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Towards a less vulnerable and more sustainable development: heritage tourism in island economies

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Abstract - For many small island economies, international tourism is an essential source of growth. However, considering the sustainability of their development path, it is not necessarily possible nor desirable for all of them. We consider the existence of nonlinear relationships between specialization in tourism, vulnerability and sustainability. By using panel regression analysis, we show that international tourism reduces vulnerability and increases sustainability—captured by the genuine savings—only for intermediate tourism specialization levels. Alternatively, vulnerability increases and sustainability decreases when tourism specialization levels are below [above] certain thresholds, found to be twice less [higher] (or even insignificant) for island economies compared to other countries in the world. We assume that the level of differentiation (through the mobilization of natural and/or cultural heritage) of tourist services should moderate the effect of specializing in tourism on vulnerability and sustainability. Empirical results show that heritage-based tourism is one of the most sustainable strategies for the islands highly relying on tourism activities. Alternative tourism strategies are discussed based on our empirical results and illustrative case studies.

Keywords – **heritage, insularity, sustainable development, tourism, vulnerability**

JEL classification – Z32, O57, Q01

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 small 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 tourist services. Thus, contrary to heritage-based tourism, it does not escape per se, even partially, from the pressures of international competition and doubtfully 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

[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.

economically possible or desirable for all island economies. Specializing 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)[3] that make of international tourism an essential source of growth.

The shifting orientation in the tourism strategy of several island economies that are highly specialized in tourism[4] and essentially offer undifferentiated services toward 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 nonlinear effect of tourism on GDP growth.[5] The relationships between specializing in tourism, economic vulnerability, and sustainability should in part be similar to those that exist between specializing in tourism and growth, as we shall show in the second section by means of econometric analysis. These relationships would thus appear to be nonlinear and, more precisely, from certain thresholds of specializing in tourism, economic vulnerability would increase and sustainability decrease. 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. We assess the proposal whereby for SIDS at a cost disadvantage (remoteness, smallness), differentiated tourist services based

[3] We use here the UNCTAD's [informal] list of SIDS, mainly characterized by "small size, remoteness from large markets and high economic vulnerability to economic and natural shocks beyond domestic control".

[4] 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.

[5] See, for example, Sequeira and Nunes (2008), Narayan et al. (2010), Adamou and Clerides (2010), Holzner (2011); see section 2.1. for a brief literature review.

on heritage may be better suited to ensuring sustainable development while at the same time reducing economic vulnerability.

We first call on an econometric analysis to show that the relationships between tourism and vulnerability (using the *Economic Vulnerability Index* [6] of the UNDP) as well as the relationship between tourism and sustainability (proxied by the *Adjusted Net Savings* [7], also called *genuine savings,* from the World Bank) are affected by thresholds, echoing the results of the literature examining the relationships between tourism and growth (section 2). We then examine the differentiation of tourist services as an explanatory factor of the differing impacts of specializing in tourism on vulnerability and genuine savings (section 3). The main hypothesis we test in this respect is that specialization in differentiated tourism services improves sustainability and reduces vulnerability as compared to other forms of tourism specialization. In order to test this hypothesis, we classify tourism services following two criteria: the evolution of spending per tourist — as a rough proxy of "*tourism price*" [8]— and the presence of world heritage site(s) (based on the World Heritage List of UNESCO). Thus, we identify three tourism categories: mass tourism (negative trend in *tourism price*), luxury tourism (nonnegative trend in *tourism price*), and heritage tourism (increasing *tourism price* and the presence of world heritage sites)[9].

This paper is composed of four sections. After having introduced our research objectives, we discuss in Section 2 the literature linking international tourism, growth, vulnerability, and sustainability.

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[6] Defined by the UNDP and the CERDI, this measure combines an indicator of exposure to shocks (i.e., population, in log; share of agriculture, forest and fisheries in GDP; export concentration of merchandises; remoteness from the word markets, adjusted for landlockness), and an indicator of shocks (i.e., instability of exports of goods and services; instability of agricultural production; homelessness due to natural disasters) (see Cariolle and Goujon, 2013). 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).

[7] Adjusted net savings are equal to net national savings plus education expenditure and minus energy depletion, mineral depletion, net forest depletion, and carbon dioxide. The series considered in this study excludes particulate emissions damage.

[8] More precisely, our variable *TourPrice* represents the trend 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). 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.

[9] **Luxury tourism** is based on the *market segmentation* (higher prices compared to mass tourism, with competitive pressure on the evolution of these prices) while **heritage tourism** is the result of *product differentiation* (alleviating the pressure on tourism prices through « uniqueness »). Following the World Bank and UNESCO, we consider that the mobilization of heritage plays a central role in maintaining "uniqueness", i.e. tourism services differentiation.

Based on an empirical investigation of panel data for up to 18 SIDS and 119 non-SIDS, between 1990 and 2008[10], we investigate the nonlinear relationships between specializing in tourism, vulnerability and genuine savings, and give empirical estimations for thresholds in a comparative analysis of SIDS and non-SIDS. Section 3 extends the empirical analysis to the exploration of the effects of tourism specialization on vulnerability and genuine savings, conditional on tourist services' differentiation. Drawing on our exploratory empirical results, we build in the subsection 3.2 a typology of SIDS based on the specialization in tourism and the differentiation of the services offered to visitors, by providing several illustrated case studies. The final section draws some conclusions and discusses further researches.

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

2.1. Nonlinear 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) as the first to examine this relationship from an empirical standpoint. For instance, by employing a Keynesian approach to test the relationship between tourism development and economic growth in Hawaii, Ghali (1976) found that tourism contributes to increased income but also intensifies the variability of growth, as it is captured by the increase of the coefficient of variation of growth by 21%. 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.

[10] See Table A.2 in appendix for the list of countries.

The impacts of tourism on growth thus differ according to the specializations 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. Some works (e.g., 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 yet at the embryonic stage should maintain diversified economic activities in parallel to the development of the tourist sector.

2.2. Nonlinear relationships between tourism, economic vulnerability, and genuine savings: an empirical investigation

Several factors contribute to the potential exhaustion of the spillover effects of tourism on the rest of the economy. First, a large share of the income derived from international tourism is usually 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. Although on certain islands in the Caribbean zone this sector of activity has generated income that 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 (López Gómez, 2007). 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"[11] (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

[11] Quote translated from French.

resources, growing urbanization, land artificialization, increased traffic, insufficient waste management, deteriorating water quality, etc. Local communities may also experience negative impacts, such as marginalization, shortages (water, energy), lack of respect for local traditions, delinquency, and/or acculturation. More generally, international tourism may have a negative influence upon local culture by affecting indigenous society by way of distortions to traditional lifestyles, values and rituals – *i.e.*, local communities attempt to emulate the apparently attractive lifestyle of tourists, who generally have much greater purchasing power (Wood, 1980).

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 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. Undoubtedly, it would have been more relevant in this study to use a sustainability indicator that takes into account the specificities of the island economies: e.g., freshwater quantity and quality, soil quality, fisheries, biodiversity, sea level rise or the stock of cultural heritage, which are missing from the genuine savings' calculation. However, despite serious limitations, well informed in the academic literature (Ferreira and Vincent, 2005; Gnegne, 2009), the genuine savings have the great advantage of procuring an index of [weak] sustainability available for a wide array of countries (in particular, for developing countries for which

data is generally scarce or not internationally comparable) and years.[12]

The choice of specialization in tourism can also lead to increased vulnerability—that is, "the risk of poor countries seeing their development hampered by the exogenous shocks to which 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 may 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 direct contribution of international tourism to GDP, in %) on vulnerability and sustainability, we perform regressions using unbalanced panel data for the period 1990–2008, adopting the economic vulnerability indicator (**EVI**)[13] 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) compared to the others (78 non-SIDS for which the EVI is available, essentially developing economies, and 119 non-SIDS countries in the GS models).[14]

2.2.1 EVI and GS basic empirical models

Testing a nonlinear (quadratic or cubic) relationship means checking whether the effect of a change

[12] We should note that World Bank's estimates of genuine savings have been subject to critical scrutiny and used to test the underlying theory (e.g., Pillarisetti, 2005; Ferreira and Vincent, 2005; Ferreira et al, 2008). As suggested by Atkinson and Hamilton (2007), questions still arise with regard to the capacity of the adjusted net savings to predict the social welfare or the level of the elasticities of substitution between manufactured capital and natural capital. Despite these limits, genuine savings may still be used as a convenient approximation of "weak sustainability" for small developing countries. Indeed, as found by Ferreira and Vincent (2005), whereas the World Bank's estimates have little value for predicting the magnitude of the difference between the average future consumption and the current consumption of OECD countries, the genuine savings tend to move in the same direction as this difference, in particular in non-OECD (developing) countries. In this study, we are more interested in identifying the sustainability of the economic development path in island economies rather than to estimate an order of magnitude of their genuine progress. Despite its limitations, a negative sign of genuine savings can be interpreted as a clear indication of non-sustainability, whereas when the values are non-negative it indicates only a potential for sustainability.

[13] Although international tourism enters the formula of EVI, this should not be a problem because different, weakly correlated measures are used in our regressions. In particular, our explained variable EVI takes into account the average squared deviation from a "mixed trend" of the current exports (of which international tourism) in absolute terms, whereas our explanatory variable of interest—specialization in tourism—is computed in relative terms (direct contribution to GDP, %) and is less flexible over time.

[14] Table A.2 in appendix lists the countries included in our study (all countries for which data was available).

in the specialization in tourism on economic vulnerability/genuine savings depends 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—that is, 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 genuine savings.

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 percent of 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 production factors (e.g., 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 et al., 2010): accumulation/consumption of economic capital, preservation/depletion of natural capital, and enhancement/decline of social capital (as large measures 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 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 calculation.[15] 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 proxy for natural resource rents. The social assets are captured in our empirical model by human and institutional capitals. In particular, we use duration of secondary education (years) as a measure of human capital (one of the most available indicators for education in the countries around the world), 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 et al., 2007; Sato et al., 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.

[15] 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.

Our **basic empirical** model can therefore be expressed as:

$$\boldsymbol{Y_{it} = \alpha + \beta_1 TourGDP_{it} + \beta_2 (TourGDP)^2_{it} + \beta_3 (TourGDP)^3_{it} + \phi X_{it} + \chi Z_{it} + u_i + e_t + \varepsilon_{it}} \qquad \textbf{(Eq.1)}$$

where $\boldsymbol{Y}$ is the dependent variable (*EVI* - economic vulnerability index and GS – genuine savings), ***TourPIB*** is the level of specialization in tourism (direct contribution of international tourism to GDP), $\boldsymbol{X}$ represents the aforementioned determinants of economic volatility and genuine savings, $\boldsymbol{Z}$ represents the control variables, $\boldsymbol{u_i}$ is the error term fixed over time representing the effects proper to each country, $\boldsymbol{e_t}$ is the time fixed effect denoting unobserved factors that vary over time but are invariant to entities, and $\boldsymbol{\varepsilon_{it}}$ is the random error term. The explanatory variables that we have used are defined in the appendix (Table A.1).

Having observed our empirical data and the quality of the statistical distributions[16], we opt for ***log(EVI)—log/level****(x)* and ***level(GS)—log/level****(x)* equations. Negative data was transformed before taking logs by applying the commonly used technique: log(X-Min(X)+1). Adding or subtracting a constant affects the mean but does not affect variance. However, such transformation leads to much more difficult interpretation of the results because the unit change in log(x) depends on the new values of x. Indeed, log(x) changes quickly at small values of x and log(x) changes slowly for large values of x. Hence, this technique would be quite suitable for control variables (e.g., *GDPcapGrowth*), but is not preferable for our dependent variable *GS*, which we keep in levels in our empirical models.[17] In our dataset, *WHS* has many zeros and low values (median(WHS) = 2 [3] and max(WHS) = 37 [41] for EVI [GS] model); the data was thus multiplied by 10 and added 1 before taking logs. Following O'Hara and Kotze (2010), we chose not taking log of our count variables, especially when standard deviation is small and the mean is large (e.g., *Education1*). Finally, when normality scores do not allow choosing between the variable in log or level, we keep the presentation that makes more sense for discussion (in particular, we do not take log of some variables in relative terms (e.g., *AgeDepend* (%), *UrbPop* (%)).

