International Tourism in the Caribbean. Its Contribution over the last 25 years: 1980 – 2005

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Abstract

Over many years international tourism has become a specialisation of the Caribbean region. The question as to whether the contribution from International Tourism Earnings has impacted on the incomes of the people of the Caribbean has evolved into both a theoretical and practical area of study. By structuring the concept of contribution around the notions of causality and elasticity, this article presents various summarised data which are applicable to the whole of the Caribbean and hence looks beyond the diversity that characterises the region. Econometrics of panel data supplies the framework for the observations that follow and the regressions that can be estimated therefrom provide information on the dynamic contribution of international tourism to the revenue of the region.

Key Words:
Contribution, causality, elasticity, panel data

Resumen

Desde hace años el turismo internacional se ha convertido en una especialización de la región del Caribe. La pregunta sobre si la contribución de las ganancias del turismo internacional ha repercutido en las rentas de la población del Caribe, ha generado un ámbito de estudio tanto teórico como práctico. Estructurando el concepto de contribución alrededor de las nociones de causalidad y elasticidad, este artículo presenta varios datos resumidos y aplicables a todo el conjunto del Caribe, por lo que mira más allá de la diversidad que caracteriza la región. La econometría del panel de datos proporciona el marco para las observaciones siguientes y las regresiones que de ellas pueden ser estimadas nos proporcionan información sobre la contribución dinámica del turismo internacional a los ingresos de la región.

Palabras clave:
Contribución, causalidad, elasticidad, panel de datos

Introduction

"In today's world, the Caribbean can be considered as being the region that depends most heavily on tourism […]", stated Jean Holder, the secretary general of the Caribbean Tourism Organisation (CTO) during a speech he made at the Department of Social Sciences in the University of the Virgin Islands on 10th April 2003. Twenty years earlier, the same J. Holder, in le Courrier International n° 80, had condensed the issue as follows, "Tourism is as necessary to us as oil is to the Arabs". Although separated by twenty years, both the above statements echo the conclusion drawn by Vellas (2002), "international tourism can be the basis for economic development in countries where agricultural and industrial growth is insufficient. This enlargement of the tourist sector can and should consequently create a domino effect on the economy as a whole".

These two assertions both justify and underpin the debate that constitutes the key issue within this article: Has the development of tourism contributed to an increase in the incomes for the population of the Caribbean? The question is theoretical because it refers to the issue of export led growth and in particular tourism led growth, but on an economic policy level, the question also has a practical side when we take into account the desired specialisation and the implementation strategy the region chooses to adopt.

The importance of international tourism for the thirty or so countries that comprise the region can be understood statically by looking at the ratio of international tourism earnings to GDP, total exports and the external balance of goods and services. These ratios vary from country to

country - less than 5% to more than 90% for certain countries. Our ability to transcend intrinsic diversity and understand the dynamics that link the region's revenue to its International Tourism Earnings (ITE) is at the heart of the question on contribution. The notion of contribution has essentially three facets and can be structured around the following concepts:

- Causality - has international tourism caused a growth in income for the population of the Caribbean?
- Elasticity - what are the dynamic relationships between growth in international tourism and income for the population of the Caribbean?
- Short term/long term effects - will the effects of international tourism take place over the short term or long term?

The above three questions are the pillars for the thinking behind this article. We begin with a brief reminder of the importance of tourism for the region (A), followed by a summary of the chosen methodological approach (B) and finally, a presentation of the results (C) supporting the inferences gained from the econometric estimates that relate to the question on the contribution of international tourism to the Caribbean.

Several general observations conclude the article.

The Extent of the Importance of tourism for the Caribbean

The Caribbean can be viewed and defined very differently according to the approach used. If the area is characterised as being a group of countries whose common frontier is the Caribbean Sea, then a number of Central American countries need to be included, such as Mexico. Within this definition we observe that Guyana, one of the founders of CARICOM, is the base of operations for the organisation, and that Mexico is a member of the Caribbean Tourism Organisation (CTO). A more restrictive definition would be that the Caribbean is limited to those islands containing a coastline that is surrounded by the Caribbean Sea. Between Grand Caribbean, Greater Caribbean, the Little Antilles, the Big Antilles, East Caribbean and West Caribbean there are many classifications, especially as individual countries differ in political status, currency, size of territory and population, and finally, in economic makeup, although they all have a shared history when it comes to the origins of the region.

