# MODELING THE ECONOMIC IMPACT OF CHANGES IN TOURISM FOR THE FRENCH OVERSEAS DEPARTMENT: THE GUADELOUPEAN CASE

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***Presented at the 28th Annual Review Seminar***
***Research Department***
***Central Bank of Barbados***
***July 24-27, 2007***

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**Résumé:** En s'intéressant au cas particulier de la Guadeloupe, cet article veut prendre part aux réflexions et travaux empiriques qui sont actuellement menés un peu partout dans la Caraïbe afin d'apporter des éléments de réponse aux questionnements relatifs à la modélisation des variables du tourisme.

D'un coté, il s'agit d'enrichir le corpus des études empiriques consacrées à cette thématique. Puisque le secteur du tourisme tend de plus en plus à occuper le statut de créneaux stratégiques, il devient nécessaire de mieux cerner les contours des différentes problématiques macroéconomiques qui en sont rattachés: prévision de la fréquentation touristique, analyse de scénarios d'évolution macroéconomique, impact sectoriel d'une variation de la demande touristique, etc.

De l'autre coté, il s'agit de fournir des illustrations des types de contributions d'analyse économique attendues par les décideurs, tant au plan local qu'à l'échelon national. Indiscutablement, les budgets et les dispositifs d'incitation à l'investissement mis en place par les collectivités locales et le gouvernement durant ces dernières années attestent de leur grande foi pour les secteurs du tourisme qui sont souvent perçus comme un « remède magique » pour le développement des activités et de l'emploi en Guadeloupe. En contrepartie de leur engagement dans le financement, ils réclament maintenant des expertises pouvant établir des images correctes des effets directs et indirects du tourisme sur l'activité économique, en particulier sur la création de richesses et l'emploi.

**Summary:** Using the Guadeloupean case, this article contributes to the issues raised in the literature on Caribbean studies by focusing on and answering a certain number of questions related to the modelling of the variables which drive tourism industry. Thus, on the one hand, it enriches quantitatively and qualitatively the corpus used in several similar empirical studies. Since the tourism sector is the core of many economies, it becomes increasingly imperative to identify the different related macroeconomic problems that may arise. To name a few, forecast of tourist arrivals, analysis of different scenarios for macroeconomic evolution and sector impact of a change in the demand for tourism. On the other hand, it provides examples of the different types of economic analysis needed by decision makers at the local as well as national levels. Unquestionably, recently the budgets and investment check incentives set up in Guadeloupe by the government have showed a favourable bias towards the tourism sector, which is considered as a "magic cure" for economic activity and employment generations. In return to their commitment for providing the much needed finances, the authorities are now requiring a certain level of expertise to deal accurately with the determination of the direct and indirect effects of tourism on economic activity, particularly on the creation of wealth and employment.

***Keywords***: Social Accounting Matrix, Tourism Account, Tourism Impact, decomposition of multiplier

At the outset, it is worth noting that at the levels of international economy as well as regional or national economies, the tourism sector has shown progressive developments, especially since the liberalization of the airline industry in the 1990s. Indeed, according to the statistics of the World Tourism Organization (WTO)[1], the total number of tourist arrivals increased from 69.3 million in 1960 to 286.5 million in 1980, attaining 455.9 million in 1990 and 702.6 million in 2002. Thus, there were four times as many tourists travelling in 2002 than there were in 1960. Similarly, since the early 1990's, the evolutionary curve for this variable has been showing a steeper rise than during preceding periods. Likewise, revenues from tourism have increased from 7 billion US dollars in 1960, to 103 billion in 1980 and 341 billion in 1994. International trade figures also show that tourism occupies a leading position among the various categories of goods and services being exchanged worldwide, well ahead of oil and automobiles.

Not surprisingly, the tourism sector plays an extremely important role, in terms of employment, consumption and investment, in the developing countries, which happen to be the major beneficiaries of revenues generated by international tourism. In other countries, the emergence of tourism industry is considered to be a strategy for economic development. This is the case in certain Caribbean countries, such as Cuba and the Dominican Republic, where growth rates have been relatively high in recent years, due to economic policies which place a lot of emphasis on tourism.

It is equally important to point out that within the Caribbean in the space of one decade since 1990, there has been a real shift in the distribution of the "tourist arrival cards" among certain countries. That is, some countries have gained in tourist arrivals. Such are the cases of Cuba and the Dominican Republic which occupy the top spots. To corroborate, Cuba saw her number of visitors grow by 1400000 between 1990 and 2001, resulting in Cuba's jumping from fifteenth place to first. During the same period, in the Dominican Republic the number of visitors grew by 1500000 tourists, and moved the later country from fourth to second place. Other countries, on the contrary, stagnated or saw a reversal of their trends. Such are the cases of Barbados and Jamaica which registered little progress and the Bahamas which underwent a slight regression.

[1] World Tourism Organization

These brief observations are good enough to demonstrate the relevance of studies measuring the macroeconomic impact of variations in tourist arrivals within a country as well as the need for forecasts in this domain. Witt and Witt (1995) highlighted clearly the need for forecasts: "Short-term forecasts are required for scheduling and staffing, medium term forecasts for planning tour operator brochures and long term forecasts for investment in aircraft, hotels and infrastructure."

Using the Guadeloupean case, this article contributes to the issues raised in the literature on Caribbean studies by focusing on and answering a certain number of questions related to the modeling of the variables which drive tourism industry. On the one hand, it enriches quantitatively and qualitatively the data base of interest in several similar empirical studies. Since the tourism sector is the core of many economies, it becomes increasingly imperative to identify the different related macroeconomic problems that may arise. To name a few, forecast of tourist arrivals, analysis of different scenarios for macroeconomic evolution and sector impact of a change in the demand for tourisms. On the other hand, it provides examples of the different types of economic analysis needed by decision makers at the local as well as national levels. Unquestionably, recently the budgets and investment check incentives set up in Guadeloupe by local governments and the French government have showed a favourable bias towards the tourism sector, which is considered as a "magic cure" for economic activity and employment generations. In return to their commitment for providing the much needed finances, the authorities are now requiring a certain level of expertise to deal accurately with the determination of the direct and indirect effects of tourism on economic activity, particularly on the creation of wealth and employment.

The paper is organized as follows. Section I outlines the evolution of Guadeloupe's tourism industry, describes its positioning with regards to other Caribbean countries and discusses present-day stakes. Section II reviews the literature focusing on the different approaches dealing with the dynamics of the key variables which drive the tourism's evolution. Section III presents a SAM type model built for Guadeloupe and proposes its use in the elaboration of macroeconomic simulations of the impact of tourism. The last section contains concluding remarks.

## 1. A brief Synopsis of tourism's evolution in the Caribbean since 1985

A careful look at the distribution of tourists vacationing in the Caribbean between 1985 and 2001 reveals the following key facts. First, it is the case that in general tourist flows have increased, and often sharply, in most Caribbean countries. Indeed, with rare exceptions, the distribution tables in appendix 1 indicate a multiplying factor varying between 0.9 and 3.5.

Second, there is the phenomenon of the re-distribution of tourist visitation flows among countries. As seen above, in one decade, certain destinations have undergone a decrease in appeal which led to a decline or an almost steady evolution in their tourist arrival numbers. At the same time, other destinations have seen substantial increases in the arrival numbers of long and short term visitors as well as cruise ship passengers. It seems natural to question the actual value of these observations. In particular, is this a punctual occurrence without future consequences for countries registering a decline?