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

[16] See descriptive statistics in Tables A.3 and A.4 in appendix (for lack of space, we display only statistics for our extended empirical model, discussed in section 3.1).

[17] We should also note that a log transformed GS series (i.e., log(GS-min(GS)+1) has increased skewness and kurtosis (see Table A.4 in appendix).

panel estimation techniques rather than ordinary least squares (OLS). At the same time, the statistics from the Hausman test show that, for our empirical models and specific country samples, the FE model is consistent and the RE model is inconsistent.

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).[18] 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) to (4) in Table 1) and sustainability (models (5) to (8) in Table 1). Given the poor data of some series and the use of proxies for various explanatory factors, we focus on the meaning (sign) and the statistical significance of our empirical results rather than their magnitudes.[19] Based on the Hausman test statistics, we will discuss only the empirical results of models that are consistent (FE models).

Factors such as the economic development (***GDPcap***), capital endowment (***K/L***), education (***Education1***), and the quality of the institutions (***FH*** for democracy) are thus negatively associated with **economic vulnerability**, whereas economic openness and specialization in agriculture would increase vulnerability. The size of the government has no statistically significant effect in these regressions. The development of the financial market appears to increase the vulnerability of SIDS. A negative coefficient for the squared term of ***CreditGDP*** should however suggest the existence of a certain threshold of financial development beyond which the financial market would be sufficiently developed to absorb shocks. Finally, economic vulnerability appears to follow a downward trend.

[18] Chow-type test (run for the models on pooled data, ALL: SIDS + non-SIDS) suggests statistically different results for SIDS and non-SIDS.

[19] However, we would like to emphasize the attention to be cared to our β interpretations. For instance, in the ***log****(EVI)—log/level(x)* model (3) in Table 1, 1 % increase in total population would induce 0.6% increase in macroeconomic vulnerability (log—log), whereas 1 additional percentage point in *AgrGDP* would be associated with an increase of 0.5% (**β*100**) of vulnerability (**log—level**). Alternatively, in the ***level****(GS)—log/level(x)* model (7), an increase of one percentage point in *AgeDepend* would reduce the share of genuine savings in the gross national income by 0.4 percentage points (level—level), whereas a 1% increase of GDP/cap would reduce GS by 0.31 (**β/100**) percentage points (**level—log**).

Table 1. Nonlinear effect of tourism specialization

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Dependent variable	***lnEVI***	***lnEVI***	***lnEVI***	***lnEVI***	***GS***	***GS***	***GS***	***GS***
Explanatory variables	(RE) ALL	(FE) ALL	(FE) **SIDS**	(FE) **Non-SIDS**	(RE) ALL	(FE) ALL	(FE) **SIDS**	(FE) **Non-SIDS**
GDPcapGrowth	0.001^{+} *(0.001)*	**0.001*** *(0.001)*	-0.002 *(0.002)*	**0.002*** *(0.001)*	**0.185*** *(0.041)*	**0.149*** *(0.042)*	-0.157 *(0.145)*	**0.224*** *(0.042)*
lnFH	**-0.042*** *(0.011)*	**-0.039*** *(0.011)*	-0.006 *(0.033)*	**-0.041*** *(0.012)*	-0.819 *(0.746)*	-1.328^{+} *(0.801)*	-4.301 *(3.482)*	-0.735 *(0.790)*
Education1	**-0.036*** *(0.007)*	**-0.039*** *(0.007)*	**-0.078*** *(0.017)*	**-0.031*** *(0.008)*	-0.859^{+} *(0.514)*	0.060 *(0.583)*	0.646 *(1.583)*	-1.082^{+} *(0.632)*
lnGDPcap	**-0.078*** *(0.018)*	**-0.141*** *(0.025)*	**-0.207*** *(0.077)*	**-0.121*** *(0.027)*	**3.938*** *(0.759)*	**8.435*** *(1.434)*	**-31.274*** *(8.455)*	**10.162*** *(1.390)*
lnOpen	**0.040*** *(0.013)*	**0.042*** *(0.013)*	0.095^{+} *(0.052)*	**0.029*** *(0.014)*	0.485 *(0.892)*	0.270 *(0.994)*	-1.320 *(4.084)*	-0.552 *(1.010)*
Trend	**-0.003*** *(0.001)*	**-0.005*** *(0.001)*	**-0.020*** *(0.004)*	**-0.003*** *(0.001)*	-0.012 *(0.038)*	-0.065 *(0.055)*	0.128 *(0.249)*	-0.015 *(0.056)*
AgrGDP	**0.005*** *(0.001)*	**0.005*** *(0.001)*	**0.005*** *(0.002)*	**0.005*** *(0.001)*				
CreditGDP	0.0005 *(0.0005)*	**0.001*** *(0.0005)*	**0.011*** *(0.002)*	0.0002 *(0.0005)*				
(CreditGDP)^2	-0.000002 *(0.000003)*	-0.000003 *(0.000003)*	**-0.0001*** *(0.000)*	-0.000003 *(0.000003)*				
lnGovExpend	0.014 *(0.013)*	0.022^{+} *(0.013)*	0.007 *(0.039)*	0.016 *(0.013)*				
lnPopul	**-0.088*** *(0.014)*	0.047 *(0.049)*	**0.599*** *(0.189)*	-0.002 *(0.054)*				
lnK/L	**-0.045*** *(0.010)*	**-0.043*** *(0.010)*	0.011 *(0.038)*	**-0.046*** *(0.010)*				
lnNatResExp					**-0.836*** *(0.318)*	**-0.686*** *(0.344)*	0.753 *(0.873)*	**-1.304*** *(0.378)*
AgeDepend					**-0.160*** *(0.036)*	**-0.131*** *(0.040)*	**-0.406*** *(0.199)*	**-0.130*** *(0.040)*
UrbPop					**-0.220*** *(0.049)*	**-0.279*** *(0.079)*	**0.958*** *(0.258)*	**-0.448*** *(0.084)*
lnTourGDP	**0.043*** *(0.009)*	**0.033*** *(0.010)*	**0.103*** *(0.023)*	**0.034*** *(0.009)*	-1.813 *(1.334)*	**-4.266*** *(1.364)*	**5.771*** *(2.584)*	**-4.085*** *(1.287)*
(lnTourGDP)^2	**-0.024*** *(0.006)*	**-0.022*** *(0.006)*	**-0.056*** *(0.013)*	**-0.022*** *(0.006)*	**3.287*** *(1.137)*	**5.200*** *(1.159)*	**2.599*** *(1.201)*	**5.088*** *(1.094)*
(lnTourGDP)^3	0.004 *(0.002)*	0.004^{+} *(0.002)*	0.001 *(0.004)*	0.004^{+} *(0.002)*	**-0.780*** *(0.284)*	**-1.163*** *(0.288)*	-0.720^{+} *(0.389)*	**-1.157*** *(0.272)*
SIDS x lnTourGDP	0.030 *(0.022)*	0.041^{+} *(0.022)*			**6.469*** *(2.341)*	**9.188*** *(2.460)*		
SIDS x (lnTourGDP)^2	-0.008 *(0.011)*	-0.011 *(0.011)*			-1.249 *(1.389)*	**-3.189*** *(1.448)*		
SIDS x (lnTourGDP)^3	-0.004 *(0.004)*	-0.005 *(0.004)*			0.183 *(0.404)*	0.605 *(0.415)*		
SIDS	0.115 *(0.077)*	0.000 *(.)*			-15.887* *(4.803)*	0.000 *(.)*		
Constant	5.886* *(0.283)*	4.171* *(0.822)*	-2.744 *(2.591)*	4.792* *(0.941)*	3.693 *(7.861)*	-36.504* *(13.509)*	242.423* *(75.181)*	-28.164* *(13.846)*
Observations	1590	1590	267	1323	1888	1888	187	1701
Hausman test (FE vs RE; chi2 (dl))	51.45*		39.02*	38.95*	163.89*		100.91*	332.86*

Legend: standard errors in parentheses; $^{+}$ $p < 0.10$, * $p < 0.05$; FE - for fixed-effects and RE - for random-effects models

Concerning **genuine savings**, depletion of natural resources, age dependency, and urbanization have negative and statistically significant effects, whereas economic development and its growth are positively associated with genuine savings in all the countries (increased manufactured and human capital allowing for a lower dependence on natural resources), excepting the SIDS (where it would reflect an intensive use of environmental resources and pollution). 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. Finally, education and democracy do not seem to exert significant impact on genuine savings. We can suppose this finding is due to multicollinearity resulting from the simultaneous inclusion of these variables and GDP/capita as explanatory variables.[20]

With regard to our variable of interest, that is, tourism specialization, we first observe its impact on vulnerability (models (1) to (4) in Table 1). As expected, we find a nonlinear 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.

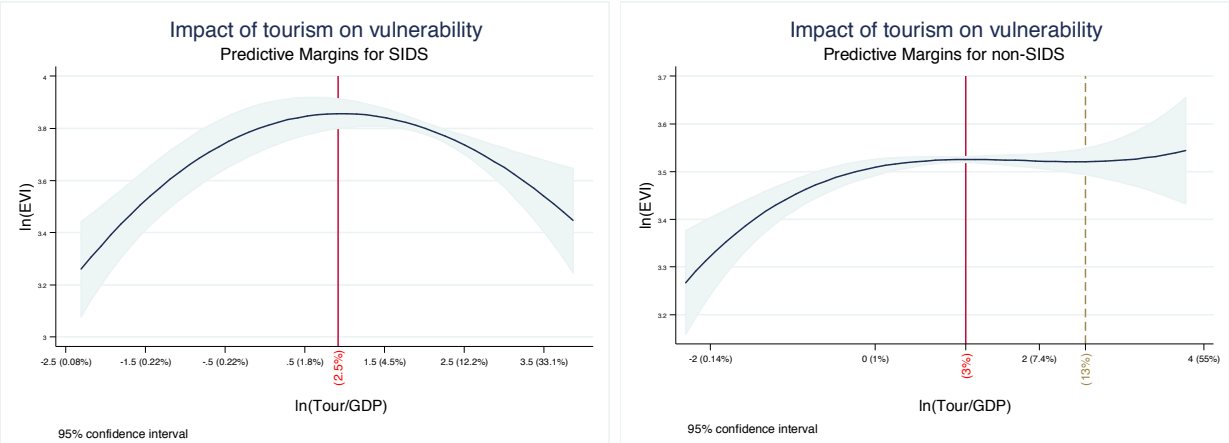
Results are quite different for SIDS and non-SIDS. By exploring Figure 1, we observe that a weak specialization in tourism (up to 2.5% of GDP for SIDS and less than 3% of GDP in other countries)[21] is associated with an increase in economic vulnerability. It then appears that this effect diminishes with increasing specialization in tourism, and even could become negative thus reducing vulnerability in the SIDS. On the contrary, a second barely significant (p=0.07) threshold would exist for non-SIDS

[20] See partial correlations in Figures A.2 and A.3 in appendix. We do not suspect severe collinearity problems because none of our core variables (*EVI*, *GS*, *TourGDP*, *TourPrice* and *WHS*) has partial correlations > 0.8. Nonetheless, to test the robustness of our results to a potential collinearity problem, we perform some regressions in Section 3.1 by excluding *lnGDPcap* (highly correlated with *K/L*, *AgrGDP*, *FH*, *AgeDepend* and *UrbPop*).

