major issues in any analysis of the Canary Island economy from a macro-economic perspective. Up until the 80's, imports came mainly from foreign countries, due to the free trade regime enjoyed by the

Islands. Hence, the rate of commercial openness¹ has traditionally exceeded the rates registered for the Spanish economy as a whole. However, from the mid 80's onwards, when Spain joined what was then the European Economic Community, there was a change in behaviour. On the one hand, the Spanish economy opened up rapidly and intensely to foreign economic exchanges, especially with European countries; and, on the other, the Canary Island economy, which was traditionally more open to trade, did not intensify its already high import flows, but it did change the geographical origin of these imports, turning to the mainland market as its main source of supply.

The consequence of this whole process of change was that, in 1999, the rate of openness of the Spanish economy reached 47.3%, whereas the figure for the Canary Islands was a mere 19.2%. Nonetheless, if the openness of the Canary Island economy was calculated including foreign trade along with trade relations with the Spanish mainland, this rate would rise to 55.7% for 1999. It can, therefore, be said that the economy of the Islands has maintained a high rate of commercial openness, although the origin of its purchases has changed.

Canary Island foreign trade is characterised not only by high intensity of flows, but also by trade imbalances. The commercial coverage rate for international trade was 30.9% in 1999, compared with a rate of 74.1% for the country as a whole². These high openness and low coverage rates have traditionally been associated with the *small island problem*: small size of the domestic market and lack of competition; disadvantages in reaching economies of scale in productions for the local market; export specialisation; dependency on imports of intermediate, consumer and capital goods; etc³. Tourism consumption has also been considered as one of the explanatory factors, as it constitutes an exogenous injection of

¹ Measured as the sum of exports to and imports from abroad in relation to GDP.

² In trade with Spain (mainland) this rate is only 14.3%.

demand that, in an open economy, has an effect on import flows. This hypothesis is also supported by the fact that reduction in the commercial coverage rate has coincided historically with expansion in tourism.

Statistical analysis of the relation between tourism consumption and imports faces difficulties concerning methodology and the lack of available sources. The method of analysis will be explained in the next section. The lack of statistical sources for analysing tourism from a macroeconomic standpoint is due to the character of the industry that, unlike most cases, is defined from the demand side. This shortage of statistical sources and standardised methods for measuring the impacts of tourism has been discussed widely in the context of the World Tourism Organisation, leading to an international consensus on the design and implementation of the Tourist Satellite Account (United Nations, 2000)⁴.

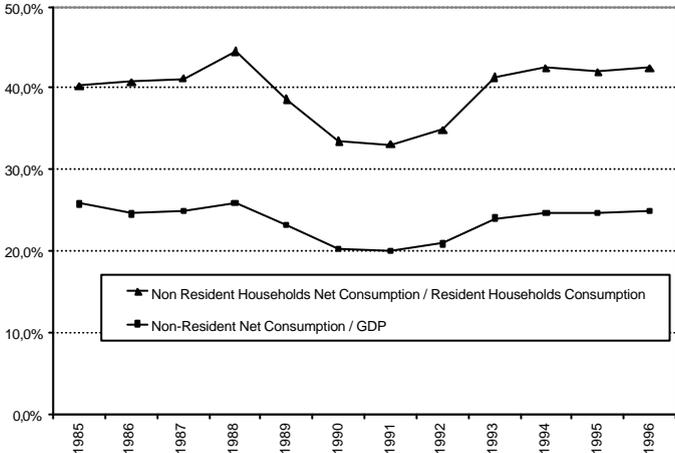
From the Regional Accounting data for Spain it is possible to obtain a rough estimate of non-resident consumption in the Canary Islands. Although, this variable can only be approximated in net terms, i.e., through the difference between final consumption generated in the Canary Islands by non-resident households and the consumption generated overseas by residents in the Canary Islands; including non-residents both from the mainland and from abroad. This way, it is possible to get a first approximation of tourist consumption to the extent that the consumption generated by Canary Island households overseas is far below non-resident consumption in the Canaries.

³ See Hernández Martín (1994).

⁴ A pilot version of the Tourist Satellite Accounts of the Spanish economy is available since June 2002. However, we may have to wait somewhat longer before time series are available and, especially, data broken down to a regional level. For more about the present state of the project in Spain, see Cañada Martínez (2001).

Between 1985 and 1996, the net consumption of non-residents in relation to GDP has remained around 25%, except during the period of economic and tourist crisis from 1990 to 1993, when the figure fell to around 20%. A similar dynamic, although for a different level, is the one experienced by the ratio of net non-resident consumption to resident household consumption, which has remained around 42%, except in the aforementioned crisis period, when it fell to approximately 32%.