Crusol and Vellas (1996) only include the island communities, a group of 30 countries in all. The list for our research comes from the 34 members of the CTO and brings together 27 countries as listed in Appendix 1. Moreover, given the availability of the data regarding GDP, Curacao, Bonaire, St Maarten, Saint Eustache and Saba have been included under the heading of the 'Netherlands Antilles'. This list of countries almost entirely represents the Caribbean when the following elements are taken into account:

- Linguistic: we have the 4 spoken languages of the region - English, French, Spanish and Dutch.
- Political and economic: a complete representation of political makeup and economic size in the region.
- Tourism: the list includes those countries where tourism makes up the central part of the economy or those where the sector has recently taken off.

Two statistical measures provide us with a global appreciation and/or understanding of the importance of tourism to the Caribbean economy:

- The first is static; it relates International Tourism Earnings (ITE) to total GDP $\left(\frac{ITE \times 100}{GDP}\right)$. It is an approximation for the weight of the tourist sector within the economy.
- The second is dynamic; using the ratio of the respective variations of ITE and GDP $\left(\frac{\Delta ITE \times 100}{\Delta GDP}\right)$ we can assess the contribution made by international tourism earnings to growth. This second measure enables us to understand to what extent ITE have been instrumental in the growth of revenue.

The above macroeconomic measures offer, in the case of the Caribbean, a true representation of the data per capita, given the slow population growth. Between 1980 and 2005, the average annual rate of growth for the population was 1.16%. Consequently, analysis of these ratios gives information on the weight of tourism exports in income for the population of the Caribbean and its contribution to growth.

The GDPs and ITE for the Caribbean are assessed in real terms. Appendix 2 shows the sources and the deflator calculations.

When the whole of the Caribbean is taken into consideration (by calculating the ITE and GDP for each country) the static weight of ITE has increased by a factor of 1.5 over twenty five years, therefore the ratio of ITE to GDP has evolved from 5% of GDP in 1980 to 7.8% in 2005. After rising steadily, it reached a maximum in 1994 and has since fallen, also steadily. The dynamic weight of tourism in relation to growth increased by a factor of 3.3, moving from 1.6% of growth in 1981 to 5.5% in 2005. By accumulating the ITE and GDPs over twenty years, we note that ITE make up 8.1% of GDP and 10.1% of growth. Our initial approach hence shows

that international tourism through ITE has established itself as a substantial force for growth. If the static weight of ITE has remained relatively stable over the period (1980–1990: 6.7%; 1990–2000: 9.7%; 2000–2005: 8.3%), its dynamic contribution has continued to fall (1980–1990: 32%; 1990–2000: 13.4%; 2000–2005: 2%).

When we consider the course of the dynamic indicator, it appears to have been an important damper in times of recession during the first part of the period under study (1980-2000). The end of the period is marked by a minimal role for tourist activity. On the strength of this observation we should take into consideration the hypothesis that international tourism is equivalent to a 'kickstart' for Caribbean countries. It is still appropriate to point out that the consequences of 'September 11' have clearly undermined the dynamic nature of Caribbean tourism, the decrease in ITE only being stemmed in 2004.

The average ratios as shown mask the diversity of the situation. The contributions from ITE to GDP and to growth differ from country to country. In 2005, on first examination, three groups stood out with regard to the static weight of ITE within GDP and the dynamic contribution of ITE over the period:

- Those countries with a very strong dependence on tourism - where ITE made up more than 40% of GDP and the growth for that period. Five countries belong to this group: Anguilla, Cayman Islands, US Virgin Islands, British Virgin Islands (BVI) and St Lucia.

- Those countries with a limited dependence on tourism - where ITE came to less than 10% of GDP in 2005 and growth. There are four countries: two French overseas departments (Guadeloupe and Martinique), Puerto Rico and Trinidad.

- The other 18 countries constitute the third group, which can be considered as those countries having a varying dependence on tourism.

A more systematic approach via PCA and HAC is explored in depth by (Marques 2003).

Countries that rely little on tourism are in effect those countries with diversified economies. Within this group are two of the four richest countries in the Caribbean. By contrast, the smaller countries (by area and population size) are in the majority when it comes to a heavy dependence on tourism. Three countries from the heavily dependent group (Anguilla, BVI and St Lucia) have rates of growth that are in the top ten rates of growth from 1980 to 2005.

