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"Human development and tourism specialization. Evidence from a panel of developed and developing countries"

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Abstract

The analysis of the relationship between tourism and human development points to a positive link between these activities, basically by means of the improvement of economic conditions. In the present study we analyze whether and to what extent this relationship remains positive under different circumstances. We examine a selection of 63 countries from 1996 to 2008 and consider the Human Development Index plus a composite indicator of the tourism market as a whole. Findings confirm that, on average, tourism is positively associated with human development, particularly education (i.e., literacy rate), although the association may be affected by circumstances.

JEL classification: 015, 010, D62
Keywords: Human Development Index, tourism development, capability approach, externalities.

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1. INTRODUCTION

For many countries, the tourism sector represents a significant source of economic growth. The positive effect of tourism on local and national economies depends on the nature of the tourism product: a bundle of goods and services, the majority of which are location specific. As a result, the economic impact of tourism is linked to its unique characteristics: an ample and interrelated set of locally provided services directly and indirectly linked to the tourist experience (accommodation, restaurants, bars, cultural attractions, local transports, health services, waste management, and so on). From an empirical point of view, the impact of the tourism sector at a regional and national level has been widely explored by scholars. Many of these scholars investigate the Tourism-Led Growth (TLG) hypothesis, which specifically refers to the economic impact of international tourism arrivals, receipts, or consumption in developed or developing countries. A fundamental literature review of TLG empirical analysis has been performed by Sinclair (1998); however, since the 1990s, the number of studies on this topic has increased remarkably (Bimonte et al., 2012). The majority of TLG studies focus on a single country; however, a few consider more extensive samples (for European countries, see Paci & Marrocu, 2013; for countries worldwide, see Lee & Chang, 2008, and Figini & Vici, 2010). Overall, applied research reaches the conclusion that the relationship between tourism and economic growth is positive and particularly robust when countries are small or specialize in tourism (Vanegas & Croes, 2003, Brau et al., 2007).

All the above-mentioned studies explore the relationship between tourism and development by means of an economic indicator: real GDP. The underlying assumption of the studies is that wealth is strongly correlated to human development, well-being, or quality of life. As is well known, many scholars discuss the use of GDP as the sole indicator of quality of life or economic progress (see Kenny 2005 for an updated literature review). Specifically, for Nobel Prize scholar Amartya Sen (1987, 1993, 1999), income and consumption are just

components of well-being, while the most crucial factor is the capability of individuals to achieve conditions in life. For Sen, “capabilities are notions of freedom, in the positive sense: what real opportunities you have regarding the life you lead” (Sen, 1987, p.36). Since 1990, the United Nations Development Programme (UNDP) has used the Human Development Index (HDI) as an alternative indicator to measure human achievements. HDI is a composite statistic used to rank countries according to several development dimensions, such as life expectancy, education, and income. Since its introduction, the use of HDI rather than GDP has been criticized by mainstream economists (for a review see Klugman et al., 2011), and two main shortcomings are mentioned: the methodology and variables used to build the index and the redundancy of the index in respect to GDP. Due to this criticism, a new version of HDI has been proposed. Redundancy of the index in respect to GDP refers to the high correlation between the level of GDP per capita and the HDI (McGillivray, 1991). Conversely, other studies find some evidence that the link between GDP and other possible indicators of quality of life is not necessarily “linear and universal” (Kenny, 2005, p.2), that the correlation between the change in HDI and the growth of GDP per capita is not as strong as the correlation in these factors’ levels, and that such a link is even weaker when one calculates the correlation between the change in the non-income component of HDI and GDP growth (Klugman et al., 2011).

The main purpose of the present work is to study the relationship between tourism and human development à la Sen, using the revised version of HDI. Specifically, we show that the relationship between tourism and a broader concept of development needs to be investigated more in depth, and using GDP per capita is insufficient when the purpose is to investigate whether tourism affects human development. Unlike the connection between tourism and economic growth, the relationship between tourism and human development has not received much attention in the literature.

As has been investigated in tourism literature, tourism activity may produce negative or positive effects on resident welfare. The positive impacts regard primarily the economic sphere, such as the increase of job opportunities and local income. Moreover, the presence of a tourism industry allows the resident population to enjoy more opportunities for local entertainment, such as cultural amenities and recreational services. On the other side, negative impacts occur when, for instance, the cost of living increases due to the extra demand for second homes or when the price of local products increases due to the presence of tourists (Biagi et al., 2012); other types of negative effects may arise in the case of intensification of local crime (Schubert, 2009; Biagi & Detotto, 2014) and possible problems related to crowd and environmental pressures on the urban and natural equilibrium (Andereck et al., 2007, Lindberg et al., 2001). In the present work, however, we hypothesize that human development is triggered not only by improvements in economic conditions but also by tourist-host relations. Tourism is a bundle of goods and services that can only be consumed in the place of production. Hence, consumers (tourists) and producers (residents) interact with each other at the market place (tourism destinations). Apart from some exceptions, the vast majority of the tourism literature analyzing the host-tourism relationship focuses on quality of life of residents and, specifically, on their perceptions of the tourism impacts; these studies use surveys in which residents answer questions about the influence of tourism in their own life or in their community life. The main assumption of such studies is that the effect of tourism on resident well-being and, therefore, the success of a tourism destination will depend on the "positive" attitude of residents toward tourists (Purdue et al., 1990). This field of research applies the so-called social exchange theory to the tourism-host relationship and assumes that "social relations involve an exchange of resources among social actors; social actors seek mutual benefits from the exchange relationship" (Ap, 1990, p.669; Ward & Berno, 2011). The social exchange, therefore, implies interaction among actors. A negative resident's perception of the impact implies an asymmetric and unbalanced

exchange (Ap, 1990). Andereck et al. (2007) find that for the Anglo and Hispanic populations in the southwestern United States, tourism has a positive impact on the economy of their communities, but they have a different opinion regarding the other types of impacts such as socio-cultural and environmental ones. In the case of Arizona, Andereck and Nyaupane (2010) find that the frequency with which residents interact with tourists and the local impact of tourism in terms of local employment affect the positive perceptions of the resident population. Aref (2011) shows that the strongest tourism impacts in Shiraz (Iran) are linked with emotional and community well-being, income, and employment, while health and safety well-being are found to be marginal. Yu, Chancellor, and Cole (2011) conclude that perceived social costs have no significant effect on residents in Orange County (Indiana, United States). The authors explain this result by the fact that tourism development in the case under analysis is in the initial development stage, so residents are anticipating positive effects and may have demonstrated a higher tolerance toward tourism-induced social costs. Figini et al. (2009), studying one of the major Italian seaside destinations, show that residents consider the presence of tourists as a positive means of improving their life conditions (not strictly in an economic sense).

Overall, the results highlight that economic impact is perceived mostly as positive, but other types of impacts are also considered important. One of the main shortcomings of these studies is that they are mainly qualitative and investigate the host-tourist relationship in one point in time; hence they neglect possible medium long-run impacts of the tourism activity on the quality of life of residents. In a recent work, new empirical insights come from Marrocu and Paci (2011) that analyzing a cross section of 199 European regions (EU15) by using spatial econometric techniques provides empirical evidence that tourism can be a channel for transmitting new ideas and knowledge for local firms and regions. However, none of this literature empirically tests possible impacts of tourism in resident education and life expectancy due to host-resident interactions.

Despite the fact that some scholars recognize that the possible effect of the host-resident relationship is the increase in "…education of indigenous citizens by exposing them to other people and cultures…" (Ankomah & Crompton, 1990), overall, applied research does not empirically investigate this possible impact. The only exception is presented by Croes (2012), who analyzes the existence, nature, and direction of a possible relationship between tourism and human development in Nicaragua and Costa Rica from 1990 to 2009. Croes's work is a first attempt to open a line of research, but in our view, it presents some critical problems. First, it does not clarify the underlying mechanism of the tourism–human development relationship. In other words, it does not clearly explain why the presence of tourists should affect HDI. Second, it finds inconclusive results. Third, it investigates only the case of two developing countries without considering any counterfactual evidence. Finally, it measures tourism by means of a demand-side indicator (tourism receipts) rather than market indicators (demand and supply) that would capture the overall effect of tourism-related activities in the countries studied.

On this line of research, the present work investigates the link between tourism and human development for a panel of 63 countries, both developed and developing and both urbanized and rural, from 1996 to 2008. We measure the effect of tourism on HDI by means of a composite Tourism Index (Biagi et al., 2012), which allows us to capture the importance of the tourism market as whole (demand and supply side factors) in the sampled countries.

Our findings confirm that, on average, tourism is positively associated with human development, but in small and developed countries this relationship tends to be negative, suggesting that above a certain threshold tourism development produces some types of negative externalities. Furthermore, component-by-component analysis of the relationship with HDI indicates that investing in the tourism sector is important not only to achieve economic growth but also to improve human development, specifically in one dimension of HDI – local education. Our results are robust to the specification of the tourism composite

index and to several alternative estimations. This result suggests the need to further study the role of tourism for human development beyond the pure economic growth effects.

