TOWARDS A LESS VULNERABLE AND MORE SUSTAINABLE DEVELOPMENT: THE ROLE OF HERITAGE TOURISM IN THE ISLAND ECONOMIES

Natalia ZUGRAVU-SOILITA[*], Vincent GERONIMI[†],

Christine LE GARGASSON[**], Jessy TSANG KING SANG[††]

This version: April 2016

Abstract - *The relationships between economic specialization in tourism, economic vulnerability and sustainability are, to a certain extent, similar to those which exist between specialization in tourism and growth. These relationships are therefore non-linear and more particularly, beyond certain tourism specialization thresholds, economic growth slows while economic vulnerability increases and sustainability decreases. Our analysis is founded on the hypothesis that these thresholds relate to strategic differences in the development of tourism according to the existence and method of mobilising the heritage resources of insular economies. The level of differentiation of tourist services – evaluated using an indicator of the change in prices charged for tourist services in presence of world heritage sites (UNESCO's list) – would appear to moderate the impacts of specializing in tourism on vulnerability and sustainability. Analysing the tourism strategies adopted in Dominica and the Dominican Republic serves to illustrate the relevance of such an approach in evaluating the impacts of the different tourism specialization strategies on the vulnerability and the sustainability of small island economies.*

Keywords - INSULARITY, TOURISM, HERITAGE, VULNERABILITY, SUSTAINABILITY

Classification JEL - Z32, L83, O57, Q01

---

[*] University of Versailles Saint-Quentin-en-Yvelines, CEMOTEV research unit; natalia.zugravu@uvsq.fr

[†] University of Versailles Saint-Quentin-en-Yvelines, CEMOTEV research unit; vincent.geronimi@uvsq.fr

[**] University of Versailles Saint-Quentin-en-Yvelines, CEMOTEV research unit; mahoc.clg@wanadoo.fr

[††] University of Versailles Saint-Quentin-en-Yvelines, CEMOTEV research unit; jessy.tsang@uvsq.fr

1. INTRODUCTION

The tourist potential of a territory or site is always founded on the exploitation of a heritage combining, to various degrees, natural, social, economic and cultural characteristics[1]. The heritage dimension often gives rise to a comparative advantage making a given site more attractive than another in light of the unique or authentic characteristics engraved in history or the imagination and resulting in motivations and behaviors proper to the devotees of "heritage or cultural" tourism in terms of accommodation and travel, spending and preparation activities (Martin et al., 2004).

In the current phase of competitive development in the field of traditional beach tourism, or undifferentiated tourism, certain governments and institutions deliberately play the cultural tourism card both to generate the resources necessary to conserve this heritage and to increase the income of the local populations (Richards, 2007), and this is particularly true for islands. This differentiation of the island product, in particular by promoting cultural heritage[2], makes it possible to limit pressure on coastal areas – which are, by their very nature, fragile due to the concentration of mass activities – by encouraging visitors to favor other geographical sites (towns, areas away from the coast), with the local communities enjoying the related economic benefits. Another option for diversification is luxury tourism. This last option, with high value and low volume, has specific impacts on vulnerability and sustainability. Diversification in luxury tourism (through segmentation of markets) does not imply differentiation of tourism services. Thus, contrary to heritage based tourism it does not escape *per se*, even partially, from the pressure of international competition nor alleviates the pressure of tourism on environment.

Tourism would appear to be a possible economic specialization and is often a source of growth (Lanza and Pigliaru, 2000; Pablo-Romero and Molina, 2013), in particular for the development of small island economies (Hampton and Jeyacheya, 2013; Seetanah, 2011). However, it is not necessarily economically possible or desirable for all island economies. Specialising in tourism could therefore have a positive but decreasing marginal effect on economic growth (Holzner, 2011; Adamou and Clerides, 2010), thereby questioning the economic sustainability of small island developing states (SIDS) that make of international tourism an essential source of growth.

---

[1] Cultural tourism based on material or immaterial cultural assets, represents 40% of global income from tourism, provides 215 million jobs and generates approximately 10% of the global economic activity (Licciardi and Bigio, 2010, p. 35).

[2] In this respect, the promotion of "exceptional" natural heritage (e.g. endemic species) can have the same effect as cultural heritage.

The shifting orientation in the tourism strategy of several island economies that are highly specialised in tourism[3] and essentially offer undifferentiated services towards differentiated tourism (eco-tourism, cultural tourism, etc.) would thus reflect the gradual exhaustion of development based solely on mass tourism.

While the impact of tourism on growth is more or less known, depending on both the characteristics of the tourist products and the particularities of the destinations, the link between tourism, sustainability and vulnerability in the SIDS has not yet been empirically explored and thus has to be studied in sufficient detail.

Several authors have observed a non-linear effect of tourism on GDP growth[4]. The relationships between specializing in tourism, economic vulnerability, and sustainability should in part similar to those which exist between specializing in tourism and growth, as we shall show in the second section by means of econometric analysis. These two relationships would thus appear to be non-linear and more precisely, from certain thresholds of specializing in tourism, economic growth may slow while economic vulnerability increases and sustainability decreases. We therefore focus our analysis on the hypothesis that these thresholds result from differences in the development strategy of the tourist industry determined by the existence and means of incorporating the heritage resources of island economies.

Consequently, the effects of the development of tourism depend on the resources implemented and the dynamics of how these resources evolve. If the dynamics associated with specializing in tourism do not allow the assets concerned to be replenished (be they natural, economic or cultural and heritage-based), sustainability is in no way guaranteed. We thus assess the proposal whereby for SIDS at a cost disadvantage (remoteness, smallness), differentiated tourist services based on heritage may be better suited to ensuring sustainable development while at the same time reducing economic vulnerability.

We will first call on an econometric analysis to show that the relationships between tourism and vulnerability (using the Economic Vulnerability Index of the UNDP[5]) as well as the relationship between tourism and sustainability (proxied by the adjusted net savings from the World

[3] In this article, "specialisation in tourism" refers to the share of GDP represented by tourism. An economy is deemed to be "specialised in tourism" if the tourist industry generates a relatively high proportion of the country's GDP. It is not, therefore, a direct measure of international specialisation which, for example, would be based on a measurement of the weight of revenue from international tourism in the total exports of goods and services.

[4] See, for example, Sequeira and Nunes (2008), Narayan et al. (2010), Adamou and Clerides (2010), Holzner (2011); see section 2 for a brief literature review.

[5] According to EVI indicator, macroeconomic vulnerability essentially reflects the main types of external shock affecting low-income countries and the exposure of these countries to these shocks (Guillaumont, 2006).

Bank) are affected by these thresholds, echoing the results of the literature examining the relationships between tourism and growth. We will then examine the differentiation of tourist services as an explanatory factor of the differing impacts of specializing in tourism on vulnerability and sustainability (section 3). We consider three tourism categories: *i.e.*, mass, luxury and heritage tourism, each providing a different impact of tourism specialization on macroeconomic vulnerability and sustainability. Whereas luxury tourism is captured in our empirical analysis by a positive trend in tourism price, the heritage tourism is proxied by the combination of increasing tourism price and the presence of world heritage site(s) (based on the World Heritage List of UNESCO). Thus, drawing on our exploratory empirical results, we will provide a typology of SIDS based on the specialization in tourism and the differentiation of the services offered to visitors. To illustrate and extend our hypotheses, two case studies are developed in the final section of the paper (section 4): Dominica and the Dominican Republic. The first promotes differentiated tourism founded on heritage while the second exhibits an older practice of undifferentiated mass beach tourism.

2. PRESENCE OF THRESHOLDS IN THE RELATIONSHIPS BETWEEN TOURISM, VULNERABILITY AND SUSTAINABILITY

2.1. Non-linear relationships between tourism and growth: a review of the literature

The relationship between tourism and growth has been the subject of numerous academic studies with Ghali (1976) and Lanza and Pigliaru (2000) the first to examine this relationship from an empirical standpoint. Numerous publications aimed at confirming the hypothesis of growth driven by tourism have since followed. The links between tourism and economic growth would appear to be subject to threshold effects, which would in part explain the fact that empirical results are rarely unequivocal. For example, while Brida et al. (2009) demonstrate a negative short-term impact of tourism on growth but a positive long-term effect, Jin (2011), in contrast, observes a positive short-term impact with a negative long-term effect. The results of Lean and Tang (2010), echoed by Schubert et al. (2010), suggest a continuation of positive effects over time. The impacts of tourism on sustainability thus differ according to the specialisations in tourism. This gives rise to a threshold that can be measured in terms of the level of specialization in tourism (Adamou and Clerides, 2010; Holzner, 2011; Narayan et al., 2010). Based on this threshold, the marginal effect of tourism on growth decreases. Recent works (for example Adamou and Clerides, 2010; Holzner, 2011) suggest the advantage for certain economies with a specific (relatively high) level of specialization in tourism of developing other economic activities in light of the decreasing marginal effect of tourism over time. Similarly, those

island territories where tourism is as yet at the embryonic stage should maintain diversified economic activities in parallel to the development of the tourist sector.

2.2. Non-linear relationships between tourism, economic vulnerability and sustainability: an empirical investigation

Several factors contribute to the potential exhaustion of the spillover effects of tourism on the rest of the economy. The manner in which the international tourism sector works means that a large share of the income derived from this type of tourism is collected from the very outset and therefore remains in the countries providing these tourist services which are home to the head offices of the international airline companies, hotel chains or major tour operators. Furthermore, once on site, traditional beach tourists are more likely to consume imported food products, thereby exacerbating this phenomenon of outflow. While on certain islands in the Caribbean zone this sector of activity has generated income which has increased rapidly since the end of the 1980s, the benefits of tourism on the local economy have been marginal with regard to real spending on the part of tourists[6]. Thus, "these islands serve more as simple host structures in line with an international rationale where the prospects of local participation are limited for want of capital and access to outbound markets" (Dehoorne et al., 2007). This type of tourism development, very often concentrated in small geographic areas, also has negative environmental and social consequences due to the often uncontrolled development of hotel and road infrastructures. The considerable pressure exerted on the environment can take many forms including forest clearance, shoreline erosion, over-frequentation of natural areas, increased marine pollution, reduced fishery resources, growing urbanisation, land artificialisation, increased traffic, insufficient waste management, deteriorating water quality, etc. For local companies, the effects also exhibit certain negative impacts and can lead to shortages (water, energy), marginalisation, delinquency, acculturation and/or the non-respect of customs.

Thus the specialization in tourism may endanger sustainability, especially for small islands. Macroeconomic sustainability can be evaluated through the genuine savings approach (Hamilton, 1994; 2006). In this approach, it is supposed that each dimension of wealth is substitutable with other dimensions (*i.e.*, it is possible to substitute human or economic capital to natural capital). Thus, considering that sustainability is achieved as soon as investments (in human or economic capital) compensate the degradation in various dimensions of capital (including a

[6] Turismo sin desarrollo. Los intereses creados como amenaza al sector turístico de República, Dominicana María Dolores López Gómez, OXFAM 2007.

shrinking natural capital) over a given period, it is an index of weak sustainability. The corresponding empirical index implemented by the World Bank is the so-called adjusted net savings. Despite serious limitations, well informed in the academic literature (Ferreira et Vincent, 2004; Gnegne, 2009), the adjusted net savings (also called *genuine savings*) has the great advantage of procuring an index of sustainability available for a wide array of countries and years.

The choice of specialization in tourism can also lead to increased vulnerability, *i.e.*, "the risk of poor countries seeing their development hampered by the exogenous shocks to which are they are subject, shocks which are both natural and external" (Guillaumont, 2006). From a certain threshold, the expected advantages of an increase in tourism income give way to negative effects, in particular associated with increased exposure to shocks.

In order to test the impact of the specialization in tourism (measured here by the weight of the international tourism sector in GDP) on vulnerability and sustainability, we perform regressions using unbalanced panel data for the period 1990-2008, adopting the economic vulnerability indicator (EVI)[7] and the World Bank's genuine savings (GS) indicator as dependent variables. We intend to verify whether (1) the marginal effect of specializing in tourism is variable, as observed in the literature linking tourism and economic growth and (2) specializing in tourism has a different effect on the economic vulnerability and sustainability of SIDS (18 countries in the sample for EVI models and 17 SIDS in the GS models[8]) compared to the others (79 non-SIDS for which the EVI is available; essentially developing economies, and 108 non-SIDS countries in the GS models).

2.2.1 EVI and GS basic empirical models

Having observed our empirical data and the quality of the statistical distributions (see figure A.1 in the appendix), we opt for log-log equations and acknowledge the existence of a quadratic, or even cubic, relationship between specializing in tourism, economic vulnerability, and sustainability. Testing a non-linear (quadratic or cubic) relationship means checking whether the effect of a change in the specialization in tourism on economic vulnerability/sustainability depends

[7] Indicator defined by the UNDP and the CERDI, see Cariolle and Goujon (2013). The EVI combines an indicator of exposure to shocks and an indicator of shocks. In particular, the indicator of exposure to shocks incorporates an indicator of export concentration. However, this does not take account of the elements of the invisible balance and does not, therefore, incorporate a direct development effect of the tourism sector. The development of the contribution of tourism to GDP can nevertheless be reflected by a call in the weight of agriculture in the GDP (indicator of exposure to shocks incorporated in the EVI). Finally, the indicator of shocks measuring the instability of exports also includes tourism services, and thus the income derived from them. In balance, the effects of tourism on the vulnerability indicator are not defined a priori.