Table 1 shows the static and dynamic weight measures for international tourism in the region. Appendix 3 gives detailed information for both indicators country per country.

Table 1: The weight of ITE for the Caribbean

Year	ITE/GDP	ΔITE/ΔGDP	Year	ITE/GDP	ΔITE/ΔGDP
1980	5.3		1994	10	27.1
1981	5.3	1.6	1995	9.8	3.6
1982	5.3	-2.8*	1996	9.7	6.5
1983	5.4	2.3	1997	9.7	9.8
1984	5.6	19.7	1998	9.5	6.3
1985	6.7	-45.7*	1999	9.5	8.7
1986	6.9	14	2000	9.5	11.1
1987	7.7	37.2	2001	8.8	-5.7**
1988	8.2	22.9	2002	8.1	-16.7**
1989	8.1	5.5	2003	7.6	0.0**
1990	8.3	50.8	2004	8.0	18.8
1991	8.5	-6.7*	2005	7.8	5.5
1992	9	-106.2*			
1993	9.7	114.3			

* : Decrease in GDP ** : Decrease in ITE

The above data allows for an approach to tourism contributions which is both descriptive and all-encompassing. The following two sections expand on the explanatory side, beginning with a presentation of the chosen method.

Econometrics of panel data, elasticity and causality

In adherence with the approach as set out in the introduction, econometrics of panel data methodology is employed in the treatment of the question of contribution. This methodology enables the estimation of explanatory regression for GDP, thereby shedding light on the issue of contribution in relation to the questions posed in the introduction.

Econometrics of panel data

If the double dimension involving individuals and groups is taken into account, the econometrics of panel data approach is particularly suited to the study of the dynamic relationship between ITE and GDP, where the Caribbean is deemed to be a whole unit. Sevestre (2002) details the methodological principles and the means for estimating the regressions from econometrics of panel data. The models used in this study are single fixed effect models. In the latter, the influence of the explanatory variables is identical for each individual, and their heterogeneity is accounted for when the constant b_{0nt} is broken down into $b_0 + a_n$. Consequently the general model is set out as follows:

$$Y_{nt} = b_0 + a_n + \sum_{k=1}^{k} b_k X_{knt} + w_{nt}$$

The coefficients are fixed (hence the name, 'fixed effect models') and the heterogeneity of the individual is shown by a specific constant for each individual. The fixed nature of the coefficients rests on the hypothesis that there exists an identical behaviour for a group of individuals for which heterogeneity must be taken into account. The second part of the model $\left(\sum_{k=1}^{k} b_k X_{knt} \right)$ describes the general behaviour via the explanatory variables, and the constants summarise the specific effects for each of the individuals.

Two estimators enable us to estimate the fixed effect model:

- The intra-individual estimator, which applies OLS to the variable differences in relation to their average.
- The first difference estimator using OLS.

The convergence, measured by the HAUSMAN test, indicates a correct model specification.

The fixed effect model can be rendered dynamic autoregressively when the delayed values of the variable requiring explanation are considered as explanatory variables. The autoregressive fixed effect model is estimated using the following two estimators:

- The Balestra-Nerlove (BN) intra-individual estimator.
- The first difference estimator, which includes instrumental variables to overcome the problems of exogeneity and error autocorrelation. The BN, Hsiao, Anderson and Arellano-Bond first difference estimators can be distinguished by their use of different instrumental variables.

The convergence of the estimators indicates a correct model specification. Questions relative to unit root and cointegration tests have been excluded, following comments by Baltagi (2001), who states that "unlike the single times-series spurious regression literature, the panel data spurious regression give a consistent estimate of the true value of parameters as both N and T tend to ∞. This is because the panel estimators average across individuals and the information in the independent cross section data in the panel leads to a stronger overall signal than the pure time-series case"

By means of the fixed effect models it is therefore possible to consider the influence of international tourism on the region, which over and above the specificities of each country, indicates the common structure for the influence of international tourism. To summarize the previous sentence, it is worth to quote Sevestre (2002) saying "the group of 'unobservable specificities' are linked to differences in economic policies and/or economic characteristics for each country".

A series of econometric estimates

The econometric estimates that provide the framework for the method of approach for tourism contributions, relate GDP to ITE. The latter are therefore considered to be the international tourism indicator which is likely to influence growth. In the light of previous remarks concerning changing populations, the estimates focused on macroeconomic variables and in addition the analysis favoured the macroeconomic dynamics of the region.