The paper is structured as follows: Section 2 analyzes the Human Development Index and the adjustments undertaken to investigate the panel of countries; Section 3 describes the tourism data used in the analysis and the Tourism Index as a useful research tool, which combines tourism demand and supply variables to capture the intensity of tourism activity in each country under analysis; Section 4 presents a descriptive analysis and comparison of HDI and the Tourism Index; and Section 5 illustrates the empirical models. Section 6 shows the basic results (subsection a); the relationship between the tourism index and the HDI component by component (subsection b); the role of the size of the countries and the degree of development (subsection c); and the robust checks implemented to test the stability of the parameter under analysis (subsection d). In this context, the possible problem of endogeneity of the regressors has been taken into account by performing GMM types of estimators. Finally, Section 7 discusses the results and offers some tentative conclusions.

2. HUMAN DEVELOPMENT INDEX

The first Human Development Report (HDR) in 1990 opened with a statement that has guided all subsequent reports: “People are the real wealth of a nation.” This statement is from Mahbub ul Haq (1934–1998), the founder of the Human Development Report, who also affirmed that

> *“The basic purpose of development is to enlarge people's choices. In principle, these choices can be infinite and can change over time. People often value achievements that do not show up at all, or not immediately, in income or growth figures: greater access to knowledge, better nutrition and health services, more secure livelihoods, security against crime and physical violence, satisfying leisure hours, political and cultural freedoms and sense of participation in community*

activities. The objective of development is to create an enabling environment for people to enjoy long, healthy and creative lives" (HDR, 1990, p.9).

The Human Development Index (HDI) is a composite statistic used to rank countries according to several development dimensions: life expectancy, education, and income. It was created by two economists, Mahbub ul Haq and Amartya Sen, in 1990 and is published by the United Nations Development Programme. The HDI has helped to shift attention away from the focus on economic growth as the objective of development policies. Nevertheless, criticism has forced improvement since the initial definition. Klugman et al. (2011) list three aspects of the HDI. First, there is the choice of the indicators; for example, the list of capabilities is much wider than the short list of considered variables. These indicators have been replaced and improved over the years. Second, there is the functional form, which has been replaced since 2010 from an arithmetic average to a geometric average of three separate indexes, each computing on a scale where a value equal to 1 means the country has the maximum value in every considered dimension. The new formula is characterized by some level of complementarity and substitutability between the basic variables.

The 2010 definition of the HDI considers the new functional form and a list of new indicators. The UNDP has defined the Hybrid HDI, a systematic assessment of trends in key components of human development over the past 40 years.[1] The Hybrid HDI, which incorporates several changes, is computed as follows:

$$Hybrid\ HDI\ values, HDI = \sqrt[3]{Lifex * EDUx * GDPx} \tag{1}$$

where:

$$Lifex = \frac{Life-20}{83.166(Japan,2010)-20}$$

$$GDPx = \frac{\ln(GDP)-\ln(163.28143(Liberia,1995)}{\ln\big(106769.74(UAE,1977)\big)-\ln\big(163.28143(Liberia,1995)\big)}$$

$$EDUx = \sqrt[2]{Litx * GERx}$$

and:

$$Litx = \frac{(Lit-0)}{99(several\ countries, several\ years)-0}$$

$$GERx = \frac{GER-0}{115.8192(Australia,2002)-0}$$

where *Lit* is the literacy rate, *GER* the Combined Gross Enrolment Rate, *Life* the Life Expectancy at Birth, and *GDP* the Gross Domestic Product per capita, with PPP adjusted and measured in dollars.

The third criticism listed by Klugman et al. (2011) addresses redundancy, given the high correlation between the index and its components. As a measure of development, Sagar and Najam (1998) note that HDI has become a relevant alternative to the traditional one-dimensional measure of development (GDP per capita), given that HDI captures more dimensions of development. Nevertheless, rich countries are usually healthier and more educated than poor countries. In fact, the correlation between all indicators for any year is usually above 0.90. The redundancy of the evolution of these indicators over time is, however, unclear. Klugman et al. (2011) find no significant correlation between growth and improvements in human development in a sample of 135 countries from 1970 to 2010. Consequently, the redundancy argument may disappear if one looks at changes rather than at levels.

3. TOURISM DATA

How important is tourism in a country? Usually, the tourism sector is analyzed by means of one variable, such as arrivals (Lee & Chang, 2008), night of stays (Marrocu & Paci, 2013), and tourism receipts (Lee & Chang, 2008; Figini & Vici, 2010). The literature on Tourism-Led Growth hypothesis has already found strong evidence of the positive effect of tourism expenditures on GDP. Other aspects may matter, though, if we look at human development. Consequently, in addition to the economic dimension of tourism, we also consider supply and demand variables by looking at data from the World Tourism Organization (UNWTO) and the World Bank World Development Indicators (WDI). After considering up to twenty

alternative tourism indicators, by data constraints we ended up with three variables, all of them extracted from the statistics World Tourism Organization (UNWTO)[2]:

1. Tourism expenditures of inbound tourists (Exp_total). This variable refers to "the amount paid for the acquisition of consumption goods and services, as well as valuables, for own use or to give away, for and during tourism trips" (UNWTO, 2008, p.31).
2. Total number of rooms in hotels and similar establishments (Rooms). This variable represents a proxy for the number of firms operating in formal tourist accommodation (supply side of the market); it also represents a proxy for local amenities like bars, restaurants, and cultural events but also for local public services. The variable is expected to have a positive effect on HDI, mainly through the rise of GDP but also for the overall improvement of the quality of life and, therefore, health, safety, and life expectancy of the resident population (Aref, 2011). According to recent studies (see for an instance Andereck, 2007), the presence of the tourism industry contributes to improving the quality and quantity of amenities "that help the communities to attain desirable living environments" (p. 484). Conversely, it is possible that the effect of the tourism industry on HDI would turn to be negative. This occurs when negative externalities prevail such as, for instance, environmental degradation and pollution (Shubert, 2009).
3. Tourism arrivals in hotels and similar establishments (Arr_Overn). This variable represents a proxy for tourism demand in destination countries and refers to the number of persons who arrive at a tourist accommodation and check in. The increase of the demand in destination countries may have multiple effects on the HDI components. First, it might increase the GDP: tourism arrivals affect tourism expenditures and therefore national GDP. The positive effect of tourism on GDP is confirmed by the extensive literature on Tourism-Led Growth hypothesis (among others: Sinclair, 1998; Lee & Chang, 2008; Figini & Vici, 2010; Bimonte et al., 2012; Paci & Marrocu, 2013).

Furthermore, tourists in destination countries might represent an extra channel for transmitting new ideas and knowledge to local firms, increasing their productivity and, therefore, national GDP. For the first time, this specific type of spillover effect has been empirically analyzed by Marrocu and Paci (2011) who study a sample of European regions. Second, the presence of tourists in the destination countries might also affect the other components of HDI. According to the social exchange theories, for instance, tourists and residents in destinations interact not only at the marketplace (Ap, 1990; 1992); as Ankomah and Compton (1990) highlight, the presence of tourists might facilitate education of indigenous citizens by exposing them to other people and cultures. This effect can be particularly strong in the case of developing countries. Consequently, tourism arrivals might also exert a positive effect on the literacy rate of the local population. Of course, negative externalities may also occur when the presence of visitors decreases the quality of life of the resident population due to excessive crowds, congestion, noise, and lack of safety (Andereck et al. 2007, Lindberg et al. 2001). The resident-host social relationship might produce a positive or negative attitude of residents toward tourists that depends on the perceptions of residents on the effect of activity on their communities (Ap, 1992, Figini, 2007, Andereck et al., 2007, Aref, 2011).

In order to check how tourism affects development, one can analyze the impact of every variable but also merge them into a single composite measurement, which would allow one to capture the tourism market as a whole (demand and supply side) and, therefore, the importance of tourism activity at the destination. Assuming Arrow's impossibility theorem (1963) which shows that no perfect aggregation convention can exist, several alternatives arise for building composite indices, such as using principal components analysis, averaging the standardized variables, etc. As the Handbook on Constructing Composite Indicators (OECD, 2008) recommends, we will follow a deep sensitivity analysis and robustness check

of alternative composite indices, but as a point of departure, we propose the use of the Van der Waerden (VdW) ranking score, which is a type of fractional rank (FR) defined as:

$$VDW_{i,t} = \frac{R_{i,t}}{(n+1)} \tag{2}$$

where

VDW_{it} = Var Der Waerdem rank for country *i* at time *t*;

$R_{i,t}$ = rank of each country *i* at time *t*;

for i = 1,…76 countries and t = 1996, … 2008 years.