This is an interesting question because for example, it becomes obvious that certain countries have registered, at specific periods, drops in their normal tourist flows, to the point where some observers believed that they were witnessing the formation of a sort of cyclical movement. For example, Guadeloupe experienced a decline between 1986 and 1989, Barbados between 1991 and 1994, and Guyana between 1997 and 1999. Each of these countries, after these cyclical reductions, experienced a revival of its tourist activities.

It is worth noting that if countries were classified according to various criteria such as their belonging to a common organization such as the Organization of the Eastern Caribbean States (OECS) or their history such as the Dutch West Indies, striking similarities, enameled by some differences at times, would be observed.

During the period of investigation, OECS member countries registered a 90% increase, with their tourist arrivals leaping from 428 700 to 813 100 thousand. One may be tempted at first glance to consider this increase to be very significant. But upon closer examination, all the clusters of countries examined, it is superior to 2. Commonwealth nations experienced a 110% growth rate,

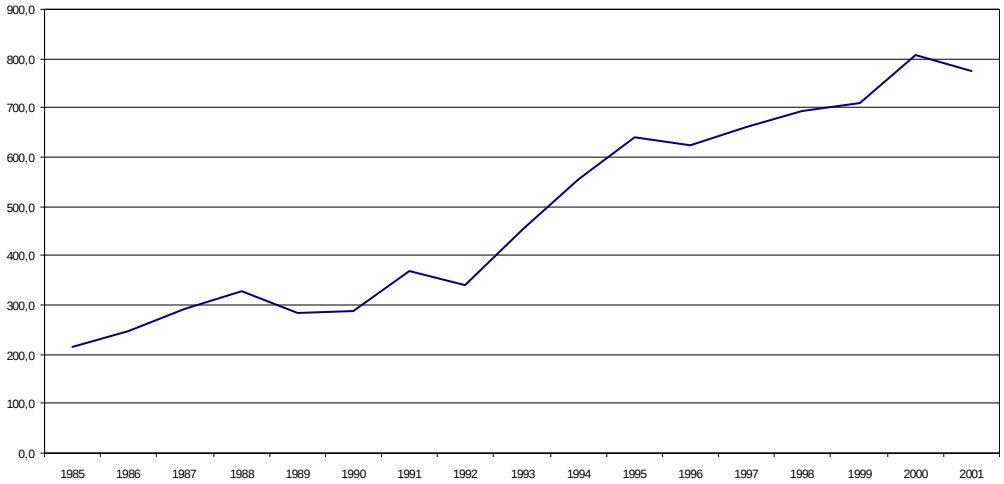
since their tourist arrival numbers grew from 1 577 300 to more than 3 300 700. The French West Indies also showed remarkable progress, with a multiplier coefficient of 3.25. The sharpest increase, which comes as no surprise, was registered in the group consisting of Cuba and the Dominican Republic, with a 350% increase!

This last result is even more remarkable in that these two countries are members of a 4-element group, which also includes Haiti and Surinam. The latter countries, for various reasons, have yet to find necessary conditions for the promotion of their development. Between 1985 and 2001, tourist visits to Haiti decreased by more than 8000. More recently, these observations can also be said to hold true in Surinam's case, with a less drastic but just as significant reduction. Tourism's importance is obvious in leading countries like Cuba and the Dominican Republic. In the former, tourist arrival numbers grew from 204 500 in 1985 to 1 774 500, with an increase of 1 570000 persons. In the latter, the increase was even sharper: more than 2 222 000. Another phenomenon deserves to be noted: in 1985, Guadeloupe and Martinique welcomed 375 000 tourists (216 400 in Guadeloupe and 158 900 in Martinique) while Cuba registered 240 000. The French West Indies maintained a positive differential over Cuba until 1994. Until now, their different evolutionary paths have neither been of the same nature nor magnitude. The French West Indies are experiencing a period of stagnation, while tourists continue to flock to Cuba. In 2001, Guadeloupe and Martinique attracted 773 400 and 447000 foreign visitors respectively, while Cuba welcomed 1 774 500 tourists.

In the Caribbean context, it would be difficult to not consider the Bahamas, as this island is heavily mentioned in many studies on tourism. Actually, this reputation has not been exaggerated. The Bahamas registered a steady increase in tourist arrivals up until 1989. However, like Barbados and Guyana (in their own proportions), this trend was reversed and the country had to wait several years before it reached again its former level.

**Figure 1. Evolution of the number of tourists visiting Guadeloupe between 1985 and 2001**

(number in thousands)




## 2. Modelling tourism's economic impact: a brief literature review

The literature dealing with the economic issues of tourism industry is vast and various and had its first impetus with studies using the structural econometric approach with a Keynesian flavor. In the first instances, these studies were carried out for developed countries and dealt with the issues of specification of behavioural relationships in view of finding out the determinants of tourism demand.

In this context, the models were concerned with tourism-related earnings and expenditures. In particular, two types of variables were of interest: those showing a price effect, taking account of visitor reactions to price and exchange rate changes and, those showing a revenue effect, linked to a rise in tourist expenditure following an increase in their buying power (see Coulomb (1988)).

In the second instances, after the initial period, studies were progressively extended to include the rest of the world since tourist trade was being increasingly placed at the heart of economic strategies in most of the countries. This holds true for activities directly or indirectly dependent on tourism as well as for activities related to employment or to the foreign trade balance.

Concerning the Caribbean, the first empirical implementations including forecasts of behavioural relations were proposed in the late 1980's (see Clarke et al. (1986), Belchere (1988), Rosensweig (1988) and Carey (1991)).

The almost systematic use of the OLS method was eventually phased out and in the ensuing years studies were carried out in a context which gradually approached that of modern econometrics. Consequently, publications from the late 1990's placed modern econometric techniques such as the use of non-stationary variables and Zellner's SUR (seemingly unrelated regression), at the heart of their methodological approaches.

Whether dealing with country specific cases or with comparative analyses of several economies, these studies paid particular attention to various issues, such as the price effects on tourism results, the problem of tourism maturity (Whitehall and Greenidge (1996)), the forecasting of tourist arrivals (Downes, Greenidge and Worrell (1997)), etc.

The methodological approach based on input-output as well as on computable general equilibrium models has also drawn the attention of quantitative macroeconomists. In this context, Adams and Parmenter (1992 and 1995) were the first to opt for an input-output model. Since then, there has been widespread utilisation of general-equilibrium modelling, as can be noted in the many applications realized for the Australian economy, (Skene (1993), Madden and Thapa (2000), Woollett, Townsend and Watts (2001), Dwyer et al. (2003a, 2003b)), for the American economy (Blake et al., 2000), in Hawaii (Zhou et al., 1997), Canada (Decaluwe, 1998), Spain (Blake, 2000), the United Kingdom (Blake, Sinclair and Sugiyarto, 2003) and in the Balearic Islands (Valle and Polo, 2004).