Two categories of econometric regression, aimed at determining elasticity and causality, were carried out:

- The first, Keynesian inspired, via the following general equation:

$$GDP_{n,t} = aGDP_{n,t-1} + \sum_{i=0}^{n} b_i ITE_{t-n} + c + w_{n,t}$$

  was also carried out in logarithmic form for a direct reading of the elasticities. With ITE being limited to

time t (n=0), multiplier effects are favoured. The introduction of delays for ITE takes into account accelerator effects; 'a' links the other components of demand (domestic Investment and Consumption) to GDP delayed by one period; 'c' symbolises the individual effects. From this regression we can deduce:

- The ITE elasticity of GDP,
- The causality using the GRANGER causality tests.

- The second, directly favouring the dynamic contribution from tourism by differentiating the effects of ITE (delayed or otherwise) relative to the other demand elements which are considered exogenously - GDPWT (GDP without tourism). The general equation which supports this approach is

$$GDP_t = \sum_{i=1}^{n} a_i \, GDPWT_{t-n} + \sum_{i=1}^{n} b_i \, ITE_{t-n} + c + w_{nt}$$

This regression assesses the dynamic contribution of ITE relative to the other variables which ensure the formation of GDP. Although this model resides within the Keynesian paradigm in its use of variables of demand to explain growth, its main aim is to study the dynamic connection from an econometrics point of view. Nevertheless, it departs from the usual causal relationships that provide the framework for the Keynesian paradigm (consumption function and accelerator).

Thus, the estimates from the two models below support the discussion concerning the contribution from international tourism towards the growth in income for the population of the Caribbean over the last twenty five years (see both generic models below).

Model 1:

$$GDP_{n,t} = aGDP_{n,\,t-1} + \sum_{i=1}^{n} b_i \, ITE_{t-n} + c + w_{n,t}$$

Model 2:

$$GDP_t = \sum_{i=1}^{n} a_i \, GDPWT_{t-n} + \sum_{i=1}^{n} b_i \, ITE_{t-n} + c + w_{nt}$$

The following section shows the results from the estimates.

The results from the estimates and consequent inferences

The results from the estimates comprise the first part of this section; the second part shows the consequent inferences.

The results from the estimates

Using RATS (Regression Analysis Time Series) software, estimates of the real annual ITE and GDP levels were obtained between 1980 and 2005 for the 27 Caribbean countries which make up the study sample.

For type 1 models - the autoregressive dynamic models, the Balestra-Nerlove (BN) intra-individual estimator in GMM was used for all the estimates. The Hausman tests at a 5% threshold confirmed the convergence of the different estimators (in difference, with or without the instrumental variable). According to Sevestre (2002), the convergence of the alternative estimators and the level intra-individual Balestra-Nerlove estimator leads to the retention of the hypotheses concerning:

- The exogeneity of ITE relative to GDP (Their non-correlation with the disruptions)

- The relevance of the modelling.

Thus the initial hypothesis on the modelling approach under review is confirmed - this hypothesis intrinsically sets down the exogeneity of ITE. Furthermore, the regression estimate $ITE_t = f\,(GDP_{t-1}, ITE_{t-1})$ establishes the coefficients for GDP_{t-1}, either significantly non different from 0 at a threshold of 5%, or extremely weak. The level of ITE can therefore be considered as independent of the level of GDP. In other words, GDP cannot be accepted as an explanatory variable for the level of ITE.

Moreover, by following Sevestre (2002), this estimator, when submitted to the Sargan/Hansen test leads to the retention of the hypothesis of non autocorrelation of the disruptions of order greater than or equal to 1.

For type 2 models, the estimates use the intra-individual estimator in OLS. The Hausman test guarantees the convergence with the difference estimators, and hence the exogeneity of the regressors and the relevance of the modelling approach. The Durbin-Watson Statistic ensures the non autocorrelation of the errors.

Model 1:

$$GDP_{n,t} = 1.01 \times GDP_{n,t-1} + 0.784 \times ITE_{n,t} \qquad R^2 = 0.96$$

$$LGDP_{n,t} = 0.815 \times LGDP_{n,t-1} + 0.081 \times LITE_{n,t} \qquad R^2 = 0.92$$

The attempts to introduce the delays in the estimate for this model were unsuccessful - the student's t for

the delayed periods greater to one expressed the nullity of the coefficients at the 5% threshold.