The VdW fractional rank is a simple method for standardizing scores so that they range from 1/(n+1) to n/(n+1). The advantage of the Van Der Waerden metrics is that they combine the efficiency of the ANOVA analysis with the robustness of the Kruskal-Wallis metrics when the normality assumptions do not hold. Methods based on rankings are not affected by outliers and allow us to follow over time the performance of countries in terms of relative positions. However, individual performance in absolute terms cannot be evaluated as information on levels is lost. After having computed the VdW index for each variable, which was expressed in relative terms with respect to every country's total area, the average of the three scores is calculated to obtain the final index of tourism for each location under analysis:

$$Tourism\ Index_{it} = \frac{\sum_{j=1}^{3} WDV_{it}}{3} \tag{3}$$

where *j* is the total number of variables in the index. In this case, a higher score corresponds to more touristic areas. In our view, the main advantage of using this method to build the tourism index is its computational simplicity. Furthermore, the presence of few variables makes simpler and more easily interpretable the connections between the single variable inside the index and each variable inside the HDI. Other works have used composite indices based on rankings. OECD (2008) reports two examples using rankings: the Information and Communications Technology Index (Fagerberg, 2001) and the Medicare Study on Healthcare Performance (Jencks et al., 2003). Biagi et al. (2012) explore the effect of

tourism on the house market in 377 Sardinian municipalities (Italy)[3]. The authors construct a simple index by using six variables: local expenditure in recreation and culture; number of summer houses; total number of accommodations in hotels and similar establishments; location quotient of tourist sector; distance from the coast; and altitude. Many of those variables, such as distance from the coast and altitude, are suitable for urban or regional analysis rather than country-level study; furthermore, other types of variables are not available for many international countries (especially for developing countries).

Therefore, despite the present paper uses the same method, the choice of the variables has been constrained on the data availability at the international level. To avoid a consistent reduction of the sample of the international countries under analysis, the number of variables in the index is reduced at three. It is worth noticing, however, that the main contribution of the present paper is not the type of index *per se* but the idea that the tourism development of a particular country/area is better encapsulated using a composite measure rather than a single variable. Map 1 shows the results of the index for the whole sample plus the top and bottom countries according to the 2008 index. Appendix 2 displays a descriptive analysis of the tourism variables, the index based on the Van Der Waerden ranking metrics, and a list of composite alternatives of tourism. Our starting point is clearly not affected by outliers and will be tested against a list of alternatives later on.

[MAP1 HERE]

4. DESCRIPTIVE ANALYSIS

Having defined the key variables in our analysis, we need to consider whether, *a priori*, there is any relationship between them. The final sample includes 63 countries over the time span of 1996 to 2008 (for the final list of the countries see Table A.2 in the Appendix), considering all countries for which we have information regarding both the HDI and our Tourism Index. Table 1 presents quantitative results for the correlation between the Tourism

Index, the HDI, and its components. In addition, Figures 1 to 3 display the overall within and between variation of the tourism and HDI indices.

Overall, most of the variation of both the HDI and the Tourism Index is observed between countries. Interestingly, the correlation between these two variables is positive and strongly connected with the average country performance (see Pictures 1 and 3), while once the country effects are considered the correlation almost collapses (0.08, resulting from Picture 2). Nevertheless, once country and time effects are controlled, the correlation rises again, although it remains low (0.238). Finally, if we look at growth rates, again, the correlation is weak (0.093). The rest of the variables exhibit a similar behavior, with the log of GDP and the literacy rate being those with higher values once time and country effects are controlled for or growth rates are used.

[TABLE 1 HERE]

[PICTURE 1 HERE]

[PICTURE 2 HERE]

[PICTURE 3 HERE]

Finally, we develop several exercises to check for redundancy between the HDI components in our sample. To examine the relationship between the economic dimension of development and the social dimensions (health and education), we have built an index, the Social HDI, that considers the geometric average between Education and Life Expectancy rate indexes: $Social\ HDI = \sqrt[2]{Lifex * EDUx}$. Next, we have computed the correlation coefficients between the HDI, the Social HDI, and all development indicators. Table 2 shows the correlation coefficients by using raw data, by controlling country and time effects, and by using yearly growth rates. As expected, all variables are highly correlated with regard to their levels. In contrast, once we look at changes over time (by removing country

fixed effects or by looking at yearly changes), the correlations between the economic dimension and the social dimension of development diminish or even collapse in our sample.

[TABLE 2 HERE]

In addition to examining the correlation coefficients, we also look at the international disparities in living standards. Picture 4 displays the evolution of the standard deviation between countries over our period of analysis. We observe that an increasing inequality in economic terms is accompanied by a decreasing inequality in social development. Consequently, one should worry less about income when nearly everything that matters is converging (Kenny, 2005).

[PICTURE 4 HERE]

We finally computed two alternative regressions, where the growth of GDP and the Social HDI between 1996 and 2008 were regressed against the same set of independent variables from 1996: the initial value of the endogenous variable, openness, investment rate, inflation, and government consumption. We could not find any variable that was simultaneously significant in the two considered regressions (Table 3), which can be interpreted as two development dimensions with different sources and determinants.

[TABLE 3 HERE]

Overall, if the Tourism-Led Growth hypothesis is confirmed in the literature, it is reasonable to wonder if one can also discuss the Tourism-Led Development hypothesis, as the economic and the social dimensions of development may not follow parallel processes.

5. EMPIRICAL MODEL

The empirical model we use in this paper considers development, proxied by HDI or its components, as a function of the Tourism Index plus a list of control variables. We follow

the literature on the determinants of cross-country differences in economic growth. This literature tends to rely on OLS regressions of accumulated growth rates over initial values of explanatory variables, and results are interpreted as measuring the long-run effects of those variables on subsequent economic growth. In particular, we follow the method of economic growth analysis developed by Sala-i-Martin et al. (2004). Out of 67 possible explanatory variables, they find 18 are significantly related to long-run growth over 1960 to 1996. The results suggest that among these 18 variables the main determinants for growth are the initial level of per capita GDP – the neoclassical idea of conditional convergence – and variables for natural resource endowments, physical and human capital accumulation, macroeconomic stability, and productive specialization (a negative and significant effect is found for the fraction of primary exports in total exports).

Rather than considering the growth rate of the HDI as a dependent variable, we follow Easterly's (2007) argument that the current level of a variable is the result of consecutive years of growth. Consequently, rather than looking at long-run effects, our empirical model will consider a contemporaneous correlation between the HDI and the Tourism Index as in the following equation:

$$HDI_{i,t} = \alpha + \beta_1 Tourism_{i,t} + \beta_2 Governement\ Consumption_{i,t} + \beta_3 Investiment_{i,t} + \beta_4 Openess_{i,t} + \beta_5 \mathrm{Inflation}_{i,t} + \beta_6\ Urban\ population_{i,t} + \beta_7 Urban1M + Population_{i,t} + u_{i,t}$$

where the control variables are defined as follows:[4]

1. *Government Consumption (% GDP).* Grier and Tullock (1989) found a significantly negative relation between the growth of real GDP and the growth of the government share of GDP.

2. *Investment (% GDP).* This variable covers the total investments made by a particular country relative to its GDP. Harrod (1939), Domar (1946), and Rostow (1959) argue that countries with higher investment relative to their GDP are the fastest-growing

countries, while countries in which investment has less weight are those with the lowest growth.

3. *Openness*. This variable reflects the sum of exports plus imports relative to GDP. In addition, this variable provides information about the extent to which an economy is open to the outside. Trade openness is a variable of interest because different agencies, including UNCTAD, argue that economic liberalization is a key factor in developing countries. From this point of view, it is often argued that trade restrictions have a negative effect on the efficiency of an economy because of the failure to exploit comparative advantage, and, therefore, they reduce aggregate output. If this were true, countries that reduced trade restrictions over time should experience higher economic growth.

4. *Inflation*. Stockman (1981) argues that in a "cash-in-advance" economy, higher anticipated inflation reduces economic activity, in which case greater growth in anticipated inflation would lower economic growth.

5. *Urbanization:* we consider *Urban Population*, that is, the percentage of the population that lives in urban agglomerations; and *Urban1M*, that is, the urban population in cities of more than 1 million (as a proportion of total population, Castells-Quintana and Royuela, 2014).

6. *Population*. Kormendi and Maguire (1985) argue that, under standard neoclassical growth theory, the steady-state growth rate should equal the growth rate of the labor force plus the growth rate of exogenous technological change. Thus, if all countries are in the steady state there should be a one-for-one effect of population growth on development. In the transition to the steady state, however, the effect may be less than one-for-one if either capital accumulation or labor force growth does not keep pace with population growth.

