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Promoting heritage for a sustainable development: the case of tourism in the island economies

Natalia ZUGRAVU-SOILITA*, Vincent GERONIMI†,
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Abstract

This study explores the issue of development sustainability through differentiated tourism for Small Island Developing States (SIDS). We empirically test the hypothesis that the threshold we found in the relationship between tourism specialization (its share in GDP) and genuine savings (a measure of weak sustainability) relates to strategic differences in the development of tourism, including the mobilization of heritage resources, if available. We confirm the common view that heritage-based tourism is the right solution for a sustainable development in the SIDS *highly* relying on tourism activities. However, this strategy would undermine genuine savings in the SIDS *weakly* specialized in tourism, where alternative tourism strategies (e.g., mass tourism) would be more suitable for macroeconomic sustainability.

Keywords – development; genuine savings; heritage; insularity; product differentiation; sustainability; tourism

JEL classification – Z32; O57; Q01

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1. INTRODUCTION

The question of sustainability takes a specific dimension for Small Island Developing States (SIDS)¹. Their economic opportunities in the global market are limited by their smallness and remoteness. Hence, over the last decades, SIDS have adapted to these constraints by following specific paths of development. Several authors have emphasized the role of rents (measured as the difference between the price of a product and all the unitary costs of production, including a “normal” rate of profit) in these economies (Bertram, 1999). Rents can be very diverse, grounded in history (in the form of financial transfers from a former colonial power), in human capital (remittances), or stemming from natural endowments valorization (sub-soil assets) or from market positioning through product differentiation (Bertram and Poirine, 2007). Macroeconomic sustainability—the transmission of wealth to future generations—would thus suppose the capacity to maintain those rents over time, or to invest in new sources of rents. This paper focuses on tourism as a potential source of economic rents, especially in the SIDS, and explores the specific conditions under which tourism could contribute to sustainable development.

In the literature, it is well established that tourism is 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; Pratt, 2015). However, it is not necessarily economically possible nor desirable for all island economies. Indeed, tourism as a sector of predilection for most SIDS questions their sustainability as long as it is based on the valuation of natural characteristics (sea, sun, beaches) that can be found in a large number of destinations. Positioning SIDS on the global market for tourism on the segment of undifferentiated tourism exposes them to a high level of price competition, leaving few opportunities for generating rents. In addition, mass-tourism could gradually exhaust natural capital through multiple degradations (pollution, over-crowding, dysneylandisation,...), and thus limit the contribution of tourism to current

¹ In this study, we use the UNCTAD’s official term and classification of “SIDS” proposed at the first Global Conference on the Sustainable Development of SIDS, held in Barbados in 1994.

and future well-being.

We thus focus in this study on the possibility to engage into a sustainable development path by promoting tourism based on cultural and/or natural heritage, as an example of economic specialization through product differentiation – a source of rent. From a sustainability point of view, SIDS should differentiate their tourism services in order to benefit from market rents. They should therefore valorize the specificities of their natural as well as cultural capital, in particular their heritage, as a source of differentiation, and preserve these specificities for future generations. As stated by Akgün, van Leeuwen and Nijkamp (2012), “synergies between protecting natural/cultural heritage and sectoral economic development (e.g. tourism or land-based industries) can ensure success in sustainable development”². This view is rather common—with a wide range of formulations—in the literature. However, no empirical investigation of the validity of this view is available. Most academic studies examine the relationship between tourism and economic growth/development, without explicitly investigating sustainability issues. For instance, Sims (2010) shows that strictly protected areas have contributed to economic development and poverty reduction in Thailand; the economic benefits from increased tourism having offset the costs of land use restrictions.

Our empirical study (based on panel data for 17 SIDS and 119 non-SIDS, between 1990 and 2008) should at least partially fill the gaps in the literature on the link between tourism and sustainable development, through an econometric investigation of the links between the degree of tourism specialization and an index of macroeconomic sustainability, constructed through the Hamilton’s (2006) approach of genuine savings (see Section 2 for the literature review and more discussion with regards to the choice of this ‘weak’ sustainability index). We assume that the relationship between specialization in tourism and sustainability is similar to that between tourism specialization and growth (see Section 2), as we shall show in the Section 3 through an econometric analysis. This relationship would thus appear to be nonlinear and, more precisely, from a certain threshold of tourism specialization, the positive impact of international tourism on genuine savings should decrease. We therefore focus our

² Underlined by the authors

analysis on the hypothesis that this threshold results from differences in the development strategy of the tourist industry determined by the existence and means of incorporating the heritage resources of island economies. In order to test this hypothesis, we classify tourism services following two criteria: the evolution of spending per tourist (the trend in ‘real’ spending per tourist, not affected by the underlying inflationary trends in the economy)³ — as a rough proxy of “*tourism price*” — and the presence of world heritage site(s) (based on the World Heritage List of UNESCO⁴). 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). **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 »). We assess the proposal whereby for SIDS at a cost disadvantage (remoteness, smallness), differentiated tourist services based on heritage may be better suited to ensure sustainable development, in comparison to other tourism strategies.

This paper is composed of five sections. The introduction presents our research objectives in perspective with the main results of the literature on tourism and growth, which are presented in Section 2. In Section 3, we investigate empirically the nonlinear relationship between tourism specialization and genuine savings. Section 4 extends the empirical analysis to the exploration of the effects of tourism specialization on sustainability, conditional on tourist services’ differentiation. Drawing on our exploratory empirical results, we build in the subsection 4.2 a typology of SIDS based on the specialization in tourism and the differentiation of the services offered to visitors, by discussing some illustrated case studies. The final section concludes.

³ 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.

⁴ The Convention Concerning the Protection of the World Cultural and Natural Heritage was adopted by UNESCO in 1972.

2. LITERATURE REVIEW

If the theoretical mechanisms linking the SIDS' economic growth to their structural disadvantages make a consensus, their empirical validation would be controversial. For example, Easterly and Kraay's (2000) empirical study of a sample of 157 countries (1960-1995), with controls for geographical features, shows that small countries have higher GDP per capita than other countries. Thus, according to Logossah (2007), the empirical exploration of structural disadvantages related to specialization would make more sense and would be more interesting than the investigation of issues related to absolute disadvantages. In other words, research should focus on the most appropriate specialization choices for the small size, isolation and remoteness of island economies. For instance, Logossah and Maupertuis (2007) suggest that some natural disadvantages (isolation, remoteness, insularity) could provide comparative advantages for island territories by transforming them into unique and highly desirable tourism destinations. Indeed, many SIDS enjoy a unique "social, cultural or natural attractiveness" (Seetanah, 2011) that could, as long as the valued assets are preserved, generate economic rents.

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. 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, by developing a panel smooth transition vector error correction model, Wu *et al.* (2016) find a bi-directional, nonlinear, time- and country-varying causality between the economic growth and tourism. 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. Thus the impact of tourism on growth might differ according to the intensity of tourism specialization, and a threshold effect might arise that can be measured in terms of the level of specialization in tourism. Some previous analyses (e.g., Adamou and

Clerides, 2010; Holzner, 2011) suggest the need for certain economies, with a specific (relatively high) level of specialization in tourism, to develop other economic activities in light of the decreasing marginal effect of tourism on growth over time. Similarly, those island territories where tourism is still at the embryonic stage should maintain diversified economic activities alongside the development of the tourist sector. Specializing in tourism could therefore have a positive but decreasing marginal effect on economic growth, thereby questioning the economic sustainability of SIDS where international tourism constitutes an essential source of growth.

While the impact of tourism on growth received considerable attention, the link between tourism and macroeconomic sustainability has not yet been empirically explored, and particularly in the SIDS. However, the need to explore through quantitative analysis the impact of tourism on sustainability has been emphasized in several studies (e.g., Buckley, 2012). What constitutes sustainable development depends on how one perceives total capital. One of the visions - and especially that which is at the heart of the Hamilton's approach (retained in this study) - is that sustainable development requires total wealth to be not declining (weak sustainability), which implies perfect substitutability between different types of capital that can be evaluated using monetary values (Hartwick, 1978; Asheim, Buchholz and Withagen, 2003; Dasgupta, 2009; Arrow *et al.*, 2012). 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. Following Arrow *et al.* (2012), given the assumption of unlimited substitutability among different forms of capital, countries with positive levels of genuine savings should experience non-declining future utility. The corresponding empirical index implemented by the World Bank is the so-called *Adjusted Net Savings* or *genuine savings*, measuring an economy's long-term sustainability⁵. According to an alternative view, sustainable development requires non-declining natural capital (strong sustainability) because of the existence of critical thresholds beyond which any decrease in a physical unit of natural capital can

⁵ Adjusted net savings are equal to net national savings plus education expenditure and minus energy depletion, mineral depletion, net forest depletion, and carbon dioxide emissions.

not be replaced by an increase in the many other forms of capital (Constanza and Daly, 1992; Daly, 1996; Ekins *et al.*, 2003). Undoubtedly, it would have been more suitable to use a strong 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, the literature does not provide a robust indicator of strong sustainability, comparable across countries and over time. Data is even rarer for small island economies. Despite some serious limitations well informed in the academic literature (Ferreira and Vincent, 2005; Gnegne, 2009)⁶, more recent empirical studies provide support for genuine savings as a measure of weak sustainability, which can be used as a forward looking indicator of future well-being for periods of up to 100 years (Greasley *et al.*, 2014; Hanley *et al.*, 2016). According to Markandya and Pedroso-Galinato (2007), it is difficult to establish empirically the degree of substitutability and the choice between weak and strong sustainable development would be a matter of values-based preference. Also, as highlighted by Blum, Ducoing and McLaughlin (2016), this dichotomy (weak sustainability and strong sustainability) would be false in some respects. Indeed, if a country failed a weak sustainability test, it would likely also fail a strong sustainability test: *i.e.*, negative genuine savings are a clear sign of unsustainability (Hamilton and Clemens, 1999). Finally, the genuine savings have the great advantage of procuring an index of [weak] sustainability, firmly anchored in the system of national accounts, and thus able to be used to measure and compare a large number of countries consistently and over long periods of time.