[8] Table A.2 in the appendix lists the data available per SIDS.

on the level of this specialization. This marginal effect would either increase (if the three terms—simple, quadratic and cubic—have the same sign) or decrease (if the signs are contrasting) with the change in specialization. When the estimated coefficients of the simple and quadratic terms, or quadratic and cubic, have contrasting signs, it is possible to determine the turning point (subsequently referred to as "threshold") from which the trend is reversed, *i.e.*, the negative (positive) marginal effect would gradually become exhausted before stopping and becoming positive (negative).

With regard to the other explanatory variables, we draw on the vast literature on the determining factors of macroeconomic vulnerability / volatility and sustainability[9].

First, we distinguish two groups of factors explaining **macroeconomic vulnerability**:

(i) the determinants of economic volatility (e.g., Aghion et al., 1999; Anbarci et al., 2011; Bejan, 2006; Easterly et al., 2001; Ferreira da Silva, 2002; etc.): growth of GDP per inhabitant, the level of sophistication of the financial market (e.g., share of private credit in GDP, in a quadratic relation), size of the government (e.g., public spending as % GDP as a proxy of the level of automatic stabilization), economic openness;

(ii) the macroeconomic control variables (e.g., Acemoglu et al., 2003; Anbarci et al., 2011; Fiaschi and Lavezzi, 2005; Holzner, 2011; Kent et al, 2005; etc.): initial level of economic development (e.g., GDP/inhabitant, share of value added of the agricultural sector in GDP), endowments of factors of production (capital-to-labor ratio), quality of the institutions (e.g., civil liberties and political rights), human capital (e.g., level of education), trend variable over time (to capture the improvement in management processes, financial innovation, the change in institutional independence, etc.).

Second, ***weak* sustainability** can be explained by the following:

(i) determinants of genuine savings (e.g., Atkinson and Hamilton, 2003; Hamilton and Clemens, 1999; Hamilton, 2006; Sachs and Warner, 1995 and 2001; Soysa, Bailey and Neumayer, 2010): accumulation/consumption of economic capital, preservation/depletion of natural capital, and enhancement/decline of social capital (as a large measure of human, cultural, institutional assets). All proxy variables for different capital assets are carefully chosen to avoid partial identity in the GS regression. Indeed, using for instance investment in fixed capital to proxy physical assets, and the value of natural resource rents (in absolute or relative to GDP terms) should cause collinearity problems (*i.e.*, partial identity), because these variables enter directly in the GS

[9] The idea here is to adopt as many explanatory variables as possible other than those used directly in constructing the EVI and the GS indicators in order to limit problems of endogeneity and/or collinearity.

calculation[10]. We thus chose GDP/capita and share of natural resource exports (fossil fuel and minerals) in total merchandise exports to proxy changes in the economic and natural capitals, the first variable being highly correlated with fixed capital accumulation (and capital to labor ratio) whereas the second being widely used in the literature on the resource curse as a measure of natural resource rents. The social assets are captured in our model by human and institutional capitals. In particular, we use duration of secondary education (years) as a measure of human capital, whereas the institutional capital is proxied by the Freedom House's indicator of democracy, calculated as the average of "political rights" and "civil liberties".

(ii) determinants of (gross) saving as *control variables for genuine savings* (e.g., Boos and Holm-Müller, 2013; Dietz, Neumayer and Soysa, 2007; Sato, Samreth and Sasaki, 2013; Soysa and Neumayer, 2005): economic growth measured as the change in per capita income levels (higher rates are usually associated with intensive use of environmental resources and pollution, but also may enable increases in manufactured and human capital reducing thus the dependence of people on natural resources), trade openness (usually associated with higher efficiency and less corruption), age dependency (affecting the saving rate of households), share of urban population in total population (with its important implications for pollution levels and investment in manufactured capital), and trend variable to control for general changes in behavior, preferences and technology over time.

Our basic empirical models can therefore be expressed as:

$$\log(Y)_{it} = \alpha + \beta_1 \log(TourPIB)_{it} + \beta_2 (\log(TourPIB))^2_{it} + \beta_3 (\log(TourPIB))^3_{it} + \phi \log(X)_{it} + \chi \log(Z)_{it} + u_i + \varepsilon_{it}$$

where Y is the dependent variable (EVI - economic vulnerability index and GS – genuine savings), *TourPIB* is the level of specialization in tourism (proportion of tourism income in GDP), X represents the aforementioned determinants of economic volatility and genuine savings, Z represents the control variables, u_i is the error term fixed over time representing the effects proper to each country and $\boldsymbol{\varepsilon}$ is the random error term. The explanatory variables that we have used are defined in Appendix (Table A.1).

With regard to the empirical strategy, Breusch-Pagan LM tests for random effects (RE) and the F-test (ui = 0) for the fixed effects (FE) enable us to reject the null hypotheses and suggest the use of panel estimation techniques rather than ordinary least squares (OLS). At the same

[10] Following the World Bank's formula, Adjusted Net Saving (or genuine saving) = gross national saving – consumption of fixed capital + education Expenditure – energy depletion – mineral depletion – net forest depletion – damage from carbon dioxide emissions [– damage from particulate emissions]. Natural resources' depletion is calculated using measures of natural resource rents.

time, the statistics from the Hausman tests show that, for our empirical models and country samples, the coefficients estimated with FEs are more consistent than those estimated with REs.

2.2.2 Empirical results on critical thresholds of tourism specialization

Empirical results of EVI and GS basic models' regressions are displayed in Table 1, both for the pooled sample and by country-group (SIDS and non-SIDS). The effects of all the explanatory variables, when they are statistically significant, have the signs predicted in theory and are mostly coherent with the results of the existing work on the indicators of macroeconomic vulnerability (models 1-4) and sustainability (models 5-8). Based on the Hausman test statistics, we'll discuss only the empirical results of models that are more consistent (FE models). Factors such as the initial level of development (GDP/cap), capital endowment (K/L), education and the quality of the institutions (democracy) are thus negatively associated with economic vulnerability, whereas economic openness and specialization in agriculture would increase vulnerability. The size of the government and the development of the financial market have no statistically significant effect in our regressions, except for the square term of Credit/GDP that is negative in the regression of vulnerability on all the explanatory variables excluding Tourism/GDP (Table A.3 in appendix). This result should suggest the existence of a certain threshold of financial development beyond which the financial market would be sufficiently developed to absorb shocks. Economic vulnerability appears to follow a downward trend. Concerning genuine savings, depletion of natural resources, age dependency and urbanization have a negative effect on sustainability, whereas economic development and its growth are positively associated with genuine savings. These results are quite similar to general findings in the empirical studies on the adjusted net savings. As expressed by Dietz, Neumayer and Soysa (2007), trade openness is generally insignificant in the empirical literature. Whereas we also validate this finding for our pooled sample of countries, trade openness appears however to reduce genuine savings in the SIDS (model 7). Finally, education and democracy don't seem to exert significant impact on sustainability. We can suppose this finding is due to inclusion of GDP/capita and its growth as explanatory variables, which are usually highly correlated with human capital and institutional quality.

Table 1. Nonlinear effect of tourism specialization

	(1) EVI (RE) ALL	(2) **EVI (FE) ALL**	(3) EVI (FE) ***SIDS***	(4) EVI (FE) ***Non-SIDS***	(5) GS (RE) ALL	(6) **GS (FE) ALL**	(7) GS (FE) ***SIDS***	(8) GS (FE) ***Non-SIDS***
lnGDPcapGrowth	-0.002	-0.002	-0.008	0.000	**0.003***	**0.003***	0.002	**0.003***
	(0.003)	*(0.003)*	*(0.008)*	*(0.003)*	*(0.001)*	*(0.001)*	*(0.003)*	*(0.001)*
lnFH	**-0.058***	**-0.055***	-0.010	**-0.054***	-0.004	-0.006+	-0.004	-0.003
	(0.013)	*(0.013)*	*(0.041)*	*(0.013)*	*(0.003)*	*(0.003)*	*(0.015)*	*(0.003)*
lnEducation	**-0.267***	**-0.310***	**-0.608***	**-0.194***	-0.013	0.005	0.018	-0.019
	(0.045)	*(0.047)*	*(0.108)*	*(0.056)*	*(0.013)*	*(0.015)*	*(0.041)*	*(0.016)*
lnGDPcap2005	**-0.072***	**-0.143***	**-0.257***	**-0.117***	**0.012***	**0.021***	**-0.191***	**0.032***
	(0.020)	*(0.029)*	*(0.099)*	*(0.030)*	*(0.003)*	*(0.006)*	*(0.034)*	*(0.006)*
lnOpen	**0.049***	**0.052***	0.060	**0.036***	-0.000	-0.001	**-0.039***	-0.003
	(0.014)	*(0.015)*	*(0.063)*	*(0.015)*	*(0.004)*	*(0.004)*	*(0.018)*	*(0.004)*
Trend	**-0.004***	**-0.005***	**-0.024***	**-0.003***	0.000	-0.000	0.002	-0.000
	(0.001)	*(0.001)*	*(0.005)*	*(0.001)*	*(0.000)*	*(0.000)*	*(0.001)*	*(0.000)*
lnAgrGDP	**0.039***	**0.061***	0.017	**0.080***				
	(0.013)	*(0.014)*	*(0.039)*	*(0.016)*				
lnCreditGDP	-0.005	-0.015	-0.025	0.002				
	(0.026)	*(0.027)*	*(0.184)*	*(0.026)*				
(lnCreditGDP)^2	-0.000	0.003	0.033	-0.002				
	(0.005)	*(0.005)*	*(0.027)*	*(0.005)*				
lnGovExpend	-0.003	0.003	-0.040	-0.003				
	(0.014)	*(0.015)*	*(0.042)*	*(0.016)*				
lnPopul	**-0.093***	0.030	**0.779***	-0.003				
	(0.014)	*(0.050)*	*(0.181)*	*(0.054)*				
lnK/L	**-0.048***	**-0.043***	-0.021	**-0.042***				
	(0.011)	*(0.011)*	*(0.048)*	*(0.012)*				
lnNatResExp					**-0.003***	**-0.002+**	0.005	**-0.004***
					(0.001)	*(0.001)*	*(0.004)*	*(0.001)*
lnAdeDepend					**-0.037***	**-0.031***	**-0.105***	**-0.028***
					(0.010)	*(0.010)*	*(0.047)*	*(0.010)*
lnUrbPop					**-0.021***	-0.013	**0.201***	**-0.047***
					(0.008)	*(0.012)*	*(0.040)*	*(0.013)*
lnTourGDP	**0.052***	**0.042***	**0.123***	**0.043***	-0.006	**-0.012***	**0.044***	**-0.009+**
	(0.010)	*(0.011)*	*(0.030)*	*(0.010)*	*(0.005)*	*(0.005)*	*(0.013)*	*(0.005)*
(lnTourGDP)^2	**-0.045***	**-0.041***	**-0.051***	**-0.038***	**0.010***	**0.013***	**0.018***	**0.012***
	(0.008)	*(0.008)*	*(0.014)*	*(0.008)*	*(0.004)*	*(0.005)*	*(0.005)*	*(0.004)*
(lnTourGDP)^3	**0.009***	**0.009***	-0.002	**0.008***	**-0.002+**	**-0.003***	**-0.005***	**-0.003***
	(0.003)	*(0.003)*	*(0.005)*	*(0.003)*	*(0.001)*	*(0.001)*	*(0.002)*	*(0.001)*
SIDS x lnTourGDP	0.041	**0.052+**			**0.054***	**0.062***		
	(0.028)	*(0.028)*			*(0.011)*	*(0.012)*		
SIDS x (lnTourGDP)^2	0.010	0.005			0.003	0.001		
	(0.013)	*(0.013)*			*(0.006)*	*(0.006)*		
SIDS x (lnTourGDP)^3	**-0.014***	**-0.014***			**-0.003+**	**-0.003+**		
	(0.005)	*(0.005)*			*(0.002)*	*(0.002)*		
SIDS	0.114				**-0.104***			
	(0.080)				*(0.022)*			
Constant	6.324*	4.836*	-3.204	4.886*	5.727*	5.557*	6.839*	5.650*
	(0.305)	*(0.859)*	*(2.631)*	*(0.979)*	*(0.065)*	*(0.086)*	*(0.340)*	*(0.094)*
Observations	1371	1371	222	1149	1705	1705	156	1549
Hausman test (FE vs RE; chi2 (dl))	42.71*		539.86*	97.23*	119.80*		40.62*	1822.34

Legend: standard errors in parentheses; + $p < 0.10$, * $p < 0.05$

With regard to our variable of interest, *i.e.,* tourism specialization, we first observe its impact on vulnerability (models 1-4). As expected, we find a non-linear effect similar to that presented in the works examining the relationships between tourism and growth. The marginal effect of tourism on economic vulnerability is therefore not constant but varies according to the level of specialization in tourism. Results are quite different for SIDS and non-SIDS. We observe that a weak specialization in tourism (up to 3,34% of GDP for SIDS and less than 2,09% of GDP in other countries)[11] is associated with an increase in economic vulnerability. It then appears that this effect diminishes with increasing specialization in tourism (share of international tourism in GDP), and even could become negative thus reducing vulnerability in the SIDS. On the contrary, a second threshold is found for non-SIDS indicating an upward impact of tourism on economic vulnerability beginning with a share of international tourism in GDP of 11,35%. In other words, the presence of thresholds indicates that the positive downwards effects on vulnerability associated with the intensification of a specialization in tourism can gradually become reversed, finally increasing the vulnerability of those economies most dependent on tourism. This trend reversal occurs only in the non-SIDS. The SIDS are more likely to reduce economic vulnerability with high tourism specialization.