6. RESULTS

(a) *Main Results*

In the next tables we display the estimation results. The model employed assumes a panel specification, considering both cross-sectional and time-series information. The essential advantage of the model is that it is able to control for country and time specificities in the fixed-effects estimation. The estimations were performed using different procedures (see Table 4). All estimates gave a positive and significant result for the Tourism Index. The Hausman test applied to the fixed and random effects estimations rejected the null hypothesis of equal vectors of parameters, which implies potential endogeneity in the random effects estimation. Consequently, the fixed effects estimation is preferable to the random effects estimation, although in both cases tourism is significant. In fact, the pool estimates (columns 1 and 2) and the between (column 4) and random effects (column 5) consider the cross section information, which can be linked to the redundancy criticism, as countries' level of development may show information similar to countries' economic level. In contrast, the fixed effects estimate (column 3) captures the cross section information in the fixed effects, and, consequently, every parameter informs on the time series information of every country.

If we would assume a dynamic relationship between tourism and development, following Baltagi and Griffin (1984) and Pirotte (1999), the between estimates would represent the long-run impact of tourism on development, while the fixed effects estimates would capture the short-run impact of the variable, with the random effects parameter a mix of the between and fixed effects estimate. Consequently, one can consider a significant impact of tourism on development, both in the short and long run.

[TABLE 4 HERE]

[TABLE 5 HERE]

The basic results displayed in Table 4 show how tourism is significantly and positively correlated with development. This correlation is larger between countries than over time once long-term characteristics of countries are considered. Thus, the between parameter is three times larger than the fixed effects estimation. As both the HDI and the Tourism Index are composite measures, we do the numeric interpretation of the parameters in terms of standard deviations. Thus, the between estimation reports a standardized parameter of 0.22: country A with a Tourism Index 1 standard deviation higher than country B can be expected to have an HDI that is approximately 0.22 standard deviations higher. The fixed effects estimates report a standardized parameter equal to 0.079. Thus, if a country increases one standard deviation of its Tourism Index, we expect it to experience a parallel growth in its HDI of approximately 0.08 standard deviations.

(b) *The relationship between the Tourism Index and the components of the HDI*

After estimating the basic models, we analyze the relation between our Tourism Index and the HDI components. Table 5 displays the fixed effects estimates. The main results of the models are that the economic (log of GDP) and educational dimensions (Literacy Rate) are correlated with the Tourism Index. The result is particularly strong for the literacy rate. The analysis of social rather than economic dimensions to report development is not new in the literature. Kenny (2005) reports that one major factor behind global increases in literacy has been far more widespread access to basic education and that urbanization may indeed be a key factor because it is easier to provide social services to urban residents than to rural populations. As far as tourism supply is connected with urbanization, one can consider a connection with the provision of public services. Nevertheless, we admit that this argument should be valid for life expectancy, although it could not be the case for enrollment rates, as young people leave education to join the tourism sector. However, the effect of tourism activity on education may depend on the increase in labor demand in tourism or in tourism-

related activities, but the effect can also be a consequence of social interactions among tourists and the resident population. In other words, it is likely that the presence of the temporary population with high education, high income, and an open-minded attitude – such as international tourists – triggers changes in residents' aspirations and perspective on life.

[TABLE 6 HERE]

(c)The Tourism Index and the role of size and development

Tables 6 and 7 report the interaction of the Tourism Index with two dummies: size and development. The results do not report significant results for small (below one million inhabitants) or developed countries (according to the UN description of economic regions). Only the pooled and between estimates report significant and negative results for small and developed countries, what can be interpreted as long-term *diminishing returns* of tourism with regard to development. Nevertheless, the consistent (fixed effect) and the mixed (random effects) estimates do not report a larger influence of tourism on HDI for smaller or more developed countries.

We also checked the inclusion of non-linearity of the Tourism Index in the regression analysis (not shown, for brevity). Only the fixed effects model for Gross Enrollment Rate presented a significant (and positive) parameter for the square of the Tourism Index (it was negative but not significant linearly). Thus, only in this dimension the Tourism Index needs to be large enough to have a significant influence.

[TABLE 7 HERE]

(d) *Robustness analysis: testing for alternative tourism indicators, dynamic models, and endogeneity*

We have also analyzed whether the specification of the tourism indicator may influence the obtained results. We have regressed HDI on a list of alternative tourism indicators, considering single indicators and composite measurements (see Appendix 2 for details). The results in Table 8 show how the indicators considering a single variable do not report robust

significant parameters. Tourism arrivals are never significant, while tourism expenditure and rooms are significant if the transformation is logarithmic (tourism expenditure) or using the Van Der Waerden metrics (Rooms). On the contrary, composite indicators are always significant. The chosen index in this work is the more significant tourism indicator, but not the one reporting higher adjustment (which is the model using the logarithmic transformation of Rooms). Overall, we believe that our strategy is valid as far as composite indices are capable of collecting the joint information of all tourism dimensions, and is robust, as far as all composite indices are able to report a significant of tourism on human development.

[TABLE 8 HERE]

The last check of the model examines the dynamic specification and the potential endogeneity of tourism. Croes (2012) analyses the relationship between tourism and human development in Nicaragua and Costa Rica by means of a cointegration analysis, with conflicting results. Despite the fact that our approach does not allow for a Granger causality analysis, we run several dynamic specifications of the model to test if a temporal misspecification of the model would be forcing the results towards a false significance of tourism on human development. We first check for the inclusion of the tourism index with alternative lags. Table 9 displays the results for different lags of the tourism index on human development. The relationship is still significant after two lags.

As human development is expected to be persistent, we also run several alternative models to account for endogenous persistence. First, we run a Generalized Least Squares estimation (GLS) where we assume a first order autoregressive process on the error term. And second we run a dynamic estimation using the Blundell and Bond (1998) system Generalized Method of Moment estimation (GMM). Table 10 displays these results in the first two columns. In both cases tourism is significant, which reinforces previous results. Finally, we also deal with potential endogeneity of tourism in the dynamic model. As is usual in System

GMM estimations, we use internal instruments based on past values of the variable. The results, shown in column 3 of Table 10, still report a significant parameter for the tourism index, which reinforces all previous results. Finally, the fourth column of Table 10 presents the GMM estimation where the Tourism index is regressed using second and third lags as instruments. Again the tourism parameter arises as significant, and the result (0.081) is close to the basic estimation in Table 4 (0.0829).

[TABLE 9 HERE]

[TABLE 10 HERE]

7. DISCUSSION AND CONCLUSION

The purpose of the present work is to study the relationship between human development and tourism development for a panel of 63 developed to developing and small to large countries. Applied research has already found a positive and significant relationship between tourism and economic growth (TLG hypothesis); conversely, in a few examples (Croes, 2012) very little attention is devoted to the relationship between tourism and a broader definition of economic progress, such as the Human Development Index (HDI) of UNDP, a measure of individual capabilities. Although one could think about redundancy between GDP and HDI, we find that when change in the non-income component of HDI (the Social HDI) and change in GDP are considered, rather than their levels, the correlation between the economic and social dimensions of HDI reduces or even collapses. Consequently, although the relationship between economic growth and tourism is important, it tells just one part of the story of the effect of tourism on development in terms of individual capabilities.

Following Croes (2012), the dependent variable in our analysis is the HDI. Instead of using a single indicator of tourism, we build a composite index, which captures the importance of the tourism market as a whole in the countries under analysis by looking at both the demand and supply sides.

Our findings, which are robust to the specification of the composite tourism index and to estimation techniques, suggest that investing in the tourism sector may have a strong and significant positive effect for human development in the destination countries. Furthermore, more in-depth analysis has revealed that the greatest effect regards local education (more specifically, the literacy rate). One possible explanation is the social exchange among tourists (demand) and residents (supply). The presence of a temporary population, such as foreign visitors, with a high level of education, high income, and an open-minded attitude may trigger changes in residents' aspirations and perspective on life. These findings suggest the need for further studies on the role of tourism in human development beyond the pure economic growth effects. Moreover, they also indicate the need to more deeply investigate the role of tourism on residents' quality of life using methodologies other than the analysis of resident perceptions through questionnaires.

NOTES

1. This dataset considers 135 countries over the 1970–2010 period. The Hybrid HDI is available at: http://hdr.undp.org/en/media/2010_Hybrid-HDI-data.xls
2. These variables have been accessed at http://statistics.unwto.org/
3. The exercise of Biagi et al. (2012) is based on a previous work of Biagi and Faggian (2004), in this context the tourism index is presented for the first time.
4. The sources, definitions, and descriptive statistics of such variables are displayed in the Appendix.