Figure 1. Evolution of net, non-resident consumption



Source: Instituto Nacional de Estadística. Regional Accounts of Spain

3. THEORETICAL BACKGROUND AND METHODOLOGY

The methods that have been traditionally used to measure the impact (direct, indirect and induced) of tourist expenditure on imports are based on estimating the multipliers derived from the Keynesian model and the input-output model. In this section, both methodologies will be explained, as well as their associated advantages and disadvantages. These are two

techniques that share some concepts, initial assumptions and objectives (Briguglio 1992), although they offer different results⁵.

3.1. KEYNESIAN MULTIPLIERS

The concept of the Keynesian multiplier relates an exogenous injection of expenditure to the total effects it generates on different macro-economic aggregates. The theoretical foundation on which this multiplier rests is to be found in the Keynesian model of aggregate demand within an open economy, whose basic assumptions adjust well to the characteristic features of the Canary Island economy: the assumption of a small country, which means that the prices of imported goods are given and do not depend on the volume of imports; the inflexibility of the price of goods and factors; the existence of unemployment of labour and all other factors; and the production is led by demand. The multiplier to analyse the effect of an exogenous variation in tourism consumption on income can be specified in the following manner:

$$\frac{dY}{dTC} = \frac{1-g}{1-c+m} \quad [1]$$

Where Y is income, TC tourism consumption, c is the marginal propensity to consume, m is the marginal propensity to import and g is the propensity to import in tourist consumption. Including two propensities to import (m and g) highlights the fact that not all consumption

⁵ In recent years, several complementary methods have been developed to analyse the impact of tourist consumption on the economy. First of all, models based on the Social Accounting Matrix. Second, Computable General Equilibrium modelling applied to tourism (see, for instance, Zhou et al., 1997, Dwyer, Forsyth & Spurr, 2003, or the works carried out in the Christel DeHaan Tourism and Travel Research Institute of Nottingham University, for example, Blake, 2000). Third, World Tourism Organization methodology for Tourist Satellite Accounts provides a new simple framework for estimating the impacts of tourism. To complete the review of the methodologies that have been used, mention must be made of the so-called *ad hoc* models (Fletcher and Archer, 1991), which combine Keynesian and input-output models, although they have less analytical basis and have been used in the absence of input-output tables.

generates impacts on domestic production and income, because imports can be considered as leakages⁶.

An increase in tourism consumption generates, in the first round, an increase in imports (direct impact) and an increase in the economy's income due to the productive activity carried out to obtain the goods to attend the demand. The increase in income will lead to successive, but decreasing increases (due to the effect of savings and the imports themselves) in aggregate demand that will, once again, generate increases in both imports and income (induced effect). The Keynesian multiplier adapted to measure the impact of tourism consumption on imports would take the following expression:

$$\frac{dM}{dTc} = \frac{\partial M}{\partial Tc} + \frac{\partial M}{\partial Y} \cdot \frac{\partial Y}{\partial Tc} = g + \left(m \cdot \frac{\partial Y}{\partial Tc} \right) = \frac{g(1-c) + m}{1-c+m} \quad [2]$$

Where M represents imports. According to the above expression, the increase in imports due to tourist expenditure would be due to a direct impact, g; and an induced effect, through the effect produced by the increase in income.

This way of evaluating the effect of tourism consumption on the value of imports has the basic disadvantage, above and beyond the well-known of the Keynesian model, the fact that we are working with an aggregate model that does not specify inter-sectoral relations, as the intermediate demand for imports generated as a consequence of tourism consumption is impossible to identify. In other words, the indirect effect of tourism consumption on imports

⁶ The specific form taken on by the Keynesian multiplier depends on whether there are leakages or not in the first round. In the case of tourist consumption, these leakages are associated with imports in the first round and, from the second round on, they are also associated with savings. Different specifications of the Keynesian multiplier can be found in Sinclair and Sutcliffe (1988).

cannot be observed. It is for this reason that empirical studies have been more often based on the more complete multipliers of the input-output model.