Similarly, tourism specialization has a non-linear effect on sustainability, but results are more contrasting for different country groups (models 5-8). Whereas tourism specialization reduces sustainability in the non-SIDS at small share of international tourism in GDP (less than 1,57%), it is associated with increasing genuine savings in the SIDS for very weak tourism specialization (less than 1% in GDP). This positive [negative] effect of tourism on genuine savings amplifies [diminishes] in the SIDS [non-SIDS] with further increasing levels of tourism specialization. However, a second threshold appears at 9,16% and 26,88% of international tourism's share in GDP, in non-SIDS and SIDS respectively, above which extra tourism specialization would harm sustainable development. A threshold three times higher for SIDS than for non-SIDS justifies the choice of a high level of specialization in tourism for SIDS in relation to the other activities and compared to the other countries. We believe that this relative advantage of the SIDS when specializing in tourism results from the fact that small island economies benefit from a "unique social, cultural or natural" attractiveness (Seetanah, 2011). Because the very fact of being an island is often associated with the presence of a specific natural and cultural heritage, the additional costs linked to isolation and/or remoteness are thus offset by income derived from the

[11] To calculate the thresholds, we adopt the Taylor series method of first order approximation of development (Delta method). We would like to note that the estimation of the thresholds derived from our empirical results provides purely indicative figures (to be interpreted in relative terms), as they are highly sensitive to the nature and size of the country sample (SIDS or not) used in the regressions.

use of this specific heritage. The inversion of the effects of specializing in tourism on sustainability should relate to the possibility that natural and cultural heritage may deteriorate over time due to over-frequentation, a lack of conservation, maintenance or investment or a loss of specificity of the heritage concerned ("disneylandisation", "folklorisation") which can even lead to irreversible situations preventing the stock of initial resources from being replenished.

The existence of thresholds in the effect of specializing in tourism on economic vulnerability and sustainability, together with their variability across different countries (e.g., SIDS/ non-SIDS), thus could be explained by the type of capital assets involved and the complementarity / substitutability effects in play between their different dimensions (e.g., natural, human-made and cultural capital). This echoes the explanation of the decreasing marginal effect of tourism on growth put forward by Pablo-Romero and Molina (2013).

3. SPECIALISATION IN TOURISM AND DIFFERENTIATION OF TOURISM SERVICES

3.1. Impact of tourism conditional on products' differentiation

The gradual exhaustion of development trajectories based on specialization in tourism is not universally expressed with the same level of intensity, even for islands which have reached an equivalent level of specialization in tourism. In this section, we assume that one of the factors of differentiation of the impact of tourism on vulnerability and sustainability is founded on the type of tourism service provided. More precisely, the impacts of specializing in tourism should depend on the greater or lesser degree of differentiation of the tourism services (differentiated or undifferentiated), as well as the dynamics of change of the heritage in question. Three possible tourism development strategies therefore appear, particularly in the SIDS: *i)* one calling on the particularities of the natural or cultural heritage to differentiate tourism services in the long term (i.e., heritage tourism), *ii)* another focusing on luxury services, given inherent SIDS' disadvantages because of distances and transport costs, and *iii)* the last providing less-differentiated services and thus opening the door to strong price competition (i.e., mass tourism). In the first case, for example, we are referring to the promotion of tourism segments focusing on archaeological and historical heritage (cultural tourism, remembrance tourism), natural heritage (naturalist tourism, ornithology, scientific tourism), immaterial and human heritage (ecotourism, community tourism) – the associated tourism products often operate in small groups calling on a roving approach thereby limiting the pressure on the environment and distributing the benefits locally. The last case relates to a more sedentary form of tourism such as all-inclusive packages in large resort-type installations focusing on the traditional island attributes of sea, sand and sun.

It goes without saying that the undifferentiated model is founded on a rationale of volumes and optimized occupancy rates (planes and accommodation), enabling prices to be driven downwards. Differentiated (heritage, and sometimes luxury) tourism, by contrast, plays the experiential tourism card, sometimes exceptionally favoring a more harmonious relationship between tourism and local life; quality, or even elitism or niche tourism, is prioritized. The effect of tourism on vulnerability and sustainability would thus depend on the type of tourist services provided at each link in the chain of tourism, transport, accommodation/board, cultural activities and leisure activities: volume of residential capacities, length of visit, size of groups, type of reception and the means of transporting visitors to the most remarkable sites. It also depends on the quality of the services provided, the training of the staff working in the tourism sector and the origin of the capital invested in tourist facilities: in the Caribbean, for example, more than 60% of hotels belong to citizens from outside the region, thereby limiting the involvement of the local communities in the tourism sector.

The importance of Heritage in the countries of our sample is thus expected to moderate the effect of tourism specialization on vulnerability and sustainability. The UNESCO World Heritage List[12] provides a useful indication on the importance of Heritage (natural, cultural or "mixed") in each country. Following Arezki (Arezki, 2009), we consider that Heritage is a source of differentiation in tourism products. Thus we introduce in our empirical models the number of sites on the UNESCO World Heritage List per country as a moderator variable of the impact of tourism on sustainability and vulnerability.

We see tourism as a potential source of income as soon as the services provided are differentiated in relation to rival services in the tourism industry, thereby contributing to maintaining a specific macroeconomic loop. By providing differentiated, heritage based tourism services, islands would be in a position to set higher prices for these services and to increase the proportion of tourism income retained at the local level by taking advantage of their market power (situations of differentiated oligopolies or monopolistic competition). It is not for all that easy for all tourism services provided by SIDS to be differentiated from those provided by their rivals. Competition between destinations can be fierce and the prices of tourism services may follow a downward trend, illustrating the loss of product differentiation. In particular, this would seem to be the case in SIDS having prioritized a relatively undifferentiated trio of sea, sand and sun, in some cases leading to mass tourism. Though also under competition pressure, luxury

[12] The Convention Concerning the Protection of the World Cultural and Natural Heritage was adopted by UNESCO in 1972. It embodied the goal to encourage the identification, protection and preservation of cultural and natural heritage around the world considered to be of outstanding value to humanity.

tourism products keep relatively high price levels and are not generally likely to convert into mass tourism.

To distinguish between luxury, mass and heritage tourism, and their specific impacts on vulnerability and sustainability, we make the following assumptions:

- Specialization in **undifferentiated** (**mass) tourism** follows a general decreasing trend in "tourism price", regardless the existence of world heritage sites;
- Specialization in **differentiated (heritage) or segmented (luxury) tourism** occurs when the general trend in "tourism price" is increasing. If it is happening in the presence of world heritage sites, we consider a possible strategy of developing heritage tourism; otherwise, the luxury tourism supply would be prevailing.

To test the above hypotheses, we extend our EVI and GS empirical models by including two- and three-way interaction terms, between the share of international tourism in GDP (i.e., tourism specialization), the trend in spending per international tourist arrival (i.e., tourism price), and the number of UNESCO world heritage sites (WHS):

$$\begin{aligned}\log(Y)_{it} = \alpha + \beta_1 \log(TourGDP)_{it} + \beta_2 \log(TourPrice)_{it} + \beta_3 \log(WHS)_{it} + \beta_4 \log(TourGDP)_{it} \\ * \log(TourPrice)_{it} + \beta_5 \log(TourGDP)_{it} * \log(WHS)_{it} + \beta_6 \log(TourPrice)_{it} \\ * \log(WHS)_{it} + \beta_7 \log(TourGDP)_{it} * \log(TourPrice)_{it} * \log(WHS)_{it} + \phi \log(X)_{it} \\ + \chi \log(Z)_{it} + u_i + \varepsilon_{it}\end{aligned}$$

where Y is the dependent variable (EVI - economic vulnerability index and GS – genuine savings), *TourGDP* is the level of specialization in tourism, *TourPrice* is the change in spending per tourist, a proxy for "tourism price", *WHS* is the number of sites registered as "world heritage" by UNESCO, X represents the determinants of economic volatility and sustainability, Z represents the control variables, u_i is the fixed error term over time illustrating the effects specific to each country and ε is the random error term.

To incorporate the economic particularities of the different tourist destinations more efficiently (heterogeneity of the absolute price levels, exchange rates, etc.), the variable *TourPrice* is calculated such that it only captures the general long-term price change trend as a constant value[13]. The two- and three-way interaction terms serve to estimate the effect of tourism specialization depending on whether prices are following an upward or downward trend (*TourGDP*TourPrice*) and according to the number of WHS (*TourGDP*TourPrice*WHS*).

[13] More precisely, the variable TourPrice represents the change in spending per tourist (from abroad) in constant 2011 dollars over the period 1995-2008 (see Table A.1 in appendix for the definition and sources of the variables).

Table 2 displays results for the impact of tourism specialization (TourGDP) on vulnerability (EVI) and sustainability (GS), conditional to tourism price (TourPrice) and heritage (WHS). As suggested by our previous results (Table 1), tourism specialization reduces macroeconomic vulnerability (term [1]) in the SIDS with no valuable heritage and without luxury tourism strategy (null terms [3], [5] and [8]). This marginal effect seems to be stronger in the SIDS with both heritage and a positive trend in the tourism price, *i.e.,* pursuing a heritage tourism strategy ([1]+[8]). On the contrary, it is reduced in the SIDS with either a prevailing luxury products supply in the absence of heritage (non-null term [3] with a positive trend in TourPrice, and null terms [5] and [8]) or focusing on mass tourism while WHS exist (negative trend in TourPrice and non-null term [5]). In other words, a prevailing luxury or mass tourism seem to increase macroeconomic vulnerability, whereas the heritage tourism should decrease it. With regard to sustainability, tourism specialization seems to have a statistically significant effect only in the SIDS with valuable heritage. Namely, it appears to reduce genuine savings when the mass tourism strategy prevails (negative trend of TourPrice in the term [8]). When the focus is on the heritage tourism (simultaneously increasing number of world heritage sites and tourism price), this negative effect is at least partially offset.

Table 2. Conditional effects of tourism: the role of heritage and product differentiation

	EVI model		**GS model**	
	SIDS	***Non-SIDS***	***SIDS***	***Non-SIDS***
[1] lnTourGDP	**-20.371***	-0.573	0.609	0.051
	(3.069)	*(0.438)*	*(1.062)*	*(0.084)*
[2] lnTourPrice	**-2.062***	**-0.323***	0.191	0.007
	(0.344)	*(0.048)*	*(0.137)*	*(0.009)*
[3] lnTourGDP x lnTourPrice	**1.371***	0.043	-0.041	-0.004
	(0.207)	*(0.030)*	*(0.072)*	*(0.006)*
[4] **lnWHS**	**-6.669***	**-0.698***	**2.359***	**0.057***
	(1.611)	*(0.140)*	*(0.575)*	*(0.027)*
[5] lnTourGDP x lnWHS	**3.361***	0.078	**-0.953***	-0.034
	(0.774)	*(0.084)*	*(0.286)*	*(0.023)*
[7] lnTourPrice x lnWHS	**0.451***	**0.049***	**-0.161***	**-0.004***
	(0.109)	*(0.010)*	*(0.039)*	*(0.002)*
[8] **lnTourGDP x lnTourPrice x lnWHS**	**-0.228***	-0.006	**0.065***	0.002
	(0.052)	*(0.006)*	*(0.019)*	*(0.002)*
Other determinants & control variables	*See models (5-6) in Table A.4. in appendix*		*See models (5-6) in Table A.5. in appendix*	

Legend: standard errors in parentheses; $^{+}$ $p < 0.10$, * $p < 0.05$

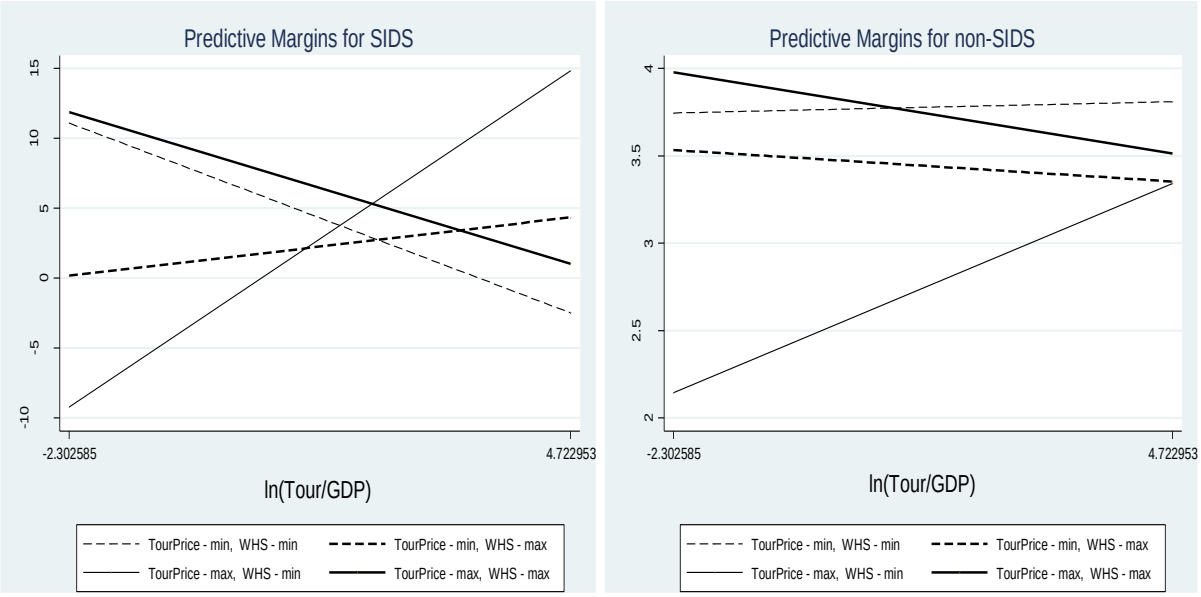
In the non-SIDS, international tourism appears to affect macroeconomic vulnerability and sustainability only through the differentiation of tourism products, regardless tourism's share in GDP. Existence of world heritage in these countries would reduce vulnerability and increase

To separate our series of TourPrice into trend and cyclical components, we applied the Hodrick-Prescott filter that is a flexible detrending method widely used in empirical macro research.

sustainability (term [4]), whereas luxury tourism strategy when there is no heritage should reduce vulnerability without any impact on sustainability (term [2]). These marginal effects would however diminish in magnitude when there are both world heritage sites and an increase in tourism price.