The shifting orientation in the tourism strategy of several island economies—highly specialized in tourism and essentially offering undifferentiated services—toward differentiated tourism (eco-tourism, cultural tourism, etc.) would thus reflect the gradual exhaustion of a development based solely on mass

⁶ 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. In this study, we are 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.

tourism. In the current phase of increasing competition in the field of traditional beach tourism, or undifferentiated tourism, several governments and institutions have played 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). This is particularly true for small islands. The differentiation of the island product, in particular by promoting cultural heritage,⁷ 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 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. However, combined tourism services—luxury and heritage—are frequent tourism strategies.

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. They 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.

⁷ In this respect, the promotion of “exceptional” natural heritage (e.g., endemic species) can have the same effect as cultural heritage.

3. THRESHOLDS IN THE RELATIONSHIP BETWEEN TOURISM AND GENUINE SAVINGS

In order to test the impact of the specialization in tourism (measured here by the direct contribution of international tourism to GDP, in %) on sustainability, we perform regressions using panel data for the period 1990–2008, adopting the World Bank’s genuine savings (**GS**) indicator as dependent variable. 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 genuine savings in the SIDS (17 countries) compared to the non-SIDS (119 countries).

3.1 Empirical models for non-linear relationships

To investigate a potential non-linear relationship between genuine savings and tourism, we prefer using the panel threshold model proposed by Hansen (1999) that is a category of regime-switching models in which (i) the slope parameters vary according to a ‘regime’ switching mechanism that depends on a threshold variable, and (ii) the regime is observable ex-post, contrary to the Markovian regime switching models. Indeed, having no strong arguments for the number of possible regimes, we want to rely on the data to detect the number of statistically significant thresholds. However, the fixed-effect panel threshold model requires balanced panel data. This significantly reduces the number of observations in our dataset, from eighteen to eight hundreds, thus excluding almost all SIDS (from 17 to 3). We therefore first estimate a parametric model including quadratic and cubic terms in order to exploit the nonlinear relations for all the countries in our dataset. The fixed-effects threshold model in a balanced panel allows us further testing the robustness of these results.

Testing a nonlinear (quadratic or cubic) relationship means checking whether the effect of a change in the specialization in tourism on sustainability depends on the level of this specialization. This marginal effect would either increase (if the simple, quadratic, and cubic (where appropriate) terms 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 eventually becoming positive (negative).

As discussed in the introduction, the GS indicator is a good indicator of sustainable development when persistent trends indicate continued wealth erosion or, conversely, a permanent increase in different assets. This requires a dynamic model, taking into account previous GS levels. Therefore, all of our regressions must include the lagged dependent variable.

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

$$GS_{it} = \alpha + \gamma GS_{i,t-1} + \beta_1 TourGDP_{it} + [\beta_2 (TourGDP_{it})^2 + \beta_3 (TourGDP_{it})^3] + \phi X_{it} + \chi Z_{it} + u_i + e_t + \varepsilon_{it} \quad (\text{Eq.1})$$

where **GS** represents genuine savings; **TourGDP** is the level of specialization in tourism (direct contribution of international tourism to GDP), in its simple, quadratic and eventually cubic forms; **X** represents the other determinants of genuine savings; **Z** represents the control variables; **u_i** is the error term fixed over time representing the effects proper 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 autoregressive parameter **γ** needs to satisfy $|\gamma| < 1$. The explanatory variables that we have used are discussed below and defined in the appendix (Table A.1).

With regard to the explanatory variables X and control variables Z, we draw on the vast literature on the determining factors of the genuine savings. We distinguish two groups of factors explaining **weak sustainability**:

(i) *determinants of genuine savings* (e.g., Atkinson and Hamilton, 2003 and 2007; Hamilton and Clemens, 1999; Hamilton, 2006; Sachs and Warner, 2001; Soysa et al., 2010): accumulation/consumption of economic capital, preservation/depletion of natural capital, and enhancement/decline of social capital (as a large measure of human, cultural, institutional assets). All proxy variables for different capital assets are carefully chosen to avoid partial identity in the GS regression. Indeed, using investment in fixed capital to proxy economic assets, and the value of natural resource rents (in absolute or relative to GDP terms) for the depletion of natural assets, should cause collinearity problems (i.e., partial identity)

because these variables enter directly in the GS calculation. We therefore 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, respectively—the first variable being highly correlated with fixed capital accumulation 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 indicators. In particular, we use duration of secondary education (years) as a measure of human capital, whereas the institutional capital is proxied by the Freedom House’s indicator of democracy, calculated as the average of “political rights” and “civil liberties.”

(ii) determinants of (gross) saving as *control variables for genuine savings* (e.g., Boos and Holm-Müller, 2013; Dietz 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.

Our baseline parametric model is also contrasted with fixed-effect panel threshold models, which assume a binary transition function⁸ and take the following forms:

- in the presence of a single threshold:

$$GS_{it} = \mu + \gamma GS_{it-1} + TourGDP_{it}(q_{it} < \tau)\beta_1 + TourGDP_{it}(q_{it} \geq \tau)\beta_2 + \phi X_{it} + \chi Z_{it} + u_i + e_t + \varepsilon_{it} \quad (\text{Eq.2})$$

where q_{it} is the threshold variable and τ is the threshold parameter that divides the equation into

⁸ Gonzalez, Teräsvirta and van Dijk (2005) have introduced a generalized Panel Transition Regression (PTR) model, by considering a logistic (continuous) transition function to account for possible smooth and gradual transitions: i.e., the Panel Smooth Transition Regression (PSTR). We retain here the PTR model introduced by Hansen (1999), with a binary transition function, in order to have results comparable with a parametric regression including quadratic and cubic terms for non-linear relationships. The quadratic (cubic) form model should bring results comparable with the PTR model in the presence of a single (two) threshold(s). Unlike the static model proposed by Hansen, our model includes the lagged dependent variable as a regressor.

two regimes with coefficients β_1 and β_2 . This equation can also be written as follows:

$$GS_{it} = \mu + \gamma GS_{it-1} + TourGDP_{it}(q_{it}, \tau)\beta + \phi X_{it} + \chi Z_{it} + u_i + e_t + \varepsilon_{it} \quad (\text{Eq.3})$$

where $TourGDP_{it}(q_{it}, \tau) = \begin{cases} TourGDP_{it} * I_{(q_{it} < \tau)} \\ TourGDP_{it} * I_{(q_{it} \geq \tau)} \end{cases}$ with $I(\cdot)$ the indicator function.

- in the presence of multiple (e.g., here two) thresholds:

$$GS_{it} = \mu + \gamma GS_{it-1} + TourGDP_{it}(q_{it} < \tau_1)\beta_1 + TourGDP_{it}(\tau_1 \leq q_{it} < \tau_2)\beta_2 + TourGDP_{it}(q_{it} \geq \tau_2)\beta_3 + \phi X_{it} + \chi Z_{it} + u_i + e_t + \varepsilon_{it} \quad (\text{Eq.4})$$

Our estimation models are represented by level(GS)—log/level(X) equations: that is, the dependent variable, GS , is expressed in levels and only one explanatory variable, $\ln GDP_{cap}$, is expressed in logarithm, with all other variables kept in levels. Indeed, GDP_{cap} is the only variable representing an exponential trend. Following O’Hara and Kotze (2010), we chose not taking log of our count variables when standard deviation is small and the mean is large (e.g., *Education*). The variables in relative terms: e.g., *TourGDP* (%), *NatResExp* (%), *AgeDepend* (%), *UrbPop* (%), *Open* (%) do not need log-transformation.

With regard to the empirical strategy, Breusch-Pagan LM tests for random effects (RE) and the F-test ($u_i = 0$) for the fixed effects (FE) enable us to reject the null hypotheses and suggest the use of panel estimation techniques rather than ordinary least squares (OLS). At the same 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 (see Table 1 below).

3.2 Empirical results on critical thresholds of tourism specialization

Estimation results of Equations (1)-(4), for the pooled sample of countries (SIDS and non-SIDS), are displayed in Table 1. Models (1) to (4) present the results from the benchmark parametric (linear and quadratic/cubic) panel regressions. Model (5) displays results from the fixed-effects panel threshold model.

Table 1. Nonlinear effect of tourism specialization (pooled sample of countries)

Model	(1)	(2)	(3)	(4)	(5)
Dependent variable	GS	GS	GS	GS	GS
Explanatory variables					
GS_{t-1}	0.723* (0.015)	0.570* (0.020)	0.570* (0.020)	0.571* (0.020)	0.664* (0.024)
GDPcapGrowth	0.213* (0.034)	0.192* (0.034)	0.189* (0.034)	0.190* (0.034)	0.291* (0.036)
Democracy	-0.096 (0.097)	-0.233+ (0.135)	-0.233+ (0.135)	-0.237+ (0.135)	-0.093 (0.121)
Education	-0.569* (0.251)	-0.101 (0.481)	-0.085 (0.481)	-0.051 (0.481)	-0.126 (0.765)
lnGDPcap	0.594+ (0.321)	1.961+ (1.082)	1.967+ (1.081)	2.121+ (1.084)	1.504 (1.123)
NatResExp	-0.017+ (0.009)	0.003 (0.015)	0.004 (0.015)	0.003 (0.015)	-0.057* (0.021)
AgeDepend	-0.036* (0.018)	-0.043 (0.030)	-0.040 (0.030)	-0.034 (0.031)	0.003 (0.031)
UrbPop	-0.022 (0.018)	-0.055 (0.062)	-0.060 (0.062)	-0.072 (0.062)	-0.076 (0.053)
Open	-0.000 (0.005)	-0.009 (0.010)	-0.010 (0.010)	-0.011 (0.010)	0.010 (0.011)
TourGDP	0.027 (0.049)	0.136* (0.069)	0.283+ (0.146)	0.666* (0.263)	
(TourGDP)²			-0.004 (0.004)	-0.035+ (0.018)	
(TourGDP)³				0.001+ (0.000)	
TourGDP < τ_1					0.252* (0.110)
τ_1 < TourGDP < τ_2					-0.210* (0.087)
TourGDP > τ_2					0.094+ (0.051)
Constant	4.853 (3.418)	-5.233 (10.031)	-5.700 (10.039)	-7.657 (10.095)	-4.994 (11.019)
Observations	1857	1857	1857	1857	874
Type of panel data model	RE	FE	FE	FE	FEPTM
R2 - within	0.365	0.369	0.369	0.371	0.585
R2 - between	0.947	0.898	0.898	0.896	0.863
R2 - overall	0.798	0.738	0.737	0.736	0.760
Bootstrap (500)	No	No	No	No	YES
Hausman fixed-vs-random effects test's statistic (chi2 (dl))		159.73*	160.20*	161.20*	N/A