[21] To calculate the thresholds, we solve the first derivative function of our cubic polynomial specification. The solution of this equation when set to zero is given by the solution to a quadratic. Thus there are two turning-points from the two roots (given $\beta_3 \neq 0$) defined as: $\widehat{\tau_{1,2}} = \left(-\widehat{\beta_2} \pm \sqrt{\widehat{\beta_2}^2 - 3\widehat{\beta_1} * \widehat{\beta_3}}\right)/3\,\widehat{\beta_3}$. When the cubic term has a statistically insignificant result, we solve the first derivative function of a squared polynomial specification ($\hat{\tau} = \widehat{\beta_1}/\left(-2\widehat{\beta_2}\right)$). 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.

indicating an upward impact of tourism on economic vulnerability beginning with a share of international tourism in GDP of 13%. In other words, the presence of a second threshold indicates that the positive downward 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 would occur only in the non-SIDS. The SIDS are more likely to reduce economic vulnerability with high tourism specialization. Indeed, international tourism would be a good alternative to traditional economic drivers in the SIDS: e.g., mining, agriculture, etc., which are usually more vulnerable to international shocks.

Figure 1. Nonlinear effect of tourism on vulnerability (SIDS vs. non-SIDS)

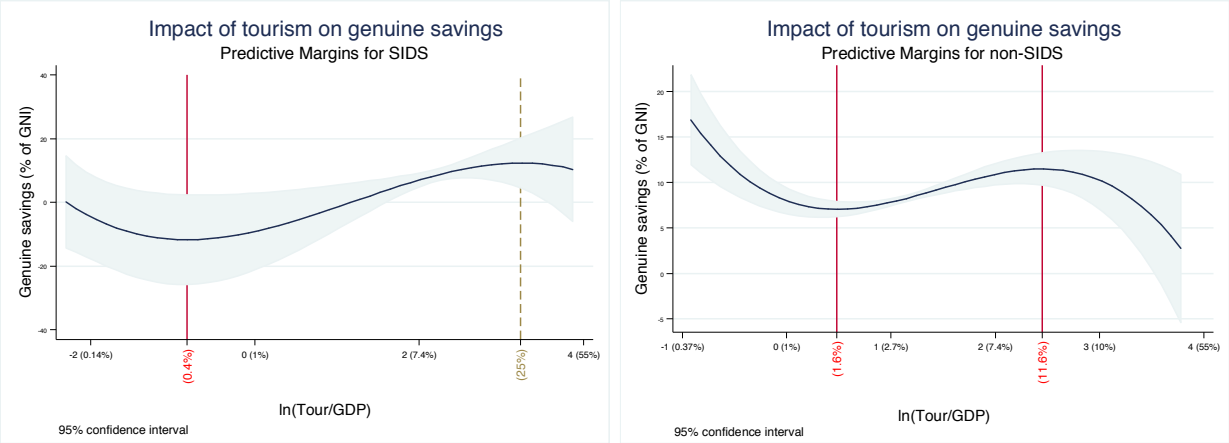


Legend: Predictive margins computed using the estimation results from models (3) and (4), Table 1; plotted using PLOT_MARGINS code in Stata, provided by S. HSIANG; solid vertical lines for highly significant ($P < 0.05$) thresholds and dash vertical line for moderate significance ($P < 0.10$).

Similarly, tourism specialization has a nonlinear effect on genuine savings, and results are contrasting for different country groups (models (5) to (8) in Table 1). We can see on Figure 2 that tourism specialization has a negative and statistically significant effect on sustainability (genuine savings) in the non-SIDS at small shares of international tourism in GDP (first threshold at 1.6%). In the SIDS, the 95% confidence interval is quite large below the first threshold (0.4%); a positive marginal impact of tourism on genuine savings would start for very low level of tourism specialization and increase its magnitude for higher levels of tourism specialization (the same but weaker positive impact is found for non-SIDS). However, a second threshold appears at approximately 25% (for

SIDS) and 12% (for non-SIDS) of international tourism's share in GDP, above which extra tourism specialization would harm sustainable development (i.e., reduce genuine savings).

Figure 2. Nonlinear effect of tourism on genuine savings (SIDS vs. non-SIDS)



Legend: Predictive margins computed using the estimation results from models (7) and (8), Table 1; plotted using PLOT_MARGINS code in Stata, provided by S. HSIANG; solid vertical lines for highly significant ($P < 0.05$) thresholds and dash vertical line for moderate significance ($P < 0.10$).

At a first glance, this result (a second threshold almost twice higher for SIDS; or even the non-existence of a second threshold at a high significance level, $P < 0.05$, in the SIDS) could be surprising when having in mind that the islands have usually a smaller size and are more dependent on their ecosystems. This result stems at least partially from the fact that we consider here an index of weak sustainability, which only indicates (when non-negative) a potential for sustainability, and which does not include the possibility of non-substitution between natural, human and produced capital. At the same time, given that tourism based on unique advantages (e.g., insularity, exceptional ecosystems, indigenous peoples, etc.) is much more present on islands than elsewhere, it seems therefore that the channels of influence of international tourism on genuine savings are not the same in the SIDS, compared to non-SIDS. For instance, international tourism might increase genuine savings in the SIDS by: (i) substituting revenues from exhaustible resources' exploitation, (ii) improving local revenues when mainly exploiting local "unique" products/services, (iii) requiring and thus improving

education[22], etc… As regards the non-SIDS, where undifferentiated (mass) tourism would be prevailing, tourism specialization would mainly reduce genuine savings by: (i) boosting deforestation, (ii) increasing CO_2 emissions, (iii) reducing opportunities for enhancing local revenues, etc.

Hence, 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 use of this specific heritage. However, the inversion of the effects of specializing in tourism on genuine savings 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 ("disneylandization", "folklorization") 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 genuine savings, 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 TOURIST SERVICES

3.1. Impact of tourism conditional on products' differentiation: extended empirical model

The gradual exhaustion of development trajectories based on specialization in tourism is not universally expressed with the same level of intensity, even for islands that have reached an equivalent

[22] Tourism is generally requiring a more educated labor force as compared to other traditional activities in the SIDS (mining, agriculture…).

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 tourist service provided. More precisely, the impacts of specializing in tourism should depend on the greater or lesser degree of differentiation of the tourist services (differentiated or undifferentiated). 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 tourist services in the long term (i.e., ***heritage tourism***), (ii) another focusing on luxury services (i.e., ***luxury tourism***), 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 tourist products often operate in small groups calling on a roving approach thereby limiting the pressure on the environment and distributing the benefits locally. Differentiated (heritage, and sometimes luxury) tourism plays the experiential tourism card, sometimes exceptionally favoring a more harmonious relationship between tourism and local life by focusing on quality, or even elitism or niche tourism. 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 downward. 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 genuine savings. The UNESCO World Heritage List[23] provides a useful indication on the importance of heritage (natural, cultural, or "mixed") in each country. Following Arezki et al. (2009), we consider that heritage is a source of differentiation in tourism products. Thus, we introduce in our empirical models the number of World Heritage sites per country (variable WHS) as a moderator variable of the impact of tourism on genuine savings and vulnerability.[24]

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 tourist 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). For instance, Taylor et al. (2003) developed a small-economy computable general-equilibrium model on data from surveys of tourists, businesses, and households in Galapagos Islands in order to assess the ecotourism's potential for generating income. The authors reveal complex market linkages that transmit the impacts of tourist spending through local economies, with significant multiplier effects. As discussed by Taylor et al. (2003), even though Galapagos tourists rarely purchase vegetables from farmers or fish from fishermen, a 10% increase in tourist spending is found to increase incomes of agricultural and fishing households on the islands by

[23] 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.

[24] Following the seminal distinction between "heritage by appropriation" and "heritage by designation" introduced by Rautenberg (2003), through the WHS, we clearly consider the latter. Although one could suppose that high vulnerability and weaken sustainability might stimulate a country to start the registration procedure (action it would probably not begin if there were no threats to its economic vulnerability and sustainability), "heritage by designation" is less guaranteed compared "to heritage by appropriation." Indeed, the inscription on the World Heritage List of a specific site stems from a negotiation between local authorities and UNESCO and generally does not depend on the commitment of local authorities to sustainable development. Thus, the risk of endogeneity between WHS and GS/EVI seems limited. Even though there may still be a simultaneity bias, our main conclusions should not be affected because WHS is not our core variable but its moderator; that is, we seek for the impact of specializing in tourism depending on the differentiation of tourist services, regardless of the reasons behind the inscription of a site on the UNESCO's World Heritage List.

3.9% and 4.7%, respectively (as well as increasing migration to the ecotourism area by 5% of the existing island workforce for every 10% increase in tourism revenue). The authors also suggested the existence of a strong complementarity between tourism and environmentally sensitive island production activities (including agriculture, fishing and other natural resource extraction), requiring rigorous conservation policies.

It is not easy so far for all tourist services provided by SIDS to be differentiated from those provided by their rivals. Competition between destinations can be fierce and the prices of tourist 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. Although also under competition pressure, luxury 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 genuine savings, we make the following assumptions:

- Specialization in **undifferentiated** (**mass) tourism** follows a general decreasing trend in "tourism price", regardless of the existence of world heritage sites;
- Specialization in **differentiated (heritage) or segmented (luxury) tourism** occurs when the general trend in "tourism price" is increasing, or at least not declining. If such a trend is associated with an increasing number 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 basic 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).

Our **extended empirical** model becomes:

$$Y_{it} = \alpha + \beta_1 TourGDP_{it} + \beta_2 TourPrice_{it} + \beta_3 WHS_{it} + \beta_4 TourGDP_{it} * TourPrice_{it} + \beta_5 TourGDP_{it} * WHS_{it} + \beta_6 TourPrice_{it} * WHS_{it} + \beta_7 TourGDP_{it} * TourPrice_{it} * WHS_{it} + \phi X_{it} + \chi Z_{it} + u_i + e_t + \varepsilon_{it} \quad \textbf{(Eq.2)}$$

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 Hodrick-Prescott trend in spending per tourist, in constant 2011 US$, 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 genuine savings, Z represents the control variables, u_i is the fixed error term over time illustrating the effects specific to each country, e_t is the time fixed effect denoting unobserved factors that vary over time but are invariant to entities, and ε_{it} is the random error term.

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 (*lnTourGDP*lnTourPrice*) and according to the number of WHS (*lnTourGDP*lnTourPrice*lnWHS*). Table 2 displays results for the impact of tourism specialization (*TourGDP*) on vulnerability (*EVI*) and genuine savings (*GS*), conditional to tourism price (*TourPrice*) and heritage (*WHS*), for the period 1995-2008.[25]

As suggested by our results (Table 2), all other things being equal, tourism specialization reduces macroeconomic vulnerability (term [1]). The coefficient of term [1] in the first column (i.e., -3.9) corresponds to the marginal impact on *lnEVI* of ***lnTourGDP*** in the SIDS with null values for ***lnTourPrice*** and ***lnWHS***. The positive, statistically significant estimates of our interaction terms ***[3] lnTourGDP × lnTourPrice*** and ***[5] lnTourGDP × lnWHS*** suggest, all other things being equal, at least partial compensation of the negative effect of ***[1] lnTourGDP*** on EVI in countries with <u>either</u> *a positive trend in TourPrice and no WHS* <u>or</u> *a high value of WHS and a nonpositive trend in TourPrice.* Concurrently, the negative and statistically significant three-way interaction term ***[7] lnTourGDP × lnTourPrice × lnWHS*** suggests interdependency of the two previous conditional effects. That is, an

[25] For an easier reading of our empirical results, Table 2 displays only estimates for our variables of interest in separate models estimated for SIDS and non-SIDS. The detailed empirical results are presented in Tables A.5 and A.6 in Appendix, which in addition give estimates for the regressions on pooled samples with fixed and random effects (models (1) to (4)). Chow-type and Hausman tests suggest statistically different results for SIDS and non-SIDS, and consistent estimates in the regressions with country-fixed effects.

increased share of tourism in GDP in the SIDS with both a positive trend in the price of tourist services and in presence of valuable heritage (i.e., pursuing a heritage tourism strategy) is associated with a stronger reduction of the macroeconomic vulnerability. This result confirms our previous findings (Table 1) and their discussion in section 2.2.