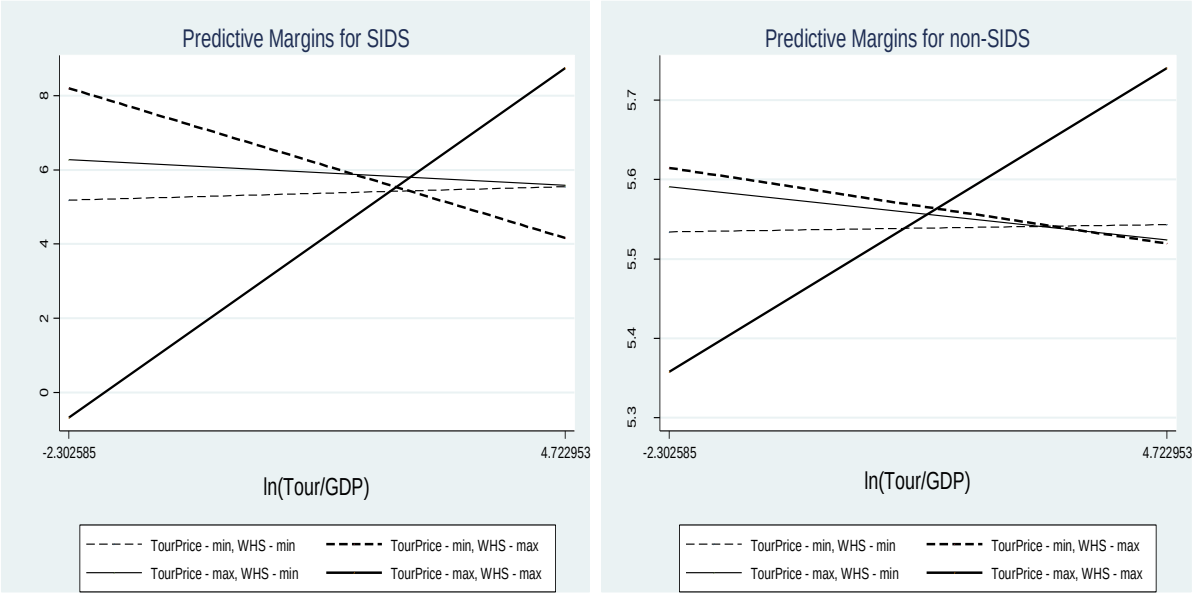
It should be noted that results in Table 2 are obtained at the average value of each of our moderator variable. In a more general case, by analyzing economic vulnerability by means of its linear prediction for the extreme values of Tour/GDP, TourPrice and WHS (Figure 1, corresponding to the data from models 5-6 in Table A.4, in appendix), these effects can be summarized as follows: *(i)* the increased level of specialization in tourism would be associated with a fall [increase] in economic vulnerability in the countries promoting heritage tourism, *i.e., thick solid lines* [luxury tourism, *i.e., thin solid lines*]; these effects are found for both SIDS and non-SIDS, with a stronger impact in the first country-group; *(ii)* whereas the increased share in GDP of mass tourism (*i.e., dash lines*) has insignificant impact on non-SIDS' economic vulnerability, it appears to reduce [increase] vulnerability of the SIDS with no [high] heritage value.

Figure 1. Linear prediction of Vulnerability, *dln(EVI)/dln(Tour/GDP)*



Linear prediction of genuine savings for the extreme values of Tour/GDP, TourPrice and WHS, also provides interesting results (Figure 2, corresponding to the data from models 5-6 in Table A.5, in appendix). If the increased share of international tourism in GDP has no or very weak (negative) effect on sustainability in the countries without any world heritage site, *i.e., thin lines*, it is found to increase [decrease] genuine savings when a heritage [mass] tourism strategy is envisaged in countries with strong heritage value, *i.e., thick lines*. These results are quite similar for SIDS and non-SIDS, with however stronger magnitudes for SIDS.

Figure 2. Linear prediction of Sustainability, *dln(GS)/dln(Tour/GDP)*



We further deepen our analysis by computing the marginal effects of tourism specialization on vulnerability and sustainability (models 5-6 in Tables A.4 and A.5 in appendix) for more reliable values of our moderators: in particular, at their sample mean, at two standard deviations above the mean and at two standard deviations below the mean.

Our results (Table A.6 in appendix) indicate that tourism specialization increases economic vulnerability in the islands with no or weak heritage value (number of WHS at most at the sample's mean) and having opted for "niche" tourism (*i.e.,* higher prices, in particular for luxury services). Indeed, because luxury tourism in the SIDS is usually operated by foreign companies, a high dependence on it should increase macroeconomic vulnerability. On the contrary, the SIDS with no or a few WHS and developing a mass tourism strategy appear to be relatively less vulnerable while increasing international tourism's share in GDP. No statistically significant effect is found for tourism specialization on vulnerability in the SIDS with a high number of WHS, regardless the tourism price (the heritage tourism perhaps prevailing on the other types of product specialization).

As regards the sustainability (Table A.7 in appendix), tourism specialization is found to increase genuine savings in the islands characterized by both a strong heritage value and an upward trend in tourism price, *i.e.,* SIDS having chosen to develop heritage tourism. On the opposite, increased tourism specialization is associated with declining sustainability in the islands *(i)* with valuable heritage and having chosen the mass tourism strategy (downward trend in tourism

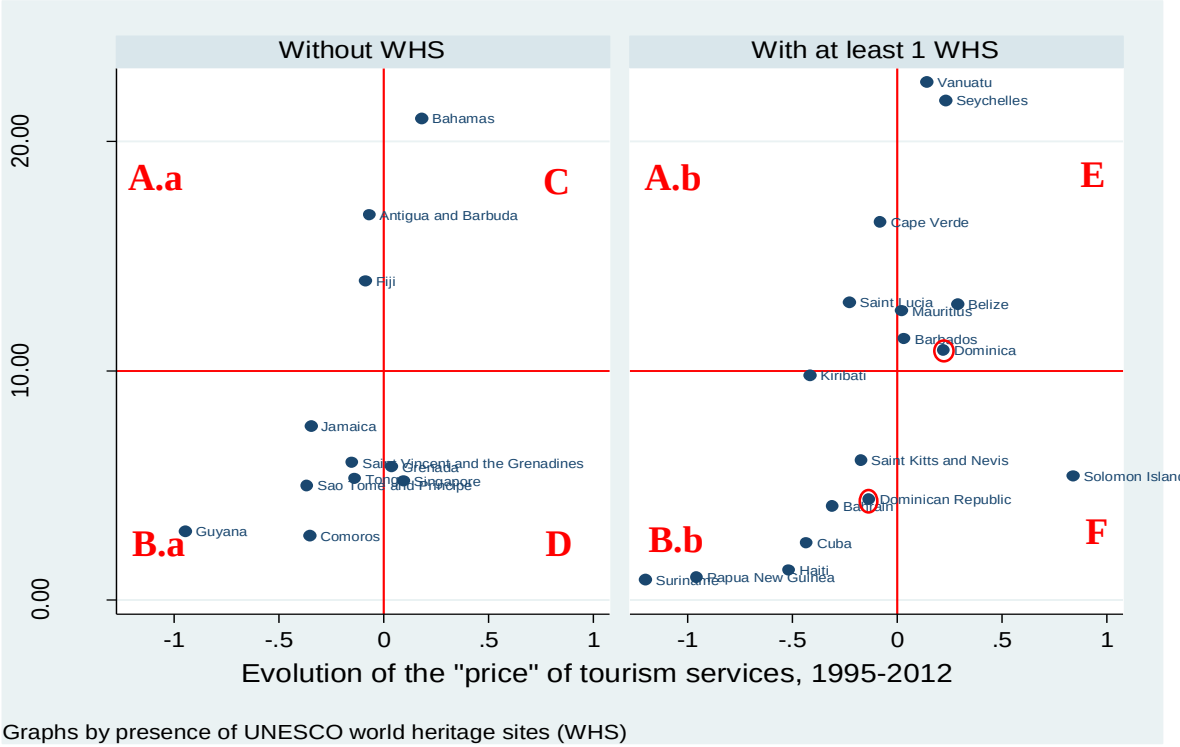
price), or *(ii)* with no heritage but operating predominantly luxury tourism. Tourism specialization seems to have no effect on genuine savings in the SIDS with no or weak heritage value and focusing on mass tourism.

According to our empirical results, if SIDS wanted to make international tourism a major source of their economic growth (high level of specialization in tourism), they should have interest to promote unique comparative advantages (heritage-based differentiated tourism) that should allow them in addition to reduce vulnerability and to increase sustainability. We should however note that, depending on the extent of the conservation policies implemented at local level, or the strategies of reinvesting in heritage using income derived from tourism, the tourism services provided may or may not retain their differentiated character. Finally, the development of mass tourism would appear to be a good compromise for SIDS with no or very weak heritage value, because it would reduce their vulnerability without harming sustainability.

3.2. Differentiation of tourism products: a typology of SIDS

Our empirical results on the impact of the specialization in tourism on vulnerability and sustainability, moderated by the differentiation of tourism services, lead us to provide a SIDS typology (Figure 3), as an initial approximation, based on three variables: specialization in tourism (share of international tourism in GDP), tourism price changes (measured by the change in the general trend of tourist spending per arrival), and number of world heritage sites.

Figure 3. Typology of SIDS according to the intensity of specialization in tourism, the changing prices of tourism and the existence of WHS (1995-2012)



Note: the figure does not include the Maldives, which is an outlier (Tour/ GDP>40%). For its position on the graph, see Figure A.2. in appendix.

We therefore divided the SIDS into six categories, based on the prevailing tourism strategy:

A. *Mass [undifferentiated] tourism – high level of specialization*: a) without WHS - Antigua and Barbuda, Fiji, and b) with WHS - Cape Verde, Saint Lucia.

B. *Mass [undifferentiated] tourism – low or moderate level of specialization*: a) without WHS - Comoros, Guyana, Jamaica, Sao Tome, Saint Vincent and Grenadines, Tonga, and b) with WHS – Bahrain, Cuba, Dominican Republic, Haiti, Kiribati, Papua New Guinea, Saint Kitts and Nevis, Surinam.

C. *Luxury [segmented] tourism – high level of specialization*: Bahamas and Maldives.

D. *Luxury [segmented] tourism – low or moderate level of specialization*: Grenada and Singapore.

E. *Heritage [differentiated] tourism – high level of specialization*: Barbados, Belize, Dominica, Mauritius, Seychelles, Vanuatu.

F. *Heritage [differentiated] tourism – low or moderate level of specialization*: Solomon Islands.

This initial characterization of tourism trajectories observed in island territories aims to foster debate concerning the supposed correlation between specialization in tourism, economic vulnerability and sustainability, given that only in-depth case-by-case analyses will make it possible to qualify this exploratory analysis according to the particularities of each SIDS: geographic

accessibility, characteristics of the economic fabric, maturity of the tourism product, volume of tourist flows, level of local institutional stability, etc.

These initial results show both a distinct trend towards the differentiation/segmentation of tourism services in numerous SIDS (categories C, D, E and F), with some strongly marked situations accompanied by a high level of specialization in tourism (Seychelles, Bahamas and Vanuatu). The reality of tourism on these islands shows that this differentiation can take very different forms calling on exceptional heritage (volcanos and the seabed in Vanuatu), the luxury market through the development of high-end tourism services (Bahamas, Seychelles) or a desire to restrict the target markets (the Bahamas where 85% of tourists are from the United States).

We also observe that numerous SIDS maintain their development by focusing on undifferentiated tourism (A and B), in particular with large islands having long ago opted to develop a mass tourism industry (e.g., Cuba, Dominican Republic and Jamaica), founded on the trio of sea, sand and sun available through all-inclusive or package deals (McElroy, 2003). Exhibiting relatively low costs, these products are developed around huge beach resorts implementing charter flight + hotel packages through agreements between the major international operators, and rarely include small-scale accommodation units or local tourism service providers. Consequently, the country of destination benefits from only a small proportion of total tourist spending and we can therefore question the capacity of SIDS to generate, through tourism, the income necessary for reinvestment with a view to conserving their heritage (e.g., Cuba, Haiti, Kiribati).