Legend: standard errors in parentheses; + for p-value < 0.10, * for p-value < 0.05; FE - for fixed-effects and RE - for random-effects models; FEPTM - fixed-effect panel threshold model (Hansen, 1999; Gonzalo and Wolf, 2005), which requires balanced panel data; N/A - not applicable

Based on the Hausman test statistics, we will discuss only the empirical results of models that are consistent (FE models). We would like to emphasize the attention to be cared to our β interpretations. For instance, in the level(GS)—log/level(X) model (2), an increase of one percentage point in *GDPcapGrowth* would increase the share of genuine savings in the gross national income (GNI) by about 0.2 percentage points (level—level), whereas a 1% increase of *GDP/cap* would increase GS by 0.02 ($\beta/100$) percentage points (level—log). We note that the autoregressive parameter of GS satisfies the

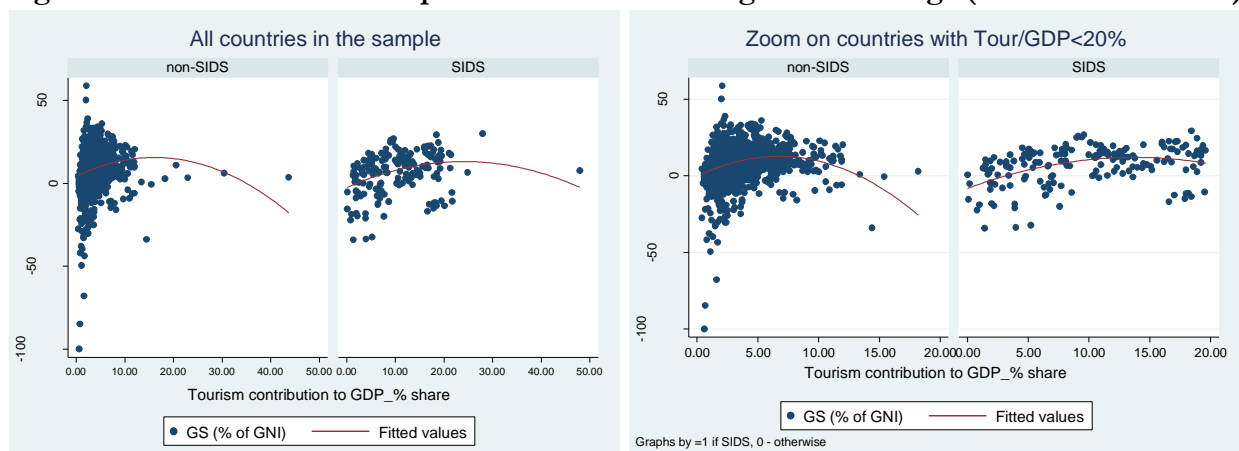
condition $|\gamma| < 1$, which implies the dynamic process is stable, and that its inclusion in the model significantly improves the regressions' goodness of fit. Our results express the fact that where GS go depends partly (57-72%) on where they currently are (as expressed by the autoregressive coefficient, γ) and partly (28-43%) on what happens along the way (as expressed by other explanatory variables' coefficients and the random noise component).

When found to be statistically significant (random-effects model (1) and fixed-effects panel threshold model (5)), the effect of natural resources' depletion on genuine savings is negative. Age dependency and urbanization were found to reduce genuine savings in a static model (not reported here) but have no statistically significant effect in the dynamic model of genuine savings. As for economic development and growth, they are positively associated with genuine savings (increased manufactured and human/technological capital allowing for a lower dependence on natural resources). As expressed by Dietz, Neumayer, and Soysa (2007), trade openness is generally insignificant in the empirical literature. Similarly, (secondary) education do not seem to exert a significant impact on genuine savings. Finally, democracy appears to reduce genuine savings, which contradicts our expectations. It should however be noted that while the theory strongly suggests that liberal democracies should perform better than autocracies in terms of sustainability indicators, the empirical evidence is still ambiguous (e.g., Midlarsky, 1998; Barrett and Graddy, 2000; Grafton and Knowles, 2004; Lin and Liscow, 2012). As suggested by Ward (2008), that might be explained by the fact that most of the existing literature does not control for the degree of public opinion and support for environmental quality, and/or ignores the type of democracy (e.g., stable and unstable systems, party system, presidential and parliamentary systems, federalism...).

With regard to our variable of interest, tourism specialization is found to increase genuine savings. All else equal, an additional percentage point of the tourism contribution to GDP would induce an increase of the share of genuine savings in the GNI by about 0.14 percentage points (models 1 and 2). As observed, the estimates presented in models (4) and (5) clearly exhibit an inverted-U relationship between *GS* and *TourGDP*. We should note that the cubic term was introduced in the model (4) because

the quadratic model alone does not indicate for non-linear relationship in the model (3), despite the visible nonlinearity displayed by Figure 1 (in particular for SIDS). As we can see in the second part of Figure 1, the nonlinear pattern (and the threshold's value) would differ between SIDS and non-SIDS. This would prevent us from finding out a significant quadratic term for a pooled sample. Adding a cubic term should allow for a better consideration of country heterogeneity. Indeed, significant linear and quadratic terms are found in model (4), whereas the cubic terms is very weak and significant at only 10% level.

Figure 1. Nonlinear relationship between tourism and genuine savings (SIDS vs. non-SIDS)



To find out the number of statistically significant thresholds and their values, we run fixed-effects panel threshold model (5) and perform bootstrap tests. The F-statistics, along with their bootstrap p-values, are presented in the Table 2 for models with a single threshold (1) and with two thresholds (2).

Table 2. Threshold test results (from fixed-effect panel threshold model (5) in Table 1)

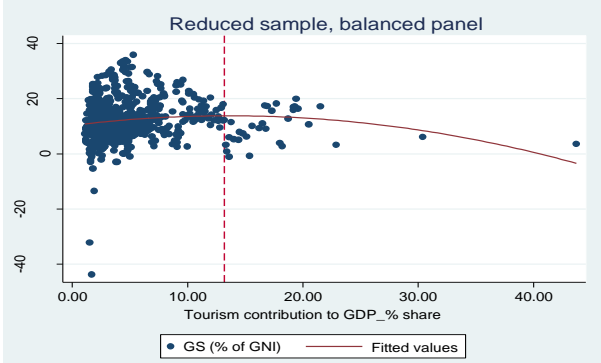
Number of thresholds	(1)	(2)
Statistical Hypotheses:	H0 : No threshold (K=0) H1 : At most one threshold (K=1)	H0 : One threshold (K=1) H1 : At most two thresholds (K=2)
Threshold estimate	$\tau_1=13.20$ (%)	$\tau_2= 16.50$ (%)
95% confidence interval	[12.0500, 13.6000]	[. , .]
F-statistic	19.91	18.06
Bootstrap P-value	0.0220	0.1170

Legend: K - the number of thresholds; the estimation and test of the threshold effect are computed in Mata (*xthreg* Stata module). 1000 bootstrap replications were used to obtain the p-values.

The null hypothesis of no single threshold (K=0) is rejected (at 5% level) since the bootstrap p-value is less than 0.05 (column (1)). At the same time, we cannot reject the null of a single threshold (column (2)), the second threshold thus being non-significant. As we have seen in Table 2, our empirical model is characterized by a nonlinear relationship between GS and tourism specialization, with an unique

statistically significant threshold at 13.2% of tourism contribution to GDP (see also Figure 2, which represents data on the reduced, balanced panel).

Figure 2. Pair correlation plot of tourism specialization and genuine savings



The reported *TourGDP* threshold value of 13.2% splits the sample into two regimes. The first regime below this threshold indicates for a positive effect of tourism specialization on GS. That is, an increase of tourism contribution to GDP by 1 percentage point would be associated with a rise by 0.25 percentage points of the GS’ share in the GNI. The second regime, in countries with tourism contribution to GDP > 13.2%, is characterized by a negative effect. All else equal, an additional percentage point of tourism contribution to GDP in these countries would reduce the share of GS in the GNI by 0.21 percentage points. We should note that the coefficients of models (4) and (5) are not directly comparable because the condition of having a balanced panel in model (5) has sharply reduced the number of observations: from 1857 (119 non-SIDS and 17 SIDS) to 874 (43 non-SIDS and 3 SIDS: Barbados, Mauritius and Saint Lucia). Despite this significant change in the country sample, we emphasized a similar to model’s (4) nonlinearity pattern: i.e., an inverted-U relationship between *GS* and *TourGDP*.

Because of too few observations for SIDS in the fixed-effects panel threshold models, a distinction between SIDS and non-SIDS is not relevant and statistically robust. Hence, we further focus on our basic nonlinear parametric model. As stated above, we suppose that the quadratic term in model (3) is non-significant for the pooled sample of countries because of structural differences between SIDS and non-SIDS. Indeed, the most important shares of tourism in GDP are specific to SIDS (up to 48%).