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

	lnEVI model (log-log)		**GS model (level-log)**	
	SIDS	***Non-SIDS***	***SIDS***	***Non-SIDS***
[1] **lnTourGDP**	**-3.895***	**-0.271***	10.142	-4.367
	(0.853)	*(0.130)*	*(77.721)*	*(7.378)*
[2] lnTourPrice	**-0.708***	**-0.211***	18.297	1.390
	(0.180)	*(0.030)*	*(18.446)*	*(1.411)*
[3] ***lnTourGDP*** x lnTourPrice	**0.506***	**0.045***	-1.450	0.613
	(0.112)	*(0.019)*	*(10.334)*	*(1.045)*
[4] **lnWHS**	**-1.730***	**-0.373***	**287.518***	**7.982***
	(0.851)	*(0.070)*	*(71.942)*	*(3.814)*
[5] ***lnTourGDP*** x lnWHS	**1.069***	**0.094***	**-118.461***	-2.129
	(0.428)	*(0.041)*	*(37.779)*	*(3.204)*
[6] lnTourPrice x lnWHS	**0.231***	**0.056***	**-39.539***	**-1.050***
	(0.114)	*(0.010)*	*(9.759)*	*(0.528)*
[7] **lnTourGDP x lnTourPrice x lnWHS**	**-0.143***	**-0.015***	**16.285***	0.334
	(0.057)	*(0.006)*	*(5.084)*	*(0.444)*
Time trend and country-fixed effects	Yes	Yes	Yes	Yes
Other determinants and control variables	*See model (5) in Table A.5. in appendix*	*See model (6) in Table A.5. in appendix*	*See model (5) in Table A.6. in appendix*	*See model (6) in Table A.6. in appendix*

Legend: standard errors in parentheses; $^{+}$ $p < 0.10$, * $p < 0.05$. Term [1] captures the effect of *lnTourGDP* when *lnTourPrice* and ln*WHS* are "zero". Similarly, term [2] gives the marginal effect of *lnTourPrice* for countries with minimum values of *lnTourGDP* and *lnWHS*. Finally, the coefficient of term [4] indicates the marginal effect of increasing the number of world heritage sites in the countries with "null" terms [1] and [2]. For instance, 1% increase of WHS in the SIDS would reduce EVI by 1.7% and increase GS by 2.9 (287/100) percentage points, when ***ln****TourGDP* and ***ln****TourPrice* are zero. The two-way interaction terms [3], [5] and [6] are dependent on the three-way interaction term [7]. For example, the effect of term [3] *lnTourGDP x lnTourPrice* in the first column is 0.506 when term [7] *lnTourGDP x lnTourPrice x lnWHS* is zero; that is, when the ***ln****WHS* variable is '0'. The absolute value of the conditional effect [3] decreases as *WHS* increases.

Following our empirical results, tourism specialization seems to have a statistically significant effect on genuine savings only in the SIDS with valuable heritage (non-null variable ***lnWHS***). More precisely, it appears to reduce genuine savings when the number of WHS increases and there is no change in

lnTourPrice, i.e., non-null term **[5]** and "zero" values of variable ***lnTourPrice*** in the terms **[6]** and [**7]**). When the focus is on the heritage tourism, that is, *simultaneously increasing number of world heritage sites and tourism price* (non-null term **[7]**), this negative effect is at least partially offset. Similarly, the effect of ***lnTourPrice*** depends on the existence of WHS and the level of ***lnTourGDP***. Any increase in tourism price would decrease genuine savings in the SIDS with valuable heritage and low specialization in tourism activities (non-null term **[6]**, "zero" value of ***lnTourGDP*** in the terms **[5]** and [**7]**). On the contrary, this negative effect could be offset and even become positive in the SIDS with *both valuable heritage and a high specialization in tourism*. This result might suggest that income derived from a low specialization in heritage-based tourism would not allow a genuine policy of heritage conservation to be implemented (we are dealing with "pioneering" tourism in unprepared territories). At higher level of specialization, the territory should become more "professional" and organized with an ability to handle flows and provide visitors with services. Though impacts on vulnerability are similar (in sign but not in magnitude) for SIDS and non-SIDS, the international tourism appears to affect sustainability only through the differentiation of tourism products.

According to our empirical results, if SIDS wanted to make of 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 to increase sustainability without a significant impact on vulnerability. 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 tourist 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, with insignificant impact on genuine savings.

Our extended model's empirical results are quite robust to the sample composition and size, the potential collinearity problems induced by GDP/cap variable and to assumptions of simultaneity bias of our *TourGDP* variable in the GS model. Indeed, after replacing *lnTourGDP* with $lnTourGDP_{t-1}$ (i.e.,

with a delay of one year) in Eq.2 (see Table A.7 in appendix), our variables of interest keep the same sign and statistical significance as compared to results from Table 2. Moreover, our results stay highly robust after considering an alternative proxy for the education levels and despite a drastic reduction in the sample size (models (3) and (6) in Table A.7). Finally, and as expected, the coefficient of *lnFH* becomes significant in model (2) after dropping *lnGDPcap*. This collinearity is not a real problem in our investigation because it does not concern our core variables (*TourGDP*, *TourPrice*, and *WHS*)[26]; thus their sign and statistical significance are not affected.

3.2. Differentiation of tourist products: a typology of SIDS

Our empirical results on the impact of the specialization in tourism on vulnerability and genuine savings, moderated by the differentiation of tourist services, lead us to provide a typology of SIDS (Table 3 below and Figure A.1. in appendix), as an initial approximation, based on three variables: specialization in tourism (direct contribution of international tourism to GDP), changes in "the tourism price" (measured by the change in the general trend of tourist spending per arrival), and number of world heritage sites. We therefore divided the SIDS into three categories, and eight subcategories, based on their prevailing tourism strategy. The discussion of specific case studies allows us to check and validate the proposed empirical strategy for the distinction between mass, luxury and heritage tourism.

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.

[26] See partial correlations in Figures A.2 and A.3 in appendix.

Table 3. Typology of SIDS according to the direct contribution of international tourism to GDP (2012), the changing prices of tourism (1995–2012), and the existence of WHS (2012)

World Heritage (2012)	Change in "tourism price" (1995-2012)	Tourism specialization level (2012)	Tourism strategy (Category)	SIDS	Impact on vulnerability*	Impact on sustainability*
No	Declining: (prevailing mass tourism)	High	***1. Mass tourism high specialization, without heritage***	Antigua and Barbuda, Fiji	**−**	− (n.s.)
Yes			***2. Mass tourism high specialization, with heritage***	Cape Verde, Saint Lucia	+ (m.s.)	**−**
No		Low	***3. Mass tourism low specialization, without heritage***	Comoros, Guyana, Jamaica, Sao Tome, Saint Vincent and Grenadines, Tonga	**+**	− (n.s.)
Yes			***4. Mass tourism low specialization, with heritage***	Bahrain, Cuba, Dominican Republic, Haiti, Kiribati, Papua New Guinea, Saint Kitts and Nevis, Surinam	− (n.s.)	**+**
No	Non declining: (prevailing luxury tourism)	High	***5. Luxury tourism high specialization***	Bahamas, Maldives	**+**	+ (n.s.)
		Low	***6. Luxury tourism low specialization***	Grenada, Singapore	− (n.s.)	+ (n.s.)
Yes	Non declining: (prevailing heritage tourism)	High	***7. Heritage tourism high specialization***	Barbados, Belize, Dominica, Mauritius, Seychelles, Vanuatu	+ (n.s.)	**+**
		Low	***8. Heritage tourism low specialization***	Solomon Islands	**+**	**−**

***Note**: Although classified as SIDS by the United Nations, we should note that Guyana, Surinam, and Belize are inlands rather than islands.*
Legend**: ** - Delta-method used to estimate margins of responses of EVI and GS in models (5), Tables A.5 and A.6, at specified values of lnTourGDP, lnTourPrice, and lnWHS (in particular, at their minimum and maximum values) and averaging over the remaining covariates. "**n.s.**" – for a statistically non-significant result; "**m.s.**" – for "marginally significant" result ($p \leq .10$);* **bolds** *– for statistically significant effects.*

These initial results show a distinct trend toward the differentiation/segmentation of tourist services in numerous SIDS (categories 5 to 8), 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 their demarcation can take very different forms calling on exceptional heritage (volcanos and the seabed in Vanuatu, granitic islands in Seychelles), the luxury market through the development of high-end tourist services (Bahamas, Maldives, Seychelles) and/or a desire to restrict the target markets (e.g., the Bahamas, where 85% of tourists are from the United States). Whereas in the Bahamas the tourism development is conducted in conjunction with the development of financial

services by seeking for a highly targeted and wealthy customer base,[27] the Seychelles' luxury tourist services are increasingly differentiated based on local unique attributes (e.g., leisure sports in nature; hiking, horse riding, mountain biking and climbing, surfing, diving, sailing, canoeing, etc.).[28] Although having similar levels of tourism specialization (around 20% in GDP) and developing luxury products, the macroeconomic vulnerability of the Bahamas and Seychelles would differ according to the nature of tourist services—that is, their differentiation based on local unique attributes (natural and/or cultural heritage). The former would thus be more vulnerable than the latter because it is more sensitive to international, external factors. Although benefiting from the presence of valuable heritage, some island economies struggle to make of heritage tourism a central driver of their economic growth. For instance, the Solomon Islands have extensive coral reefs teeming with marine biodiversity and are considered some of the world's best diving spots, especially for the observation of wrecks of World War II. It is the largest raised coral atoll in the world at 86 km long and 15 km wide, governed by the customary law on the site's ownership and management (attesting for both cultural and natural heritage). Unfortunately, these absolute advantages have not been exploited at a larger scale because of the political instability of the country, missing infrastructure, as well as regular seismic, volcanic, and hurricane activity. These obstacles prevent the island from the possibility of organizing mass tourism. Hence, the Solomon Islands' tourist offer has spontaneously been built on services addressed mainly to customers "eager" for discovery, who are adaptable and attracted by ecotourism, such as, bird and turtle watching, diving, cultural tourism (Ell, 2003).

We also observe that numerous SIDS maintain their development by focusing on undifferentiated

[27] The offshore financial sector in the Bahamas represents about 25% of GDP (source: http://www.diplomatie.gouv.fr/fr/dossiers-pays/bahamas/presentation-des-bahamas/). Cruise tourism is prominent compared to the tourist stay, and in the last case the boating is one of the preferred activities. The registration of boats is an important source of income in the Bahamas. Unfortunately, only 0.2% of boats registered in the Bahamas are owned by local residents (Dehoorne et al., 2007).