In light of our empirical results on the interdependent effects of tourism specialization and tourism differentiation, we would expect vulnerability to increase and sustainability to decline in islands B.b and D [A.b and C] if they seek for [continue to rely on] a high level of specialization in tourism. On the contrary, a strategy of developing [maintaining] a high tourism specialization in islands F [E] should be associated with less economic vulnerability and higher degree of sustainability. Islands with no WHS would prefer developing mass tourism compared to luxury tourism (passing from category D to A rather than C), because the first should contribute to less macroeconomic vulnerability. In their attempts to maintain an international tourism development strategy without affecting sustainability, islands A.b should revise their tourist offer by incorporating differentiated services. Naturally, a combination of tourism services would appear to be the most pertinent solution for islands providing differentiated (undifferentiated) tourism and which are far from (in excess of) the critical threshold of specialization in tourism.

4. UNDIFFERENTIATED TOURISM *VS* HERITAGE-BASED DIFFERENTIATED TOURISM

A targeted observation of the Caribbean basin shows that certain islands attempt to adopt alternative forms of tourism based on the development of either heritage-based tourism or high-end beach tourism with a view to escaping price competitiveness in favor of the rarity of the sites and/or tourism services offered. It is a form of tourism related to "luxury" tourism founded on the promise of a rare, personalized tourist offer that stirs the imagination: it involves providing the visitor with an exclusive, sometimes tailor-made, experience which studies show to be fed by authenticity and novelty.

There are numerous designations for these different forms of tourism (ecotourism, responsible tourism, solidarity or fair tourism, integrated and diffuse tourism, etc.) and it is often difficult to differentiate them as they are linked to one another by common values and the tourism practices they encourage (Froger, 2012). A common denominator is that these forms of tourism are more often than not founded on the rich heritage of the territories concerned, be it the architectural, cultural, environmental, immaterial or traditional heritage of the local communities (way of life, leisure, religion, etc.). Let us take the example of nature tourism, a recent trend dating back only about twenty years. According to the WTO, nature tourism is developing at an annual rate of between 25 and 30% and accounts for 7% of international spending on tourism (CCBP, UNESCO), a figure which is far from negligible.

In principle, ecotourism follows an economic rationale different from that underpinning mass tourism. It is based on small infrastructures capable of contributing to territorial development and networking by having a positive impact on the local populations.

This differentiated, heritage-based tourism can therefore have significant, local socio-cultural impacts. The host populations can appropriate the singularity of their own historical, cultural and natural heritage and contribute to its rehabilitation and conservation. The revenue that this heritage-based tourism represents may serve as a sufficient incentive to foster these behaviors and promote the development of this type of tourism.

As emphasized by Hampton and Jeyacheya (2013), studying this type of tourism proves to be particularly beneficial when evaluating the indirect impacts. Differentiated tourism (calling on a specific heritage) would exercise a considerable multiplier effect on the local economy (by improving the quality of life of the local populations and thus the social capital) and should be encouraged as a strategy to reduce economic vulnerability. The island of Dominica, for example, has chosen to distinguish itself from neighboring islands by developing, alongside agriculture, forms of tourism focusing on nature and culture: dividing the island into nature parks, ensuring the moderate construction of hotel infrastructures, optimizing the size of airports, etc.

We see here the idea that tourism would be a good specialization strategy as small island economies enjoy a "unique social, cultural or natural attractiveness" (Seetanah, 2011), offsetting the handicaps linked to the insularity and the small size of SIDS. The deterioration effects of the cultural and natural aspects associated with the development of tourism would thus be limited.

The Dominican Republic and the island of Dominica are two examples of islands in the Caribbean zone which have adopted different rationales for the development of tourism[14]. However, they are both currently at "turning points" in their strategies. Faced simultaneously with ageing beach tourism installations and major domestic social, economic and environmental challenges, the Dominican Republic, wishes to diversify its traditional tourism products with the development of loss-leader products based on ecotourism. The island of Dominica is attempting to attract other types of international stakeholders based on ecotourism in order to access the so-called "mass" tourism market.

4.1. The Dominican Republic: the limits of non-differentiated or mass tourism

The Dominican Republic (area: 48,734 km²; 10.4 million inhabitants in 2013) is the leading tourist destination in the Caribbean. It has founded its economic development on a specialization in traditional beach tourism, mass tourism offering all-inclusive packages.

Revenue from tourism has increased dramatically, rising from 1,224 million dollars in 1980 to 5,065 million dollars in 2013[15]. This tourism dynamic has contributed to the Dominican economic boom observed over the past twenty years, exhibiting annual average GDP growth per inhabitant of 4% compared to 1.8% for the Latin America/Central America/Caribbean region as a whole (ILO, 2013).

In 2012, the Dominican Republic offered 66,019 rooms (compared to 19,000 in 1990), with an occupancy rate of 70.3% and the tourist industry employed 201,235 people directly and indirectly (compared to 88,000 in 1990). According to sources in the Central Bank, direct tourism (hotel sector, bars and restaurants) represented 6.1% of GDP in the Dominican Republic. This figure would jump to 12% of GDP if we were to add the significant share of activity generated by tourism in the transport, construction and retail sectors. The country has welcomed some

[14] These two islands were chosen for their geographic location (Caribbean zone) and the tourism development policy implemented in this zone. Comparisons are drawn with regard to the development trajectories of these two islands which belong to the same host territory and adopt similar political development strategies. It is for these reasons that the difference in size is not a decisive factor of comparison.

[15] Dominican Republic Ministry of Tourism.

4.5 million tourists, with half of them coming from the United States. This means that the economic growth of the country depends on tourists primarily arriving from the United States, Canada and Europe.

Luxury hotels are located on the island's eastern coastal fringe and welcome tourists benefiting from "all-inclusive" deals. The only economic benefits enjoyed at local level relate to jobs because with most of the hotels belonging to foreign groups, the currency also remains abroad. This spatial concentration of tourism activities exacerbates the pressure on resources and leads to significant damage, while limiting the spillover effects for the local territories and populations.

The face of tropical beach tourism has nevertheless changed; not only is it currently facing heightened global competition but customers are now looking for other activities in addition to the beach, thereby encouraging islands with specific heritage assets to turn to ecotourism in a bid to diversify their basic tourism products and to be in a position to attract other types of customer in the long term. For the Dominican Republic, this form of alternative tourism also offers the chance to diversify the product per day which can be offered to guests staying in beach resorts.

Turning to ecotourism would facilitate a geographic redeployment of tourists outside the already saturated, strictly seaside zones, primarily towards the interior with its rich and varied natural heritage. The island boasts the highest summit in the West Indies, the Pico Duarte (3090m), the largest salt lake in the Caribbean, Lake Enriquillo, 14 national parks and 7 scientific reserves with a unique biodiversity. Promoting the attractiveness of these sites would contribute to reducing tourist pressure and redistributing the sites visited while having a positive impact on the other host populations.

"By its very principles, ecotourism cannot be a form of tourism which attracts many people and it is therefore often presented as a complement to traditional tourism; it attracts both a specialist clientele and traditional tourists wishing to diversify their activity during their stay" (Augier, 2007). This intrusion of traditional tourism into the sphere of ecotourism can be dangerous if it satisfies purely commercial rationales where ecotourism is merely another consumer product.

The Dominican Republic must now reconcile these different forms of tourism which should be able to coexist in order to reduce the country's exposure to different types of shock (macroeconomic disturbances, environmental risks, social tension, etc.) and enable it to make it a lever of "sustainable" development.

4.2. The island of Dominica: the choice of ecotourism

A relatively isolated state in the Lesser Antilles, the island of Dominica (751 km², fewer than 80,000 inhabitants in 2013), does not enjoy sufficient endowments to offer traditional beach tourism due to its location, its size and its geographical characteristics.

Like several islands in the Caribbean area, the island of Dominica – independent since 1978 and a member of the Commonwealth – chose ecotourism in the 1990s as this type of tourism corresponded to its need to diversify its economic activities. The flows remain weak, with fewer than 85,000 tourists in 2006 (CTO, 2007 cited by Dehoorne in Breton, 2011) following a downward trend resulting from the cost of air travel, so that fewer than 79,000 tourists visited in 2013[16]. Despite a low number of visitors in absolute terms, Dominica is characterized by a relatively high level of specialization in tourism (greater than 10% of the GDP) in comparison to other sectors of the economy and the desire of the local authorities is to increase this level to 15%.

Now an emerging tourist destination, Dominica calls on its resources and territorial stakeholders as well as foreign investors to anchor its development in ecotourism, thereby favoring products based on its natural and social heritage. It has forged an image of being a "nature island" or "the island of 365 rivers" and makes use of its numerous environmental assets such as Morne Diablotin (1,477 m), its eight volcanos including the second largest bubbling crater lake in the world, several national parks (Morne Trois Pitons, Cabrits) and an exceptional biodiversity (about one hundred and seventy permanent or migratory species). The tourism installations themselves are scaled accordingly: no tourist accommodation site has in excess of 100 beds.

In small island areas such as Dominica, developing tourism focused on specialist tourism products positioned in growth sectors such as natural and cultural heritage can attract both wealthy tourists and those who are keen to discover and promote all the assets and resources to be found on the island.

Dominica therefore founds its economic development on differentiated tourism based on its natural riches and its specific cultural character, placing it among the destinations enjoying a relatively high level of income generated by each visitor: "With its rich historical, Amerindian, French, British and African heritages, Dominican culture is a fundamental element of heritage bearing witness to the particularity of island" (Bruce, 2010).

[16] 2013 visitor statistics report, Discover Dominica Authority, March 2014.

Dominica is currently attempting to change its positioning in the tourist sector by using the lever of ecotourism to provide access to international tourism and enable it to open itself to the international financing of mass tourism. This strategy could lead to forms of undifferentiated tourism which would pull the destination towards category A mentioned earlier, thereby increasing its vulnerability.

5. CONCLUSION

The effects of tourism on the vulnerability and sustainability of SIDS' growth trajectories depend on the type of tourism developed. We demonstrate that differentiated tourism (more expensive, niche, innovative or based on a unique cultural heritage), helps reduce the vulnerability and increase genuine savings of island economies once it enables this heritage to be conserved (irrespective of its nature), thereby overcoming the challenges of strong sustainability. If, in contrast, there is little heritage in the tourism product on offer, replaced by other less-differentiating island attributes (such as the sea, beach and resorts), we return to an undifferentiated tourism product particularly subject to price competitiveness. With regard to undifferentiated tourism products, price competition comes fully into play and island attributes represent a major handicap, in particular due to geographic remoteness and the related costs, dependence for provisions (energy, food commodities, household equipment, etc.). Moreover, instabilities on the international market can affect the demand for tourism in outbound countries, a phenomenon which be passed on to the domestic island economy through the tourist sector. All these external factors which are beyond the control of the local economy have significant impacts on the level of vulnerability of the growth trajectories of the SIDS concerned.

For all that, adopting a differentiated tourism strategy does not guarantee the sustainability of island economy development trajectories. The deterioration of the heritage resulting from its use must be offset by investment in protective and restorative measures. Above a certain number of tourists, tourist heritage – included culture-based heritage – deteriorates drastically and the tourism service provided loses its attractiveness if the investments in the economic dimensions do not offset this damage caused.

Heritage and revenue dimensions remain at the heart of the economic trajectories of small island economies. Beyond the issue of effectively assessing public policies, incorporating these dimensions in evaluating the limits of specializing in tourism is also an ethical question reflecting what one generation wants to hand on to subsequent generations.

REFERENCES

Acemoglu D., Johnson S., Robinson J., Thaicharoen Y., 2003. Institutional causes, macroeconomic symptoms: volatility, crises and growth. *Journal of Monetary Economics* 50(1), 49–123.

Adamou A., Clerides S., 2010. Prospects and limits of tourism-led growth: The international evidence. *Review of Economic Analysis*, 3, 287–303.

Aghion P, Banerjee A, Piketty T, 1999. Dualism and macroeconomic volatility. *Quarterly Journal of Economics* 114(4):1359–1397.

Anbarci N., Hill J., Kirmanoglu, H., 2011. Institutions and Growth Volatility. *Economic Papers: A journal of applied economics and policy*, 30: 233–252.

Arezki R., Cherif R., Piotrowski J., 2009. Tourism Specialization and Economic Development: Evidence from the UNESCO World Heritage List. *IMF Working Paper*, WP/09/176, 1-24.

Atkinson G., Hamilton K. 2003. Savings, Growth and the Resource Curse Hypothesis. World Development 31 (11), 1793–1807.

Augier D., 2007. L'écotourisme forestier : pour un rapprochement entre tourisme et environnement à la Martinique. *Études caribéennes*, 6. http://etudescaribeennes.revues.org/440

Bejan M., 2006. Trade openness and output volatility. *MPRA Paper* 2759.

Boos A., Holm-Müller K., 2013. The Relationship between the Resource Curse and Genuine Savings: Empirical Evidence, Journal of Sustainable Development 6(6), 59-72.

Briguglio L., 1995. Small Island States and their Economic Vulnerabilities. *World Development* 23 (9), 1615-32.

Briguglio L., Galea W., 2003. Updating and Augmenting the Economic Vulnerability Index. *Occasional Paper* 4, *Islands and Small States Institute*, Université de Malte.