In the following regressions, we keep only simple and quadratic terms by adding interactions with a

dummy taking value 1 for SIDS. This should get accurate estimation of nonlinear relationships for heterogeneous countries, organized in two country groups: SIDS and non-SIDS. In addition to depicting differences between SIDS and non-SIDS, regression results displayed in Table 3 take into consideration the potential issue of endogeneity. In particular, we can expect variables *GDPcapGrowth*, *lnGDPcap*, and *TourGDP* to be influenced by the engaged sustainability patterns and thus to be endogenous in our empirical model explaining GS. To alleviate the potential endogeneity, we first run fixed-effects models including one-period lagged variables of *GDPcapGrowth*, *lnGDPcap*, and *TourGDP* (models 2 and 3). This technique being highly controversial (Roodman, 2009; Reed, 2015; Bellemare, Masaki and Pepinsky, 2017), especially in dynamic panel models, we also run a Dynamic Panel Two-Stage system-GMM (DP2S_GMM or Arellano-Bond) estimation (model 4). The GMM estimator based on panel data (designed for small-T large-N panels) is typically used to correct for bias caused by endogenous explanatory variables and has the advantage to be robust to large heterogeneity. In particular, the two-stage system-GMM makes the endogenous variables pre-determined and, therefore, not correlated with the error term in equation. We check the validity of our ‘internal’ instruments (i.e., one-period lagged variables) and the robustness of our results by using the *system-GMM* instead of *difference-GMM* estimations, because the lagged levels of our endogenous variables might be poor instruments for the first-differenced regressors. The system-GMM estimator usually increases efficiency by using a system of two equations: one differenced (the first-differenced variables are instrumented with lagged variables in level) and one in levels (the variables in levels are instrumented with their own first differences). As suggested by Roodman (2009), instrumenting with lags should be acceptable as long as the e_{it} are not serially correlated, and the time dummies are included in order to prevent the contemporaneous correlation. As reported in Table 3, we fail to reject the Arellano-Bond test for AR(2) at 10% or lower significance level. Autocorrelation of the random error term in the level equations has been removed and our specified (internal) instruments are valid (see more explanations in the Note of Table 3).

Table 3. Endogeneity and nonlinearity between tourism specialization and genuine savings

Model	(1)	(2)	(3)	(4)
Dependent variable				
Explanatory variables	GS (ALL)	GS (ALL)	GS (only SIDS)	GS (ALL)
GS_{t-1}	0.571* (0.020)	0.575* (0.020)	0.440* (0.069)	0.740* (0.066)
GDPcapGrowth <i>(1 year-lag in models (2) and (3))</i>	0.193* (0.034)	0.050 (0.033)	0.069 (0.127)	0.390* (0.080)
SIDS x GDPcapGrowth				-0.468+ (0.239)
Democracy	-0.225+ (0.135)	-0.188 (0.136)	-1.275* (0.563)	-0.523+ (0.273)
SIDS x Democracy				0.684+ (0.400)
Education	-0.084 (0.481)	-0.221 (0.484)	1.311 (1.360)	-1.348* (0.544)
SIDS x Education				2.800* (1.335)
lnGDPcap <i>(1 year-lag in models (2) and (3))</i>	1.972+ (1.084)	0.674 (1.092)	-10.623+ (6.051)	2.524* (1.214)
SIDS x lnGDPcap				-3.243+ (1.883)
NatResExp	0.004 (0.015)	-0.002 (0.016)	0.079 (0.053)	-0.023 (0.019)
SIDS x NatResExp				0.102+ (0.053)
AgeDepend	-0.039 (0.030)	-0.053+ (0.031)	-0.176 (0.138)	0.004 (0.044)
SIDS x AgeDepend				-0.018 (0.096)
UrbPop	-0.065 (0.062)	-0.041 (0.063)	0.391+ (0.234)	-0.103* (0.052)
SIDS x UrbPop				-0.015 (0.076)
Open	-0.010 (0.010)	0.001 (0.010)	-0.048 (0.036)	-0.001 (0.014)
SIDS x Open				-0.002 (0.033)
TourGDP <i>(1 year-lag in models (2) and (3))</i>	0.337* (0.167)	0.196 (0.139)	1.520+ (0.803)	-0.309 (0.188)
SIDS x TourGDP <i>(1 year-lag in model (2))</i>	0.093 (0.420)	1.143+ (0.588)		1.364* (0.463)
(TourGDP)² <i>(1 year-lag in models (2) and (3))</i>	-0.008 (0.005)	-0.003 (0.003)	-0.048+ (0.024)	0.009 (0.006)
SIDS x (TourGDP)² <i>(1 year-lag in model (2))</i>	0.004 (0.009)	-0.042* (0.018)		-0.025* (0.010)
Constant	-5.858 (10.056)	4.708 (10.020)	80.506 (54.900)	-1.121 (9.257)
Observations	1857	1855	184	1857
Type of panel data model	FE	FE with lags	FE with lags	DP2S_GMM
Instruments		1-year lags of TourGDP GDPcapGrowth lnGDPcap	1-year lags of TourGDP GDPcapGrowth lnGDPcap	Difference equation: D.(Democracy Education NatResExp AgeDepend UrbPop Open) + L(1/2).(GS GS _{t-1} GDPcapGrowth lnGDPcap TourGDP) Level equation: Democracy Education NatRe- sExp AgeDepend UrbPop Open + D.(GS GS _{t-1} GDPcapGrowth lnGDPcap TourGDP)
R2 - within	0.370	0.361	0.412	
R2 - between	0.879	0.862	0.004	
R2 - overall	0.722	0.696	0.025	
Orthogonal deviations				YES
AB test for AR(1) in FD: Pr > z				0.000
AB test for AR(2) in FD: Pr > z				0.086
Year-fixed effects				YES

Legend: standard errors in parentheses; + for p-value < 0.10, * for p-value < 0.05; FE - for fixed-effects DP2S_GMM – for Dynamic Panel Two-Stage GMM regressions (Arellano–Bond estimators); D. – first difference, L(1/2) – one-period and two-period lags, DL – first-difference of one-period lag.

Note: The Arellano – Bond (AB) test for autocorrelation has a null hypothesis of no autocorrelation and is applied to the differenced residuals. The test for AR (1) process in first differences usually rejects the null hypothesis, but this is expected since $\Delta e_{it} = e_{it} - e_{it-1}$ and $\Delta e_{it-1} = e_{it-1} - e_{it-2}$ both have e_{it-1} . The test for AR (2) in first differences is more important, because it will detect autocorrelation in levels. The AB test would have a greater power than the Sargan and Hansen tests to detect whether the lagged instruments are invalid because of autocorrelation and heteroscedasticity.

We can see that once endogeneity is considered in models (2) to (4), tourism specialization has an impact on GS only in the SIDS, and relationship is nonlinear as previously discussed. A U-inverted relationship is found for SIDS regardless the estimation model (pooled sample or only for SIDS) and the regression technique (panel regression with lags or system-GMM). Our results suggest that an increase by 1 percentage point of tourism contribution to GDP would increase GS' share in the GNI by about 1.4 percentage points in the SIDS with a tourism share in GDP < 27% ($-\beta_1/(2\beta_2)$) from model (4). Any further increase in tourism activity would have a harmful effect on the sustainable development.

At a first glance, these results (a prevailing positive impact for SIDS with a twice-higher value of the threshold, and the non-significant effects for non-SIDS) could be surprising when having in mind that the islands are generally small and more dependent on their ecosystems (natural capital) when deploying tourist activities. We suppose this finding 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 savings⁹ 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

⁹ We recall that genuine savings equal net national savings plus education expenditure and minus energy depletion, mineral depletion, net forest depletion, and carbon dioxide emissions.

improving education¹⁰, etc... As regards the non-SIDS, we think the relationship between tourism and GS is rather in the opposite direction: that is, a sustainable development path (increased GS) would stimulate additional demand for tourism. Indeed, we found a positive effect of tourism on GS in these countries only in the regressions not dealing with endogeneity of *TourGDP*. Once the specific controls are made, *TourGDP* has no significant effect on GS in the non-SIDS (its impact would go through the main factors of GS, like the GDP). In the SIDS, international tourism would influence GS through mechanisms other than the economic development (*GDP*), the natural resources exhaustion (*NatResExp*), the improved institutions (*Democracy*), etc. It seems to affect GS through specific changes in the economic structure and processes (e.g., switch from low to high-value added activities, empowering or otherwise undermining local communities, etc.) and social perspectives (e.g., social cohesion, or on the contrary social acculturation, 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. 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 case is even more blatant for SIDS promoting mass tourism, where increased tourism specialization would mainly reduce genuine savings by: (i) boosting deforestation, by constructing roads, airports, hotels and other associated infrastructure; (ii) increasing CO₂ emissions because of intensified traffic and energy use in tourist accommodation; (iii) reducing opportunities for enhancing local revenues (mass tourism

¹⁰ Tourism is generally requiring a more educated labor force as compared to other traditional activities in the SIDS (mining, agriculture...).

being usually concentrated between international tour operators), etc.

The existence of a threshold in the effect of specializing in tourism on sustainability 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).

4. TOURISM DEVELOPMENT STRATEGIES: THE ROLE OF HERITAGE

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

4.1.1. Identification strategy and model specification

The gradual exhaustion of development trajectories based on specialization in tourism is not universally expressed with the same level of intensity, even for SIDS that have reached an equivalent level of specialization in tourism. In this section, we assume that one of the factors of differentiation of the impact of tourism on 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. Needless to say, 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 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 genuine savings. The UNESCO World Heritage List 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 (see also Drost (1996) for an analysis of the links between tourism and UNESCO designation). Thus, we introduce in our empirical model the number of World Heritage sites per country (variable WHS) as a moderator variable of the impact of tourism on genuine savings. 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.

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 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 GS basic model by adopting several identification strategies, making use of interactive terms.