[28] To cope with the economic crisis due to the decline of tourism, the Seychelles opted in 1980 to develop a program of "high-end" tourist products with the desire of preserving the environmental heritage of its different sites. By the approach of sports tourism, the Seychelles are thus trying to integrate the development of ecotourism that, following Naria and Sherwin (2011), "can be estimated at 70 000 nights with an average expenditure of 150 € per night, totaling a turnover of 10.05 million euros per year. This is a huge market, difficult to evaluate in euros but whose secondary effects relate to a multitude of satellites actors." These practices in the Seychelles are true markers of the island's identity, such as, the sailing dates back to the ninth century, with the arrival of Arab seafarers.

tourism (categories 1 to 4), in particular with large islands having long ago opted to develop a mass tourism industry (e.g., Cuba, Dominican Republic,[29] and Jamaica), founded on the trio of sea, sand, and sun available through all-inclusive or package deals (McElroy, 2003). For instance, Fiji has developed a high specialization of its economy on mass tourism. Its first national tourism development program was established in 1973 (Belt, Collins and Associates, 1973) and the policies that have succeeded have favored a mass tourism model by rapidly increasing flow of visitors (Narayan and Prasad , 2003)—such as, policy of securing air service, public support for tourism investment in the accommodation sector, deregulation of air transport, incentives for competition between airline companies (low cost), creation of tourism development areas of high capacity (resorts), implementation of international hotel chains, and diversification of tourist markets beyond the traditional source markets that were Australia and New Zealand. The leisure tourism is largely predominant in Fiji, accounting for 91% of tourism contribution to GDP.[30] However, a shift in this strategy seems to have started in 2003, when the World Wide Fund for Nature - South Pacific Program and the Asian Development Bank conducted an environmental assessment of the Fiji's tourism development plan[31] by highlighting a tourism model quite costly in terms of social and environmental degradations (especially around coral reefs), causing increased tensions between tourism businesses, landowners, and local communities. Thus, Fiji is actually introducing several areas of progress toward a more sustainable tourism with community-based tourism projects, such as the Wayalailai Ecohaven Resort in the Yasawas Islands (Gibson, 2015); tourist packages centered on environmental education through the development of diving tourism in the framework of the Fijian shark protection policy; and a heritage protection and promotion policy, which led in 2013 to the inclusion of Levuka port city on the UNESCO list of World Heritage. We should recall that Table 3 represents a "static picture" of tourism strategies for the 2012 year. The change of Fiji's "price of tourism" is among the weakest (i.e.,

[29] See Geronimi et al. (2015) for a comparative analysis of tourism strategies adopted in Dominica and the Dominican Republic; the former traditionally promoted heritage-based tourism but is now seeking to develop mass tourism, whereas the latter wishes to diversify its traditional beach tourism (mass tourism offering all-inclusive packages) with ecotourism products that should facilitate a geographic redeployment of tourists outside the already saturated, strictly seaside zones, primarily toward the interior with its rich and varied natural heritage.

[30] WTTC (2015).

[31] Levett and McNally (2003).

weak price competition; see Figure A.1. in appendix) in the categories 1 to 4; that should indicate to its potential shift from mass tourism to more differentiated services.

If the island economies that have differentiated (heritage tourism)/segmented (luxury tourism) their tourist services make of international tourism activity one of the main forces of their economic growth (i.e., high tourism specialization), we can see on Figure A.1. in appendix that the mass tourism takes usually a much lower share in GDP. As suggested by our empirical results, specialization on mass tourism would have opposing effects on vulnerability and genuine savings, conditional to the presence of heritage sites. In particular, we found that, whereas it is less vulnerable to promote high specialization on mass tourism when there is no valuable heritage (with no significant impact on genuine savings), specialization on mass tourism appears to be detrimental for the sustainable development when countries have unique heritage. Indeed, exhibiting relatively low costs, mass tourist services 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 tourist 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). Papua New Guinea represents an atypical and interesting case study. In fact, despite existence of unique heritage, it has recently promoted an "aggressive" tourism strategy aiming to double the number of tourist arrivals every 5 years during the period 2007–2017.[32] Regarded as a second-tier economic sector by Papua New Guinea's authorities for some time (Pratt and Harrison, 2015), tourism is now considered a source of wealth and an alternative economic model given the programmed decline in raw materials (Hayabe, 2014). It should be mentioned that its GDP is relying on natural resources' (minerals, oil, and gas) extraction and exportation. The specificity of Papua New Guinea is that it is gradually consolidating a "business" tourism offer that is attractive and competitive regionally and is positioned as an event organizer; for

[32] Papua New Guinea has seen a very significant increase in international tourist arrivals by reaching 168.212 foreign tourists in 2013, a tripling of flows since 2002 (ICCC & PNGTPA, 2006; PNGTPA, 2013).

instance, the South Pacific Games in 2015, the 8th Summit of Group ACP Heads of State in 2016, and many conferences and business seminars. If this strategy (still failing to value local natural and cultural heritage) helps to significantly improve the infrastructure and hotel facilities in Port Moresby (the capital), it has yet little induced effects on the rest of the territory, which abounds with unique resources in the world—the 38 of the 43 species of birds-of-paradise are observable in the island, landforms, rivers, and lush vegetation make it possible to participate in nature and adventure activities (trail running, kayaking , canoeing, fishing). Among the 600 islands in its territory, many of them are completely preserved and there are over 800 languages spoken by indigenous peoples, some of them having preserved intact ancestral traditions.

In light of our empirical results on the interdependent effects of tourism specialization and tourism differentiation, we would expect higher vulnerability in the islands from subcategory 6 if they seek to increase their level of specialization in international tourism (a shift to category 5). A strategy of developing a high tourism specialization in the islands from category 8 (a shift to category 7) should be associated with less or no impact on economic vulnerability and a higher degree of sustainability. On the contrary, vulnerability would be increased and genuine savings reduced in the islands with low specialization in heritage tourism, weakly assimilated in local practices (and thus likely to be controlled by international operators) and unwilling to generate sufficient revenues for the heritage preservation. Islands with no WHS and willing to make of the tourism activity one of the main drivers of their development should prefer developing mass tourism compared to luxury tourism (passing from category 6 to 1 rather than 5), because the former should contribute to less macroeconomic vulnerability. In their attempts to maintain an international tourism development strategy without affecting sustainability, islands from the category 2 should revise their tourist offer by incorporating differentiated services (shift to category 7).

4. CONCLUSION

Based on an empirical investigation of panel data for up to 18 SIDS and 119 non-SIDS, between 1990 and 2008, we show that the marginal effect of tourism on economic vulnerability and genuine savings is nonlinear and varies according to the level of specialization in tourism. We observe that a weak specialization in tourism is associated with an increase in economic vulnerability. It then appears that this effect diminishes with increasing specialization in tourism, and even could become negative thus reducing vulnerability in the SIDS, compared to non-SIDS. Whereas tourism specialization reduces sustainability (genuine savings) in the non-SIDS at very small share of international tourism in GDP, it is associated with increasing adjusted net savings in the SIDS for very weak tourism specialization (i.e., the first threshold found at 0.5-1.5%). This positive [negative] effect of tourism on sustainability amplifies [diminishes] in the SIDS [non-SIDS] with further increasing levels of tourism specialization. A second threshold, twice higher for SIDS than for non-SIDS (*i.e.,* 25% and 12% respectively)—above which extra tourism specialization would harm sustainable development—would justify the choice of a high level of specialization in tourism for SIDS in relation to the other activities and compared to the other countries.

Furthermore, focusing on the period 1995-2008, we show that increasing specialization in differentiated, heritage-based tourism in the island economies would increase genuine savings without affecting economic vulnerability. On the opposite, the SIDS promoting luxury tourist services, or mass tourism in the presence of world heritage sites, should see their economic vulnerability getting worse. Moreover, genuine savings appear to decrease in the countries with strong heritage value when a mass tourism strategy is carried out. As regards the countries with no valuable heritage, our results suggest second best options in such territories would consist of promoting luxury tourism but with weak share in GDP (insignificant impact on vulnerability and genuine savings) or a high specialization in mass tourism, with the caution of preserving social and environmental degradations (insignificant effect on genuine savings but reducing economic vulnerability). The impact of tourism specialization and differentiation is found to be quite similar for SIDS and non-SIDS but with stronger magnitudes

for SIDS.

Thus, the effects of tourism on the vulnerability and sustainability of SIDS' growth trajectories depend on the type of tourism developed. Differentiated tourism (more expensive, niche, innovative, or based on a unique cultural heritage) should help reduce the vulnerability and increase genuine savings of island economies once it enables this heritage to be conserved. If, in contrast, there is little heritage in the tourism product on offer, replaced by other less-differentiating island attributes (e.g., the sea, beach, and resorts), we return to an undifferentiated tourism product particularly subject to price competition. 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 that can be passed on to the domestic island economy through the tourist sector. All these external factors that are beyond the control of the local economy have significant impacts on the level of vulnerability of the growth trajectories of the SIDS concerned. However, even the adoption of 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, heritage—including culture-based heritage—deteriorates drastically and the tourist service provided loses its attractiveness if the investments in the economic dimensions do not offset this damage caused. Heritage and its preservation should thus remain at the heart of the economic trajectories of small island economies that aim at making international tourism an essential source of growth.

This first attempt to assess, through econometrics on international data as well as several case studies of SIDS, the interplay between tourism specialization, sustainability and vulnerability, confirms the opportunities offered by heritage tourism, and identifies some preconditions for its positive impact on sustainability and reduced vulnerability for SIDS. However, the main results presented here call

for more future research, not only concerning alternative measurements of sustainability and vulnerability, but also regarding the role of heritage. If the UNESCO's list of world heritage sites mobilized in this paper provides several important insights in the heritage-tourism—vulnerability—sustainability nexus, comparable international data on heritage remain scarce, and future analysis would have to consider alternative and complementary measures of heritage.

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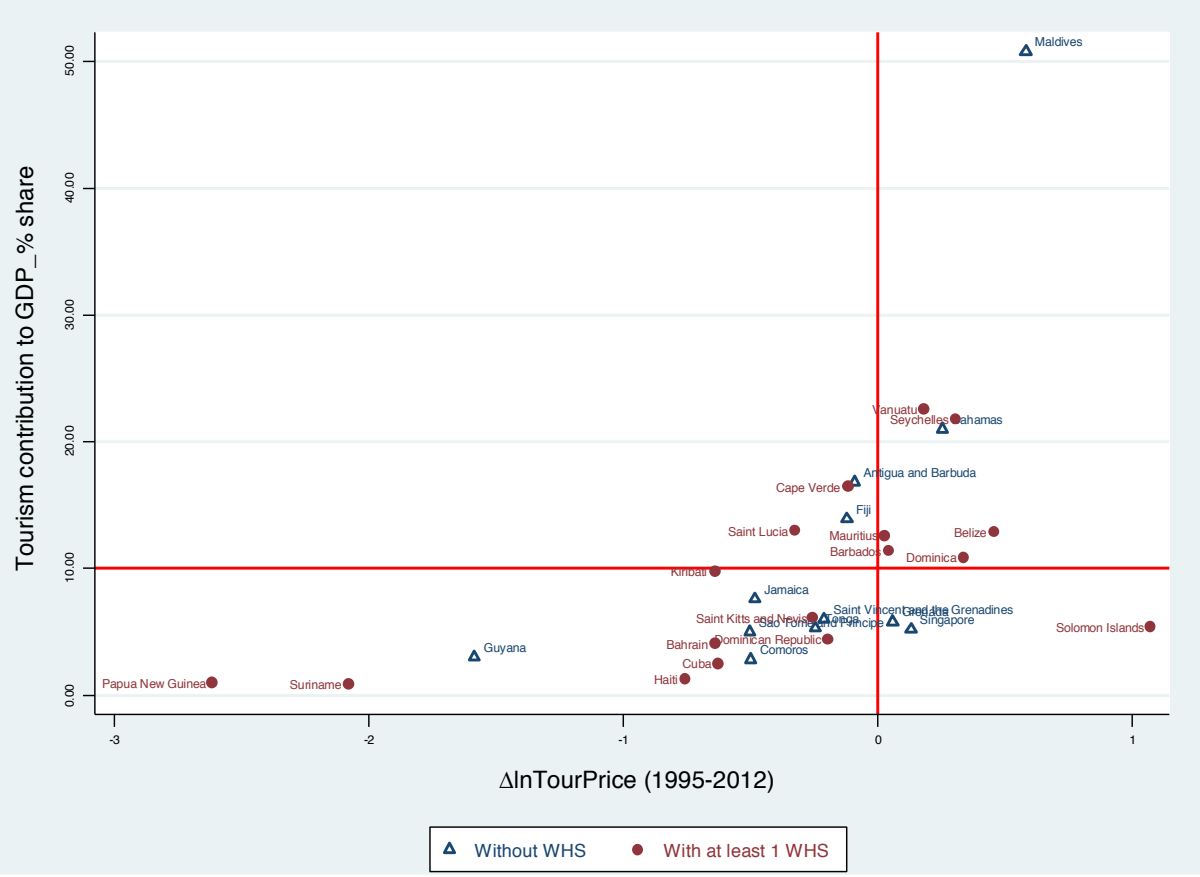
APPENDICES