Brida J. G., Barquet A., Risso W. A., 2009. Causality between economic growth and tourism expansion: Empirical evidence from Trentino-Alto Adige". *Tourismos: An International Multidisciplinary Journal of Tourism*, 5(2), 87–98.

Bruce J.-B., 2010. Identité et développement dans le petit Etat de la Dominique : le rôle de la diaspora . *Études caribéennes,* 16.

Cariolle J., Goujon M., 2013, A retrospective economic vulnerability index 1990-2011 - Using the 2012 UN-CDP definitions. Ferdi, Document de travail I17.

CCBP. Programme de renforcement des capacités dans les Caraïbes. Dans le patrimoine mondial. Gestion du tourisme dans les sites patrimoniaux". Module 2. UNESCO. Convention du patrimoine mondial.

Couharde C., Geronimi V., Maître d'Hôtel E., Taranco A., 2010. Les enjeux liés à la mesure du capital naturel : l'exemple de la Nouvelle Calédonie. *European Journal of Development Research* 23, 151-173.

Couharde C., Geronimi V., Maître d'Hôtel E., Taranco A., 2011. Vulnérabilité et Développement Soutenable en Nouvelle-Calédonie. *Mondes en développement,* Vol. 39, 2, n°154.

Daly, H.E., 1990. Towards Some Operational Principles of Sustainable Development. *Ecological Economics* 2, 1-6.

Dehoorne O., Saffache P., 2008. Le tourisme dans les îles et littoraux tropicaux : ressources et enjeux de développement . *Études caribéennes* 9-10. http://etudescaribeennes.revues.org/852

Dehoorne O., Saffache P., Augier D., 2007. Tourisme, écotourisme et stratégies de développement dans la Caraïbe . *Études caribéennes*, 6. http://etudescaribeennes.revues.org/3383

Dehoorne O., 2011. Tourisme durable et écotourisme. Le positionnement des destinations caribéennes " in J-M. Breton (dir), *Tourisme durable et patrimoines. Une dialectique développementale ? (Europe – Caraïbe – Amériques – Afrique – Asie)*, Karthala-Crejeta, 2011.

Dietz S., Neumayer E., Soysa, I. (2007). Corruption, the resource curse and genuine saving. Environment and Development Economics, 12(1). 33-53

Easterly W., Islam R., Stiglitz J., 2001. Shaken and stirred: Explaining growth volatility. in Annual World Bank Conference on Development Economics, 191–211.

Ferreira da Silva G., 2002. The impact of financial system development on business cycles volatility: Cross-country evidence. *Journal of Macroeconomics* 24(2), 233–253.

Fiaschi D., Lavezzi A.M., 2005. An Empirical Analysis of Growth Volatility: a Markov Chain Approach. *in* J. Leskow, M. Puchet, L. F. Punzo (eds.), *New Tools of Economic Dynamics*, Springer.

Froger G., 2012. Le tourisme durable dans les suds : solution ou mirage ? . *Mondes en développement*, 157, 1, 29-46.

Fusco Girard L., Nijkamp P., 1997. Le valutazioni per lo sviluppo sostenible delle citta e del territorio. Milan, F. Angeli.

Geronimi V., 2013. Développement soutenable et vulnérabilités. Les contraintes spécifiques au développement durable dans les petites îles. Colloque international Le développement durable en Océanie : vers une éthique nouvelle ?, 24-26 avril, Province Nord de Nouvelle-Calédonie.

Ghali M., 1976. Tourism and economic growth an empirical study. *Economic Development and Cultural Change*, 24(3), 527–538.

Guillaumont P., 2006. La vulnérabilité macroéconomique des pays à faible revenu et les réponses de l'aide. *Revue d'Economie du Développement,* 20(4), 21-77.

Hamilton K., 1994, Green Adjustments to GDP, Resources Policy, vol. 20, n° 3, 155-168.

Hamilton K., 2006, Where is the wealth of nations? Measuring capital for the 21st century. Washington, D.C.: The World Bank.

Hamilton K., Clemens M., 1999. Genuine Savings Rates in Developing Countries. *World Bank Economic Review* 13 (2), 333-356.

Hampton M., Jeyacheya J., 2013. Tourism and Inclusive Growth in Small Island Developing States. The World Bank, Commonwealth Secretariat, 104.

Holzner M., 2011. Tourism and economic development: The beach disease?. *Tourism Management*, 32, 922–933.

Jin J. C., 2011. The effects of tourism on economic growth in Hong Kong. *Cornell Hospitality Quarterly*, 52(3), 333–340.

Kent C., Smith K., Holloway J., 2005. Declining output volatility: What role for structural change?" *in* Christopher Kent & David Norman (ed.)*, The Changing Nature of the Business Cycle,* Reserve Bank of Australia.

Lanza A., Pigliaru, F., 2000. Tourism and economic growth: Does country's size matter?" *Rivista Internazionale di Scienze Economiche e Commerciali*, 47, 77-85.

Lean H., Tang C. F., 2010. Is the tourism-led growth hypothesis stable for Malaysia?" A note. *International Journal of Tourism Research*, 12(4), 375–378.

Licciardi A., Bigio G., 2010. The Urban Rehabilitation of Medinas. The World Bank experience in the Middle East and North Africa. The World Bank, Washington, 29.

López Gómez M. D., 2007, *Turismo sin desarrollo. Los intereses creados como amenaza al sector turístico de República Dominicana*, OXFAM.

McElroy 2003. Tourism Development in Small Islands Across the World. *Geografiska Annaler,* 85B, 4, 321-242.

Martin et al., 2004. Are Cultural Heritage Visitors Really Different from Other Visitors?. *Tourism Analysis,* 9, ½, 129-134.

Narayan P. K., Narayan S., Prasad A., Prasad B. C., 2010. Tourism, and economic growth: A panel data analysis for Pacific Island countries. *Tourism Economics*, 16(1), 169-183.

OIT, 2013. Crecimiento, empleo y cohesión social en Republica Dominicana. rapport de l'Organisation Internationale du Travail.

Pablo-Romero M. del P., Molina J.A., 2013. Tourism and economic growth: A review of empirical literature. *Tourism Management Perspectives*, 8, 28-41.

Pearce D.W., Atkinson G., 1993. Capital theory and the measurement of sustainable development: an indicator of weak sustainability. *Ecological Economics*, 8, 103-108.

Poirine B., 1994. Développement économique et traditions socio-culturelles dans le Pacifique insulaire. *Journal de la Société des océanistes*, 98, pp. 9-20.

Poirine B., 1997. A Theory of Remittances as an Implicit Family. *World Development*, Vol. 25, No. 4, pp. 583-611.

Raboteur J., 2011. La Caraïbe insulaire. Une zone de développement touristique durable . in J-M. Breton (dir), *Tourisme durable et patrimoines. Une dialectique développementale ? (Europe – Caraïbe – Amériques – Afrique – Asie)*, Karthala-Crejeta, 2011.

Richards G. (ed.), 2007, *Cultural Tourism: Global and Local Perspectives*, Haworth Press, New York.

Sachs J., Warner A. M. 1995. Natural resource abundance and economic growth. In: NBER Working Paper 5398.

Sachs J., Warner A. M. 2001. The curse of natural resources, European Economic Review, 45, issue 4-6, p. 827-838.

Sato M., Samreth S., Sasaki K. 2013. The Stability of Sustainable Development Path and Institutions: Evidence from Genuine Savings Indicators, MPRA Paper 48983, University Library of Munich, Germany.

Seetanah B., 2011. Assessing the dynamic economic impact of tourism for island economies. *Annals of Tourism Research*, 38(1), 291-308.

Schubert F. S., Brida J. G., Risso, W. A., 2010. The impacts of international Tourism demand on economic growth of small economies dependent of tourism. *Tourism Management*, 32(2), 377-385.

Sequeira T. N., Nunes, P. M., 2008. Does tourism influence economic growth? A dynamic panel data approach". *Applied Economics*, 40, 2431-2441.

Soysa, I., Bailey, J., Neumayer E. (2010). Free to Squander? Democracy and Sustainable Development, 1975-2000. In R. A. Matthew (Ed.), Global environmental change and human security (pp. 262-289). Cambridge, NY: MIT Press.

Soysa, I., Neumayer E. (2005). False Prophet, or Genuine Savior? Assessing the Effects of Economic Openness on Sustainable Development, 1980-1999. International Organization, 59, 731-772.

Spilanis I., 2006. Tourism Economic, Social and Ecological Footprint in a Sustainable Perspective. The case of Aegean islands. Paper presented at the IGR-2 Partnerships Day, Beijing.

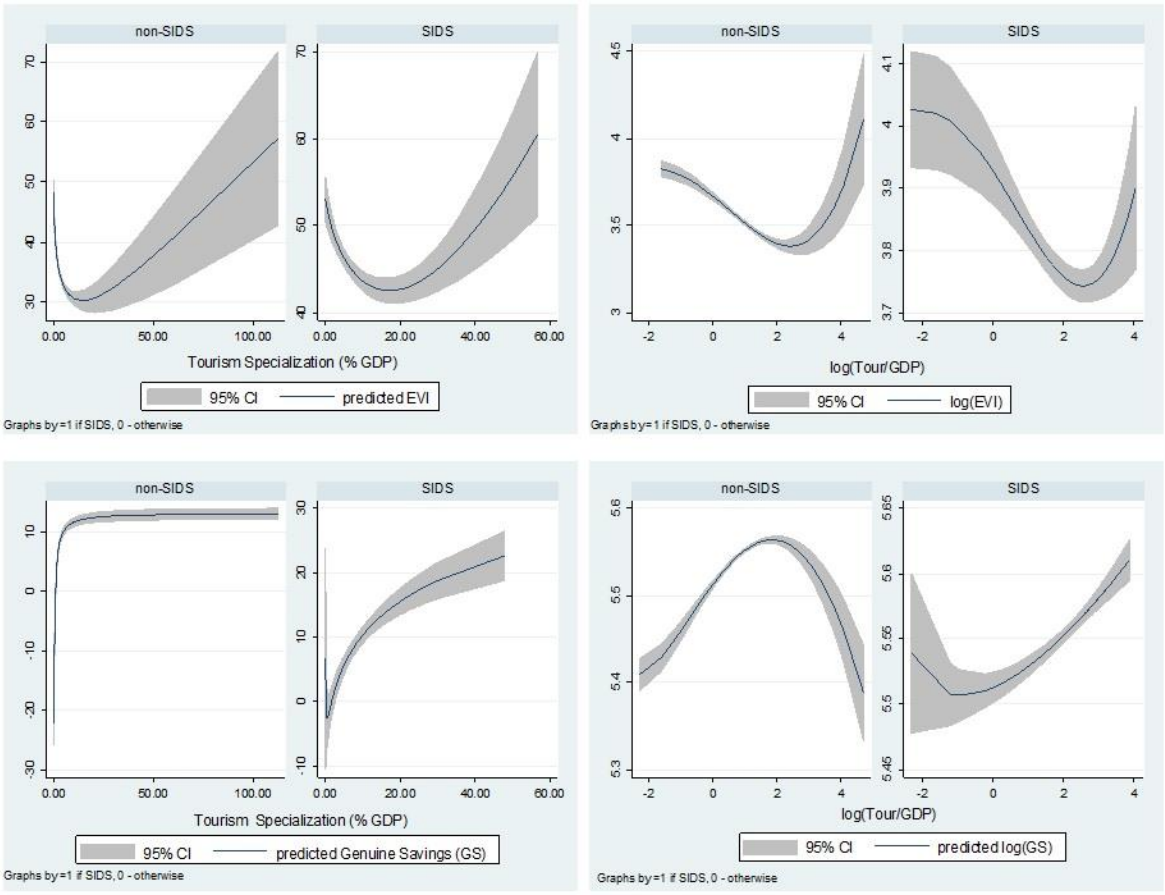
Throsby, D., 2002. Cultural capital and Sustainability concepts in the economics of cultural heritage" in de la Torre M. (ed.), *Assessing the Values of Cultural Heritage*, Los Angeles, Getty Conservation Institute.

Vernières M., Mengin Ch., Patin V., Geronimi V., Dalmas L., Noël J.F., Tsang King Sang J., 2012, Méthodologies d'évaluation économique du patrimoine urbain : une approche par la soutenabilité, *A savoir* n° 13, AFD, Paris.

Zappino V., 2005. Caribbean Tourism and Development: An overview. ECDPM Discussion Paper No. 65.