3.2. INPUT-OUTPUT MODEL MULTIPLIERS. INDIRECT IMPACTS

Input-output model multipliers are a more efficient method for estimating the impact of tourism consumption on imports, as they are derived from the explicit modelling of the inter-sectoral relations that take place in the economic system, thus overcoming the main disadvantage of the previous method. Following Fletcher (1989), other advantages of the input-output model multipliers are: the fact they are based on a model of general equilibrium, making it possible to observe all the inter-relations that occur in the economy; the nature of the input-output model makes it possible to study the impact of consumption on the three levels it occurs (direct, indirect and induced effects); and, finally, it can be considered as a *neutral* approach, in the sense that value judgements on how the economy works are few and, furthermore, they are explicit. Concerning the restrictive assumptions of the model, mention should be made of the fact that there are idle resources and constant returns to scale in production. The consequence of these assumptions is that the average and marginal values of the propensity to consume (import) are identical⁷.

Before turning to the main methodological issues concerning the impact of tourism consumption on imports, a clarification must be made of the concepts used in this paper. The import of final goods needed to satisfy consumption are considered as direct effects, whereas,

⁷ The use of the input-output model also has disadvantages due to the fact that tables are not up-dated (for the case of the Canary Islands, the latest available table is for 1992) and also due to the restrictive assumptions that are the starting point of the model. For more on the methodology and limitation of applying input-output analysis to tourism see, for example, Fletcher (1989) or Briassoulis (1991).

all imports of intermediate goods (in successive rounds) by companies in order to satisfying tourist demand are considered as indirect effects⁸.

The direct effect of tourism consumption on imports can be expressed in the following way:

$$TC^m = c^m \cdot TC \quad [3]$$

Where TC^m are imports of final goods generated directly by tourism consumption; TC is total tourism consumption; and c^m is the tourists' propensity to consume imported final goods⁹.

The input-output model makes it possible to estimate the effects of tourism consumption on income or imports in terms of multipliers, following the methodology used in the papers of Archer (1982) or Fletcher and Archer (1991). This direct multiplier effect of tourism consumption on imports would be represented as follows:

$$m^f = c^m TC^* ; \text{ with } TC^* \text{ a vector : } TC_i^* = \frac{TC_i}{TC} \quad [4]$$

Where m^f is a vector of tourism consumption multiplier effects on final imports in each branch of activity; c^m is the propensity of tourism consumption in each branch to import final goods; and TC_i is the tourism consumption satisfied with production of branch i .

⁸ This terminology differs slightly from that used for analysing the direct and indirect effects on production, income or employment, because, in this case, the direct effects are quantified with a matrix of technical coefficients, whereas Leontief's inverse makes it possible to calculate the sum of the direct and indirect effects.

⁹ As there are no data of the mean and marginal propensity of tourist consumption to import, in the empirical work later on, the average values for all private consumption have been taken. That is why the differences that one can see in the impact of resident and non-resident spending on imports are not due to different sectoral propensities, but differences in the structure of expenditure.

$$M^i = A^m X \quad [7]$$

If we bear in mind that final demand has a local production content and a final import content, the vectors D and M can be broken down in the following manner:

$$D = D^d + D^m \quad [8]$$

$$M = M^i + D^m \quad [9]$$

Where super indices d , m , i refer to the domestic, imported and intermediate nature respectively. Substituting [8] and [9] in [6] and operating gives us an expression that quantifies the effect of an increase in demand (for example, tourism consumption) on production:

$$A^d X + M^i + D^d + D^m = X + M^i + D^m \quad [10]$$

$$D^d = (I - A^d)X \quad [11]$$

$$X = (I - A^d)^{-1} D^d \quad [12]$$

Where $(I - A^d)^{-1}$ is the Leontief inverse of domestic technical coefficients. Substituting [12] in [7] gives us the expression that quantifies the indirect impact of demand on imports:

$$M^i = A^m (I - A^d)^{-1} D^d \quad [13]$$

Therefore, the value of intermediate imports originated by tourism consumption would be given by:

¹⁰ That is to say, $a^d_{ij} = x_j / X_j$; and $a^m_{ij} = m_j / X_j$. Then, x_{ij} and m_{ij} are the production and the intermediate imports of products of branch i , which are acquired by branch j .

$$M^i = A^m (I - A^d)^{-1} TC^d \quad [14]$$

The vector of the indirect multiplier effects of tourism consumption on imports is given as follows:

$$m^i = A^m (I - A^d)^{-1} TC^{d*}; \quad TC^{d*} \text{ is a vector : } TC_i^{d*} = \frac{TC_i^d}{TC} \quad [15]$$

Where TC_i^{d*} represents the proportion of the tourism consumption of each branch that is satisfied with domestic production. The total effect, both direct and indirect, of tourism consumption on imports can be calculated by adding [4] and [15].