Figure A.1. Typology of SIDS according to the direct contribution of international tourism to GDP (2012), the changing "price of tourism" (1995–2012), and the existence of WHS (2012)



***Note**: We exclude Belize from our regressions because it appears to be an outlier and empirical results on the sample including it are not robust to our different sensitivity tests. Though classified as a SIDS by the United Nations because dotted all along its coast by small islands, Belize is an inland rather than an island.*

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
Education1	Length of secondary education (years)	World Bank
Education2	Adjusted net enrollment rate, primary (% of primary school age children)	World Bank
Popul	Total population	World Bank
GDPcap	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)	World Bank
Open	Economic openness: (export + import) / GDP	Authors' calculations using World Bank's data
K/L	Capital to labor ratio	Authors' calculations using World Bank's data
NatResExp	Natural resources (fuel, ores and metals) exports (% of merchandise exports)	Authors' calculations using World Bank's data
AgeDepend	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)	Authors' calculations using UNESCO's data
TourGDP	Direct contribution of international Travel & Tourism to GDP (%)	WTTC
TourPrice *TourSpending* *TourArriv*	"Tourism Price" calculated as a Hodrick-Prescott trend of TourSpendig / TourArriv *Tourist spending (from abroad) in billion USD (constant 2011)* *International tourism, number of arrivals*	Authors' calculations *WTTC* *World Bank*

Table A.2. List of countries in the samples

Country		Basic model Eq.1 (1990-2012)		Extended model Eq.2 (1995-2012)	
		lnEVI	GS	lnEVI	GS
Bahamas	SIDS	X	X	X	X
Bahrain	SIDS	X	X	X	X
Barbados	SIDS	X	X	X	X
Cape Verde	SIDS	X	X	X	X
Comoros	SIDS	X		X	
Dominican Republic	SIDS	X	X	X	X
Fiji	SIDS	X	X	X	X
Guyana	SIDS	X	X	X	X
Maldives	SIDS	X	X	X	X
Mauritius	SIDS	X	X	X	X
Papua New Guinea	SIDS	X	X	X	X
Saint Lucia	SIDS	X	X	X	X
Saint Vincent and the Grenadines	SIDS	X	X	X	X
Sao Tome and Principe	SIDS		X		X
Seychelles	SIDS		X		X
Singapore	SIDS	X		X	
Solomon Islands	SIDS	X		X	
Suriname	SIDS	X	X	X	X
Tonga	SIDS	X	X	X	X
Vanuatu	SIDS	X	X	X	X
Sub-total SIDS		***18***	***17***	***18***	***17***
Albania	non SIDS		X		X
Algeria	non SIDS	X	X	X	X
Angola	non SIDS	X	X	X	
Argentina	non SIDS	X	X	X	X
Armenia	non SIDS		X		X
Australia	non SIDS		X		X
Austria	non SIDS		X		X
Bangladesh	non SIDS	X	X	X	X
Belarus	non SIDS		X		X
Belgium	non SIDS		X		X
Benin	non SIDS	X	X	X	X
Bolivia, Plurinational State of	non SIDS	X	X	X	X
Botswana	non SIDS	X	X	X	X
Brazil	non SIDS	X	X	X	X
Brunei Darussalam	non SIDS	X	X	X	X
Bulgaria	non SIDS		X		X
Burkina Faso	non SIDS	X	X	X	X
Burundi	non SIDS	X	X		
Cambodia	non SIDS	X	X	X	X
Cameroon	non SIDS	X	X	X	X
Canada	non SIDS		X		X
Central African Republic	non SIDS	X	X	X	
Chad	non SIDS	X		X	
Chile	non SIDS	X	X	X	X
China	non SIDS	X	X	X	X
Colombia	non SIDS	X	X	X	X
Congo	non SIDS	X	X	X	X
Costa Rica	non SIDS	X	X	X	X
Cote d'Ivoire	non SIDS	X	X	X	X
Croatia	non SIDS		X		X
Cyprus	non SIDS		X		X
Czech Republic	non SIDS		X		X
Denmark	non SIDS		X		X
Ecuador	non SIDS	X	X	X	X
Egypt	non SIDS	X	X	X	X
El Salvador	non SIDS	X	X	X	X
Estonia	non SIDS		X		X
Ethiopia	non SIDS		X		X
Finland	non SIDS		X		X
France	non SIDS		X		X
Gabon	non SIDS	X	X	X	X
Gambia	non SIDS	X	X	X	X
Germany	non SIDS		X		X
Ghana	non SIDS	X	X	X	X
Greece	non SIDS		X		X
Guatemala	non SIDS	X	X	X	X
Guinea	non SIDS	X	X	X	X
Honduras	non SIDS	X	X	X	X
Hungary	non SIDS		X		X
India	non SIDS	X	X	X	X
Indonesia	non SIDS	X	X	X	X
Iran, Islamic Republic of	non SIDS	X	X	X	X
Iraq	non SIDS		X		X

Country		Basic model Eq.1 (1990-2012)		Extended model Eq.2 (1995-2012)	
		lnEVI	GS	lnEVI	GS
Ireland	non SIDS		X		X
Israel	non SIDS		X		X
Italy	non SIDS		X		X
Japan	non SIDS		X		X
Jordan	non SIDS	X	X	X	X
Kazakhstan	non SIDS		X		X
Kenya	non SIDS	X	X	X	X
Kuwait	non SIDS		X		X
Kyrgyzstan	non SIDS		X		X
Lao People's Democratic Republic	non SIDS	X		X	
Latvia	non SIDS		X		X
Lebanon	non SIDS	X	X	X	X
Lesotho	non SIDS	X	X	X	X
Libya	non SIDS	X	X	X	X
Lithuania	non SIDS		X		X
Luxembourg	non SIDS		X		X
Macedonia, the former Yug. Rep.	non SIDS		X		X
Madagascar	non SIDS	X	X	X	X
Malawi	non SIDS	X	X	X	X
Malaysia	non SIDS	X	X	X	X
Mali	non SIDS	X	X	X	X
Mexico	non SIDS	X	X	X	X
Moldova, Republic of	non SIDS		X		X
Mongolia	non SIDS	X	X	X	X
Morocco	non SIDS	X	X	X	X
Mozambique	non SIDS	X	X	X	X
Namibia	non SIDS	X	X	X	X
Nepal	non SIDS	X	X	X	X
Netherlands	non SIDS		X		X
New Zealand	non SIDS		X		X
Nicaragua	non SIDS	X	X	X	X
Niger	non SIDS	X	X	X	X
Nigeria	non SIDS		X		X
Norway	non SIDS		X		X
Oman	non SIDS	X	X	X	X
Pakistan	non SIDS	X	X	X	X
Panama	non SIDS	X	X	X	X
Paraguay	non SIDS	X	X	X	X
Peru	non SIDS	X	X	X	X
Philippines	non SIDS	X	X	X	X
Poland	non SIDS		X		X
Portugal	non SIDS		X		X
Russian Federation	non SIDS		X		X
Rwanda	non SIDS	X	X	X	X
Saudi Arabia	non SIDS	X	X	X	X
Senegal	non SIDS	X	X	X	X
Sierra Leone	non SIDS	X		X	
Slovakia	non SIDS		X		X
Slovenia	non SIDS		X		X
South Africa	non SIDS	X	X	X	X
Spain	non SIDS		X		X
Sri Lanka	non SIDS	X	X	X	X
Sudan	non SIDS	X		X	
Swaziland	non SIDS	X	X	X	X
Sweden	non SIDS		X		X
Switzerland	non SIDS		X		X
Syrian Arab Republic	non SIDS	X	X	X	X
Thailand	non SIDS	X	X	X	X
Togo	non SIDS	X	X	X	X
Tunisia	non SIDS	X	X	X	X
Turkey	non SIDS	X	X	X	X
Uganda	non SIDS	X	X	X	X
Ukraine	non SIDS		X		X
United Arab Emirates	non SIDS	X		X	
United Kingdom	non SIDS		X		X
United States	non SIDS		X		X
Uruguay	non SIDS	X	X	X	X
Venezuela, Bolivarian Republic of	non SIDS	X	X	X	X
Viet Nam	non SIDS	X	X	X	X
Yemen	non SIDS	X	X	X	X
Zambia	non SIDS	X			
Zimbabwe	non SIDS	X	X	X	
Sub-total non-SIDS		***78***	***119***	***76***	***115***
TOTAL countries in the sample		**96**	**136**	**94**	**132**

Table A.3. Descriptive statistics for *EVI*—extended model

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max	(6) median	(7) skewness	(8) kurtosis
year	1,195			1995	2008			
EVI	1,195	36.51	11.31	10.84	68.76	34.99	0.498	2.705
lnEVI	**1,195**	**3.549**	**0.316**	**2.383**	**4.231**	**3.555**	**-0.226**	**2.829**
GDPcapGrowth	***1,195***	***2.306***	***4.030***	***-17.21***	***36.77***	***2.413***	***0.322***	***11.31***
lnGDPcapGrowth	1,195	3.978	0.0762	3.527	4.477	3.982	-0.655	9.350
FH	1,195	3.446	2.149	1.429	10	2.667	1.591	4.926
lnFH	**1,195**	**1.084**	**0.529**	**0.357**	**2.303**	**0.981**	**0.649**	**2.534**
Education1	**1,195**	**6.149**	**0.805**	**4**	**8**	**6**	**-0.334**	**2.693**
lnEducation1	1,195	1.807	0.137	1.386	2.079	1.792	-0.683	3.303
Education2	***683***	***85.33***	***16.04***	***24.58***	***100***	***92.12***	***-1.497***	***4.600***
lnEducation2	683	4.423	0.235	3.202	4.605	4.523	-2.158	8.101
GDPcap	1,195	3,472	5,719	188.2	47,081	1,522	3.934	21.92
lnGDPcap	**1,195**	**7.381**	**1.219**	**5.237**	**10.76**	**7.325**	**0.319**	**2.410**
AgrGDP	**1,195**	**18.64**	**13.54**	**0.0421**	**61.97**	**15.06**	**0.810**	**2.852**
lnAgrGDP	1,195	2.565	1.028	-3.167	4.127	2.712	-1.702	8.751
CreditGDP	**1,195**	**33.20**	**29.99**	**1.616**	**167.5**	**23.41**	**1.658**	**5.848**
lnCreditGDP	1,195	3.105	0.940	0.480	5.121	3.153	-0.245	2.557
GovExpend	1,195	13.72	5.650	3.460	42.51	12.61	1.403	6.175
lnGovExpend	**1,195**	**2.542**	**0.393**	**1.241**	**3.750**	**2.534**	**-0.0346**	**3.347**
Open	1,195	81.22	50.03	14.77	444.1	70.04	2.961	17.45
lnOpen	**1,195**	**4.258**	**0.515**	**2.693**	**6.096**	**4.249**	**0.209**	**3.556**
Popul	1,195	5.076e+07	1.785e+08	95,928	1.325e+09	1.009e+07	5.963	38.49
lnPopul	**1,195**	**15.97**	**1.886**	**11.47**	**21.00**	**16.13**	**-0.140**	**3.276**
K/L	1,195	13,550	19,298	64.32	145,594	7,750	3.573	19.61
lnK/L	**1,195**	**8.748**	**1.330**	**4.164**	**11.89**	**8.955**	**-0.213**	**2.457**
TourGDP	1,195	4.495	4.043	0.200	47.90	3.300	3.128	19.43
lnTourGDP	**1,195**	**1.230**	**0.718**	**-1.609**	**3.869**	**1.194**	**0.222**	**3.364**
TourPrice	1,195	1,335	905.3	61.28	8,063	1,197	2.337	13.25
lnTourPrice	**1,195**	**7.268**	**0.514**	**5.885**	**9.031**	**7.310**	**-0.151**	**3.368**
WHS	1,195	3.151	4.916	0	37	2	3.316	16.29
lnWHS	**1,195**	**2.361**	**1.755**	**0**	**5.916**	**3.045**	**-0.277**	**1.708**