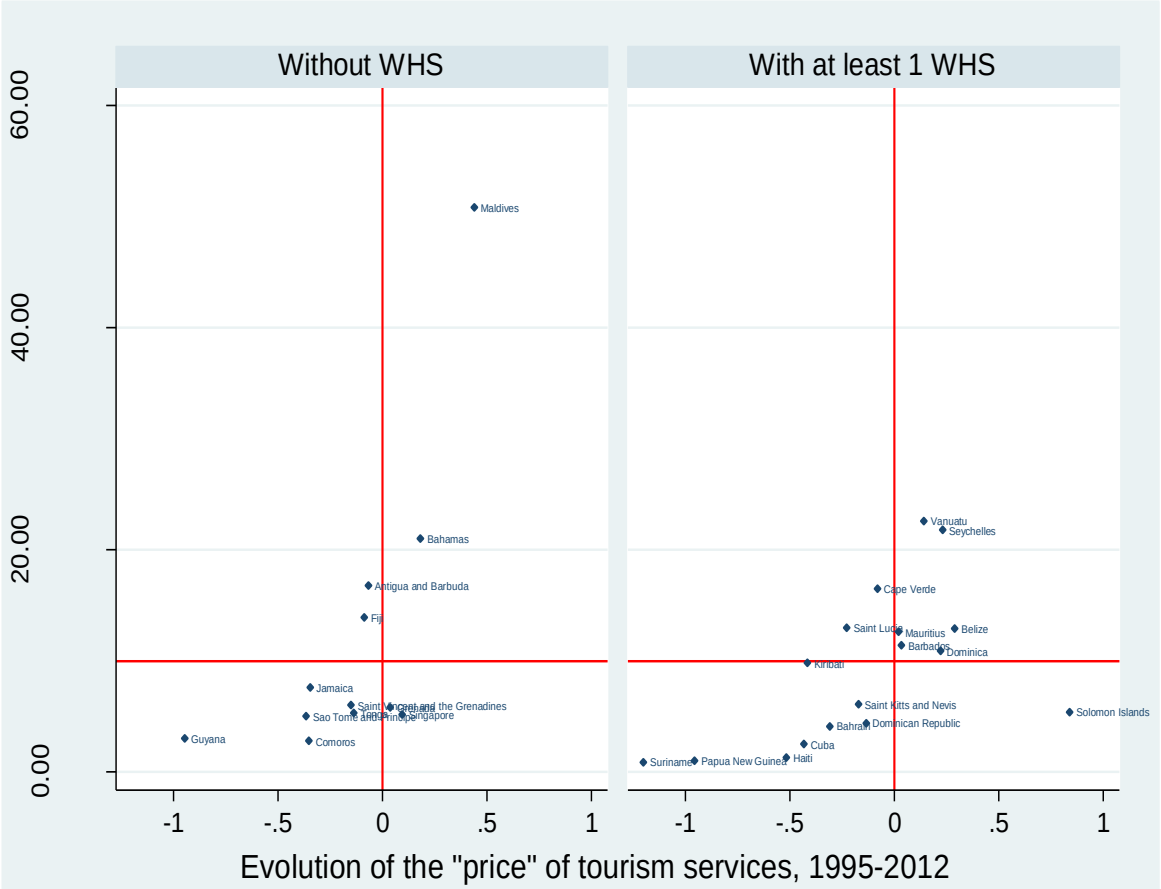
APPENDICES

Figure A.1. Relations between specialization in tourism (% GDP), economic vulnerability (EVI) and sustainability (GS); SIDS compared to other countries



Note: we observe an improved data distribution for log variables (IC 95%), in particular for EVI.

Figure A.2. Typology of SIDS according to the intensity of specialization in tourism and the changing prices of tourism (1995-2012)



Graphs by presence of UNESCO world heritage sites (WHS)

Table A.1. Definitions and sources of variables

Variable	Definition	Source
EVI	Retrospective EVI 2012	Cariolle, Goujon (2013)
GS	Genuine savings (or adjusted net savings), excluding particulate emission damage (% of GNI)	World Bank
GDPcapGrowth	GDP growth per habitant (% annual)	World Bank
FH	Democracy by Freedom House: average of "political rights" & "civil liberties" indicators	*Freedom in the World*, by Freedom House
Education	Length of secondary education (years)	World Bank
Popul	Total population	World Bank
GDPcap2005	GDP per habitant (constant 2005 dollars)	World Bank
AgrGDP	Agriculture, value added as % of GDP	World Bank
CreditGDP	Domestic credit in private sector (% of GDP)	World Bank
GovExpend	State final consumption spending (% of GDP)	Authors' calculations
Open	Economic openness: (export + import) / GDP	World Bank, authors' calculations
K/L	Capital to labor ratio	World Bank
NatResExp	Natural resources (fuel, ores and metals) exports (% of merchandise exports)	World Bank
AdeDepend	Age dependency ratio: the ratio of people younger than 15 and older than 64 to the working-age population [15-64 years old] (% of working-age population)	World Bank
UrbPop	Urban population (% of total)	World Bank
Trend	Trend over time	Authors' calculations
WHS	Cumulative number of world heritage sites (of any nature: cultural, natural, mixed)	UNESCO
TourGDP	Contribution of international tourism to GDP (%)	WTTC
TourPrice	"Tourism Price" calculated as a Hodrick-Prescott trend of TourSpendig / TourArriv	Authors' calculations
TourSpending	*Tourist spending (from abroad) in billion USD (constant 2011)*	*WTTC*
TourArriv	*International tourism, number of arrivals*	*World Bank*

Table A.2. Number of observations available for each variable and per SIDS

(max. 19 obs., 1990-2008)

SIDS	lnEVI	lnGS	GDPcapGrowth	lnFH	lnEducation	lnGDPcap2005	lnAgrGDP	lnCreditGDP	lnGovExpend	lnOpen	lnPopul	lnK/L	lnNatResExp	lnAgeDep	lnUrbPop	lnTourGDP	lnTourPrice	lnWHS
Antigua and Barbuda	19	0	17	19	19	19	19	19	19	19	19	0	4	19	19	19	14	19
Bahrain	**19**	**19**	**18**	**19**	**19**	**19**	**6**	**19**	**19**	**19**	**19**	**19**	**16**	**19**	**19**	**19**	**14**	**19**
Bahamas	**19**	**19**	**14**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**12**	**19**	**19**	**19**	**14**	**19**
Belize	19	19	19	19	19	19	19	19	19	19	19	19	15	19	19	19	14	19
Barbados	**19**	**19**	**15**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**14**	**19**
Cook Islands	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	19
Comoros	**19**	**10**	**15**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**2**	**19**	**19**	**19**	**14**	**19**
Cape Verde	**19**	**2**	**19**	**19**	**19**	**19**	**19**	**19**	**2**	**19**	**19**	**19**	**9**	**19**	**19**	**19**	**14**	**19**
Cuba	19	0	15	19	19	19	19	0	19	19	19	19	8	19	19	19	14	19
Dominica	19	19	15	19	19	19	19	19	19	19	19	0	16	0	19	19	14	19
Dominican Republic	**19**	**19**	**17**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**14**	**19**	**19**	**19**	**14**	**19**
Fiji	**19**	**19**	**15**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**14**	**19**	**19**	**19**	**14**	**19**
Micronesia, Federated States of	0	0	12	18	19	19	14	14	0	0	19	0	0	19	19	0	0	19
Guinea-Bissau	19	16	15	19	19	19	19	19	12	19	19	13	2	19	19	0	0	19
Grenada	19	0	14	19	19	19	19	19	19	19	19	0	18	19	19	19	14	19
Guyana	**19**	**14**	**13**	**19**	**19**	**19**	**19**	**19**	**19**	**16**	**19**	**19**	**12**	**19**	**19**	**19**	**14**	**19**
Haiti	19	5	7	19	19	11	0	18	16	18	19	0	3	19	19	19	14	19
Jamaica	19	15	10	19	19	1	16	19	18	15	19	15	19	19	19	19	14	19
Kiribati	19	3	15	19	19	19	19	0	3	19	19	0	3	19	19	19	14	19
Saint Kitts and Nevis	19	0	18	19	19	19	19	19	19	19	19	0	15	0	19	19	14	19
Saint Lucia	**19**	**19**	**17**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**14**	**19**
Maldives	**19**	**11**	**6**	**19**	**19**	**8**	**14**	**19**	**11**	**19**	**19**	**12**	**3**	**19**	**19**	**19**	**14**	**19**
Marshall Islands	0	0	13	18	19	19	0	0	0	0	19	0	0	0	19	0	0	19
Mauritius	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**14**	**19**
New Caledonia	0	0	10	0	10	0	8	0	1	10	19	1	10	19	19	0	0	19
Niue	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	19
Nauru	0	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	19
Palau	0	0	12	15	19	18	17	0	0	18	19	0	0	0	19	0	0	19
Papua New Guinea	**19**	**15**	**12**	**19**	**19**	**19**	**15**	**19**	**15**	**15**	**19**	**19**	**10**	**19**	**19**	**19**	**14**	**19**
Singapore	**19**	**0**	**17**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**14**	**19**
Solomon Islands	**19**	**11**	**13**	**19**	**19**	**19**	**17**	**19**	**10**	**19**	**19**	**9**	**0**	**19**	**19**	**19**	**14**	**19**
Sao Tome and Principe	**19**	**8**	**7**	**19**	**19**	**9**	**9**	**9**	**0**	**9**	**19**	**0**	**3**	**19**	**19**	**19**	**14**	**19**
Suriname	**19**	**15**	**14**	**19**	**19**	**19**	**19**	**19**	**16**	**16**	**19**	**16**	**17**	**19**	**19**	**18**	**14**	**19**
Seychelles	**19**	**14**	**13**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**0**	**19**	**19**	**19**	**19**	**14**	**19**
Timor-Leste	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
Tonga	**19**	**12**	**15**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**4**	**19**	**19**	**19**	**14**	**19**
Trinidad and Tobago	19	19	17	19	19	19	19	19	19	19	19	19	19	19	19	0	0	19
Tuvalu	19	0	11	19	19	19	9	0	0	0	19	0	0	0	19	0	0	19
Saint Vincent and the Grenadines	**19**	**19**	**17**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**16**	**19**	**19**	**19**	**14**	**19**
Vanuatu	**19**	**19**	**17**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**19**	**18**	**3**	**19**	**19**	**19**	**14**	**19**
Samoa	19	0	15	19	19	19	0	19	0	15	19	0	9	19	19	0	0	19

Note: some SIDS are "excluded" when cross-referencing the data available depending on the years. Our samples in the empirical regressions contain the 18 SIDS in EVI models (in black and red bold print), and 17 SIDS in GS models (in black and blue bold print); the 15 SIDS highlighted in black bold print and underlined are present in both EVI and GS models.

Table A.3. EVI & GS models without tourism as a determining factor

	(1) EVI (RE) ALL	(2) **EVI (FE) ALL**	(3) EVI (RE) ***SIDS***	(4) EVI (FE) ***Other***	(5) **GS (RE) ALL**	(6) GS (FE) ALL	(7) GS (FE) ***SIDS***	(8) GS (FE) ***Other***
lnGDPcapGrowth	-0.003	-0.003	-0.009	-0.001	**0.003***	**0.003***	0.001	**0.003***
	(0.003)	*(0.003)*	*(0.008)*	*(0.003)*	*(0.001)*	*(0.001)*	*(0.003)*	*(0.001)*
lnFH	**-0.051***	**-0.052***	-0.023	**-0.052***	-0.002	-0.003	-0.012	-0.003
	(0.012)	*(0.013)*	*(0.033)*	*(0.013)*	*(0.003)*	*(0.003)*	*(0.011)*	*(0.003)*
lnEducation	**-0.252***	**-0.292***	**-0.312***	**-0.164***	-0.007	0.007	0.069+	-0.026+
	(0.045)	*(0.047)*	*(0.103)*	*(0.056)*	*(0.013)*	*(0.015)*	*(0.038)*	*(0.016)*
lnGDPcap2005	**-0.064***	**-0.095***	**-0.185***	**-0.085***	**0.008***	**0.013***	**-0.165***	**0.030***
	(0.019)	*(0.028)*	*(0.065)*	*(0.029)*	*(0.003)*	*(0.006)*	*(0.024)*	*(0.005)*
lnOpen	**0.047***	**0.042***	**0.106***	**0.035***	-0.001	-0.002	**-0.046***	-0.003
	(0.014)	*(0.015)*	*(0.053)*	*(0.015)*	*(0.004)*	*(0.004)*	*(0.016)*	*(0.004)*
Trend	**-0.003***	**-0.005***	**-0.007***	**-0.004***	0.000	-0.000	0.002+	0.000
	(0.001)	*(0.001)*	*(0.002)*	*(0.001)*	*(0.000)*	*(0.000)*	*(0.001)*	*(0.000)*
lnAgrGDP	**0.038***	**0.054***	-0.031	**0.100***				
	(0.013)	*(0.013)*	*(0.036)*	*(0.015)*				
lnCreditGDP	0.037	0.021	-0.209	0.028				
	(0.025)	*(0.026)*	*(0.171)*	*(0.025)*				
(lnCreditGDP)^2	**-0.009***	-0.006	0.026	-0.007				
	(0.004)	*(0.005)*	*(0.026)*	*(0.005)*				
lnGovExpend	-0.001	0.006	-0.002	0.008				
	(0.014)	*(0.015)*	*(0.041)*	*(0.015)*				
lnPopul	**-0.096***	0.078	**-0.089***	0.079				
	(0.011)	*(0.050)*	*(0.038)*	*(0.053)*				
lnK/L	**-0.044***	**-0.040***	-0.009	**-0.041***				
	(0.011)	*(0.011)*	*(0.042)*	*(0.011)*				
lnNatResExp					**-0.003***	-0.002	**0.007***	**-0.004***
					(0.001)	*(0.001)*	*(0.004)*	*(0.001)*
lnAdeDepend					**-0.030***	**-0.025***	**-0.076+**	**-0.033***
					(0.010)	*(0.010)*	*(0.042)*	*(0.010)*
lnUrbPop					-0.008	-0.006	**0.192***	**-0.046***
					(0.008)	*(0.012)*	*(0.037)*	*(0.012)*
Constant	6.207*	3.726*	7.252*	3.156*	5.658*	5.567*	6.628*	5.699*
	(0.252)	*(0.846)*	*(0.897)*	*(0.944)*	*(0.065)*	*(0.087)*	*(0.301)*	*(0.092)*
Observations	1458	1458	248	1210	1759	1759	174	1585
F test (H0 : ui=0)		71.48*	25.09*	83.18*		31.38*	17.43*	33.01*
Hausman test (FE vs RE; chi2 (dl))	36.98*		11.87	54.24*	11.21		19.23*	17.48*