$$M = c^m TC + A^m (I - A^d)^{-1} TC^d \quad [16]$$

To obtain the total, direct and indirect multiplier effects, the following equation has to be solved:

$$m = c^m TC^* + A^m (I - A^d)^{-1} TC^{d*} \quad [17]$$

3.3. INPUT-OUTPUT MODEL. INDUCED IMPACT

As we have said, tourist expenditure of non-residents has a direct effect on imports of consumer goods and an indirect effect through the requirement for inputs to produce the locally produced goods demanded by tourists. However, the total effects do not stop there, because imports will also grow because the increase in income originated by tourist activity

$$M^{ir} = \bar{A}^m (I - \bar{A}^d)^{-1} \bar{TC}^d \quad [20]$$

Where M^{ir} are the indirect and induced impacts of tourism consumption on imports. If from M^{ir} we deduct M^i , we can obtain the induced effects alone¹².

It is important to distinguish clearly between the open input-output model, that allows us to estimate indirect impacts, with the closed model, used to estimate induced ones. The open model measures contribution of tourism consumption to GDP or imports while the closed model measures the impact of the activity with no alternative sources of income for resources employed. Besides, the results obtained with the closed model depend on the *ad hoc* assumptions needed to close the model. The main advantage of the open model are the consistency tests. On the one hand, the final demand must explain total supply and imports. On the other hand, the value added multiplier plus the import multiplier must equal one. The closed model can be suitable for analysing the impact of tourism in small open economies highly specialised and export driven like some small tourism economies, where opportunity costs of tourism can be neglected, while the open model is better for comparisons. Therefore, each model shows a different view of reality.

4. THE IMPACT OF TOURISM ON IMPORTS. SOME RESULTS

As has been pointed out, the input-output model provides a suitable tool for analysing the impact of tourism consumption on imports. For the case of the Canary Islands, the information from the 1992 input-output table has been used to calculate the direct effects, the

¹² The induced effects obtained this way include all of the effects on imports produced by income, including the indirect effects derived from income consumption.

indirect ones (through intermediate consumption) and induced effects (through income)¹³. Tourism consumption was in 1992 615 billion pesetas¹⁴. This consumption generated production of 755 billion and value added of about 484 billion pesetas, representing approximately 22.8% of GDP¹⁵. These data, like all the other data presented in this paper, only takes into consideration inbound tourism, coming from the rest of Spain and abroad, and does not take into account the domestic tourism of local residents. A different estimation of the proportion of tourism in the Canary Island's GDP (through the direct and indirect effects), considering all internal tourism (inbound and domestic) has been done in the context of the Input-Output Table of the Tourist Economy in Spain. According to this study, the tourist industry accounted for 21.4% of Canary Island GDP¹⁶.

The multiplier effect (direct and indirect) of tourist consumption on value added in the Canary Islands in 1992 was 0.79, i.e., for each unit of tourist expenditure this amount of income was generated¹⁷. This effect can be broken down into a direct multiplier effect on income of 0.56 and an indirect effect of 0.22. These figures can be considered as medium-low in comparison with those obtained in other areas¹⁸. What is more significant in the case of the Canary Islands is the relatively low value of the indirect impact in comparison with the direct one. This can

¹³ A column of tourist consumption for 1992 allocated among economic activities is available with the I-O table.

¹⁴ Net consumption of non-residents for that year was 441 billion pesetas, according to Regional Accountings from the National Statistics Office of Spain (166,386 pesetas = 1 euro).

¹⁵ Taken as a whole, the impact of direct, indirect and induced effects of tourism on GDP were 34.8%. But this figure should be treated with caution, because it depends on the adjustments made to close the input-output model. This figure is most probably overvalued, due to the fact that the transfer of income overseas has been underestimated in building the model and, therefore the effects induced by tourism have been overestimated.

¹⁶ These results are not compatible with those presented before, because these are estimations for the Canary Islands based on the input-output table for Spanish tourism.