Model 2: The intra-individual and first difference estimators (with Instrumental Variables, in order to maintain the strict definition for weak exogeneity) from the log models were not convergent, and expressed, according to Sevestre (2002), "with a quasi certainty that the model is subject to a specifications error".

$GDP_{n,t} = 1.36GDPWT_{n,t-1} - 0.36GDPWT_{n,t-2} + 1.66ITE_{n,t-1}$
$R^2 = 0.97$

The contribution of international tourism to growth in the Caribbean

The analysis of the estimated models has led to three sets of inferences that profile the dynamics of international tourism and growth within the Caribbean.

i. Elasticity, weight and dynamic contribution

Model 1 makes it possible, ceteris paribus, to estimate the ITE elasticity of GDP. Thus a variation of 1 point of ITE creates a growth of 0.08% 'on the instant'.

Considering the average rate of change of ITE between 1980 and 2005 (4.2%), tourism generated 0.34%

$$\left(\frac{\Delta GDP}{GDP} = E_{GDP/ITE} \times \frac{\Delta ITE}{ITE} = 0.081 \times 4.2 = 0.34\right)$$

of growth per year. When related to the average annual rate of growth of GDP (2.5%) for the period, international tourism therefore contributed up to 13% of the region's growth - a similar ratio to that arising from the statistical measure for the whole of the Caribbean, i.e. 10.1% (See Section A).

The ITE elasticity of GDP also provides an average estimate of the weight of tourism for the Caribbean economy during the period concerned. By using the derivative of GDP relative to ITE in model 1: $\frac{\delta GDP}{\delta ITE} = 0.78$ and the elasticity resulting from the same model, we arrive at $0.78 = 0.081 \times \frac{GDP}{ITE}$ and hence the average weight of ITE $\frac{ITE}{GDP} = 0.104$, i.e. a similar value to the average weight of tourism for the period, calculated as 8.1% for the whole of the region (see Section A).

ii. The level of ITE is a causal variable of GDP in the Caribbean, indicating a tourist multiplier of 0.8

ITE are a cause of economic growth in the Caribbean. An explanation for the growth in GDP for the countries of the Caribbean goes hand in hand with that of ITE. Indeed, a GRANGER causality test as presented by Bourbonnais (2002), carried out after estimation of a simple constrained auto-regressive model, i.e. $GDP_{n,t} = 1.054GDP_{n,t-1}$, confirms the instantaneous causality of ITE with regard to the level model 1 estimates (value calculated from the sum of squares of the residuals as 104.1, greater than the tabled value from a Fisher table at a threshold of 5% = 3.84). In addition, the composition of a VAR system consisting of a level model 1 variant and an estimate of the explanatory model of $ITE_t = f(GDP_{t-1}, ITE_{t-1})$, estimated separately, gives:

$GDP_{n,t} = 1.01GDP_{n,t-1} + 0.88ITE_{n,t-1}$

$ITE_{n,t} = -0.00946GDP_{n,t-1} + 1.2ITE_{nt-1}$

The GRANGER test is also conclusive at a threshold of 5% (the value calculated from the likelihood ratio between the residual matrix determinants of the constrained and non constrained models is 37 for a tabled value taken from a χ^2 table with two degrees of freedom equal to 8.99).

Model 1 establishes the value of the tourist multiplier as 0.78 and hence with a leakage coefficient of 22%.

iii. ITE: Short term dynamics

As the introduction of delays was deemed to be unsuccessful, model 1 expresses an 'instantaneous' influence of ITE on GDP. It can therefore be inferred that the GDP/ITE dynamics are also exempt from the effects of acceleration by assimilating the delayed ITE within the accelerator process. Similarly, the second model does not allow the introduction of delays superior to 1. Thus both models limit the influence of ITE over the short term. From this perspective and as a reading of model 2 would suggest, the effects of the variations in ITE appear during the year.

If the adjustment delay of GDP to ITE reaches one year in length, model 2 reveals that GDP is more sensitive to the effects of ITE than to the sum of the other components of demand. This revenue effect from tourism,

which can be expressed over a period of two years by a tourist income multiplier of 1.66 $\left(\frac{\delta GDP_t}{\delta ITE_{t-n}} = 1.66\right)$, confirms the major role that tourism has in the growth of revenue in the Caribbean.