Legend: standard errors in parentheses; + p < 0.10, * p < 0.05

Table A.4. Vulnerability, Tourism specialization, differentiation and heritage

	(1) EVI (RE) All	**(2) EVI (FE) All**	(3) EVI (RE) All	**(4) EVI (FE) All**	(5) EVI (FE) ***SIDS***	(6) EVI (FE) ***Non-SIDS***
lnGDPcapGrowth	-0.003	-0.003	-0.004	-0.004	-0.005	-0.003
	(0.003)	*(0.003)*	*(0.003)*	*(0.003)*	*(0.008)*	*(0.003)*
lnFH	**-0.102***	**-0.106***	**-0.106***	**-0.111***	**-0.155***	**-0.101***
	(0.015)	*(0.016)*	*(0.015)*	*(0.016)*	*(0.071)*	*(0.015)*
lnEducation	**-0.131***	**-0.166***	**-0.099+**	**-0.119***	**-0.300***	0.002
	(0.051)	*(0.054)*	*(0.051)*	*(0.053)*	*(0.119)*	*(0.063)*
lnGDPcap2005	**-0.049***	**-0.102***	**-0.038+**	**-0.081***	-0.093	-0.049
	(0.022)	*(0.035)*	*(0.022)*	*(0.035)*	*(0.148)*	*(0.036)*
lnAgrGDP	0.020	**0.040***	0.011	0.024	**-0.194***	**0.060***
	(0.014)	*(0.016)*	*(0.014)*	*(0.016)*	*(0.053)*	*(0.016)*
lnCreditGDP	0.011	-0.006	-0.005	-0.022	-0.165	-0.004
	(0.029)	*(0.029)*	*(0.029)*	*(0.029)*	*(0.214)*	*(0.028)*
$(lnCreditGDP)^2$	-0.002	0.002	-0.000	0.004	0.050	-0.002
	(0.005)	*(0.005)*	*(0.005)*	*(0.005)*	*(0.031)*	*(0.005)*
lnGovExpend	0.016	0.021	0.015	0.020	-0.043	0.017
	(0.016)	*(0.017)*	*(0.016)*	*(0.017)*	*(0.052)*	*(0.017)*
lnOpen	**0.076***	**0.087***	**0.072***	**0.080***	0.024	**0.060***
	(0.017)	*(0.018)*	*(0.017)*	*(0.018)*	*(0.078)*	*(0.018)*
lnPopul	**-0.090***	0.007	**-0.097***	-0.048	0.479	-0.023
	(0.015)	*(0.055)*	*(0.015)*	*(0.055)*	*(0.293)*	*(0.056)*
lnK/L	**-0.049***	**-0.042***	**-0.056***	**-0.049***	-0.030	**-0.046***
	(0.013)	*(0.013)*	*(0.012)*	*(0.013)*	*(0.080)*	*(0.013)*
Trend	**-0.006***	**-0.007***	**-0.006***	**-0.007***	**-0.035***	**-0.006***
	(0.001)	*(0.001)*	*(0.001)*	*(0.002)*	*(0.009)*	*(0.002)*
lnTourGDP	0.038	0.045	-0.281	-0.461	**-20.371***	-0.573
	(0.208)	*(0.208)*	*(0.466)*	*(0.464)*	*(3.069)*	*(0.438)*
lnTourPrice	**-0.133***	**-0.177***	**-0.271***	**-0.344***	**-2.062***	**-0.323***
	(0.035)	*(0.039)*	*(0.047)*	*(0.050)*	*(0.344)*	*(0.048)*
lnTourGDP x lnTourPrice	-0.002	-0.002	0.023	0.035	**1.371***	0.043
	(0.014)	*(0.014)*	*(0.032)*	*(0.032)*	*(0.207)*	*(0.030)*
lnWHS			**-0.539***	**-0.694***	**-6.669***	**-0.698***
			(0.142)	*(0.148)*	*(1.611)*	*(0.140)*
lnTourGDP x lnWHS			0.022	0.075	**3.361***	0.078
			(0.089)	*(0.089)*	*(0.774)*	*(0.084)*
lnTourPrice x lnWHS			**0.038***	**0.049***	**0.451***	**0.049***
			(0.010)	*(0.010)*	*(0.109)*	*(0.010)*
lnTourGDP x lnTourPrice x lnWHS			-0.002	-0.006	**-0.228***	-0.006
			(0.006)	*(0.006)*	*(0.052)*	*(0.006)*
SIDS x lnTourGDP	**-7.194***	**-8.472***	**-10.689***	**-13.938***		
	(1.345)	*(1.416)*	*(2.002)*	*(2.208)*		
SIDS x lnTourPrice	**-0.321***	**-0.379***	**-0.629***	**-0.851***		
	(0.133)	*(0.138)*	*(0.214)*	*(0.237)*		
SIDS x lnTourGDP x lnTourPrice	**0.479***	**0.565***	**0.716***	**0.934***		
	(0.091)	*(0.095)*	*(0.135)*	*(0.149)*		
SIDS x lnWHS			**-2.548***	**-3.242***		
			(1.033)	*(1.102)*		
SIDS x lnTourGDP x lnWHS			**1.574***	**2.096***		
			(0.522)	*(0.551)*		
SIDS x lnTourPrice x lnWHS			**0.172***	**0.219***		
			(0.070)	*(0.075)*		
SIDS x lnTourGDP x lnTourPrice x lnWHS			**-0.107***	**-0.142***		
			(0.035)	*(0.037)*		
SIDS	**5.048***		**9.554***			
	(1.964)		*(3.161)*			
Constant	7.753*	8.064*	9.823*	12.287*	30.965*	9.055*
	(0.578)	*(1.160)*	*(0.760)*	*(1.315)*	*(6.207)*	*(1.297)*
Observations	1077	1077	1077	1077	165	912
Hausman test (FE vs RE; chi2 (dl))		50.70*		53.80*		

Legend: $^{+}$ $p < 0.10$, * $p < 0.05$ (standard deviations in brackets).

Table A.5. Sustainability, Tourism specialization, differentiation and heritage

	(1) GS (RE) ALL	**(2) GS (FE) ALL**	(3) GS (RE) ALL	**(4) GS (FE) ALL**	(5) GS (FE) ***SIDS***	(6) GS (FE) ***Non-SIDS***
lnGDPcapGrowth	**0.003***	**0.003***	**0.003***	**0.003***	0.002	**0.003***
	(0.001)	*(0.001)*	*(0.001)*	*(0.001)*	*(0.003)*	*(0.001)*
lnFH	-0.003	-0.004	-0.002	-0.003	0.015	-0.004
	(0.003)	*(0.004)*	*(0.003)*	*(0.003)*	*(0.022)*	*(0.003)*
lnEducation	**-0.024+**	-0.007	**-0.036***	-0.015	-0.060	**-0.034***
	(0.014)	*(0.015)*	*(0.013)*	*(0.015)*	*(0.044)*	*(0.016)*
lnGDPcap2005	**0.016***	**0.038***	**0.018***	**0.044***	**-0.142***	**0.047***
	(0.003)	*(0.007)*	*(0.003)*	*(0.006)*	*(0.046)*	*(0.006)*
lnNatResExp	-0.002	-0.001	**-0.003***	-0.002	0.003	-0.003+
	(0.001)	*(0.001)*	*(0.001)*	*(0.001)*	*(0.004)*	*(0.002)*
lnAdeDepend	**-0.025***	-0.015	-0.011	0.014	0.127+	0.001
	(0.011)	*(0.012)*	*(0.011)*	*(0.012)*	*(0.070)*	*(0.012)*
lnUrbPop	**-0.021***	-0.003	**-0.030***	-0.023	0.069	**-0.030***
	(0.009)	*(0.014)*	*(0.008)*	*(0.014)*	*(0.065)*	*(0.015)*
lnOpen	-0.005	**-0.008+**	-0.004	-0.007	**-0.065***	**-0.012***
	(0.004)	*(0.005)*	*(0.004)*	*(0.004)*	*(0.025)*	*(0.005)*
Trend	0.000	**-0.000+**	-0.000	-0.000	0.002	-0.000
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.002)*	*(0.000)*
lnTourGDP	-0.015	-0.037	0.024	0.061	0.609	0.051
	(0.071)	*(0.072)*	*(0.089)*	*(0.087)*	*(1.062)*	*(0.084)*
lnTourPrice	-0.002	-0.006	0.009	0.004	0.191	0.007
	(0.007)	*(0.008)*	*(0.008)*	*(0.010)*	*(0.137)*	*(0.009)*
lnTourGDP x lnTourPrice	0.001	0.003	-0.001	-0.004	-0.041	-0.004
	(0.005)	*(0.005)*	*(0.006)*	*(0.006)*	*(0.072)*	*(0.006)*
lnWHS			**0.048+**	**0.061***	**2.359***	**0.057***
			(0.028)	*(0.028)*	*(0.575)*	*(0.027)*
lnTourGDP x lnWHS			-0.015	-0.036	**-0.953***	-0.034
			(0.023)	*(0.023)*	*(0.286)*	*(0.023)*
lnTourPrice x lnWHS			-0.003	**-0.004***	**-0.161***	**-0.004***
			(0.002)	*(0.002)*	*(0.039)*	*(0.002)*
lnTourGDP x lnTourPrice x lnWHS			0.001	0.003	**0.065***	0.002
			(0.002)	*(0.002)*	*(0.019)*	*(0.002)*
SIDS x lnTourGDP	0.110	-0.030	0.424	1.038		
	(0.433)	*(0.493)*	*(0.557)*	*(0.740)*		
SIDS x lnTourPrice	**0.101***	**0.108***	**0.146***	**0.294***		
	(0.046)	*(0.050)*	*(0.066)*	*(0.089)*		
SIDS x lnTourGDP x lnTourPrice	-0.006	0.003	-0.029	-0.070		
	(0.029)	*(0.034)*	*(0.038)*	*(0.050)*		
SIDS x lnWHS			**1.986***	**2.261***		
			(0.364)	*(0.384)*		
SIDS x lnTourGDP x lnWHS			**-0.777***	**-0.886***		
			(0.187)	*(0.198)*		
SIDS x lnTourPrice x lnWHS			**-0.136***	**-0.154***		
			(0.025)	*(0.026)*		
SIDS x lnTourGDP x lnTourPrice x lnWHS			**0.053***	**0.060***		
			(0.013)	*(0.013)*		
SIDS	**-1.534***		**-2.144***			
	(0.672)		*(0.966)*			
Constant	5.698*	5.322*	5.513*	4.844*	3.511	5.299*
	(0.127)	*(0.164)*	*(0.142)*	*(0.199)*	*(2.159)*	*(0.169)*
Observations	1402	1402	1402	1402	123.000	1279.000
Hausman test (FE vs RE; chi2 (dl))		66.83*		96.59*		

Legend: $^{+}$ $p < 0.10$, * $p < 0.05$ (standard deviations in brackets).

Table A.6. Marginal effect on vulnerability of tourism specialization (Delta method), dln(EVI)/dln(Tour/GDP) for different values of moderator variables

Negative marginal effect			Positive marginal effect		
ln(TourPrice) ln(WHS)	μ-2σ μ-2σ	**-2,2679***	ln(TourPrice) ln(WHS)	μ+2σ μ-2σ	**1,4286***
ln(TourPrice) ln(WHS)	μ-2σ μ	**-1,1498***	ln(TourPrice) ln(WHS)	μ+2σ μ	**0,6161***
ln(TourPrice) ln(WHS)	μ μ-2σ	**-0,4197***			
ln(TourPrice) ln(WHS)	μ μ	**-0,2669***			
ln(TourPrice) ln(WHS)	μ μ+2σ	-0,1141			
ln(TourPrice) ln(WHS)	μ+2σ μ+2σ	-0,1964			
ln(TourPrice) ln(WHS)	μ-2σ μ+2σ	-0,0318			

Legend: μ average, σ standard deviation; * p < 0.05. Bold figures highlight statistically significant results

Table A.7. Marginal effect on sustainability of tourism specialization (Delta method), dln(GS)/dln(Tour/GDP) for different values of moderator variables

Negative marginal effect			Positive marginal effect		
ln(TourPrice) ln(WHS)	μ-2σ μ+2σ	**-0,3033***	ln(TourPrice) ln(WHS)	μ+2σ μ+2σ	**0,3147***
ln(TourPrice) ln(WHS)	μ+2σ μ-2σ	**-0,2178***	ln(TourPrice) ln(WHS)	μ-2σ μ-2σ	0,2322
ln(TourPrice) ln(WHS)	μ-2σ μ	-0,0355	ln(TourPrice) ln(WHS)	μ μ-2σ	0,0072
			ln(TourPrice) ln(WHS)	μ μ	0,0065
			ln(TourPrice) ln(WHS)	μ μ+2σ	0,0057
			ln(TourPrice) ln(WHS)	μ+2σ μ	0,0484

Legend: μ average, σ standard deviation; * p < 0.05. Bold figures highlight statistically significant results