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TABLES AND FIGURES

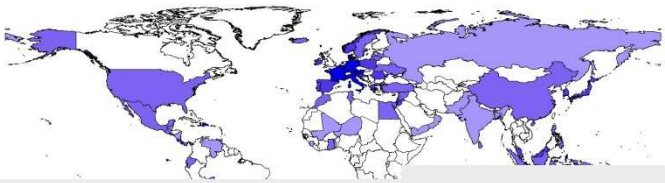
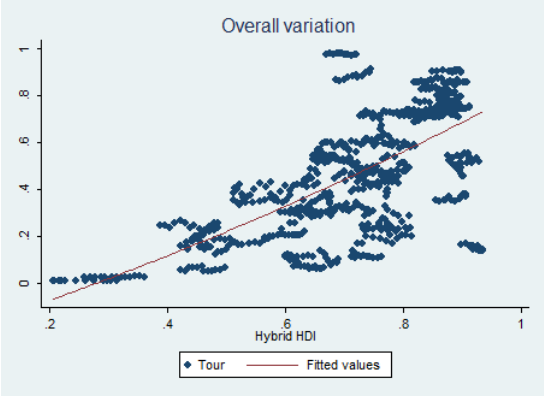
Map 1. Tourism Index 2008	Top	Bottom
	1 (0.983) Singapore 2 (0.974) Dominican R. 3 (0.948) Maldives 4 (0.944) Barbados 5 (0.913) Mauritius 6 (0.896) Luxembourg 7 (0.87) St. Lucia 8 (0.866) Seychelles 9 (0.861) Cyprus 10 (0.857) Belgium 11 (0.848) Austria 12 (0.823) Grenada 13 (0.814) Italy 14 (0.805) Israel 15 (0.797) Germany	2 (0.199) Chile 3 (0.19) India 4 (0.19) Venezuela 5 (0.182) Togo 6 (0.165) Pakistan 7 (0.147) Australia 8 (0.117) Botswana 9 (0.117) Yemen 0 (0.113) Russia 1 (0.104) Paraguay 2 (0.069) Bolivia 3 (0.069) Madagascar 4 (0.052) Sierra Leone 5 (0.026) Mali 6 (0.013) Niger

Table 1. Descriptive statistics

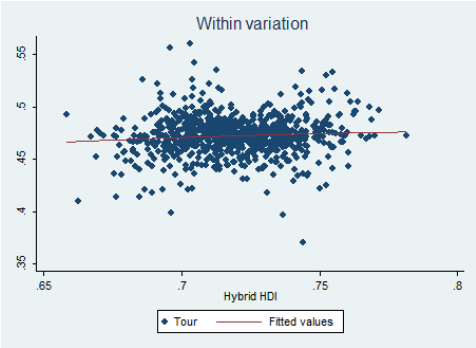
		Std. Dev.					Correlation with the Tourism Index		
	Mean	overall	between	within	Min	Max	Raw data	Country and time fixed effects	Growth rates
Tourism index	0.472	0.259	0.260	0.019	0.013	0.978	1	1	1
HDI	0.719	0.152	0.152	0.02	0.205	0.935	0.665	0.238	0.093
GDP	15340.7	14338.7	14268.4	2235.5	618.2	81101.3	0.559	0.028	0.173
log GDP	9.116	1.141	1.142	0.131	6.427	11.303	0.669	0.263	0.186
Life Exp	71.265	8.287	8.249	1.278	44.011	82.81	0.641	0.025	-0.026
Lit Rate	86.159	18.645	18.627	2.399	7.949	99	0.556	0.219	0.037
GER	75.514	17.251	16.86	4.183	16.542	115.819	0.483	0.067	-0.001

Correlation between the Tourism Index and the HDI. Overall Variation.

Picture 1.



Picture 2.



Picture 3.

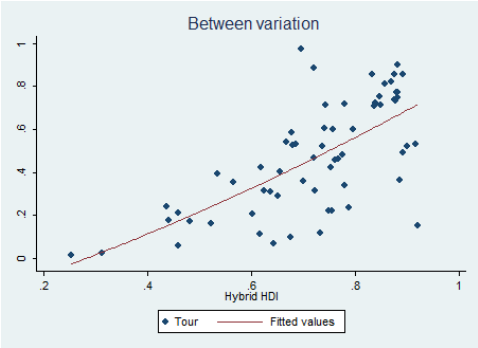


Table 2. Correlation matrixes. HDI components.

	Hybrid HDI	Social HDI	GDP	lgdp	Life	Lit
			Levels			
GDP	0.773	0.660	1			
lgdp	0.955	0.857	0.865	1		
Life	0.909	0.930	0.654	0.806	1	
Lit	0.887	0.918	0.535	0.778	0.753	1
GER	0.901	0.920	0.641	0.805	0.761	0.835
			Country and time fixed effects			
GDP	-0.008	-0.228	1			
lgdp	0.416	-0.084	0.434	1		
Life	0.639	0.751	-0.040	-0.107	1	
Lit	0.313	0.462	-0.504	-0.188	0.105	1
GER	0.669	0.690	-0.068	0.092	0.211	0.070
			Growth rates			
GDP	0.187	-0.126	1			
lgdp	0.500	-0.053	0.583	1		
Life	0.480	0.591	-0.040	-0.077	1	
Lit	0.225	0.334	-0.311	-0.091	0.046	1
GER	0.687	0.791	-0.034	0.014	0.096	0.013

Picture 4. GDP, HDI, and Social HDI, standard deviation 1996-2008.

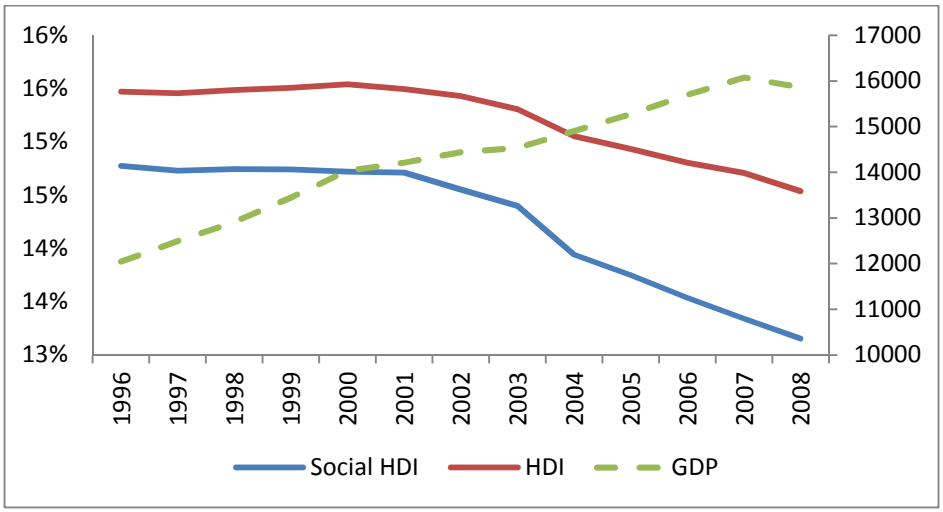


Table 3. GDP growth and Social HDI growth.

	GDP growth		Social HDI growth	
	Coef.	(s.e.)	Coef.	(s.e.)
GDP	-1.45e-06	(2.43e-06)		
Social HDI			-0.597***	(0.175)
Government cons.	0.0286*	(0.0159)	0.000664	(0.00221)
Investment ratio	0.00489	(0.00762)	-0.00133	(0.00180)
Openness	0.000273	(0.00106)	-0.000308**	(0.000151)
Inflation	0.00247	(0.00206)	-0.000592	(0.000451)
Constant	0.0447	(0.230)	0.594***	(0.126)
Observations	63		63	
R^2	0.149		0.572	

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4. Basic model. Hybrid Human Development Index.

	(1) Pool -1	(2) Pool -2	(3) Fixed Effects	(4) Between	(5) Random Effects
Tourism	0.260***	0.264***	0.0829***	0.264***	0.130***
	(0.0139)	(0.0143)	(0.0264)	(0.0423)	(0.0287)
Gov. Consumption	-0.00380***	-0.00351***	-3.27e-05	-0.00367	-0.000650
	(0.000695)	(0.000683)	(0.00106)	(0.00295)	(0.00116)
Investment	0.00105***	0.000961***	0.000903***	0.000926	0.000948***
	(0.000336)	(0.000337)	(0.000332)	(0.00162)	(0.000301)
Openness	-0.000133**	-0.000178***	-0.000121	-0.000195	-6.84e-05
	(5.74e-05)	(5.87e-05)	(0.000121)	(0.000268)	(0.000121)
Inflation	-0.000305*	-0.000243	-6.77e-05*	-0.000394	-8.42e-05**
	(0.000169)	(0.000179)	(3.75e-05)	(0.00117)	(3.77e-05)
Urban Population	0.00460***	0.00458***	8.11e-05	0.00460***	0.00165**
	(0.000200)	(0.000200)	(0.000768)	(0.000588)	(0.000642)
Urban1M	-0.000285	-0.000313	-0.000274	-0.000342	-0.000173
	(0.000195)	(0.000197)	(0.000427)	(0.000734)	(0.000404)
Population	6.51e-11***	6.18e-11***	2.21e-10***	6.21e-11	8.41e-11***
	(0)	(0)	(8.24e-11)	(5.02e-11)	(0)
Constant	0.336***	0.322***	0.627***	0.343***	0.520***
	(0.0148)	(0.0165)	(0.0488)	(0.0605)	(0.0422)
Time Fixed Effects	NO	YES	YES	NO	YES
Country Fixed Effects	NO	NO	YES	NO	NO
Observations	819	819	819	819	819
R^2	0.795	0.800	0.813	0.802	0.714

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Hausman test between RE and FE: 114.46 (p-val = 0.0002)

Table 5. Fixed Effects estimates. Component by component.