In the Caribbean, most of the work done in this domain was published in the late 1990's. These studies were devoted to analysing the most tourism-affected sectors in terms of expenditures and by their contribution to economic growth. While pioneering authors such as Armstrong, Daniels and Francis (1974) managed to shed some early light on certain macroeconomic aspects of the tourism sector in the Caribbean, their focus was placed particularly on the Barbadian economy, based on a limited input-output table (13,13) and on figures from 1968. The real impetus

concerning this non-econometric approach took place two decades later, with the key work of McDavid (2000) who produced an application for the Jamaican economy in 2003, using an input-output table constructed with data from 1993, data which he also used to create a SAM and a CGE model, in order to respond to certain questions concerning the interdependent relationship between tourism and economic growth.

As alternative to previous methodologies, the time series approach has also attracted a substantial number of researchers to deal with tourism based issues. Empirical investigations were undertaken with the aim of highlighting particular elements capable of being apprehended with a limited number of variables. This was achieved through the use of various methods of analyzing temporal series. For example, González and Moral (1995) proposed the use of a decomposition model including a revenue indicator, two price indexes, a random tendency and a random seasonal component to explain Spain's external tourist demand. For a more general look at these studies, see Witt and Witt's (1995).

For the English Caribbean two works are worth noting. Alleyne (2002) dealt with the case of Jamaica by emphasizing the use of seasonal variables to model and forecast tourism flux. Moore and Whitehall (2003) used Markov-switch models to test and analyse empirically the concept of life cycle in the sector of tourism in Barbados.

In the French West Indies, the first quantitative analyses concerning tourism only appeared in recent years. First, in 2003, Fakhoury, Joeger and Naudet of the French National Institute of Statistics and Economic Studies (INSEE) and the French Development Agency (AFD) have elaborated the TABLO model. Their goal was to estimate rapid economic accounts. With this model, they have been able to evaluate the consequences of the variations of tourist's expenditures.

Then, in Martinique, Carpin, Logossah, Marquès and Para (2004) developed a satellite account for tourism in an attempt to meet a two fold objective: assess tourism's weight in the region's development and contribute to decision-making within the sector. From a technical standpoint,

this study is based on the calculation of the Leontief multiplier using the TEI developed by INSEE and also on direct, indirect and induced effect multipliers.

Finally, in 2004, Mathouraparsad, Maurin and Montauban (2004) also dealt with this question and created the first Social Accounting Matrix (SAM) model prototype, which they used to explore different scenarios related to macroeconomic evolution, including simulations for the tourism sector. The work presented below is a follow up of that work.

## 3. Simulation exercises

The simulations were realized based on a SAM elaborated from an input-output table created for Guadeloupe using the data available for 2003. This is the last year for which accounts were published. First, we have estimated several accounts which take into consideration the activity of the sector tourism. This estimation was achieved by differentiating between the accounts of the original SAM and that in which tourist expenditures showed a 100% evolution. The different results obtained were then considered to be corresponding to those generated by the tourism account. Then, a simulation of tourism's impact on the economy was effected.

### *3.1. Use of the MCS to evaluate the weight of tourism*

Tourism represents an important stake in Guadeloupe's economy. As a generator of employment, its financial repercussions on several branches of activity make it into a real pillar of development. However, in recent years, this sector has been suffering a decrease in visitor numbers to the Guadeloupe archipelago. Tourists numbers have gone from 807 000 in 2000 to 773 400 in 2001. Terrorist attacks, airline company bankruptcy and hikes in ticket prices are just some of the possible reasons behind this 4% drop in tourist visitation. Which would be then the economic consequences if the number of tourists returned on his level record of 2000, that is to say a rise of expenditure of the tourists of 24%? What are the economic consequences of this 10% drop in tourist expenditure?

**Table 1: Percentage of tourist expenditure in local and imported goods**

| | Local products | Imported products |
|---|---|---|
| Agriculture | 0% | 0% |
| Sugar, Rum and other Alcohols | 2% | 1% |
| Other Agricultural and Food-Processing Industries | 1% | 1% |
| Consumer Goods Industry | 0% | 0% |
| Capital Goods Industry | 2% | 6% |
| Intermediate Goods | 0% | 0% |
| Energy | 0% | 0% |
| Construction | 0% | 0% |
| Trade | 0% | 0% |
| Transport, Post and Telecommunications | 4% | 1% |
| Financial Activities | 0% | 0% |
| Real-Estate Activities | 0% | 0% |
| Other Services to Companies | 20% | 0% |
| Hotels and Restaurants | 56% | 0% |
| Other Services to Individuals | 6% | 0% |
| Non-Commercial Services | 0% | 0% |

Source: INSEE

Tourists spent 265 million euros during 2003. The major areas of tourist expenditures were hotel accommodations and restaurant expenses, to which they spent 56% of their total budget. Following this we find expenditures for car rentals and consumer goods purchases.

Tourism represents 5% of the total GDP, 7 093 jobs and 4% of total household consumption in Guadeloupe as well as its dependencies. The tourists consume 12% of the local production of alcoholic drinks and 10% of services to individuals. Their presence accounts for almost one third of the turnover in the hotel and restaurant branch.

The SAM allows for the estimation of a branch account, of the different forms of intermediate consumption as well of certain aggregates.

**Table 2: Total amounts of certain aggregates produced by tourism**
(in millions of euros)

| | |
|---|---|
| Exports | 264 682 |
| Imports | 120 388 |
| Trade deficit | 144 294 |
| VAT ad other taxes on products | 36 447 |
| Direct taxes | 39 296 |

Source: Computation of the authors

**Table 3: Branch account**
(in millions of euros)

| | |
|---|---|
| Production | 691 471 |
| Intermediate consumption | 355 452 |
| Added value | 336 019 |
| Taxes on production – subventions | 17 322 |
| Salaries | 190 103 |
| Social Security contributions | 42 147 |
| Trade surplus | 128 594 |

Source: Computation of the authors

**Table 4: Products consumed**
(in millions of euros)

| | **Production** |
|---|---|
| Agriculture | 6 865 |
| Sugar, Rum and other Alcohols | 8 523 |
| Other Agricultural and Food-Processing Industries | 11 929 |
| Consumer Goods Industry | 4 723 |
| Capital Goods Industry | 6 778 |
| Intermediate Goods | 7 659 |
| Energy | 16 995 |
| Construction | 2 559 |
| Trade | 61 147 |
| Transport, Post and Telecommunications | 30 045 |
| Financial Activities | 12 839 |
| Real-Estate Activities | 7 799 |
| Other Services to Companies | 58 423 |
| Hotels and Restaurants | 102 363 |
| Other Services to Individuals | 13 073 |
| Non-Commercial Services | 3 732 |
| Total | 355 452 |

Source: Computation of the authors

**Table 5: Most productive branches within the economy**

| | Percentage of total production |
|---|---|
| Non-Commercial services | 23% |
| Trade | 22% |
| Construction | 18% |
| Tourism | 9% |
| Transport, Post and Telecommunications | 5% |
| Activites Immobilieres | 23% |

Source: Computation of the authors

The total weight of tourism sector represents more than 6% of commercial production, or 691 million euros. It directly leads to 6% of imports and accounts for 7% of VAT and custom duty takings. Furthermore, it generates close to 5% of all salaries and 5% of total profits. It is responsible for 4% of total income tax earnings and 5% of corporate taxes. Finally, it generates net external earnings (tourist consumption – consecutive imports) of close to 533 million euros. It represents the primary form of export on the island and thus finances 17% of the trade deficit.