First, by creating dummy variables for positive and negative changes in the tourism price and in heritage attractiveness, we get the following interaction terms that lead to new variables that would identify a specific tourism strategy:

- **Heritage tourism** - $HeritageTourSpecialis = TourGDP * DplusTourPrice * DplusWHSattract$, with $DplusTourPrice$ equal to 1 for non-negative changes in the logarithm of $TourPrice$ and $DplusWHSattract$ equal to 1 for positive changes in the logarithm of $WHSattractiv$. $TourPrice$ is the Hodrick-Prescott trend in spending per tourist, in constant 2011 US\$, a proxy for “tourism price”. $WHSattractiv$ is the number of international tourist arrivals by world heritage site ($TourArriv/WHS$, the last being equal to the cumulative number of UNESCO World Heritage Sites of all kinds: cultural, natural, or mixed). The coefficient of $HeritageTourSpecialis$ would reflect the effect of heritage tourism on GS and is expected to be positive.

- **Mass tourism** - $MassTourSpecialis = TourGDP * DminusTourPrice$, with $DminusTourPrice$

equal to 1 for negative changes in the logarithm of *TourPrice*, regardless the changes in $\ln WHS_{attractiv}$. The coefficient of *MassTourSpecialis* would reflect the effect of mass tourism on GS and is expected to be negative.

- **Luxury tourism - *LuxTourSpecialis*** = $TourGDP * D_{plusTourPrice} * D_{minusWHSattractiv}$, with $D_{plusTourPrice}$ equal to 1 for non-negative changes in the logarithm of *TourPrice* and $D_{minusWHSattractiv}$ equal to 1 for non-positive changes in the logarithm of *WHSattractiv*. The coefficient of *LuxTourSpecialis* would reflect the effect of luxury tourism on GS and is expected to be negative of insignificant.

The first extended model to be estimated takes the form¹¹:

$$GS_{it} = \alpha + \gamma GS_{i,t-1} + \beta_1 Heritage_{it} + \beta_2 MassTourSpecialis_{it} + \beta_3 LuxTourSpecialis_{it} + \phi X_{it} + \chi Z_{it} + u_i + e_t + \varepsilon_{it} \quad (Eq.5)$$

Second, we opt for the inclusion of two- and three-way interaction terms between *TourGDP* - the share of international tourism in GDP (i.e., tourism specialization), *lnTourPrice* - the logarithm of the trend in real spending per international tourist arrival (i.e., “tourism price”), and *Heritage* - the importance of heritage in each country, which is alternatively represented by *WHS* and *WHSattractiv* variables. The two- and three-way interaction terms serve to estimate the effect of tourism specialization depending on whether prices are following an upward or downward trend ($TourGDP * \ln TourPrice$) and according to the value of *Heritage* ($TourGDP * \ln TourPrice * Heritage$).

Our second specification of the extended empirical model is therefore given by the equation:

$$GS_{it} = \alpha + \gamma GS_{i,t-1} + \beta_1 TourGDP_{it} + \beta_2 \ln TourPrice_{it} + \beta_3 Heritage_{it} + \beta_4 TourGDP_{it} * \ln TourPrice_{it} + \beta_5 TourGDP_{it} * Heritage_{it} + \beta_6 \ln TourPrice_{it} * Heritage_{it} + \beta_7 TourGDP_{it} * \ln TourPrice_{it} * Heritage_{it} + \phi X_{it} + \chi Z_{it} + u_i + e_t + \varepsilon_{it} \quad (Eq.6)$$

The main difference between this model’s specification and the previous one (Eq. 5) lies in the fact

¹¹ The quadratic term is now omitted, as different tourism strategies should take into account the non-linearity initially found in the relationship between GS and tourism specialization.

that we control here for the magnitude / level of tourism prices and the cumulative number of WHS, in addition to capturing their positive or negative changes. Indeed, the dummy variables $D_{plusTourPrice}$ and $D_{minusTourPrice}$ used in the terms $HeritageTourSpecialis$, $MassTourSpecialis$ and $LuxTourSpecialis$ of equation (5) are limited to identifying changes in the price of tourism by ignoring its level. We may have cases of low $TourPrice$ reduction in a given year for a country where tourism activity is essentially luxury. Compared to other destinations, tourism would remain too expensive in this country, but recording a negative change in the tourism price over the course of a year would ‘mistakenly’ identify it as a destination for mass tourism. Equation (6) proposes a more complex specification because the interaction terms are continuous variables which, in an international comparative study, have the advantage of simultaneously taking into account the level and the variations of the ‘price of tourism’. The same arguments apply for the WHS variable, which should enter the equation in its absolute value to take into account the cumulative number of heritage sites in place, in addition to new sites registered at a given time.

With the exception of β_3 and β_7 , for which the interpretation is relatively more obvious and for which we would expect positive signs (as they should reflect the effect of heritage preservation and heritage tourism on GS), we have no specific expectation for the coefficients of the other interaction terms. Some of them (e.g., $TourGDP*lnTourPrice$) might be relevant for interpreting both the effect of luxury tourism and the effect of mass tourism (in the opposite sense). It should be emphasized that the three-way interactions between continuous variables create a 4D surface between all continuous variables, $TourGDP$, $lnTourPrice$ and $Heritage$, and our response variable GS . As capturing a 4D surface is not an easy task, we will use simplifications to explore our three-way interactions. The trick is to define a variable as a focal determinant of GS (e.g., $TourGDP$) and to explore changes in its slopes as the values of the other interacting variables (e.g., $Heritage$ and $lnTourPrice$) vary. A graph should make things clearer by giving the slopes of GS on an independent variable, e.g., $TourGDP$, when the moderator variables, e.g., $Heritage$ and $lnTourPrice$, are held constant at different combinations of high and low values.

4.1.2. Empirical results

Table 4 displays results for the impact of tourism specialization ($TourGDP$) on genuine savings (GS), conditional to tourism price ($\ln TourPrice$) and heritage (WHS or $WHSattractiv$), for the period 1995-2008. Models (1) to (2) provide estimates for the regressions on the global sample of countries grouping SIDS and non-SIDS. The remaining models (3) to (6) are focusing on SIDS.

Empirical results from Eq. 5 suggest a positive effect of heritage tourism on genuine savings in the SIDS and negative effects for mass and luxury tourism (model (1)). At the same time, tourism specialization has no statistically significant effect in the non-SIDS, regardless the tourism strategy. This result is in line with our previous findings, exploiting non-linear relationship between GS and tourism specialization in the non-SIDS. All else equal, an additional percentage point of ‘heritage’ tourism contribution to GDP would increase GS’ share in the GNI by about 0.2 percentage points. Conversely, an additional percentage point of ‘mass’ (‘luxury’) tourism contribution to GDP would reduce GS’ share in the GNI by about 0.13 (0.3) percentage points. We note, however, that these effects are statistically significant at 10% level only in the fixed-effects model, which should be preferred to the random-effects model that appears to be inconsistent (see Hausman test). As mentioned earlier, this identification strategy is limited although it is simple to interpret. Heritage and mass tourism might not be rigorously identified by dummy variables taking into account only yearly changes in the price of tourism and heritage (within effect), ignoring the comparability of their levels across countries (between effect).

Models (2) to (6) report estimate results for Eq.6. The effect of tourism specialization on GS in the non-SIDS appears to be negative when tourism prices do not evolve; but this result is significant at 10% level only (model (2)). With regard to SIDS, tourism specialization is found to increase genuine savings when it relies on heritage.

Table 4. Conditional effects of tourism: the role of heritage and product differentiation

Model	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	GS	GS	GS	GS	GS	GS
Explanatory variables	(ALL)	(ALL)	(only SIDS)	(only SIDS)	(only SIDS)	(only SIDS)
GS_{t-1}	0.532* (0.025)	0.855* (0.023)	0.148 (0.101)	0.272* (0.108)	0.227* (0.095)	0.263* (0.105)
GDPcapGrowth (1 year-lag in models (4) and (6))	0.242* (0.038)	0.339* (0.047)	-0.098 (0.184)	0.207 (0.197)	-0.134 (0.188)	0.221 (0.202)
Democracy	-0.279+ (0.154)	-0.085 (0.138)	0.368 (0.882)	-0.435 (1.018)	0.197 (0.901)	-0.316 (0.964)
Education	-0.876 (0.565)	-0.423 (0.355)	-1.985 (1.794)	-1.351 (2.105)	-1.565 (1.818)	-0.284 (2.108)
lnGDPcap (1 year-lag in models (4) and (6))	4.941* (1.357)	0.565 (0.489)	-22.621* (10.862)	-16.929 (12.789)	-14.912 (11.009)	-9.873 (12.372)
NatResExp	0.003 (0.018)	-0.021* (0.009)	-0.000 (0.060)	0.025 (0.064)	-0.019 (0.063)	0.035 (0.064)
AgeDepend	0.071+ (0.042)	0.001 (0.023)	0.454 (0.284)	0.495 (0.340)	0.516+ (0.297)	0.433 (0.357)
UrbPop	-0.082 (0.082)	-0.014 (0.025)	0.253 (0.378)	0.058 (0.424)	0.186 (0.397)	-0.071 (0.445)
Open	-0.021+ (0.012)	-0.004 (0.008)	-0.059 (0.052)	-0.092 (0.064)	-0.032 (0.054)	-0.046 (0.067)
HeritageTourSpecialis	0.143 (0.131)					
SIDS x HeritageTourSpecialis	0.195+ (0.103)					
MassTourSpecialis	0.092 (0.135)					
SIDS x MassTourSpecialis	-0.134+ (0.074)					
LuxTourSpecialis	0.197 (0.145)					
SIDS x LuxTourSpecialis	-0.311* (0.145)					
[1] TourGDP (1 year-lag in models (4) and (6))		-3.746+ (2.089)	12.581 (7.585)	8.660 (10.985)	4.228 (7.846)	7.051 (10.625)
[2] lnTourPrice (1 year-lag in models (4) and (6))		0.110 (0.808)	24.552* (9.741)	27.046* (12.035)	12.555 (9.358)	17.231 (11.935)
[3] TourGDP x lnTourPrice (1 year-lag in models (4) and (6))		0.507+ (0.293)	-1.658+ (0.992)	-1.191 (1.451)	-0.569 (1.027)	-0.988 (1.407)
[4] Heritage (1 year-lag in model (6))		-1.873 (2.762)	437.146* (92.059)	320.144* (110.586)	28.797* (8.555)	26.741* (10.675)
[5] TourGDP x Heritage (1 year-lag in models (4) and (6))		0.831 (0.555)	-39.951* (11.164)	-25.814+ (13.502)	-2.378* (1.081)	-2.500+ (1.363)
[6] lnTourPrice x Heritage (1 year-lag in models (4) and (6))		0.245 (0.382)	-59.768* (12.727)	-42.826* (15.129)	-4.048* (1.195)	-3.630* (1.469)
[7] TourGDP x lnTourPrice x Heritage (1 year-lag in models (4) and (6))		-0.113 (0.078)	5.418* (1.505)	3.448+ (1.806)	0.331* (0.146)	0.336+ (0.183)
SIDS x TourGDP		-1.077 (5.944)				
SIDS x lnTourPrice		-2.437 (4.007)				
SIDS x TourGDP x lnTourPrice		0.120 (0.769)				
SIDS x Heritage		294.812* (148.907)				
SIDS x TourGDP x Heritage		-17.300 (10.528)				
SIDS x lnTourPrice x Heritage		-40.617* (20.462)				
SIDS x TourGDP x lnTourPrice x Heritage		2.375+ (1.416)				
Observations	1276	1489	143	134	143	134
Not reported in the table	Constant	SIDS dummy	Constant Trend	Constant Trend	Constant Trend	Constant Trend
Type of panel data model	FE	DP2S_GMM	FE	FE with lags	FE	FE with lags
Hausman fixed-vs-random effects test's statistic (chi2 (dl))	129.63*		61.04*	41.51*	50.89*	32.79*