Conclusions

The previous developments have attempted to show the shared dynamics between growth and international tourism in the Caribbean. Fixed effect panel data econometrics has been the main tool of this approach. Indeed it has enabled us to establish the structural modelling for those relationships that can be applied, after specific effects have been removed, to all the countries of the Caribbean. Within the framework of our thinking, the panel data has also allowed us to show the contribution from international tourism via the regression of GDP on ITE.

Three learning points have come out of our study:

- ITE are a causal variable for the level of GDP. Growth in ITE determines the level of GDP in the Caribbean. The income of the population of the Caribbean hence has a causal dependence on the increase in tourist earnings.

- The effects of international tourism have a short term impact: ITE only have a direct effect on GDP for a period of at most one year. From this perspective, the necessity of maintaining a regular increase in ITE is essential for a sustainable growth in GDP based on the region choosing to specialise.

- Finally, on the numbers side, the ITE elasticity of GDP is of the order of 8% for a dynamic contribution of 13%. This data shows an average weight for ITE, representing 10% of the income for the population of the Caribbean. The ITE income multiplier reaches 0.78.

In brief, it would seem opportune to recall that our thinking on the contribution from international tourism, by way of the Keynesian paradigm, constitutes one facet in the analysis of tourism led growth. It would be possible for this field of study to be expanded by theorising on the conditions and mechanisms through which tourism could initiate or be the basis of a long term economic growth.

Appendix 1: List of countries from the sample study

ANGUILLA	DOMINICAN REPUBLIC	GUADELOUPE	ST. KITTS AND NEVIS
ANTIGUA AND BARBUDA	BERMUDA	GUYANA	ST. LUCIA
NETHERLANDS ANTILLES	BRITISH VIRGIN ISLANDS	HAITI	ST. VINCENT AND THE GRENADINES
ARUBA	CAYMAN ISLANDS	JAMAICA	SURINAME
BAHAMAS	CUBA	MARTINIQUE	TRINIDAD AND TOBAGO
BARBADOS	DOMINICA	MONTSERRAT	VIRGIN ISLANDS (U.S.)
BELIZE	GRENADA	PUERTO RICO	

Appendix 2: Sources for the data and notes on the deflator

The sources

The assessment of GDP for the region over the long term requires the collection of data from a variety of sources because the Caribbean is not considered as being 'unified' as such by international organisations. GDP data has largely come from the World Bank database (World Development Indicators - WDI). For certain countries, missing data was located by using a variety of online resources from the following organisations: CEPALC, the Eastern Caribbean Central Bank, CTO and the Central Bank. For the French overseas departments (DOM), the data was taken from different documents as published by INSEE (1993 and 2003). In a bid to make good the GDP data that was unobtainable, we used the ESMOOTH procedure from the RATS econometrics software. This procedure, which is similar to the BOX-JENKINS type uni-varied modelling approach, enabled us to make predictions and extrapolations from former database data using a time series. The different possible modelling approaches can be found in chapter 14 of the RATS manual (Thomas A. DOAN – RATS users' manual – Version 4 – ESTIMA).

Data relative to ITE came mainly from statistical compendiums of the World Tourism Organization (WTO). They have been supplemented for certain countries and for certain years by data extracted from CTO annual reports.

The Deflator

In order to assess the real growth of the Caribbean and overcome the lack of data relative to the growth in prices, we constructed a deflator for the region. This deflator was constructed from the average rate of inflation for the region to the exclusion of those countries that had undergone strong devaluations (Guyana, Jamaica, Haiti, Dominican Republic and Suriname). The French Antilles were also excluded from the average rate because of the fact that their economic structures were different from those in the countries where information about the growth in prices was missing. The deflator for the region was applied to those countries where the rates of inflation were missing for significant periods. It revealed an average annual rate of inflation of 3.99% between 1980 and 2005. This average rate is not as high for the second of the two decades (5.04% between 1980 and 1990; 2.9% between 1990 and 2005).