**Table 6: Total tourist production per branch**
(in millions of euros)

| | Production | Percentage of total production |
|---|---|---|
| Agriculture | 17 276 | 5% |
| Sugar, Rum and other Alcohols | 9 479 | 12% |
| Other Agricultural and Food-Processing Industries | 16 431 | 8% |
| Consumer Goods Industry | 6 395 | 4% |
| Capital Goods Industry | 8 737 | 4% |
| Intermediate Goods | 10 603 | 3% |
| Energy | 18 691 | 7% |
| Construction | 4 603 | 0% |
| Trade | 149 955 | 9% |
| Transport, Post and Telecommunications | 59 593 | 7% |
| Financial Activities | 28 739 | 7% |
| Real-Estate Activities | 31 829 | 4% |
| Other Services to Companies | 121 069 | 12% |
| Hotels and Restaurants | 162 406 | 29% |
| Other Services to Individuals | 25 248 | 10% |
| Non-Commercial Services | 20 418 | 1% |

Source: Computation of the authors

Tourism directly generates 407 million euros in production and 120 million in imports. The principal beneficiary branches are non-commercial services and construction.

**Table 7: Direct tourist production per branch**
(in millions of euros)

| | |
|---|---|
| Agriculture | 7 775 |
| Sugar, Rum and other Alcohols | 8 204 |
| Other Agricultural and Food-Processing Industries | 10 274 |
| Consumer Goods Industry | 1 548 |
| Capital Goods Industry | 5 740 |
| Intermediate Goods | 4 586 |
| Energy | 10 531 |
| Construction | 1 316 |
| Trade | 43 873 |
| Transport, Post and Telecommunications | 32 188 |
| Financial Activities | 17 331 |
| Real-Estate Activities | 5 404 |
| Other Services to Companies | 93 845 |
| Hotels and Restaurants | 146 439 |
| Other Services to Individuals | 16 310 |
| Non-Commercial Services | 1 587 |

Source: Computation of the authors

It indirectly generated or induced production worth 285 million euros or 6.3% of total commercial production.

The analysis of tourism's impact on other branches has provided us with the identification of certain trickle-down effects. The direct effects use the traditional Input-Output model and are only based on the interindustry transactions matrix or the Activity sub-account matrix. The indirect effects include only the additional economic impacts due to wages and salaries received by households from the local enterprises and businesses in payment for their labor (Miller and Blair, 1985). The induced effects have been developed by Stone (1985) and Bulmer-Thomas (1982) and define a SAM output multiplier by closing the interindustry transactions sub-matrix with respect to wage and capital payments to households.

Consider, for example, a change in the final demand in the Activity account due to expenditures by ecotourists visiting the region. These expenditures will result in a corresponding increase in

production from the other business activities. This is the conventional interindustry multiplier effect. This can be called the direct effect. However, the increased expenditures will also cause changes in the Primary Factor of Production and Institution accounts that also impact the Activity account. For example, the inter-group effect of an ecotourist purchasing a hotel room would be the impacts on the Activity account resulting from increased household income (the Value Added account) causing an increase in households' purchases of goods and services (the Institution account). This can be called the indirect effect. Finally, expenditures in the Activity accounts will also impact other accounts. For example, the effect of an ecotourist purchasing a hotel room would be the impacts of changes in household income (the Value Added account) and in consumption (the Institution account). These can be called the induced effects.
These effects are shown in the following table.

**Table 8: Tourism's trickle-down effects per branch**
(in millions of euros)

| | DIRECT | INDIRECT | INDUCED | CUMULATED |
|---|---|---|---|---|
| Agriculture | 7 775 | 0 | 9 501 | 17 276 |
| Sugar, Rum and other Alcohols | 8 204 | 0 | 1 275 | 9 479 |
| Other Agricultural and Food-Processing Industries | 10 274 | 0 | 6 158 | 16 431 |
| Consumer Goods Industry | 1 548 | 0 | 4 847 | 6 395 |
| Capital Goods Industry | 5 740 | 0 | 2 997 | 8 737 |
| Intermediate Goods | 4 586 | 0 | 6 017 | 10 603 |
| Energy | 10 531 | 0 | 8 160 | 18 691 |
| Construction | 1 316 | 0 | 3 287 | 4 603 |
| Trade | 43 873 | 0 | 106 081 | 149 955 |
| Transport, Post and Telecommunications | 32 188 | 0 | 27 405 | 59 593 |
| Financial Activities | 17 331 | 0 | 11 408 | 28 739 |
| Real-Estate Activities | 5 404 | 0 | 26 425 | 31 829 |
| Other Services to Companies | 93 845 | 0 | 27 224 | 121 069 |
| Hotels and Restaurants | 146 439 | 0 | 15 966 | 162 406 |
| Other Services to Individuals | 16 310 | 0 | 8 939 | 25 248 |
| Non-Commercial Services | 1 587 | 0 | 18 831 | 20 418 |
| Firms | 0 | 21 017 | 24 699 | 45 715 |
| Households | 0 | 120 052 | 101 217 | 221 269 |

Source: Computation of the authors

The branches which benefit the most from tourism are the hotel and restaurant branch and the other services to companies. Households rake in 221 269 thousands euros, which represents 4% of their total revenue.

We shall analyse the tourism multiplier effect which compares cumulated effects to direct effects. Direct production due to tourist expenditure estimated at 100 brings about a total global production of 170, because of indirect and induced effects.

**Table 9: Tourism's multiplier effect**

| | Direct effect | Indirect or induced effect | Multiplier | Total global effect |
|---|---|---|---|---|
| Production | 406 951 | 284 521 | 1,7 | 691 471 |

Source: Computation of the authors

In the same way, we can measure the economy's dependence on the tourism sector with the use of the touristicity coefficient, which indicates the different branches in which activities are heavily linked to tourism. The proportion of tourist-related added value in relation to total commercial production stands at 6%. As table 10 indicates, the hotel and restaurant branch registers the highest percentage (29%), followed by sugar, rum and other alcohols (12%), other services to companies (12%) and individuals (12%), trade (9%) and the food processing industry (8%). The potential for development through tourism is very high in these branches.

**Table 10: Touristicity of various branches in terms of production**

| | |
|---|---|
| Agriculture | 5% |
| Sugar, Rum and other Alcohols | 12% |
| Other Agricultural and Food-Processing Industries | 8% |
| Consumer Goods Industry | 4% |
| Capital Goods Industry | 4% |
| Intermediate Goods | 3% |
| Energy | 7% |
| Construction | 0% |
| Trade | 9% |
| Transport, Post and Telecommunications | 7% |
| Financial Activities | 7% |
| Real-Estate Activities | 4% |
| Other Services to Companies | 12% |
| Hotels and Restaurants | 29% |
| Other Services to Individuals | 10% |
| Non-Commercial Services | 1% |

Source: Computation of the authors

Under the hypothesis of cyclical unemployment, the job-creation generated by tourism is assessed thanks to the ensuing productivity within the economy (AV/number of jobs). These jobs are of course attributed according to branches. One can thus estimate at 7 094 the number of employment, representing 6% of the total of employment

These jobs are created mainly as a direct result of 60% of funding. The primary employer is the hotel/restaurant branch, with 30% of jobs.