Legend: Legend: standard errors in parentheses; + for p-value < 0.10, * for p-value < 0.05; FE and RE - for fixed and random effects DP2S_GMM – for Dynamic Panel Two-Stage GMM regressions (Arellano–Bond estimators); **Heritage** variable is proxied by **WHS** in models (2)-(4) and by variable **lnWHSattractiv** in models (5)-(6) (see Appendix A.1 for variable description)

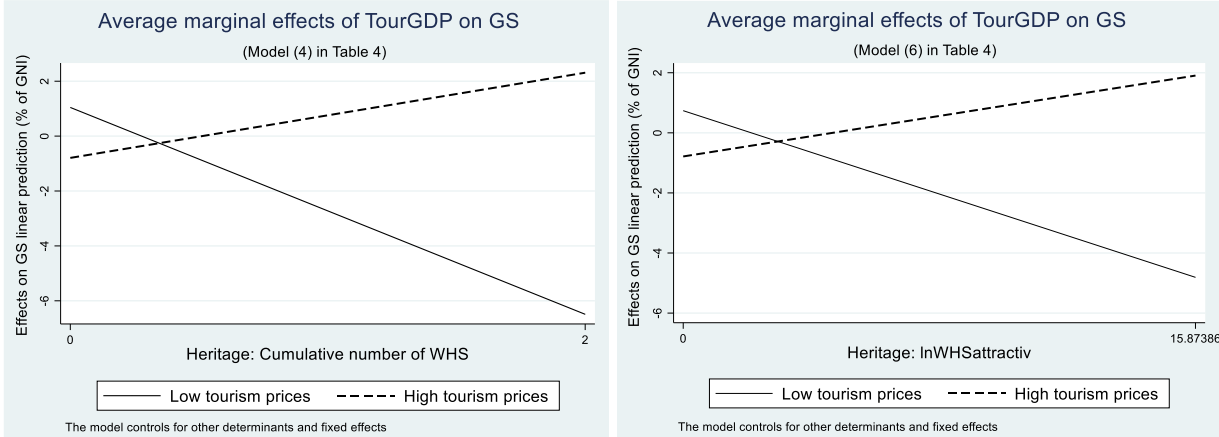
The remaining of empirical work is focused on the SIDS, and deals with potential endogeneity issues by running fixed-effects models with one-period lags (models (4) and (6)), because Dynamic Panel Two-stage system-GMM models are suitable only for data with large N and small T (we have only 17 SIDS for 14 years in models (3)-(6)). As shown by AB(2) test in Table 3, our lagged instruments should be valid because of no serial correlation. We can see that results are quite robust, regardless of the variable used to capture the role of heritage (i.e., *WHS* in models (3) and (4), and *lnWHSattractiv* in models (5) and (6)) and the estimation technique (i.e., fixed-effects without lags in models (3) and (5) or including lags in models (4) and (6)).

Interpretation of regression tables can be very challenging in the case of interaction effects, especially between continuous variables. To give clear interpretations of three-way interaction terms, we need to plot margins for different values of interacting variables. By focusing on models' (4) and (6) empirical results, we shall discuss the impact on GS of different tourism strategies. We compute simple plots of the dependent variable GS on a given independent variable in our three-way interaction terms, when its moderator variables are held constant at different combinations of high and low values (e.g., min and max values). For instance, to better see how the difference in the effect of *TourGDP* between destinations with low and high tourism prices changes with heritage (cumulative number of *WHS* in model (4) or *lnWHSattractiv* in model (6)), we explore the Figure 3).

Whether it is the absolute number of *WHS* (graph on the left, Figure 3) or the evolution of the number of tourists per *WHS* (graph on the right), we can see that the marginal effect of tourist specialization on GS is negative in the countries with valuable (moderate to strong) heritage but whose tourist prices are low (downward). This situation is typical to mass tourism (the solid line on the graph). Regarding [extreme] margins, all other things being equal, a 1-percentage point increase in the contribution of tourism to GDP would be associated with a 6.5 percentage point decrease in GS's share in the GNI, at the maximum value of heritage (cumulative number of *WHS*) and the minimum value of tourism price. On the contrary, the tourist activity seems to improve sustainability when tourist prices are on the rise and the country is enhancing its heritage. At the extreme values of *TourPrice* and *WHS*,

$dGS/dTourGDP$ is about 2.3. In this second case, we have a manifestation of heritage tourism (center and right-hand part of the dashed line). Finally, luxury tourism does not seem to have a significant impact on GS (left-hand part of the dashed line).

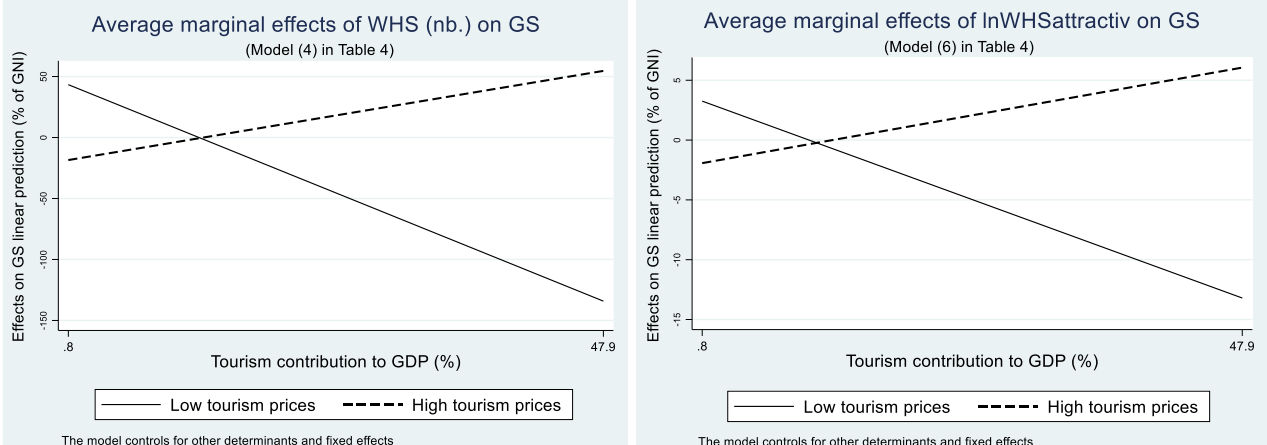
Figure 3. Average marginal effects of *TourGDP* at given values of *WHS* and *TourPrice*



Legend: Graphs are produced by the Stata’s *marginsplot* command succeeding the *margins* command, which estimates margins of responses for specified values of covariates calculated from predictions of a previously fit model.

Alternatively, by plotting the average effect of heritage on GS at different values of *TourGDP* and *TourPrice*, we can observe on Figure 4 that increasing the number of WHS (or their attractiveness) would increase GS when tourism prices go upward (heritage tourism) and the tourism contribution to GDP is substantial (right-hand part of the dashed lines). On the contrary, at high levels of tourism specialization, any increase in heritage would be associated with reduced GS if tourism prices go downward (right-hand part of the solid lines: mass tourism).

Figure 4. Average marginal effects of *Heritage* at given values of *TourGDP* and *TourPrice*

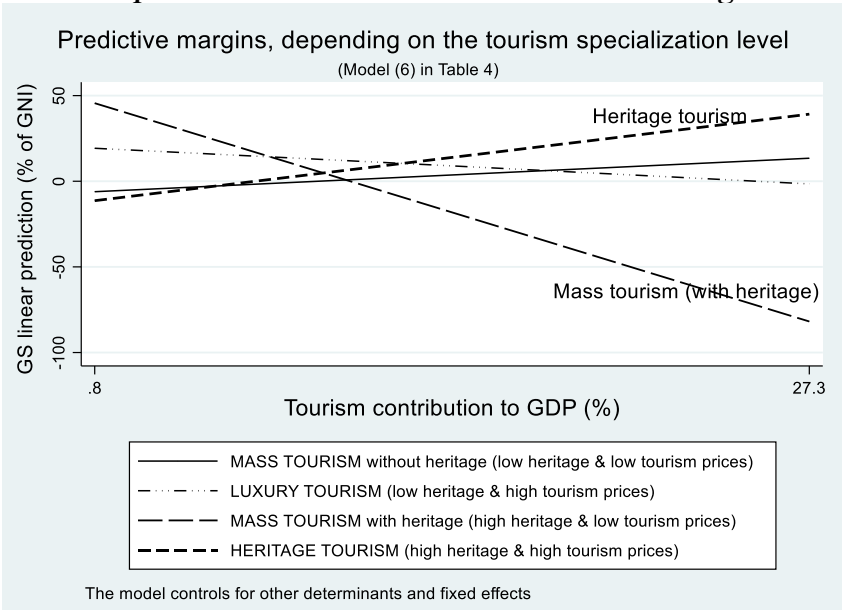


Legend: Graphs are produced by the Stata’s *marginsplot* command succeeding the *margins* command, which estimates margins of responses for specified values of covariates calculated from predictions of a previously fit model.