Table A.4. Descriptive statistics for *GS*—extended model

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max	(6) median	(7) skewness	(8) kurtosis
year	1,514			1995	2008			
GS	**1,514**	**8.616**	**10.06**	**-84.91**	**38.86**	**9.007**	**-1.302**	**11.14**
lnGS	1,514	5.519	0.0418	5.051	5.635	5.522	-1.992	18.38
GDPcapGrowth	1,514	2.749	3.525	-15.28	16.20	2.651	-0.149	5.372
lnGDPcapGrowth	1,514	3.987	0.0663	3.582	4.211	3.987	-0.624	6.558
FH	1,514	5.103	3.159	1.429	10	4.167	0.510	1.673
lnFH	**1,514**	**1.423**	**0.656**	**0.357**	**2.303**	**1.427**	**0.0447**	**1.559**
Education1	**1,514**	**6.377**	**0.923**	**4**	**9**	**6**	**0.365**	**3.130**
lnEducation1	1,514	1.842	0.145	1.386	2.197	1.792	-0.0833	3.177
Education2	***1,044***	***90.70***	***13.35***	***23.18***	***100***	***95.74***	***-2.381***	***8.686***
lnEducation2	1,044	4.492	0.193	3.143	4.605	4.562	-3.223	15.37
GDPcap	1,514	10,723	14,719	125.3	87,717	3,737	1.855	6.389
lnGDPcap	**1,514**	**8.250**	**1.582**	**4.848**	**11.36**	**8.229**	**-0.00125**	**1.962**
NatResExp	1,514	21.76	26.96	0	99.74	9.179	1.498	4.037
lnNatResExp	**1,514**	**2.411**	**1.257**	**0**	**4.613**	**2.320**	**0.0134**	**2.142**
AgeDepend	**1,514**	**62.56**	**17.40**	**31.10**	**115.9**	**56.84**	**0.855**	**2.649**
lnAgeDepend	1,514	4.101	0.262	3.437	4.753	4.040	0.506	2.163
UrbPop	**1,514**	**57.33**	**21.70**	**11.37**	**98.23**	**59.85**	**-0.296**	**2.106**
lnUrbPop	1,514	3.953	0.478	2.431	4.587	4.092	-1.106	3.571
Open	1,514	81.75	40.14	14.93	333.5	73.79	1.470	7.216
lnOpen	**1,514**	**4.290**	**0.485**	**2.704**	**5.810**	**4.301**	**-0.229**	**3.177**
TourGDP	1,514	4.261	3.572	0.400	47.90	3.200	3.387	23.90
lnTourGDP	**1,514**	**1.222**	**0.643**	**-0.916**	**3.869**	**1.163**	**0.429**	**3.434**
TourPrice	1,514	1,569	1,847	61.28	25,432	1,205	6.682	64.42
lnTourPrice	**1,514**	**7.331**	**0.575**	**5.885**	**10.16**	**7.316**	**0.661**	**5.404**
WHS	1,514	5.500	7.386	0	41	3	2.307	8.540
lnWHS	**1,514**	**3.059**	**1.685**	**0**	**6.019**	**3.434**	**-0.655**	**2.538**

Figure A.2. Partial correlations in the *EVI*—extended model

Figure A.3. Partial correlations in the *GS*—extended model

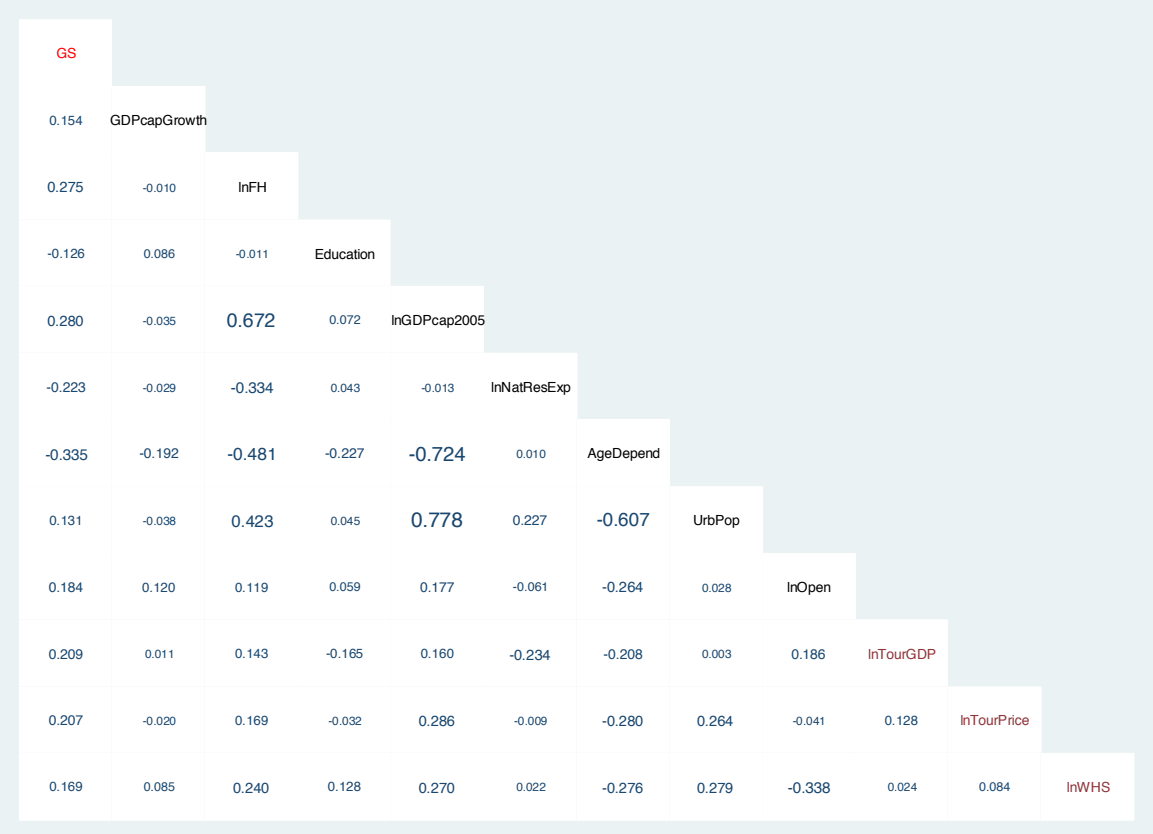


Table A.5. Vulnerability, tourism specialization, differentiation and heritage

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Dependent variable / Explanatory variables	lnEVI (RE) All	**lnEVI** (FE) **All**	lnEVI (RE) All	**lnEVI** (FE) **All**	**lnEVI** (FE) ***SIDS***	**lnEVI** (FE) ***Non-SIDS***
GDPcapGrowth	0.000 *(0.001)*	0.001 *(0.001)*	0.000 *(0.001)*	0.001 *(0.001)*	0.000 *(0.002)*	0.001 *(0.001)*
lnFH	**-0.086*** *(0.013)*	**-0.088*** *(0.014)*	**-0.090*** *(0.013)*	**-0.092*** *(0.014)*	-0.087 *(0.054)*	**-0.084*** *(0.014)*
Education1	**-0.022*** *(0.008)*	**-0.025*** *(0.008)*	-0.016+ *(0.008)*	**-0.018*** *(0.008)*	**-0.064*** *(0.020)*	-0.006 *(0.010)*
lnGDPcap	**-0.048*** *(0.021)*	**-0.107*** *(0.031)*	-0.037+ *(0.020)*	-0.**092*** *(0.031)*	-0.092 *(0.135)*	-0.057+ *(0.033)*
AgrGDP	**0.005*** *(0.001)*	**0.005*** *(0.001)*	**0.005*** *(0.001)*	**0.005*** *(0.001)*	0.007+ *(0.004)*	**0.005*** *(0.001)*
CreditGDP	0.000 *(0.001)*	0.001 *(0.001)*	0.000 *(0.001)*	0.001 *(0.001)*	**0.011*** *(0.003)*	-0.000 *(0.001)*
(CreditGDP)^2	-0.000 *(0.000)*	-0.000 *(0.000)*	-0.000 *(0.000)*	-0.000 *(0.000)*	**-0.000*** *(0.000)*	0.000 *(0.000)*
lnGovExpend	**0.032*** *(0.015)*	**0.037*** *(0.015)*	**0.026+** *(0.015)*	**0.031*** *(0.015)*	0.011 *(0.049)*	0.029+ *(0.016)*
lnOpen	**0.074*** *(0.016)*	**0.081*** *(0.016)*	**0.067*** *(0.015)*	**0.071*** *(0.016)*	0.105 *(0.068)*	**0.053*** *(0.017)*
lnPopul	**-0.081*** *(0.015)*	0.071 *(0.058)*	**-0.092*** *(0.015)*	0.010 *(0.057)*	0.372 *(0.282)*	0.017 *(0.059)*
lnK/L	**-0.043*** *(0.012)*	**-0.039*** *(0.012)*	**-0.048*** *(0.012)*	**-0.042*** *(0.012)*	0.035 *(0.073)*	**-0.043*** *(0.012)*
Trend	**-0.005*** *(0.001)*	**-0.007*** *(0.001)*	**-0.005*** *(0.001)*	**-0.006*** *(0.001)*	**-0.024*** *(0.008)*	**-0.006*** *(0.002)*
lnTourGDP	0.048 *(0.067)*	0.061 *(0.067)*	-0.196 *(0.138)*	-0.232+ *(0.137)*	**-3.895*** *(0.853)*	**-0.271*** *(0.130)*
lnTourPrice	**-0.091*** *(0.022)*	**-0.109*** *(0.025)*	**-0.188*** *(0.030)*	**-0.219*** *(0.031)*	**-0.708*** *(0.180)*	**-0.211*** *(0.030)*
lnTourGDP x lnTourPrice	-0.005 *(0.009)*	-0.007 *(0.009)*	0.034+ *(0.020)*	**0.039*** *(0.020)*	**0.506*** *(0.112)*	**0.045*** *(0.019)*
lnWHS			**-0.297*** *(0.072)*	**-0.355*** *(0.074)*	**-1.730*** *(0.851)*	**-0.373*** *(0.070)*
lnTourGDP x lnWHS			0.062 *(0.044)*	**0.086*** *(0.043)*	**1.069*** *(0.428)*	**0.094*** *(0.041)*
lnTourPrice x lnWHS			**0.045*** *(0.010)*	**0.053*** *(0.010)*	**0.231*** *(0.114)*	**0.056*** *(0.010)*
lnTourGDP x lnTourPrice x lnWHS			-0.011+ *(0.006)*	**-0.014*** *(0.006)*	**-0.143*** *(0.057)*	**-0.015*** *(0.006)*
SIDS x lnTourGDP	**-2.525*** *(0.451)*	**-2.962*** *(0.470)*	**-3.161*** *(0.607)*	**-4.002*** *(0.649)*		
SIDS x lnTourPrice	**-0.221*** *(0.083)*	**-0.264*** *(0.085)*	**-0.319*** *(0.116)*	**-0.409*** *(0.122)*		
SIDS x lnTourGDP x lnTourPrice	**0.326*** *(0.059)*	**0.383*** *(0.062)*	**0.409*** *(0.080)*	**0.519*** *(0.086)*		
SIDS x lnWHS			**-1.350*** *(0.552)*	**-1.523*** *(0.567)*		
SIDS x lnTourGDP x lnWHS			**0.863*** *(0.302)*	**1.070*** *(0.309)*		
SIDS x lnTourPrice x lnWHS			**0.179*** *(0.074)*	**0.201*** *(0.076)*		
SIDS x lnTourGDP x lnTourPrice x lnWHS			**-0.116*** *(0.040)*	**-0.143*** *(0.041)*		
SIDS	1.901* *(0.630)*	0.000 *(.)*	2.606* *(0.872)*	0.000 *(.)*		
Constant	5.989* *(0.333)*	4.450* *(1.003)*	6.766* *(0.364)*	6.253* *(1.018)*	4.534 *(4.281)*	5.235* *(1.080)*
Observations	**1195**	**1195**	**1195**	**1195**	198	997
Hausman test (FE vs RE; chi2 (dl))	72.51*		56.49*		196.80*	104.98*