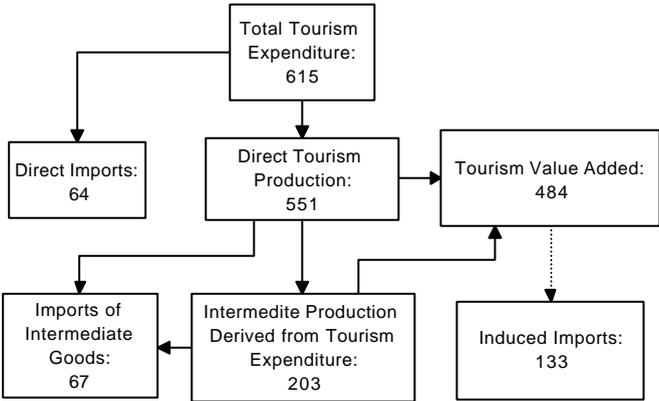
¹⁷ To obtain these results, the direct and indirect production derived from tourist consumption was multiplied by the coefficients of value added in the effective production of each branch. In this context, the concepts of *direct* and *indirect* have a slightly different sense, as the direct effects are obtained through the domestic technical coefficients and the indirect effects from Leontief's inverse matrix.

¹⁸ The conclusions drawn from international comparisons of multiplier effects must be relative because of different methods used, as well as different characteristics among the economies analysed. Value added multipliers shown in this paper rank between zero and one while Archer (1989) offers a list of results including several small island economies with figures over one. Anyway we may consider the multiplier effect of tourist consumption on income in the Canary Islands as medium-low.

be explained by the low intensity of intersectoral relations, because of the structural weakness of the Canary Islands economy, but also because of the high services content in tourist expenditure, being services a sector with a low demand for intermediate inputs.

Consumption by tourists in the Canary Islands generated high levels of direct imports (64 billion pesetas). These direct imports leak out of the local economy, thus limiting the multiplier effect of tourism on production and income. The tourist consumption satisfied by domestic production was 551 billion pesetas. In order to satisfy this tourist consumption, it was necessary to generate intermediate production worth 203 billion pesetas, which, in turn, generated imports of intermediate goods to the value of 67 billion. Finally, tourism induced imports to the value of 133 billion, through the increase in income.

Figure 2.- Simplified diagram of the economic impacts of tourism in the Canary Islands 1992. (billions of pesetas)



Based on Input-Output Table of the Canary Islands 1992

Final imports generated by tourism expenditure account for 7.8% of all imports into the Canary Islands, with imports of intermediate goods representing 8.2% of the total. A further 16.0% of Canary Island imports were induced by income generated by tourism.

The direct multiplier of tourist consumption on imports is 0.104, the indirect multiplier 0.109, while the induced multiplier is valued at 0.216. Hence, the overall multiplier of tourist consumption on imports is 0.430. This means that approximately 10.4% of tourist spending is satisfied directly with imports, while 89.6% is covered by local production. To obtain this production, it was necessary to import intermediate goods worth 10.9% of tourist consumption. Finally, to obtain this production, incomes were paid that generated consumption by resident households that induced imports worth the equivalent of 21.6% of tourist expenditure. The direct and indirect imports derived from tourist expenditure account for 16.0% of all imports into the Islands. Another 16.2% of imports were induced by tourist consumption, so, tourism, via the three lines of action, accounts for 32.1% of all imports of the Canary Islands.

One way of analysing the magnitude of the effect of tourist consumption is by comparing its multiplier effect on imports with that of the consumption by Canary Island resident households. This will show that the direct multiplier effect of household consumption on imports is 0.265, more than double the effect that non-resident consumption has. Besides the influence that the assumed equality of sectoral propensity to import of residents and non-residents may have on these results, this situation seems to be explained by the high service content of tourist spending, as services are generally non-tradable activities whose demand has to be met, to a large extent, by local production. Furthermore, the indirect effects on imports are greater in the case of tourist consumption. This apparent contradiction is justified, in part at least, by the lower levels of direct leakages out of the local economy through imports that favour a relatively more intensive diffusion of tourist consumption through inter-sectoral relations.

Table 1. Multiplier effects on imports

	Direct	Indirect	Direct + indirect	Induced	Direct + indirect + induced
Household consumption	0.265	0.079	0.344	*	*
Tourist consumption	0.104	0.109	0.214	0.216	0.430
Imports derived from tourist consumption (million pesetas)	64,315	67,277	131,593	133,131	264,723
% of total imports	7.8%	8.2%	16.0%	16.2%	32.1%
Based on Input-Output Table of the Canary Islands 1992					
* The multiplier that reflects the induced effect on imports of household consumption is not calculable, as it shows the effects of an exogenous change in a variable that is endogenous to the model.					

The effects of tourism on imports are not distributed homogeneously from a sectoral point of view. In fact, certain branches of economic activity concentrate the effects. Analysing only the direct and indirect impacts¹⁹, tourism would originate 16% of imports into the Canary Islands. These imports include branches of activity like oil products, textiles, transport equipment and chemicals, as well as all those primary and industrial activities related to food. Some significant figures include the fact that tourist consumption originates 39.6% of the imports of alcoholic drinks, 33.3% of processed meat imports, 21.3 of textiles imports and 18.1% of refined oil product imports.