**Table 11: Job-creation generated by tourism**

| | Jobs | Percentage within branch |
|---|---|---|
| Agriculture | 159 | 5% |
| Sugar, Rum and other Alcohols | 96 | 12% |
| Other Agricultural and Food-Processing Industries | 160 | 8% |
| Consumer Goods Industry | 55 | 4% |
| Capital Goods Industry | 48 | 4% |
| Intermediate Goods | 58 | 3% |
| Energy | 99 | 7% |
| Construction | 27 | 0% |
| Trade | 1 482 | 9% |
| Transport, Post and Telecommunications | 507 | 7% |
| Financial Activities | 201 | 7% |
| Real-Estate Activities | 38 | 4% |
| Other Services to Companies | 956 | 12% |
| Hotels and Restaurants | 2 130 | 29% |
| Other Services to Individuals | 665 | 10% |
| Non-Commercial Services | 413 | 1% |

Source: Computation of the authors

### *3.2. Use of the MCS to make simulation of tourism impact*

*A reduction in tourist expenditure*

All things remaining equal, a drop in tourist expenditure would entail a 0.5% drop of the GDP and a 0.6% drop in production. As table 12 shows, nearly all commercial activities would be affected by this decrease, except non-commercial services, which tends to show very little variation. The most concerned branches would be the hotel/restaurant branch, with an evolution of –2.87% and the sugar/rum branch whose decrease in activity would stand at about 1.17%. Approximately 709 jobs would be lost.

**Table 12: Effects of a 10% drop in tourist expenditure**
**On the added value of major branches**

| | |
|---|---|
| Agriculture | 0% |
| Sugar, Rum and other Alcohols | -1% |
| Other Agricultural and Food-Processing Industries | -1% |
| Consumer Goods Industry | 0% |
| Capital Goods Industry | 0% |
| Intermediate Goods | 0% |
| Energy | -1% |
| Construction | 0% |
| Trade | -1% |
| Transport, Post and Telecommunications | -1% |
| Financial Activities | -1% |
| Real-Estate Activities | 0% |
| Other Services to Companies | -1% |
| Hotels and Restaurants | -3% |
| Other Services to Individuals | -1% |
| Non-Commercial Services | 0% |

Source: Computation of the authors

The earnings of the different economic agents are also affected by this decrease. Salaries and return on capital would also show a decrease of 0.53% and 0.52%, respectively. This decrease would logically be followed by a drop in household consumption, estimated at -0.4% and a -0.6% drop in imports due to a slowdown of economic activity.

Since households have less available revenue, their consumption will be reduced and the tax revenues will also decrease. Income and corporate taxes would also be modified by -0.4% and –0.5%, respectively. Total VAT earnings and customs duties would also drop by 0.7%.

The multiplier effect highlights the branches which are the most closely related to the tourism sector. In other words, it is possible to pinpoint the sectors that are ‘boosted’ by tourism. Thus, the sugar/rum branch would have a 1.17% drop in activity. This is mostly due to the souvenirs carried away by tourists when they leave the island. Production in consumer goods industries would drop by 0.38% and activities in other services to companies by 1.17%. Finally, the most consequential variation would be registered in the hotel/restaurant branch, whose activity would be reduced by 2.87%. This minor crisis in tourism would provoke an income shortfall for firms and households of 0.52% and 0.4% respectively.

**Table 13: Variations in the revenues of certain accounts following a -10% injection in tourist expenditure**

| **Products** | |
|---|---|
| Sugar, Rum and other Alcohols | **94 466** |
| Consumer Goods Industry | **1 164 537** |
| Other Services to Companies | **1 052 567** |
| Hotels and Restaurants | **561 019** |
| Construction | **1 243 500** |
| Non-Commercial Services | **2 460 141** |
| **Branches** | |
| Sugar, Rum and other Alcohols | **80 015** |
| Consumer Goods Industry | **166 213** |
| Other Services to Companies | **1 018 587** |
| Hotels and Restaurants | **549 393** |
| **Institutions** | |
| Firms | **872 652** |
| Households | **5 528 604** |

Source: Computation of the authors

Table 15 shows results of the Breakdown of multiplier effects following a -10% injection in tourist expenditure. It can be observed that the direct multiplier generates 48 163 production units out of a total of 80 015 for the sugar/rum branch, 7 756 units through indirect effects and 24 096 with the induced multiplier. Out of 166 213 production units in the consumer goods industries, direct effects are responsible for 45 100, indirect effects 29 492 and induced effects 91 622. The hotel/restaurant branch produces 549 393 units, among which 150 460 are due to direct effects, 97 141 due to indirect effects and 301 791 due to induced effects. The agent's revenues are also affected, as already discussed. Households incomes are reduced by 5 528 604 euros. Indirect (1 653 369) and induced (2 529 001) multipliers are the major driving forces behind the generation of this revenue.