	(1) GDP	(2) log GDP	(3) Life Exp	(4) Lit Rate	(5) GER
Tourism	311.3	0.638**	-0.372	19.25***	9.938
	(5,573)	(0.295)	(2.906)	(6.476)	(12.51)
Gov. Consumption	-307.4*	-0.0380***	0.278**	0.287	0.309
	(167.7)	(0.00904)	(0.113)	(0.264)	(0.327)
Investment	64.49	0.00356***	0.0750	-0.00492	0.157***
	(38.63)	(0.00106)	(0.0637)	(0.0445)	(0.0517)
Openness	59.41*	0.00127*	-0.0165	-0.0272	-0.0219
	(32.55)	(0.000733)	(0.0186)	(0.0241)	(0.0205)
Inflation	15.65*	-5.14e-05	-0.00163	0.00871	-0.0380***
	(8.500)	(0.000240)	(0.00388)	(0.00651)	(0.0121)
Urban Population	-145.9*	0.00180	0.00424	0.0664	-0.0666
	(86.64)	(0.00658)	(0.0992)	(0.151)	(0.206)
Urban1M	-152.2	-0.00254	-0.0229	0.0668	-0.0761
	(138.5)	(0.00487)	(0.0413)	(0.105)	(0.0986)
Population	-2.51e-05***	1.59e-09	8.60e-09*	3.69e-08***	3.50e-09
	(7.97e-06)	(1.04e-09)	(5.15e-09)	(1.03e-08)	(1.31e-08)
Constant	22,503***	8.652***	66.73***	66.42***	66.05***
	(6,620)	(0.510)	(6.137)	(10.04)	(12.67)
Observations	819	819	819	819	819
R^2	0.614	0.780	0.558	0.492	0.495
Number of coun_id	63	63	63	63	63

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 6. Estimates with interaction dummy of tourism and countries' size.

	Pool -1	Pool -2	Fixed Effects	Between	Random Effects
Tourism	0.267***	0.271***	0.0805***	0.272***	0.126***
	(0.0146)	(0.0150)	(0.0260)	(0.0436)	(0.0286)
Tour * Small	-0.166***	-0.156***	0.163	-0.156	0.0850
	(0.0236)	(0.0221)	(0.347)	(0.184)	(0.267)
Small=1	0.0960***	0.0918***		0.0908	0.00799
	(0.0131)	(0.0124)		(0.126)	(0.207)
Gov. Consumption	-0.00385***	-0.00357***	-4.48e-05	-0.00372	-0.000639
	(0.000681)	(0.000670)	(0.00106)	(0.00298)	(0.00116)
Investment	0.000850**	0.000788**	0.000897***	0.000677	0.000944***
	(0.000342)	(0.000344)	(0.000334)	(0.00168)	(0.000302)
Openness	-3.03e-05	-8.08e-05	-0.000123	-8.85e-05	-7.52e-05
	(6.26e-05)	(6.43e-05)	(0.000121)	(0.000298)	(0.000121)
Inflation	-0.000289*	-0.000229	-6.74e-05*	-0.000372	-8.30e-05**
	(0.000170)	(0.000181)	(3.77e-05)	(0.00120)	(3.79e-05)
Urban Population	0.00458***	0.00456***	0.000103	0.00459***	0.00158**
	(0.000207)	(0.000207)	(0.000769)	(0.000628)	(0.000646)
Urban1M	-0.000253	-0.000273	-0.000278	-0.000302	-0.000107
	(0.000217)	(0.000219)	(0.000429)	(0.000796)	(0.000395)
Population	7.20e-11***	6.84e-11***	2.21e-10***	6.97e-11	8.80e-11***
	(0)	(0)	(8.22e-11)	(5.16e-11)	(0)
Constant	0.330***	0.317***	0.620***	0.337***	0.521***
	(0.0149)	(0.0166)	(0.0511)	(0.0615)	(0.0424)
Time Fixed Effects	NO	YES	YES	NO	YES
Country Fixed Effects	NO	NO	YES	NO	NO
Observations	819	819	819	819	819
R^2	0.799	0.803	0.814	0.805	0.659

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Interaction: Small=1 if the country has an average population over the 1995-2010 period below 1 million inhabitants. Hausman test between RE and FE: 112.19 (p-val = 0.000)

Table 7. Estimates with interaction dummy of tourism and countries' development.

	Pool -1	Pool -2	Fixed Effects	Between	Random Effects
Tourism	0.252***	0.255***	0.0561*	0.254***	0.106***
	(0.0171)	(0.0173)	(0.0304)	(0.0441)	(0.0347)
Tourism*Development	-0.157***	-0.154***	0.0957	-0.159**	0.0406
	(0.0211)	(0.0211)	(0.0697)	(0.0772)	(0.0578)
Development=1	0.172***	0.170***		0.173***	0.126***
	(0.0120)	(0.0120)		(0.0481)	(0.0376)
Gov. Consumption	-0.00358***	-0.00330***	1.11e-05	-0.00350	-0.000562
	(0.000692)	(0.000672)	(0.00106)	(0.00256)	(0.00117)
Investment	0.00181***	0.00175***	0.000901***	0.00208	0.000951***
	(0.000299)	(0.000297)	(0.000335)	(0.00142)	(0.000304)
Openness	0.000112**	7.06e-05	-0.000118	7.26e-05	-6.84e-05
	(5.29e-05)	(5.38e-05)	(0.000123)	(0.000237)	(0.000122)
Inflation	-0.000236*	-0.000167	-7.23e-05*	-0.000228	-8.08e-05**
	(0.000137)	(0.000148)	(4.18e-05)	(0.00104)	(3.96e-05)
Urban Population	0.00342***	0.00341***	0.000177	0.00337***	0.00147**
	(0.000197)	(0.000196)	(0.000767)	(0.000573)	(0.000610)
Urban1M	0.000576***	0.000550***	-0.000275	0.000569	2.90e-05
	(0.000140)	(0.000142)	(0.000425)	(0.000665)	(0.000345)
Population	5.96e-11***	5.64e-11***	2.30e-10***	5.44e-11	8.92e-11***
	(0)	(0)	(8.27e-11)	(0)	(0)
Constant	0.328***	0.314***	0.610***	0.326***	0.479***
	(0.0137)	(0.0150)	(0.0517)	(0.0522)	(0.0381)
Time Fixed Effects	NO	YES	YES	NO	YES
Country Fixed Effects	NO	NO	YES	NO	NO
Observations	819	819	819	819	819
R^2	0.852	0.856	0.815	0.859	0.696

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Interaction: Dev=1 if the country is labeled as Developed according to the UN composition of economic regions. Hausman test between RE and FE: 96.31 (p-val = 0.000)

Table 8. Sensitivity analysis of the tourism indicator

	Arrivals/km2		Tourism Expend/km2		Rooms/km2		Principal Components	Standardized Comp Index (X/km2)	Standardized Comp Index (X/pop)	Tourism index §
Variable Transformation	logs	Van der Waerden	logs	Van der Waerden	logs	Van der Waerden	Logs	Logs	Logs	Van der Waerden
Tourism indicator	0.00505	0.0179	0.00307	0.0389***	0.0118**	0.0435	0.0142*	0.0254*	0.0197*	0.0829***
	(0.00429)	(0.0265)	(0.00276)	(0.0131)	(0.00561)	(0.0273)	(0.00713)	(0.0128)	(0.0115)	(0.0264)
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Time Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	819	819	819	819	819	819	819	819	819	819
R2	0.810	0.808	0.809	0.812	0.814	0.810	0.813	0.813	0.813	0.813

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. § Corresponds to the basic results, displayed in column 3 of Table 4.

Table 9. Dynamic inclusion of tourism

	Tourism Lags					
	0 §	1	2	3	4	5
Tourism Index	0.0829***	0.0672**	0.0525**	0.0436	0.0394	0.0303
	(0.0264)	(0.0255)	(0.0255)	(0.0271)	(0.0276)	(0.0330)
Controls	YES	YES	YES	YES	YES	YES
Time Fixed Effects	YES	YES	YES	YES	YES	YES
Country Fixed Effects	YES	YES	YES	YES	YES	YES
Observations	819	756	693	630	567	504
Countries	63	63	63	63	63	63
Years	13	12	11	10	9	8
R^2	0.813	0.810	0.804	0.789	0.783	0.773

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. § Corresponds to the basic results, displayed in column 3 of Table 4.