We can also observe in Figures 3 and 4 that mass tourism would not necessarily be detrimental to

sustainable development (left-hand part of the solid lines) and that heritage tourism is not always associated with an increase in GS (left-hand part of the dashed lines). These results are quite impressive, because mass tourism has a reputation for harming the environment (and local development) and heritage tourism should be the solution for a sustainable development. In order to verify whether these results are valid for all levels of tourism specialization, we draw another graph with predictive margins for different tourism strategies. Figure 5 shows that international tourism strategies in the presence of heritage have the greatest impact on GS in the SIDS. At high levels of tourism specialization, heritage tourism (dashed line) contributes to sustainable development, while mass tourism would have negative effects on total wealth (long-dashed line). The effects are surprisingly different when the tourism contribution to GDP is low: mass tourism therefore has a positive impact on GS in the presence of heritage, while heritage tourism seems to have very weak effects, even negative. Finally, the luxury tourism, characterized by a rationale of low volumes and high values but almost exclusively benefiting to foreigners, does not appear to have significant impact on the genuine savings. Similarly, mass tourism in the destinations without (natural and/or cultural) heritage does not appear to have a significant impact on GS.

Figure 5. Linear prediction of GS for different tourism strategies in the SIDS



Note: Delta-method used to estimate margins of responses of GS in model (6), Table 4, at specified values of *TourGDP*, *lnTourPrice*, and *lnWHSattractiv* (in particular, at their minimum and maximum values) and averaging over the remaining covariates.

According to our empirical results, if SIDS wanted to make of international tourism a major

economic driver (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. We should however notice 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. If, as expected, the mass tourism appears to reduce genuine savings at high tourism specialization levels in presence of world heritage, a quite original finding is that this strategy seems to be more sustainable than heritage tourism at low levels of tourism specialization. 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). Only at higher level of specialization, the territory should become more “professional” and organized with an ability to handle flows and provide visitors with services or obtain recognized certifications which would value this specialization. At the same time, low mass tourism specialization would benefit the destination country by increasing its competitiveness and attractiveness, without making a pressure on natural and/or social capital.

4.2. A typology of tourism strategies and their sustainability in the SIDS

Our empirical results on the impact of the specialization in tourism on genuine savings, moderated by the differentiation of tourist services, lead us to provide a typology of SIDS (Table 5 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.

Table 5. 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 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	---
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	++
No	Non declining: (prevailing luxury tourism)	High	5. Luxury tourism high specialization	Bahamas, Maldives	+ (n.s.)
		Low	6. Luxury tourism low specialization	Grenada, Singapore	+
Yes	Non declining: (prevailing heritage tourism)	High	7. Heritage tourism high specialization	Barbados, Belize, Dominica, Mauritius, Seychelles, Vanuatu	+++
		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: “n.s.” – for a statistically non-significant result; **bolds** – for statistically significant effects ($p \leq .1$) in at least one of the models (3)-(6) in Table 4; the number of plus/minus signs indicates the relative magnitude of the effect (see Figure 5 for these results’ illustration).

We observe that numerous SIDS maintain their development by focusing on **undifferentiated/unsegmented tourism** (categories 1 to 4), in particular with large islands having long ago opted to develop a mass tourism industry (e.g., Cuba, Dominican Republic¹², Jamaica, etc.), founded on the trio of sea, sand, and sun available through all-inclusive or package deals. For instance, Fiji has historically developed a high specialization of its economy on mass tourism. However, facing serious social and environmental degradations, it has recently introduced several areas of progress toward a more sustainable tourism with community-based tourism projects (Gibson, 2015), tourist packages centered on environmental education through the development of diving tourism, and a

¹² See Geronimi et al. (2015) for a comparative analysis of tourism strategies adopted in Dominica and the Dominican Republic.

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 position of Fiji close to the y -axis on Figure A.1 in appendix (x approaching zero, i.e., weaken price competition) should indicate to this potential shift from mass tourism to more differentiated services. As suggested by our empirical results, the effects on sustainability of specializing in mass tourism are conditional to the presence of heritage sites. In particular, we found that high specialization on mass tourism is detrimental to 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. While incurring high losses from social and environmental degradations, the country of destination usually benefits from only a small proportion of total tourists’ spending. Consequently, the countries with world heritage, wishing to mainly promote the mass tourism, would have interest to maintain low levels of tourism specialization (e.g., Cuba, Haiti, Kiribati). Papua New Guinea represents an interesting case study in this respect. Despite existence of unique heritage, it has recently promoted an “aggressive” tourism strategy aiming to double the number of tourist arrivals every 5 years. Regarded as a second-tier economic sector by Papua New Guinea’s authorities for some time, tourism is now considered a source of wealth and an alternative economic model given the programmed decline in raw materials (Pratt and Harrison, 2015). 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. 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.

If mass tourism takes usually a low share in GDP (Table 5 and Figure A.1 in appendix), the island economies that have **differentiated (heritage tourism)/segmented (luxury tourism)** their tourist services (categories 5 to 8) make of international tourism activity one of the main forces of their

economic growth (i.e., **high tourism specialization**). 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, 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.). If for the former, our results suggest no significant effect on the genuine savings, the latter's tourism strategy should contribute to higher sustainability.

By coupling the eight tourism strategies with our empirical results from the previous section, we can identify the islands' tourism strategies that appear to be suitable for a more sustainable economic development (last column of Table 5): in particular, low specialization in mass tourism or high specialization in heritage tourism. In light of our empirical results on the interdependent effects of tourism specialization and tourism differentiation, we would expect reduced sustainability in the islands from subcategory 4 if they seek to increase their level of specialization in international tourism (a shift to subcategory 2). On the contrary, a strategy of developing (maintaining) a high tourism specialization in the islands from category 8 (7) should be associated with higher degrees of sustainability. 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).

5. CONCLUSION

In this study, we explore the issue of development sustainability through differentiated tourism, and in particular by promoting international tourism based on heritage. Our methodological approach could apply to other forms of economic specialization based on product differentiation (e.g., agro-silvo-pastoral system, R&D based on unique animal and vegetal species, cinema industry and music production based on insularity and unique "indigenous culture", etc.).

More specifically, based on an empirical investigation of panel data for up to 17 SIDS and 119 non-SIDS, between 1990 and 2008, we show that the marginal effect of tourism on genuine savings is

nonlinear and varies according to the level of specialization in tourism. Tourism specialization is associated with increasing adjusted net savings for moderate levels of tourism specialization. However, our results highlight a threshold at 13.2% of tourism contribution to GDP for a pooled sample of highly heterogeneous countries, suggesting that any increase in tourism specialization above this level would undermine sustainable development. These results are particularly significant for SIDS (compared to non-SIDS), where the corresponding threshold is twice higher (27%). This would justify the choice of many SIDS to specialize in tourism, relative to other activities and to other countries. However, the existence of a threshold in the relationship between genuine savings and tourism would call into question the sustainability of SIDS choosing to rely heavily on this activity.

Furthermore, focusing on the period 1995-2008, we show that high levels of tourism specialization do not regularly undermine sustainable development. Our empirical findings suggest that heritage-based tourism should be the optimal strategy when wishing to make of tourism a significant economic driver. Differentiated tourism (more expensive, niche, innovative, or based on a unique cultural heritage) should help increase genuine savings of island economies once it enables this heritage to be conserved—i.e., high share in GDP. Alternatively, at low levels of tourism specialization, mass or luxury tourism strategies appear to be more suitable for the SIDS' macroeconomic sustainability.

This first attempt to assess, through econometrics on international data (on SIDS compared to non-SIDS), the interplay between tourism specialization and sustainability, confirms the opportunities offered by heritage tourism. It also stresses that such a strategy is not a universal panacea for SIDS, because several preconditions must be fulfilled in order to ensure its positive impact on sustainability. However, the main results presented here call for more future research, not only concerning alternative measurements of sustainability, 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—sustainability relationship, comparable international data on heritage remain scarce, and future analysis would have to consider alternative measures of heritage.