**Table 14: Breakdown of multiplier effects following a -10% injection in tourist expenditure**
(in millions of euros)

| | | DIRECT | INDIRECT | INDUCED | TOTAL | VARIATION |
|---|---|---|---|---|---|---|
| **FACTORS OF PRODUCTION** | Capital Factor | 0 | 1 141 498 | 1 313 208 | **2 454 706** | -0,52% |
| | Labour Factor | 0 | 2 079 428 | 1 496 224 | **3 575 652** | -0,53% |
| **LOCAL PRODUCTS** | Agriculture | 151 254 | 67 744 | 210 460 | **429 458** | -0,47% |
| | Sugar, Rum and other Alcohols | 45 546 | 8 980 | 27 897 | **82 422** | -1,31% |
| | Other Agricultural Processing Ind. | 52 871 | 51 627 | 160 391 | **264 890** | -0,85% |
| | Consumer Goods Industry | 84 495 | 56 997 | 177 072 | **318 564** | -0,39% |
| | Capital Goods Industry | 167 118 | 24 897 | 77 347 | **269 361** | -0,44% |
| | Intermediate Goods | 234 222 | 46 022 | 142 977 | **423 220** | -0,31% |
| | Energy | 78 607 | 55 177 | 171 419 | **305 203** | -0,68% |
| | Construction | 1 160 310 | 20 257 | 62 933 | **1 243 500** | -0,04% |
| | Trade | -170 741 | 117 798 | 365 965 | **313 022** | -0,87% |
| | Transport, Post and Telecom. | 184 518 | 168 768 | 524 315 | **877 601** | -0,68% |
| | Financial Activities | 112 486 | 69 577 | 216 155 | **398 218** | -0,72% |
| | Real-Estate Activities | 231 259 | 161 538 | 501 853 | **894 650** | -0,36% |
| | Other Services to Companies | 345 452 | 172 158 | 534 847 | **1 052 458** | -1,18% |
| | Hotels and Restaurants | 150 411 | 99 985 | 310 624 | **561 019** | -2,89% |
| | Other Services to Individuals | 34 556 | 59 289 | 184 193 | **278 037** | -0,98% |
| | Non-Commercial Services | 1 988 695 | 114 799 | 356 647 | **2 460 141** | -0,08% |
| **IMPORTED PRODUCTS** | Agriculture | 10 232 | 10 632 | 33 032 | **53 896** | -0,46% |
| | Sugar, Rum and other Alcohols | 2 778 | 2 256 | 7 009 | **12 044** | -2,24% |
| | Other Agricultural Processing Ind. | 54 089 | 126 184 | 392 017 | **572 290** | -0,93% |
| | Consumer Goods Industry | 192 336 | 159 163 | 494 475 | **845 973** | -0,41% |
| | Capital Goods Industry | 409 380 | 92 453 | 287 224 | **789 057** | -0,56% |
| | Intermediate Goods | 188 040 | 78 565 | 244 079 | **510 683** | -0,44% |
| | Energy | 42 289 | 85 428 | 265 402 | **393 119** | -0,57% |
| | Construction | 0 | 0 | 0 | **0** | % |
| | Trade | 0 | 0 | 0 | **0** | % |
| | Transport, Post and Telecom. | 18 276 | 26 092 | 81 062 | **125 430** | -0,77% |
| | Financial Activities | 4 632 | 3 449 | 10 716 | **18 797** | -0,75% |
| | Real-Estate Activities | 0 | 0 | 0 | **0** | % |
| | Other Services to Companies | 39 | 17 | 54 | **110** | -1,14% |
| | Hotels and Restaurants | 0 | 0 | 0 | **0** | % |
| | Other Services to Individuals | 805 | 717 | 2 228 | **3 750** | -0,88% |
| | Non-Commercial Services | 0 | 0 | 0 | **0** | % |
| **BRANCHES** | Agriculture | 125 734 | 57 807 | 179 589 | **363 130** | -0,47% |
| | Sugar, Rum and other Alcohols | 48 163 | 7 756 | 24 096 | **80 015** | -1,17% |
| | Other Agricultural Processing Ind. | 41 079 | 37 465 | 116 392 | **194 936** | -0,84% |
| | Consumer Goods Industry | 45 100 | 29 492 | 91 622 | **166 213** | -0,38% |
| | Capital Goods Industry | 125 626 | 18 236 | 56 655 | **200 517** | -0,43% |
| | Intermediate Goods | 189 373 | 36 609 | 113 734 | **339 716** | -0,31% |
| | Energy | 71 254 | 49 645 | 154 232 | **275 131** | -0,67% |
| | Construction | 1 160 554 | 19 997 | 62 126 | **1 242 677** | -0,04% |
| | Trade | -926 879 | 645 414 | 2 005 119 | **1 723 655** | -0,86% |
| | Transport,Post and Telecom. | 184 942 | 166 738 | 518 008 | **869 689** | -0,68% |
| | Financial Activities | 112 215 | 69 409 | 215 633 | **397 257** | -0,72% |
| | Real-Estate Activities | 233 388 | 160 774 | 499 478 | **893 640** | -0,35% |
| | Other Services to Companies | 338 381 | 165 632 | 514 573 | **1 018 587** | -1,17% |
| | Hotels and Restaurants | 150 460 | 97 141 | 301 791 | **549 393** | -2,87% |
| | Other Services to Individuals | 36 016 | 54 383 | 168 953 | **259 352** | -0,96% |
| | Non-Commercial Services | 1 991 787 | 114 568 | 355 931 | **2 462 286** | -0,08% |
| **INSTITUTIONS** | Firms | 0 | 255 534 | 617 118 | **872 652** | -0,52% |
| | Households | 1 346 234 | 1 653 369 | 2 529 001 | **5 528 604** | -0,40% |

Source: Computation of the authors

The branches which respond most rapidly are the food-processing and trade industries (see table 16). Direct production in food-processing industries due to a decrease in tourist expenditure estimated at 100, results in a general drop by 475 in production, because of indirect and induced effects.

**Table 15: Effects of a 10% drop in tourist expenditure**

| | **Direct multipliers** |
|---|---|
| Agriculture | 2,22 |
| Sugar, Rum and Other Alcohols | 1,16 |
| Other Agricultural and Food-Processing Industries | 1,60 |
| Consumer Goods Industry | 4,13 |
| Capital Goods Industry | 1,52 |
| Intermediate Goods | 2,31 |
| Energy | 1,77 |
| Construction | 3,50 |
| Trade | 3,42 |
| Transport, Post and Telecommunications | 1,85 |
| Financial Activities | 1,66 |
| Real-Estate Activities | 5,89 |
| Other Services to Companies | 1,29 |
| Hotels and Restaurants | 1,11 |
| Other Services to Individuals | 1,55 |
| Non-Commercial Services | 12,87 |

Source: Computation of the authors

*An increase in tourist expenditure*

All things remaining equal, an increase in tourist expenditure of 24% would entail a +1.4% increase of the GDP and a 1.6% increase in production. As table 12 shows, nearly all commercial activities would be affected by this decrease, except non-commercial services, which tends to show very little variation. The most concerned branches would be the hotel/restaurant branch, with an evolution of +6.93% and the sugar/rum branch whose increase in activity would stand at about 4.95%. Approximately 1 813 jobs would be won.

**Table 16: Effects of a 24% increase in tourist expenditure on the added value of major branches**

| | |
|---|---|
| Agriculture | 1,35% |
| Sugar, Rum and other Alcohols | 4,95% |
| Other Agricultural and Food-Processing Industries | 2,50% |
| Consumer Goods Industry | 0,98% |
| Capital Goods Industry | -1,05% |
| Intermediate Goods | 0,75% |
| Energy | 1,70% |
| Construction | 0,09% |
| Trade | 2,24% |
| Transport, Post and Telecommunications | 2,15% |
| Financial Activities | 1,84% |
| Real-Estate Activities | 0,91% |
| Other Services to Companies | 2,91% |
| Hotels and Restaurants | 6,93% |
| Other Services to Individuals | 2,46% |
| Non-Commercial Services | 0,21% |

Source: Computation of the authors

The earnings of the different economic agents are also affected by this increase. Salaries and return on capital would also show an increase of 1.35% and 1.34%, respectively. This increase would logically be followed by an increase in household consumption, estimated at 1% and a 0.5% increase in imports due to a slowdown of economic activity.

Since households have less available revenue, their consumption will be reduced and the tax revenues will also decrease. Income and corporate taxes would also be modified by 1% and 1.3%, respectively. Total VAT earnings and customs duties would also increased by 1.4%.

The multiplier effect highlights the branches which are the most closely related to the tourism sector. In other words, it is possible to pinpoint the sectors that are ‘boosted’ by tourism. Thus, the sugar/rum branch would have a 5% increase in activity. This is mostly due to the souvenirs carried away by tourists when they leave the island. Production in consumer goods industries would increase by 1% and activities in other services to companies by 3%. Finally, the most consequential variation would be registered in the hotel/restaurant branch, whose activity would be increased by 7%. This minor boom in tourism would provoke an income increase for firms and households of 1.34% and 1.02% respectively.