The above results enable us to draw the conclusion that tourist consumption does not generate very intense direct leakages through imports, although there are large flows in some branches of production. However, the effect on imports reach relatively high figures if we bear in mind the indirect, and especially the induced impacts. Thus, the claim that tourism in Canaries has very little effect on GDP due to the high import content, should be qualified. Furthermore, there are other variables related to tourism that explain little effects on GDP and high import

¹⁹ The induced effects of resident and non-resident consumption do not differ in behaviour on a branch level, as they are both dependent on the sectoral distribution of consumption derived from the income obtained by households.

contents. The high proportion of tourist expenditure that is carried out in origin²⁰ and the transfer abroad of capital and labour income obtained in the sector²¹, are other constraints on the economic impacts of tourism.

5. CONCLUSIONS

The analysis shows that tourist consumption generates an external injection of expenditure that is transformed into domestic production and value added. While tourism contributes to 22.8% of GDP in 1992, a considerable portion of tourism consumption leaked out of the economy through imports. However, the impact of tourism on imports is, paradoxically, lower than that of resident consumption. The fact that each unity of tourist consumption does not generate a more intense import flow than the one originated by consumption of domestic households does not mean that the effect of tourism on imports is not considerable. The specialisation of the Canary Island economy in the tourist industry detracts resources from other activities that would maybe be more oriented towards the domestic market. In other words, the predominance of the tourist sector and of activities associated with it through intersectoral relations could be generating a crowding-out effect in alternative productions, thus favouring the fact that the consumption of tradeable goods (by both residents and non-residents) is satisfied to a large extent from imports.

In any event, resorting to imports, even if they have been considered as *leakages* from the model, should not be considered in a negative sense, as it is the result of exploiting the comparative advantages of the Islands. However, the amount of imports shows that there is a

²⁰Although part of this expenditure is devoted to paying the factors of production in Canaries, it remains striking that, according to the latest Survey on Tourist Expenditure undertaken by the Canary Island Bureau of Statistics, 63.2% of the travel budget is spent by tourists in their country of origin.

large market that could be more intensely exploited by local enterprises, especially if we bear in mind that specialisation in tourism is nowadays facing environmental constraints. The policy implications for growth in the Canary Islands over the next decades depend on the existence of opportunity cost of tourism, which may be estimated through Computable General Equilibrium Models. If tourism is having significant opportunity costs, the strategy of tourism development should be based not so much on furthering present specialisation, which would probably lead to an increase in *leakages* from the model, as on obtaining greater benefit from tourist consumption, by trying to increase its multiplier effects on domestic production and income. If tourism is having low crowding-out effects on other activities, the best policy would be to promote further tourism specialisation. The study of tourism contribution to GDP from a dynamic point of view needs more data and should take into account not only changes in tourism expenditure but also in the intensity of import leakages.

²¹ In fact, as has been said, the induced effects of tourism should be lower than those shown here, because of the size of these leakages of income abroad. Unfortunately, there are no figures on this issue.

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- (lxiii) This paper was presented at the ENGIME Workshop on “Social dynamics and conflicts in multicultural cities”, Milan, March 20-21, 2003
- (lxiv) This paper was presented at the International Conference on “Theoretical Topics in Ecological Economics”, organised by the Abdus Salam International Centre for Theoretical Physics - ICTP, the Beijer International Institute of Ecological Economics, and Fondazione Eni Enrico Mattei – FEEM Trieste, February 10-21, 2003
- (lxv) This paper was presented at the EuroConference on “Auctions and Market Design: Theory, Evidence and Applications” organised by Fondazione Eni Enrico Mattei and sponsored by the EU, Milan, September 25-27, 2003
- (lxvi) This paper has been presented at the 4th BioEcon Workshop on “Economic Analysis of Policies for Biodiversity Conservation” organised on behalf of the BIOECON Network by Fondazione Eni Enrico Mattei, Venice International University (VIU) and University College London (UCL), Venice, August 28-29, 2003
- (lxvii) This paper has been presented at the international conference on “Tourism and Sustainable Economic Development – Macro and Micro Economic Issues” jointly organised by CRENoS (Università di Cagliari e Sassari, Italy) and Fondazione Eni Enrico Mattei, and supported by the World Bank, Sardinia, September 19-20, 2003

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