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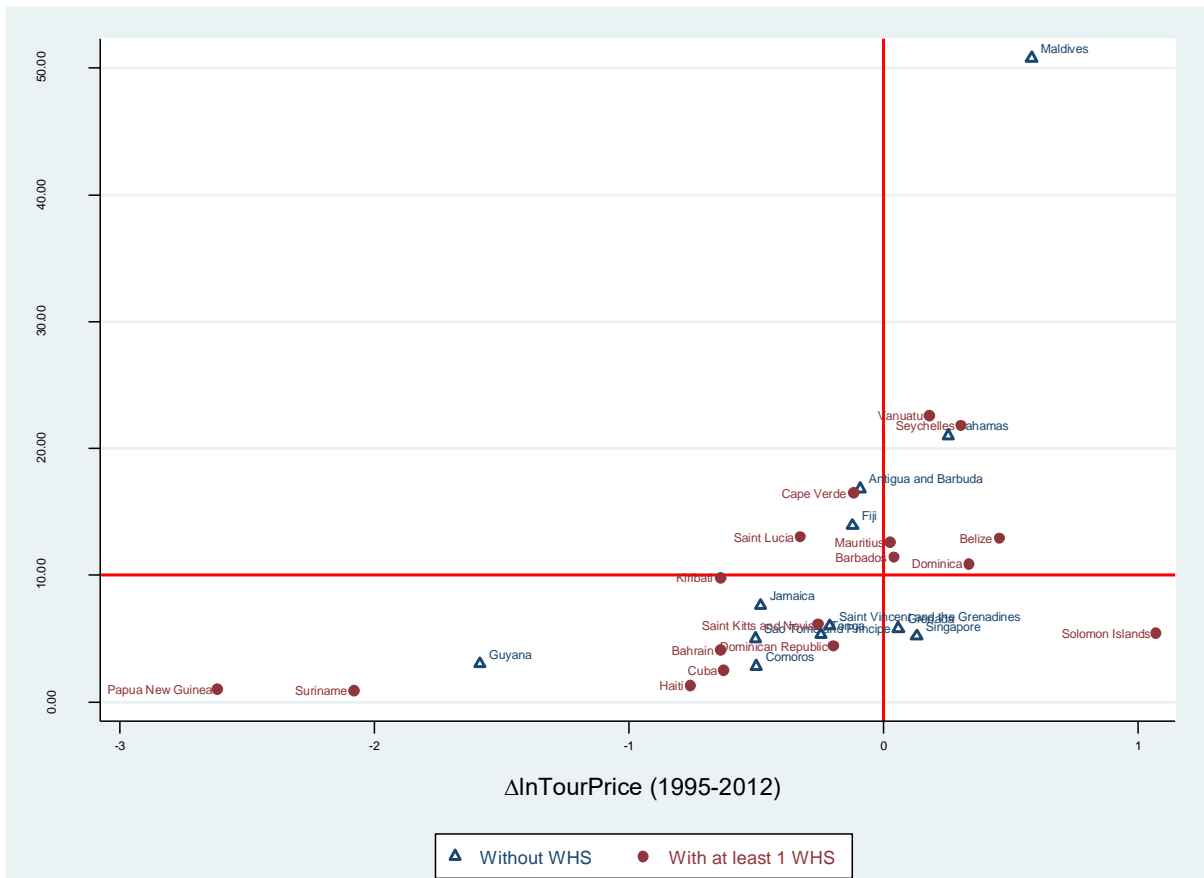
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APPENDIX

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)



Source: Authors.

Table A.1. Definitions and sources of variables

Variable	Definition	Source
GS	Genuine savings (or adjusted net savings), excluding particulate emission damage (% of GNI)	World Bank
GDPcapGrowth	GDP growth per habitant (% annual)	World Bank
Democracy	Democracy by Freedom House: average of “political rights” & “civil liberties” indicators	<i>Freedom in the World</i> , by Freedom House
Education	Length of secondary education (years)	World Bank
GDPcap	GDP per habitant (constant 2005 dollars)	World Bank
Open	Economic openness: (export + import) / GDP	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
TourGDP	Direct contribution of international Travel & Tourism to GDP (%)	WTTC
TourPrice <i>TourSpending</i> <i>TourArriv</i>	“Tourism Price” calculated as a Hodrick-Prescott trend of $TourSpending / TourArriv$ <i>Tourist spending (from abroad) in billion USD (constant 2011)</i> <i>International tourism, number of arrivals</i>	Authors’ calculations WTTC World Bank
WHS	Cumulative number of world heritage sites (of any nature: cultural, natural, mixed)	Authors’ calculations using UNESCO’s data
WHSattractiv	The number of international tourist arrivals by world heritage site ($=TourArriv / WHS$)	Authors’ calculations using WTTC and UNESCO’s data
HeritageTourSpecialis	This variable is obtained by multiplying <i>TourGDP</i> with two dummies: $DplusTourPrice$ equal to 1 for positive changes in <i>TourPrice</i> , and $DplusWHSattractiv$ equal to 1 for positive changes in <i>WHSattractiv</i> $(HeritageTourSpecialis = TourGDP * DplusTourPrice * DplusWHSattractiv)$	Authors’ calculations
MassTourSpecialis	This variable is obtained by multiplying <i>TourGDP</i> with dummy $DminusTourPrice$ taking value 1 for negative changes in <i>TourPrice</i> , regardless the changes in <i>WHSattractiv</i> $(MassTourSpecialis = TourGDP * DminusTourPrice)$	Authors’ calculations
LuxTourSpecialis	This variable is obtained by multiplying <i>TourGDP</i> with two dummies: $DplusTourPrice$ equal to 1 for positive changes in <i>TourPrice</i> , and $DminusWHSattractiv$ equal to 1 for negative changes in <i>WHSattractiv</i> $(LuxTourSpecialis = TourGDP * DplusTourPrice * DminusWHSattractiv)$	Authors’ calculations

Table A.2. Descriptive statistics for *GS*—extended model

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max	(6) median	(7) skewness	(8) kurtosis
year				1995	2008			
GS	1,514	8.616	10.06	-84.91	38.86	9.007	-1.302	11.14
<i>SIDS</i>	145	8.067	11.48	-34.24	30.03	10.41	-1.219	4.617
<i>Non-SIDS</i>	1,369	8.674	9.899	-84.91	38.86	8.883	-1.305	12.25
GDPcapGrowth	1,514	2.749	3.525	-15.28	16.20	2.651	-0.149	5.372
<i>SIDS</i>	145	1.992	3.661	-10.23	14.75	1.557	0.283	4.362
<i>Non-SIDS</i>	1,369	2.829	3.502	-15.28	16.20	2.739	-0.195	5.565
Democracy	1,514	5.103	3.159	1.429	10	4.167	0.510	1.673
<i>SIDS</i>	145	6.076	2.783	1.548	10	7.500	-0.00375	1.685
<i>Non-SIDS</i>	1,369	4.999	3.180	1.429	10	3.750	0.573	1.722
Education	1,514	6.377	0.923	4	9	6	0.365	3.130
<i>SIDS</i>	145	5.821	0.779	5	7	6	0.322	1.723
<i>Non-SIDS</i>	1,369	6.436	0.918	4	9	6	0.359	3.201
lnGDPcap	1,514	8.250	1.582	4.848	11.36	8.229	-0.00125	1.962
<i>SIDS</i>	145	8.540	0.936	6.668	10.09	8.451	-0.130	2.363
<i>Non-SIDS</i>	1,369	8.219	1.633	4.848	11.36	8.143	0.0388	1.882
NatResExp	1,514	21.76	26.96	0	99.74	9.179	1.498	4.037
<i>SIDS</i>	145	13.06	25.12	0	94.41	1.157	2.252	6.687
<i>Non-SIDS</i>	1,369	22.68	26.99	0.00122	99.74	9.937	1.449	3.902
AgeDepend	1,514	62.56	17.40	31.10	115.9	56.84	0.855	2.649
<i>SIDS</i>	145	57.93	10.82	31.10	87.18	56.78	0.324	2.688
<i>Non-SIDS</i>	1,369	63.05	17.89	36.57	115.9	56.93	0.812	2.483
UrbPop	1,514	57.33	21.70	11.37	98.23	59.85	-0.296	2.106
<i>SIDS</i>	145	48.68	21.15	13.13	88.47	45.91	0.414	2.200
<i>Non-SIDS</i>	1,369	58.24	21.56	11.37	98.23	61.47	-0.373	2.195
Open	1,514	81.75	40.14	14.93	333.5	73.79	1.470	7.216
<i>SIDS</i>	145	109.0	33.95	50.06	209.1	104.5	1.028	4.329
<i>Non-SIDS</i>	1,369	78.87	39.67	14.93	333.5	70.97	1.642	8.142
TourGDP	1,514	4.261	3.572	0.400	47.90	3.200	3.387	23.90
<i>SIDS</i>	145	10.79	6.813	0.800	47.90	10.70	1.241	7.528
<i>Non-SIDS</i>	1,369	3.569	2.056	0.400	15.40	3	1.541	6.163
lnTourPrice	1,514	7.331	0.575	5.885	10.16	7.316	0.661	5.404
<i>SIDS</i>	145	7.430	0.357	6.352	7.936	7.519	-1.430	4.433
<i>Non-SIDS</i>	1,369	7.321	0.593	5.885	10.16	7.293	0.734	5.304
WHS	1,514	5.500	7.386	0	41	3	2.307	8.540
<i>SIDS</i>	145	0.359	0.653	0	2	0	1.586	4.139
<i>Non-SIDS</i>	1,369	6.045	7.562	0	41	3	2.196	7.906
lnWHSattractiv	1,448	10.64	5.267	0	16.51	12.89	-1.416	3.258
<i>SIDS</i>	145	3.417	5.835	0	15.97	0	1.176	2.519
<i>Non-SIDS</i>	1,303	11.45	4.540	0	16.51	13.09	-1.949	5.258

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

GS													
0.152	GDPcapGrowth												
0.258	-0.014	Democracy											
-0.122	0.095	0.004	Education										
0.271	-0.048	0.720	0.069	InGDPcap2005									
-0.284	-0.059	-0.358	-0.017	-0.054	NatResExp								
-0.328	-0.184	-0.489	-0.233	-0.715	0.105	AgeDepend							
0.123	-0.047	0.436	0.043	0.774	0.143	-0.603	UrbPop						
0.217	0.107	0.137	0.034	0.180	-0.090	-0.254	0.034	Open					
0.116	-0.036	0.094	-0.150	0.117	-0.200	-0.157	-0.071	0.174	TourGDP				
0.195	-0.025	0.171	0.016	0.280	-0.010	-0.280	0.256	-0.016	0.092	InTourPrice			
0.145	0.033	0.274	0.189	0.339	-0.148	-0.323	0.257	-0.327	-0.061	0.067	WHS		
0.163	0.125	0.231	0.061	0.220	-0.169	-0.233	0.262	-0.145	-0.167	-0.028	0.391	InWHSattractiv	