**Table 17: Variations in the revenues of certain accounts following a 24% injection in tourist expenditure**

| **Products** | |
|---|---|
| Sugar, Rum and other Alcohols | **99 169** |
| Consumer Goods Industry | **1 181 155** |
| Other Services to Companies | **1 096 299** |
| Hotels and Restaurants | **618 063** |
| Construction | **1 245 161** |
| Non-Commercial Services | **2 467 431** |
| **Branches** | |
| Sugar, Rum and other Alcohols | **84 968** |
| Consumer Goods Industry | **168 481** |
| Other Services to Companies | **1 060 663** |
| Hotels and Restaurants | **604 814** |
| **Institutions** | |
| Firms | **889 003** |
| Households | **5 607 441** |

Source: Computation of the authors

Table 19 shows results of the Breakdown of multiplier effects following a 24% injection in tourist expenditure. It can be observed that the direct multiplier generates 52 662 production units out of a total of 84 968 for the sugar/rum branch, 7 756 units through indirect effects and 24 550 with the induced multiplier. Out of 168 481 production units in the consumer goods industries, direct effects are responsible for 45 640, indirect effects 29 492 and induced effects 93 349. The hotel/restaurant branch produces 604 814 units, among which 200 193 are due to direct effects, 97 141 due to indirect effects and 307 480 due to induced effects. The agent's revenues are also affected, as already discussed. Households incomes are reduced by 5 607 441 euros. Indirect (1 346 234) and induced (2 565 064) multipliers are the major driving forces behind the generation of this revenue.

**Table 18: Breakdown of multiplier effects following a 24% injection in tourist expenditure**
(in millions of euros)

| | | DIRECT | INDIRECT | INDUCED | TOTAL | VARIATION |
|---|---|---|---|---|---|---|
| **FACTORS OF PRODUCTION** | Capital Factor | 0 | 1 162 736 | 1 337 961 | **2 500 698** | 1,34% |
| | Labour Factor | 0 | 2 118 829 | 1 524 427 | **3 643 256** | 1,35% |
| **LOCAL PRODUCTS** | Agriculture | 155 101 | 67 744 | 214 427 | **437 272** | 1,34% |
| | Sugar, Rum and other Alcohols | 50 755 | 8 980 | 28 423 | **88 157** | 5,55% |
| | Other Agricultural Processing Ind. | 58 894 | 51 627 | 163 415 | **273 936** | 2,54% |
| | Consumer Goods Industry | 85 539 | 56 997 | 180 410 | **322 945** | 0,98% |
| | Capital Goods Industry | 163 958 | 24 897 | 78 805 | **267 660** | -1,07% |
| | Intermediate Goods | 236 070 | 46 022 | 145 672 | **427 764** | 0,76% |
| | Energy | 82 701 | 55 177 | 174 650 | **312 528** | 1,71% |
| | Construction | 1 160 785 | 20 257 | 64 119 | **1 245 161** | 0,10% |
| | Trade | -167 809 | 117 798 | 372 863 | **322 851** | 2,25% |
| | Transport, Post and Telecom. | 199 682 | 168 768 | 534 198 | **902 648** | 2,15% |
| | Financial Activities | 118 655 | 69 577 | 220 229 | **408 461** | 1,84% |
| | Real-Estate Activities | 233 159 | 161 538 | 511 312 | **906 009** | 0,91% |
| | Other Services to Companies | 379 104 | 172 158 | 544 929 | **1 096 192** | 2,92% |
| | Hotels and Restaurants | 201 600 | 99 985 | 316 479 | **618 063** | 6,98% |
| | Other Services to Individuals | 40 849 | 59 289 | 187 665 | **287 803** | 2,50% |
| | Non-Commercial Services | 1 989 262 | 114 799 | 363 370 | **2 467 431** | 0,21% |
| **IMPORTED PRODUCTS** | Agriculture | 10 524 | 10 632 | 33 654 | **54 811** | 1,23% |
| | Sugar, Rum and other Alcohols | 1 615 | 2 256 | 7 141 | **11 012** | -10,61% |
| | Other Agricultural Processing Ind. | 64 246 | 126 184 | 399 407 | **589 836** | 2,11% |
| | Consumer Goods Industry | 195 251 | 159 163 | 503 795 | **858 209** | 1,03% |
| | Capital Goods Industry | 397 646 | 92 453 | 292 638 | **782 737** | -1,35% |
| | Intermediate Goods | 191 024 | 78 565 | 248 680 | **518 269** | 1,04% |
| | Energy | 45 405 | 85 428 | 270 404 | **401 237** | 1,49% |
| | Construction | 0 | 0 | 0 | **0** | 0% |
| | Trade | 0 | 0 | 0 | **0** | 0% |
| | Transport, Post and Telecom. | 17 079 | 26 092 | 82 590 | **125 762** | -0,51% |
| | Financial Activities | 4 938 | 3 449 | 10 918 | **19 305** | 1,93% |
| | Real-Estate Activities | 0 | 0 | 0 | **0** | 0% |
| | Other Services to Companies | 36 | 17 | 55 | **108** | -3,12% |
| | Hotels and Restaurants | 0 | 0 | 0 | **0** | 0% |
| | Other Services to Individuals | 644 | 717 | 2 270 | **3 630** | -4,05% |
| | Non-Commercial Services | 0 | 0 | 0 | **0** | 0% |
| **BRANCHES** | Agriculture | 129 017 | 57 807 | 182 974 | **369 798** | 1,35% |
| | Sugar, Rum and other Alcohols | 52 662 | 7 756 | 24 550 | **84 968** | 4,95% |
| | Other Agricultural Processing Ind. | 45 450 | 37 465 | 118 586 | **201 501** | 2,50% |
| | Consumer Goods Industry | 45 640 | 29 492 | 93 349 | **168 481** | 0,98% |
| | Capital Goods Industry | 123 311 | 18 236 | 57 723 | **199 271** | -1,05% |
| | Intermediate Goods | 190 843 | 36 609 | 115 878 | **343 330** | 0,75% |
| | Energy | 74 937 | 49 645 | 157 139 | **281 721** | 1,70% |
| | Construction | 1 161 023 | 19 997 | 63 297 | **1 244 317** | 0,09% |
| | Trade | -910 819 | 645 414 | 2 042 915 | **1 777 510** | 2,24% |
| | Transport, Post and Telecom. | 199 924 | 166 738 | 527 773 | **894 435** | 2,15% |
| | Financial Activities | 118 369 | 69 409 | 219 698 | **407 476** | 1,84% |
| | Real-Estate Activities | 235 279 | 160 774 | 508 893 | **904 946** | 0,91% |
| | Other Services to Companies | 370 758 | 165 632 | 524 273 | **1 060 663** | 2,91% |
| | Hotels and Restaurants | 200 193 | 97 141 | 307 480 | **604 814** | 6,93% |
| | Other Services to Individuals | 41 788 | 54 383 | 172 138 | **268 309** | 2,46% |
| | Non-Commercial Services | 1 992 352 | 114 568 | 362 640 | **2 469 560** | 0,21% |
| **INSTITUTIONS** | Firms | 0 | 263 084 | 625 918 | **889 003** | 1,34% |
| | Households | 1 346 234 | 1 696 142 | 2 565 064 | **5 607 441** | 1,02% |

Source: Computation of the authors

The branches which respond most rapidly are the food-processing and trade industries (see table 20). Direct production in food-processing industries due to a decrease in tourist expenditure estimated at 100, results in a general drop by 642 in production, because of indirect and induced effects.