Table 10. Dynamic and endogenous models

	(1)	(2)	(3)	(4)
	GLS	Sys GMM	Sys GMM	GMM
HDI t-1		0.8798	0.8939	
		(0.0563)	(0.0413)	
Tourism Index	0.01995**	0.0306*	0.0339*	0.0810**
	(0.0098)	(0.0157)	(0.0189)	(0.0338)
rho	0.9223			
AR(1) Arellano Bond test (p-val)		0.000	0.000	
AR(2) Arellano Bond test (p-val)		0.780	0.629	
Controls	YES	YES	YES	YES
Time Fixed Effects	YES	YES	YES	YES
Country Fixed Effects	YES			
Tourism instrumented		NO	YES	YES
Hansen overid (p-val)		0.126	0.125	0.253

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

APPENDIX 1

Table A1.1. Variable description.

Label	Description	Source
Hybrid HDI	Hybrid HDI values, HDI=(Lifex*EDUx*GDPx)^(1/3)	United Nations Development Programme - Human Development Report
HDI Rank	Hybrid HDI ranks	United Nations Development Programme - Human Development Report
Life	Life Expectancy	United Nations Development Programme - Human Development Report
Lifex	Health Index, Lifex=(Life-20)/(83.166(Japan,2010)-20)	United Nations Development Programme - Human Development Report
Lit	Adult Literacy Rate	United Nations Development Programme - Human Development Report
GER	Combined Gross Enrolment Rate	United Nations Development Programme - Human Development Report
Litx	Literacy Index, Litx=(Lit-0)/(99(several countries, several years)-0)	United Nations Development Programme - Human Development Report
GERx	Combined Gross Enrolment Rate Index, GERx=(GER-0)/(115.8192(Australia,2002)-0)	United Nations Development Programme - Human Development Report
EDUx	Education Index, EDUx=(Litx*GERx)^(1/2)	United Nations Development Programme - Human Development Report
GDP	GDP per capita, PPP$	United Nations Development Programme - Human Development Report
GDPx	Income Index, GDPx=(ln(GDP)-ln(163.28143(Liberia,1995))/(ln(106769.74(UAE, 1977))-ln(163.28143(Liberia,1995))	United Nations Development Programme - Human Development Report
TOURISM INDEX		
Arr_Overn	Arrivals / Overnight visitors (tourists) in hotels and similar establishments ('000)	UNWTO
Rooms	Number of rooms in hotels and similar establishments (Units)	UNWTO
Exp_total	Tourism expenditure of inbound tourists US$ Mn	UNWTO
GOVERNMENT CONSUMPTION	Government Consumption Share of PPP Converted GDP Per Capita at 2005 constant prices [rgdpl] (%)	PWT 7.1. Alan Heston, Robert Summers and Bettina Aten, Penn World Table Version 7.1, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, Nov 2012.
INVESTMENT	Investment Share of PPP Converted GDP Per Capita at 2005 constant prices [rgdpl] (%)	PWT 7.1. Alan Heston, Robert Summers and Bettina Aten, Penn World Table Version 7.1, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, Nov 2012.
OPENESS	Openness at 2005 constant prices (%)	PWT 7.1. Alan Heston, Robert Summers and Bettina Aten, Penn World Table Version 7.1, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, Nov 2012.
INFLATION	Inflation, GDP deflator (annual %)	World Development Indicators
URBAN POPULATION	Urban population (% of total)	World Development Indicators
URBAN 1M	Population in urban agglomerations of more than 1 million (% of total population)	World Development Indicators
POPULATION	Population (in thousands)	PWT 7.1. Alan Heston, Robert Summers and Bettina Aten, Penn World Table Version 7.1, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, Nov 2012.

Table A1.2 List of Countries

1	Australia	33	Latvia
2	Austria	34	Morocco
3	Belgium	35	Madagascar
4	Bangladesh	36	Mexico
5	Bolivia	37	Mali
6	Botswana	38	Mauritius
7	Chile	39	Malaysia
8	China	40	Niger
9	Costa Rica	41	Nicaragua
10	Cyprus	42	Norway
11	Denmark	43	Oman
12	Dominican Republic	44	Pakistan
13	Ecuador	45	Panama
14	Egypt	46	Philippines
15	Spain	47	Poland
16	Fiji	48	Portugal
17	France	49	Paraguay
18	Ghana	50	Romania
19	Greece	51	Russia
20	Guatemala	52	El Salvador
21	Croatia	53	Slovenia
22	Indonesia	54	Sweden
23	India	55	Swaziland
24	Ireland	56	Togo
25	Iceland	57	Trinidad and Tobago
26	Israel	58	Tunisia
27	Italy	59	Turkey
28	Jordan	60	Ukraine
29	Japan	61	Uruguay
30	Korea	62	United States
31	Lithuania	63	Venezuela
32	Luxembourg		

Table A1.3 Descriptive statistics of independent variables

Variable		Mean	Std. Dev.	Min	Max	Obs	
Tour	overall	0.4909965	0.2762485	0.0163626	0.9826649	N	988
	between		0.277176	0.022546	0.9803027	n	76
	within		0.0205119	0.4031377	0.5906543	T	13
Hybrid~I	overall	0.7195145	0.1519848	0.2046213	0.9346673	N	819
	between		0.1518212	0.252418	0.9207171	n	63
	within		0.0196937	0.6583344	0.7814838	T	13
GDP	overall	15340.73	14338.71	618.1713	81101.25	N	819
	between		14268.42	645.4272	68390.36	n	63
	within		2235.454	40.37544	28051.61	T	13
lgdp	overall	9.116191	1.141377	6.426765	11.30345	N	819
	between		1.142278	6.469537	11.12472	n	63
	within		0.1307082	8.647418	9.656493	T	13
Life	overall	71.26526	8.287484	44.011	82.81	N	819
	between		8.249114	46.35931	81.71562	n	63
	within		1.277798	66.89933	79.96333	T	13
Lit	overall	86.15913	18.64464	7.949133	99	N	819
	between		18.62679	17.66532	99	n	63
	within		2.398952	76.44295	100.1102	T	13
GER	overall	75.51401	17.2506	16.54183	115.8192	N	819
	between		16.85983	21.62185	113.3418	n	63
	within		4.1832	61.34994	89.86664	T	13
kg	overall	8.178923	3.619082	3.064907	22.38491	N	819
	between		3.537901	3.485376	21.17157	n	63
	within		0.8744325	3.859887	12.724	T	13
ki	overall	23.80495	7.53997	1.751632	54.26286	N	819
	between		6.501228	11.46984	44.4118	n	63
	within		3.899387	5.07827	44.89533	T	13
openk	overall	80.57232	42.61747	20.28251	326.541	N	819
	between		41.51492	24.4223	270.7436	n	63
	within		10.86475	27.76718	136.3697	T	13
pop_urb	overall	60.95598	20.32137	9.8642	97.3904	N	819
	between		20.39831	11.36365	97.16098	n	63
	within		1.723614	53.89961	68.69393	T	13
pop_1M	overall	17.82686	15.61716	0	60.50578	N	819
	between		15.68967	0	60.23725	n	63
	within		1.158034	14.58584	36.1112	T	13
pop_tot	overall	70100000	210000000	268916	1.32E+09	N	819
	between		211000000	288943	1.28E+09	n	63
	within		9636005	-35200000	173000000	T	13
infl_G~d	overall	7.872425	12.64169	-23.47888	147.3057	N	819
	between		8.57216	-0.993961	43.12494	n	63
	within		9.349243	-29.03158	117.6934	T	13

APPENDIX 2

Tourism is proxied through three alternative variables: Tourism expenditures of inbound tourists; Total number of rooms in hotels and similar establishments; and Tourism arrivals in hotels and similar establishments. All variables can be expressed in absolute and also in relative terms with respect to every country's total area or to population, and also in the original units of measurement or in logs.

Regarding the composite indices, in addition to the Tourism Index described in section 3, several alternatives are considered here.

1. An additional index has been created using Principal Components Analysis (PCA; Jolliffe, 2002). Again, all three variables are considered. Given the high correlation between them, only one factor is needed to account for more than 83% of the total variance for raw data and 77% for variables in logs, and in both cases is the only one with an eigenvalue larger than one. Consequently, we consider one principal component, which in turn is a weighted linear combination of the original variables. One principal component is computed for variables in levels and one for variables in logs.
2. Besides, we have also built several composite indices by means of the simple average of the standardized values of the three considered variables.
    1. All tourism variables, standardized by area
    2. All tourism variables, standardized by area, in logs
    3. All tourism variables, standardized by population
    4. All tourism variables, standardized by population, in logs

The descriptive statistics of all variables and indices are presented below.