Legend: standard errors in parentheses; + $p < 0.10$, * $p < 0.05$; FE - for fixed-effects and RE - for random-effects models

Table A.6. Sustainability, tourism specialization, differentiation and heritage

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Dependent variable / Explanatory variables	GS (RE) ALL	**GS** (FE) **ALL**	GS (RE) ALL	**GS** (FE) **ALL**	**GS** (FE) ***SIDS***	**GS** (FE) ***Non-SIDS***
GDPcapGrowth	**0.221***	**0.187***	**0.230***	**0.194***	-0.087	**0.232***
	(0.041)	*(0.042)*	*(0.040)*	*(0.041)*	*(0.184)*	*(0.041)*
lnFH	-1.376+	**-1.743***	-0.935	-1.289	3.123	-1.377+
	(0.782)	*(0.852)*	*(0.761)*	*(0.837)*	*(5.061)*	*(0.811)*
Education1	**-1.298***	-0.689	**-1.907***	**-1.247***	-2.943	**-1.877***
	(0.504)	*(0.573)*	*(0.488)*	*(0.560)*	*(1.929)*	*(0.588)*
lnGDPcap	**4.967***	**9.795***	**5.004***	**10.099***	**-30.707***	**10.742***
	(0.800)	*(1.548)*	*(0.752)*	*(1.508)*	*(11.467)*	*(1.462)*
lnNatResExp	-0.458	-0.359	**-0.773***	-0.696+	0.064	-0.732+
	(0.329)	*(0.363)*	*(0.323)*	*(0.356)*	*(1.090)*	*(0.378)*
AgeDepend	**-0.095***	-0.051	-0.066	0.011	0.299	-0.034
	(0.041)	*(0.048)*	*(0.041)*	*(0.048)*	*(0.301)*	*(0.047)*
UrbPop	**-0.255***	**-0.259***	**-0.274***	**-0.364***	0.606	**-0.431***
	(0.051)	*(0.092)*	*(0.049)*	*(0.093)*	*(0.407)*	*(0.093)*
lnOpen	-1.052	-1.585	-0.928	-1.590	-3.472	**-3.121***
	(0.954)	*(1.086)*	*(0.916)*	*(1.053)*	*(5.305)*	*(1.067)*
Trend	0.036	-0.039	0.009	-0.029	0.185	0.029
	(0.047)	*(0.069)*	*(0.047)*	*(0.068)*	*(0.425)*	*(0.067)*
lnTourGDP	-4.606	-6.621	-7.263	-3.224	10.142	-4.367
	(5.938)	*(6.126)*	*(7.862)*	*(7.816)*	*(77.721)*	*(7.378)*
lnTourPrice	-0.127	-0.639	1.196	1.177	18.297	1.390
	(1.181)	*(1.336)*	*(1.375)*	*(1.495)*	*(18.446)*	*(1.411)*
lnTourGDP x lnTourPrice	0.756	1.027	1.135	0.457	-1.450	0.613
	(0.824)	*(0.851)*	*(1.113)*	*(1.107)*	*(10.334)*	*(1.045)*
lnWHS			6.015	**9.346***	**287.518***	**7.982***
			(3.887)	*(4.038)*	*(71.942)*	*(3.814)*
lnTourGDP x lnWHS			0.874	-2.441	**-118.461***	-2.129
			(3.292)	*(3.396)*	*(37.779)*	*(3.204)*
lnTourPrice x lnWHS			-0.702	**-1.221***	**-39.539***	**-1.050***
			(0.536)	*(0.559)*	*(9.759)*	*(0.528)*
lnTourGDP x lnTourPrice x lnWHS			-0.128	0.383	**16.285***	0.334
			(0.457)	*(0.471)*	*(5.084)*	*(0.444)*
SIDS x lnTourGDP	3.716	-24.487	7.591	-28.865		
	(33.905)	*(38.597)*	*(41.469)*	*(51.756)*		
SIDS x lnTourPrice	10.879	8.376	13.241	13.323		
	(7.159)	*(7.807)*	*(9.158)*	*(11.354)*		
SIDS x lnTourGDP x lnTourPrice	-0.135	3.807	-1.055	4.126		
	(4.539)	*(5.172)*	*(5.524)*	*(6.874)*		
SIDS x lnWHS			**222.797***	**213.019***		
			(46.371)	*(48.036)*		
SIDS x lnTourGDP x lnWHS			**-84.704***	**-74.922***		
			(24.407)	*(25.419)*		
SIDS x lnTourPrice x lnWHS			**-30.922***	**-29.389***		
			(6.247)	*(6.451)*		
SIDS x lnTourGDP x lnTourPrice x lnWHS			**11.564***	**10.155***		
			(3.271)	*(3.399)*		
SIDS	-91.974+	0.000	-100.787	0.000		
	(52.646)	*(.)*	*(68.122)*	*(.)*		
Constant	3.143	-42.905*	-6.254	-57.472*	114.468	-36.759*
	(11.505)	*(18.360)*	*(12.665)*	*(19.482)*	*(164.087)*	*(18.409)*
Observations	**1514**	**1514**	**1514**	**1514**	145	1369
Hausman test (FE vs RE; chi2 (dl))	45.26*		19.40		143.34*	40.88*

Legend: standard errors in parentheses; + $p < 0.10$, * $p < 0.05$; FE - for fixed-effects and RE - for random-effects models

Table A.7. Robustness tests (for models n°5 from Tables A.5 and A.6)

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Dependent variable / Explanatory variables	**lnEVI** (FE) ***SIDS***	**lnEVI** (FE) ***SIDS***	**lnEVI** (FE) ***SIDS***	**GS** (FE) ***SIDS***	**GS** (FE) ***SIDS***	**GS** (FE) ***SIDS***
GDPcapGrowth	0.0003 *(0.0019)*	-0.0000 *(0.0019)*	0.0048^{+} *(0.0024)*	-0.1128 *(0.1825)*	***-0.3127^{+}*** *(0.1689)*	0.1120 *(0.2524)*
lnFH	-0.0898^{+} *(0.0518)*	**-0.1088*** *(0.0490)*	-0.1348^{+} *(0.0780)*	2.5228 *(5.2367)*	-1.2101 *(5.1741)*	8.1334 *(9.8143)*
Education1	**-0.0728*** *(0.0191)*	**-0.0825*** *(0.0183)*		-2.7449 *(1.9766)*	-0.3571 *(1.7441)*	
Education2			**0.0115*** *(0.0039)*			**-1.0572*** *(0.3860)*
lnGDPcap	-0.0983 *(0.1335)*		**-0.4715*** *(0.1885)*	**-33.8830*** *(12.0022)*		**-34.6708*** *(16.9031)*
lnOpen	0.0811 *(0.0631)*	0.0769 *(0.0633)*	**0.4345*** *(0.1051)*	-2.9526 *(5.2731)*	-1.6052 *(5.1781)*	-2.5125 *(8.8191)*
Trend	**-0.0226*** *(0.0080)*	**-0.0223*** *(0.0063)*	**-0.0819*** *(0.0154)*	0.5068 *(0.4466)*	-0.2123 *(0.3790)*	0.3520 *(0.7871)*
AgrGDP	**0.0075*** *(0.0035)*	**0.0076*** *(0.0035)*	0.0013 *(0.0066)*			
CreditGDP	**0.0098*** *(0.0027)*	**0.0100*** *(0.0027)*	**0.0155*** *(0.0034)*			
$(CreditGDP)^2$	**-0.0001*** *(0.0000)*	**-0.0001*** *(0.0000)*	**-0.0001*** *(0.0000)*			
lnGovExpend	0.0303 *(0.0479)*	0.0439 *(0.0468)*	0.1097 *(0.0751)*			
lnPopul	0.3262 *(0.2739)*	0.3326 *(0.2439)*	0.5983 *(0.5506)*			
lnK/L	0.0191 *(0.0739)*	-0.0182 *(0.0728)*	**1.1383*** *(0.2307)*			
lnNatResExp				-0.2985 *(1.1012)*	-0.0656 *(1.1160)*	1.3366 *(2.4992)*
AgeDepend				0.4314 *(0.3074)*	0.3282 *(0.3084)*	0.5233 *(0.5848)*
UrbPop				0.5456 *(0.4084)*	0.1169 *(0.3847)*	0.0258 *(0.6778)*
$lnTourGDP_{t-1}$	**-4.2051*** *(0.7880)*	**-3.8476*** *(0.7271)*	**-4.2582*** *(1.2803)*	110.7154 *(81.7930)*	22.3212 *(75.4935)*	-66.6098 *(187.5110)*
lnTourPrice	**-0.7152*** *(0.1683)*	**-0.6807*** *(0.1434)*	**-1.4633*** *(0.3090)*	**40.7098*** *(19.1290)*	20.0746 *(17.9885)*	17.8837 *(55.5491)*
$lnTourGDP_{t-1}$ x lnTourPrice	**0.5488*** *(0.1040)*	**0.5017*** *(0.0961)*	**0.5439*** *(0.1688)*	-14.5797 *(10.9526)*	-2.8295 *(10.1223)*	9.4851 *(25.4313)*
lnWHS	**-1.6475*** *(0.7929)*	**-1.8374*** *(0.6441)*	**-5.0373*** *(1.3770)*	**326.4619*** *(75.6119)*	**233.3361*** *(69.7269)*	**369.0885*** *(167.3288)*
$lnTourGDP_{t-1}$ x lnWHS	**0.9330*** *(0.4265)*	**0.9903*** *(0.3763)*	**2.0843*** *(0.5854)*	**-134.5456*** *(38.4735)*	**-82.2547*** *(34.6677)*	**-152.9278^{+}** *(78.9340)*
lnTourPrice x lnWHS	**0.2217*** *(0.1066)*	**0.2482*** *(0.0864)*	**0.6826*** *(0.1873)*	**-44.5973*** *(10.3324)*	**-31.8893*** *(9.5315)*	**-49.5577*** *(23.0962)*
$lnTourGDP_{t-1}$ x lnTourPrice x lnWHS	**-0.1252*** *(0.0571)*	**-0.1333*** *(0.0503)*	**-0.2815*** *(0.0796)*	**18.3483*** *(5.2093)*	**11.2477*** *(4.6908)*	***20.5066^{+}*** *(10.7454)*
Constant	5.4837 *(4.0555)*	4.7260 *(3.5276)*	-2.4872 *(8.3650)*	-40.4669 *(156.5990)*	-153.9231 *(147.7152)*	226.5824 *(423.2002)*
Observations	198	203	100	145	150	93
R^2 (within)	0.53	0.505	0.796	0.395	0.36	0.44

Legend: standard errors in parentheses; $^{+}$ $p < 0.10$, * $p < 0.05$; FE - for fixed-effects models