**Table 19: Effects of a 24% increase in tourist expenditure**

| | **Direct multipliers** |
|---|---|
| Agriculture | 1,97 |
| Sugar, Rum and other Alcohols | 1,09 |
| Other Agricultural and Food-Processing Industries | 1,47 |
| Consumer Goods Industry | 4,22 |
| Capital Goods Industry | 0,73 |
| Intermediate Goods | 2,52 |
| Energy | 1,80 |
| Construction | 3,50 |
| Trade | 3,33 |
| Transport, Post and Telecommunications | 1,60 |
| Financial Activities | 1,66 |
| Real-Estate Activities | 6,01 |
| Other Services to Companies | 1,30 |
| Hotels and Restaurants | 1,12 |
| Other Services to Individuals | 1,55 |
| Non-Commercial Services | 12,86 |

Source: Computation of the authors

## 4. Conclusion

Since the late 1990s, economists in the French overseas regions are increasingly being asked to provide simple explanations and propose guidelines to deal with the great challenges affecting the balance and evolution of their societies: exclusion and precariousness, salary inequalities, unemployment, ecological problems, development of local production, tourism policy, etc.

Faced with such diverse questions and needs, which are among the top priorities of the decision-makers and local authorities, a number of studies have proposed various responses, ideas and methodological approaches which have proven to be very useful in terms of understanding economic machinery, appreciating socio-economic evolutions and facilitating decisions.

The macro-economic models and analytical exercises proposed and discussed in this article stem from a resolute desire to provide the French overseas regions with the tools necessary for preparing and evaluating economic policies.

Our essential contribution has been the setting up of the first Social Accountability Matrix for Guadeloupe, which was created by extending the input-output table developed by the Insee for the year 2000. From this point on, a *Pandora's Box* of CGE models awaits, in Guadeloupe's case, which will permit many fruitful studies to be carried out, as in numerous other countries, in the aim of examining many diverse subjects.

The various scenarios explored in this article have proven to be extremely useful for analyzing the effects of some measures, which bring different facets of the Guadeloupean economy into play and which highlight different problems confronting the island. On the matter of reducing public sector salaries for example, the SAM model is very clear: the GDP would drop by more than 20 points, leading to a spiral of economic disequilibrium. One of the after-effects would be reductions of more than 10 points of the main variables: production in most sectors, consumption in households, investment and exports. Similarly, the State's tax earnings would be reduced by more than 14 points.

Despite the fact that it opens up the way for a wide variety of potential models for Guadeloupe, the SAM tool proposed here allows economists to achieve substantial results, which, at this point, is a by no means insignificant contribution where the economic decision-makers are concerned.

**Bibliography**


Adams, P.D. and B.R. Parmenter, 1992, "The medium term significance of international tourism for the Australian economy". Canberra: Bureau of Tourism Research.

Adams, P.D. and B.R. Parmenter, 1995, "An applied general equilibrium analysis of the economic effects of tourism in a quite small, quite open economy", *Applied Economics*, 27, pp. 985-994.

Alleyne D. (2002), Forecasting tourist arrivals: the use of seasonal unit root pre-testing to improve forecasting accuracy, paper presented at the 23rd Annual Review Seminar, Central Bank of Barbados, july 9-12, Barbados.

Armstrong W.E., Daniel S. and Francis A.A. (1974), A structural analysis of the Barbados economy, 1968, with an application to the tourist industry, *Social and Economic studies, ???*

Bacharach (1970) "Biproportionnal Matrices and Input-Output Change." Cambridge University Press, pp.42-58 and pp.75-86.

Blake, A., 2000, "A computable General Equilibrium Model of Tourism in Spain", mimeo.

Blake, A., R. Durbarry, T. Sinclair and G. Sugiyarto, 2000, "Modelling tourism and travel using tourism satellite accounts and tourism policy and forecasting models". Tourism and Travel Research Institute Discussion Paper 2001/4;

Blake, A., T. Sinclair and G. Sugiyarto, 2003, "Quantifying the impact of foot and mouth disease on tourism and the UK economy", *Tourism Economics*, in press.

Carpin G., Logossah K., Marquès B. and Para G. (2004), Evaluations de l'impact économique du tourisme international à la Martinique: vers l'élaboration d'u compte satellite du tourisme, INSEE.

Coulomb F. (1988), L'économétrie des échanges touristiques de la France, *Economie Prévision*, No 84, pp. 41-59.

Daniel S., Francis A.A., Nelson D., Nembhard B., Ramjeesingh (1985), General equilibrium models for development policy, a World Bank research publication, Washington DC

Dalrymple, Holder, Holder and King (1996).

Divay, J.-F. and Meunier, F. (1980) « Deux méthodes de confection du Tableau entrées-sorties », *Annales de l'Insee*, n° 37, janvier-mars 1980, pp. 59-108.

Dwyer, L., P. Forsyth, R. Spurr and T. Ho, 2003b, "General equilibrium modelling in tourism, CRC for sustainable tourism, Australia", Monograph Series, in press.

Dwyer, L., P. Forsyth, R. Spurr and T. Ho, 2003a, "Contribution of tourism by origin market to a state economy: A multi-regional general equilibrium analysis", *Tourism Economics*, 9,(2), pp 117-132.

Fakhoury L., Joeger C and Naudet J.D. (2003), Baisse de la fréquentation touristique: une étude d'impact en Guadeloupe, *Antiane Eco*, n0 58, pp. 21-23

INSEE (1997), Les comptes économiques des Départements Français d'Amérique, Années 1993-1994-1995, Base 95, Les cahiers de l'INSEE.

Madden, J., and P. Thapa, 2000, "The contribution of tourism to the New South Wales economy", Centre for Regional Economic Analysis, University of Tasmania.

McDavid H. (2003), An input-output analysis of the Jamaican hospitality and tourism sector, Social ans Economic Studies 52:1, pp. 161-184

Mathouraparsad S., Maurin A., Montauban J-G. (2004), La modélisation input-output: une approche pour mesurer l'impact des mesures économiques dans les DOM, papier présenté aux journées internationales du LEAD sous le thème "la macroéconomie appliquée au service de la politique économique", le 21 Mai 2004.

Maurin A., Montauban J-G. (2004), L'enjeu du développement économique insulaire, éditions SEDES.

Maurin A. and Watson P.K. (2002), "*Quantitative Modelling of the Caribbean Macroeconomy for Forecasting and Policy Analysis: Problems and Solutions*", Social and Economic Studies, Vol. 51, N°2, pp. 1-47.

Moore W. and Whitehall P. (2003), Modelling the tourism life cycle using regime switching models, Working Parpers 2003, Central Bank of Barbados.

Polo C., Valle E. (2004), An appraisal of tourism impact on the Balearic Islands economy.

Samuel W.A. (1991), The contribution of tourism to the OECS economies, *Carribean finance and management*, 7 (12).

Simon O. (2003), Méthode de conception d'un Table des échanges intermédiaires (TEI) pour le département de la Guadeloupe sur l'année 1999, INSEE.

Skene, J., 1993, "The economic impact of the growth in visitor expenditure: A quantitative assessment", Bureau of Industry Economics Working Paper Nº 92.

Woollett, G., J. Townsend and and G. Watts, 2001, “Development of QGEM-T a computable general equilibrium model of tourism”, Office of Economic and Statistical Research, Queensland Government Treasury.

Zhou, D., J.F. Yanagida, U. Chakravorty and P.Leung, 1997, “Estimating economic impacts from tourism”, *Annals of Tourism Research*, vol. 24, nº1, pp. 76-89.