Clearly, the tourism variables in levels are highly skewed and with high values of the Kurtosis index. The same results are found for all composite indicators resulting from them: Principal Components – levels and the Standardized Index 1 - (km2) and Stand. Index 3 - (pop). This form is largely alleviated once the variables are expressed in logs (index 2 and Index 4) or when the use of rankings is considered (see the Tourism Index and all variables expressed in terms of the Van Der Waerden metrics).

The correlation matrices of raw data and data once country and time fixed effects are taking into account report how the three indices are only slightly correlated
Consequently the Tourism Index based on the Van Der Waerden is correlated with the composite indices based on the standardized variables expressed in logs.

Table A2.1 Descriptive statistics

	Mean	Sandard Deviation			Min	Max	Skewness	Kurtosis
		Overall	Between	Within				
Arrivals / km2	11286.5	52680.32	51798.93	51798.93	3.078	530666.7	8.019	69.083
Expenditure / km2	5254133	1.48E+07	1.39E+07	1.39E+07	2288.871	1.47E+08	5.269	36.849
Rooms / km2	186.5	911.6	905.7	905.7	0.097	8825.6	7.855	65.051
Arrivals / pop	486.0	624.0	612.1	612.1	1.332	3633.8	2.072	7.227
Expenditure / pop	363164.2	781775.3	722408.7	722408.7	973.6325	7820891	5.143	37.520
Rooms / pop	7.107	8.906	8.933	8.933	0.031	49.617	2.306	9.044
log (Arrivals / km2)	7.091	2.186	2.184	2.184	1.124	13.182	-0.177	3.007
log (Expenditure / km2)	13.360	2.179	2.157	2.157	7.736	18.804	0.080	2.730
log (Rooms / km2)	3.041	2.008	2.013	2.013	-2.330	9.085	0.013	3.301
Principal Components - levels	-0.107	1.203	1.187	0.240	-0.424	11.120	7.215	58.144
Principal Components - logs	-0.339	1.733	1.732	0.218	-5.066	4.418	-0.061	3.024
Stand. Index 1 - (km2)	0	0.887	0.873	0.873	-0.258	7.929	6.544	49.497
Stand. Index 2 - (km2-logs)	0	0.967	0.966	0.966	-2.638	2.654	-0.061	3.024
Stand. Index 3 - (pop)	0	0.869	0.855	0.855	-0.678	4.205	2.242	8.246
Stand. Index 4 - (pop-logs)	0	0.947	0.945	0.945	-2.664	1.785	-0.612	3.032
Arr/ km2 - VdW	0.474	0.266	0.267	0.267	0.013	0.974	0.009	1.817
Exp/ km2 - VdW	0.474	0.275	0.274	0.274	0.013	0.974	0.084	1.844
Room/ km2 - VdW	0.470	0.264	0.265	0.265	0.013	0.987	0.001	1.895
Tourism Index	0.472	0.259	0.260	0.260	0.013	0.978	0.032	1.888

Table A2.2 Correlation coefficients. Raw data.

	Arrivals / km2	Expenditure / km2	Rooms / km2	Arrivals / pop	Expenditure / pop	Rooms / pop	log (Arrivals / km2)	log (Expenditure / km2)	log (Rooms / km2)	Principal Components - levels	Principal Components - logs	Stand. Index 1 - (km2)	Stand. Index 2 - (km2-logs)	Stand. Index 3 - (pop)	Stand. Index 4 - (pop-logs)	Arr/ km2 - VdW	Exp/ km2 - VdW	Room/ km2 - VdW
Expenditure / km2	0.541																	
Rooms / km2	0.994	0.508																
Arrivals / pop	0.071	0.301	0.042															
Expenditure / pop	0.030	0.701	-0.007	0.618														
Rooms / pop	0.074	0.196	0.078	0.838	0.440													
log (Arrivals / km2)	0.429	0.501	0.409	0.548	0.321	0.497												
log (Expenditure / km2)	0.357	0.602	0.343	0.508	0.493	0.506	0.894											
log (Rooms / km2)	0.452	0.501	0.452	0.453	0.284	0.562	0.916	0.898										
Principal Components - levels	0.982	0.684	0.975	0.119	0.174	0.111	0.477	0.442	0.505									
Principal Components - logs	0.427	0.553	0.415	0.520	0.378	0.540	0.968	0.962	0.970	0.491								
Stand. Index 1 - (km2)	0.952	0.770	0.940	0.156	0.272	0.131	0.503	0.489	0.528	0.992	0.524							
Stand. Index 2 - (km2-logs)	0.427	0.553	0.415	0.520	0.378	0.540	0.969	0.962	0.970	0.491	1.000	0.524						
Stand. Index 3 - (pop)	0.067	0.460	0.044	0.942	0.790	0.874	0.524	0.578	0.498	0.155	0.552	0.214	0.552					
Stand. Index 4 - (pop-logs)	0.105	0.326	0.089	0.730	0.528	0.710	0.713	0.709	0.659	0.159	0.717	0.195	0.717	0.755				
Arr/ km2 - VdW	0.338	0.473	0.316	0.570	0.322	0.522	0.972	0.864	0.885	0.391	0.938	0.423	0.938	0.542	0.708			
Exp/ km2 - VdW	0.318	0.532	0.307	0.513	0.448	0.527	0.874	0.969	0.877	0.393	0.937	0.435	0.938	0.571	0.705	0.885		
Room/ km2 - VdW	0.339	0.459	0.337	0.469	0.290	0.587	0.891	0.876	0.973	0.398	0.945	0.426	0.945	0.516	0.678	0.905	0.894	
Tourism Index	0.344	0.507	0.332	0.536	0.368	0.565	0.946	0.937	0.945	0.408	0.975	0.444	0.975	0.564	0.723	0.964	0.962	0.967

Table A2.3 Correlation coefficients. Adjusted data, once controlled by country and time effects.

	Arrivals / km2	Expenditure / km2	Rooms / km2	Arrivals / pop	Expenditure / pop	Rooms / pop	log (Arrivals / km2)	log (Expenditure / km2)	log (Rooms / km2)	Principal Components - levels	Principal Components - logs	Stand. Index 1 - (km2)	Stand. Index 2 - (km2-logs)	Stand. Index 3 - (pop)	Stand. Index 4 - (pop-logs)	Arr/ km2 - VdW	Exp/ km2 - VdW	Room/ km2 - VdW
Arrivals / km2																		
Expenditure / km2	0.202																	
Rooms / km2	0.971	0.182																
Arrivals / pop	0.059	-0.048	-0.012															
Expenditure / pop	-0.030	0.771	-0.048	0.233														
Rooms / pop	0.058	-0.220	0.089	0.370	0.001													
log (Arrivals / km2)	0.052	-0.150	0.011	0.479	-0.120	0.098												
log (Expenditure / km2)	-0.078	0.085	-0.073	0.072	0.183	0.022	0.228											
log (Rooms / km2)	0.012	-0.183	0.047	-0.066	-0.185	0.329	0.219	0.164										
Principal Components - levels	0.912	0.576	0.901	0.004	0.287	-0.031	-0.033	-0.029	-0.053									
Principal Components - logs	-0.019	-0.085	-0.022	0.240	-0.012	0.181	0.681	0.776	0.573	-0.053								
Stand. Index 1 - (km2)	0.799	0.747	0.784	-0.010	0.448	-0.087	-0.069	0.000	-0.094	0.974	-0.066							
Stand. Index 2 - (km2-logs)	-0.019	-0.085	-0.023	0.241	-0.012	0.181	0.683	0.777	0.570	-0.052	1.000	-0.066						
Stand. Index 3 - (pop)	0.011	0.534	-0.026	0.660	0.866	0.333	0.124	0.175	-0.111	0.217	0.123	0.325	0.123					
Stand. Index 4 - (pop-logs)	-0.026	-0.074	-0.034	0.301	0.009	0.216	0.665	0.786	0.474	-0.056	0.962	-0.066	0.963	0.170				
Arr/ km2 - VdW	0.061	0.011	0.009	0.487	-0.003	-0.024	0.776	0.211	0.078	0.037	0.515	0.033	0.516	0.196	0.497			
Exp/ km2 - VdW	-0.004	0.063	-0.010	0.126	0.132	0.016	0.259	0.823	0.086	0.021	0.653	0.034	0.654	0.157	0.670	0.250		
Room/ km2 - VdW	0.009	-0.002	0.024	-0.038	-0.050	0.246	0.074	0.090	0.743	0.012	0.365	0.010	0.363	-0.010	0.303	0.064	0.074	
Tourism Index	0.028	0.046	0.007	0.286	0.067	0.096	0.548	0.674	0.382	0.035	0.805	0.041	0.806	0.187	0.784	0.639	0.802	0.469

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