Appendix 3: Weights and dynamic contribution

COUNTRY	ITE/GDP 2005	COUNTRY	ΔITE/ΔGDP
ANGUILLA	71.6	CUBA	327.5
US VIRGIN ISLANDS	53.9	GUYANA	92.1
MONTSERRAT	43.3	ANGUILLA	83.5
BRITISH VIRGIN ISLANDS	43.0	US VIRGIN ISLANDS	75.2
ARUBA	42.0	ARUBA	64.6
CAYMAN ISLANDS	40.8	ST LUCIA	48.5
ST LUCIA	40.3	CAYMAN ISLANDS	42.1
ANTIGUE	35.6	SURINAME	39.5
BAHAMAS	33.2	NETHERLANDS ANTILLES	38.5
NETHERLANDS ANTILLES	32.9	JAMAICA	36.3
BARBADOS	29.1	BRITISH VIRGIN ISLANDS	36.1
ST KITTS	28.3	ANTIGUE	33.5
ST VINCENT	26.9	ST KITTS	32.8
DOMINICA	19.0	DOMINICA	29.9
BELIZE	15.7	ST VINCENT	28.9
JAMAICA	14.6	BARBADOS	28.6
BERMUDA	14.5	BELIZE	21.1
GUYANA	12.9	BAHAMAS	15.9
DOMINICAN REPUBLIC	11.4	DOMINICAN REPUBLIC	15.7
GRENADA	7.7	HAITI	8.4
GUADELOUPE	7.5	GUADELOUPE	7.4
SURINAME	7.5	MARTINIQUE	5.7
MARTINIQUE	5.9	PUERTO RICO	3.1
CUBA	4.2	GRENADA	1.4
PUERTO RICO	3.6	TRINIDAD	1.2
TRINIDAD	1.7	MONTSERRAT	-2.8
HAITI	1.0	BERMUDA	-218.2

References

Baltagi, B.H. 2001. *Econometric analysis of panel data*. New York. John Wiley & Son Ltd, 2nd edition.

Bourbonnais, R 2002. Econométrie. Paris. Dunod, 4th edition.

Bresson, G., Pirotte, A. 1995. Econométrie des séries temporelles. Paris. PUF.

Caribbean Tourism Organization 1980-2004. Caribbean Tourism Statistical Report. Barbados, Bridgetown. Carib-

bean Tourism Organization.

Célimène, F., Logossah, K. 2007. Evaluer l'impact Economique du Tourisme: Un exemple de modélisation macro-sectoriel. *Téoros*. Presse Universitaire du Quebec.

Célimène, F. 1993. Distinguishing Characteristics of the Martiniquan Economy and constraints on modelling Economic Modelling. Elsevier.

Crusol, J., Vellas, F. 1996. *Le tourisme et la Caraïbe*. Paris. L'Harmattan.

Holder, J. 2003. L'état du tourisme aux Caraïbes après le 11 septembre 2001. 10 April 2003 à l'Université des Iles Vierges Américaines. Présentation de Jean Holder, Secrétaire Général de la CTO.

INSEE, Institut National de la Statistique et des Etudes Economiques. 1993. 20 ans de comptes économiques des départements d'outre mer 1970-1989 - Tableaux Economiques Régionaux - Série Economie Générale.

INSEE, Institut National de la Statistique et des Etudes Economiques 2002. Les comptes économiques des Départements Français d'Amérique: Années 1993-1997, CDROM.

Logossah, K. 2007. Les petites économies insulaires: quelle spécificité? Revue d'Economie Régionale et Urbaine. Armand Colin.

Logossah, K. 2007 La spécialisation touristique des petites économies insulaires en développement: la voie de croissance durable? *Revue d'Economie Régionale et Urbaine*. Armand Colin.

Logossah, K. 2007. L'industrie de croisière dans la Caraïbe: facteur de développement ou pâle reflet de la mondialisation. *Téoros*. Presses universitaires du Quebec.

Marques, B. 2003. Tourisme et croissance dans la Caraïbe: L'expérience des vingt dernières années, Mémoire de DEA.

Organisation Mondiale du Tourisme 1980-2003. Compendium statistiques du tourisme. Madrid; Organisation Mondiale du Tourisme.

Sevestre, P. 2002. Econométrie des données de panels. Paris. Dunod.

Vellas, F. 2002. *Economie et Politique du tourisme international*. Paris. Economica.

Biographical notes

Fred Célimène is a full professor of economics at the University of the Antilles-Guyane. He is the founder and the present director of the centre. He is responsible for two Master's courses, specialising in territorial collectivities and finance respectively; and supervises PhD dissertations. He has also developed practices designed to enhance cooperation in the Carribean area. He is one of the founders and current scientific director of the 'Institut de la Francophonie pour la Gestion dans la Caraïbe' (IFGCar), an international management institute established by the 'Agence Universitaire de la Francophonie' (AUF). He has published a considerable number of papers and books dealing with relations between ultra peripheral regions and the European Union.

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