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Abstract

This paper investigates the nonlinear relationship between tourism and economic growth using a balanced sample of 58 countries in three continental samples (Africa, Asia, and Latin America) for the 2003–2017 period. First, we document an asymmetric threshold effect of tourism on economic growth. By utilizing an endogenous threshold regression model, we show that a single tourism threshold cutoff exists and that tourism receipts influence growth only till the threshold cutoff point in all three continental samples; however, this influence is nonexistent past the threshold point. Second, a quantile effect decomposition shows separate marginal effects for the tourism and economic growth relationship across the growth distribution. By using an unconditional quantile regression approach, we show that compared to their regional cohorts, slow- and medium-growth African countries, slow-growth Asian countries, and medium-growth Latin American countries exhibit substantially higher economic growth benefits from tourism. We explain these empirical observations and discuss their policy implications.

Keywords

tourism, economic growth, threshold regression, quantile regression, panel data, Africa, Asia, Latin America

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Introduction

In 2016, the travel and tourism sector was responsible for 7% of global trade, employed one in 10 persons worldwide, and accounted for 10% of global output produced that year (United Nations World Trade Organization [UNWTO], 2017). These trends are expected to rise in the future, prompting regulators and policymakers to set aside more and more investments in tourism resources to encourage larger visitor spending (World Travel and Tourism Council [WTTC], 2019). Tourism can benefit the economy in numerous ways. While tourism sector directly finances the import of capital goods, generates employment, increases tax revenue, and improves labor productivity, technology, and knowledge transfer; it has significant spill-overs that help alleviate various inefficiencies in other sectors of the economy. Therefore, many scholars have argued that there is a positive association between tourism and economic growth (e.g., Brida et al., 2010; Brida et al., 2016; Fayissa et al., 2008; Holzner, 2011; Kumar and Kumar, 2012; Pablo-Romero and Molina, 2013; Narayan et al., 2010).

Nonetheless, the effect of tourism on economic growth is not always positive. Take the case of resource-rich economies and developing economies that are overdependent on tourism. These economies are more likely to undergo a type of economic shrinkage, commonly referred to as the "Dutch disease," which happens when production moves away from the traditional sectors (e.g., manufacturing and mining) towards the non-tradable sectors (e.g., tourism). By doing so, the economic activity reduces over the long-term even though there are significant immediate gains from the non-tradable sectors (Corden and Neary, 1982). Chao et al. (2006) and Inchausti-Sintes (2015) empirically validate this phenomenon in the tourism context. Other negative effects of tourism include increased living, environmental, and other social-economic costs (Arslanturk et al., 2011; Chen and Chiou-Wei, 2009; Lee and Chien, 2008; Li et al., 2018; Schneider et al., 2010; Sharma, 2021). Thus, the first question this study seeks to investigate is "Does an ever-expanding tourism sector yield sustainable returns to economic growth?" We posit that the reason why certain studies find a positive association between tourism and economic growth and others find the complete opposite may stem from the fact that the relationship between tourism and economic growth is not necessarily linear. If this supposition is true, then the relationship between tourism and economic growth, whether positive or negative, is dependent on the levels of tourism activity that the country experiences.

The tourism and economic growth relationship is also not necessarily similar across different countries (Eugenio-Martin et al., 2004; Oh, 2005; Tang and Jang, 2009; Tang and Tan, 2018). Several authors argue that this dissimilarity not only arises from certain economic attributes, such as the country's commitment to developmental goals, varying degrees of economic precarity, and different levels of technology diffusion (Robinson et al., 2019; Tuomi et al., 2020), but also based on the size (Brau et al., 2007) and the developmental stage of the country (Stabler et al., 2009). Therefore, the second question is "Do certain countries, *ceteris paribus*, obtain significantly higher growth gains from tourist visitors than others?" Thus, we posit that there are unignorable inter-country variations to examine the tourism and economic growth nexus.

Therefore, we test for the possibility of nonlinearity in the relationship between tourism and economic growth using Hansen's (1999) threshold analysis and capture the inter-country tourism effect using Firpo et al.'s (2009) quantile regression technique. As opposed to other nonlinear regressor models (e.g., quadratic modeling), Hansen's technique does not assume that the nonlinear tourism returns are invariably diminishing and nor does it make an apriori requirement of monotonicity and symmetricity of such returns across the levels of tourism. Furthermore, this technique produces precise estimates even when there is more than one directional change in the underlying relationship (e.g., Po and Huang, 2008). For the subsequent quantile analysis, we employ the Firpo et al.'s (2009) unconditional quantile estimation technique. As opposed to its conditional counterparts (e.g., Harding and Lamarche, 2009; Koenker, 2004), this technique does not require the other covariates to be held constant at a specific value to make inferences on the principal regressor, tourism. Furthermore, the technique is not sensitive to the covariate sets included in the analysis nor the sample size.

Tourism is a more prominent economic growth vehicle in developing countries than their developed counterparts (Eugenio-Martin et al., 2004; Stabler et al., 2009). The continental regions of Africa, Asia, and Latin America host the lion's share of developing countries and emerging markets, forming an ideal test bed to assess our suppositions. Regulatory authorities in these three regions are particularly concerned with the regional economic impacts of tourism policies, anticipate future macroeconomic shocks, and accordingly invest in tourism infrastructure. Unfortunately, there are not a lot of nonlinear studies on the tourism and economic growth phenomenon in Africa, Asia, and Latin America. In this study, we aim to fill that gap.[1] Analyzing the tourism and growth nexus for these three continental regions concurrently may be particularly pertinent as it not only provides a within-continent scrutiny of our research findings but also the out-of-continent comparisons between the three regions. These comparisons help country-level policymakers design their long-term tourism strategies and global development partners (such as World Bank and UNWTO) address the current and future economic, social, and environmental impacts of global tourism.

The remainder of the paper is divided into the following sections. The overview of the literature on tourism and economic growth, with a focus on its nonlinear relationship, is provided in Section 2. Our empirical strategy of employing Hansen's (1999) threshold analysis in conjunction with Firpo et al.'s (2009) quantile regression analysis to capture the nonlinear effect of tourism on growth is detailed in Section 3. The results of our statistical analysis and its regulatory implications are discussed in Sections 4 and 5, respectively. And finally, Section 6 concludes this paper.

Literature review

Tourism and economic growth are generally studied in a linear modeling setting.[2] However, by reviewing over one hundred empirical studies, Brida et al. (2016) argues that ignoring the nonlinear aspect of tourism and economic growth relationship can result in unreliable and inaccurate estimates. This section provides a review of current literature on the key nonlinear tourism studies and specifically those that examine the nonlinearity aspect in the three regions, Africa, Asia, and Latin America.

The literature on panel nonlinear models on tourism and economic growth can be broadly classified in two ways based on how they capture the nonlinear effect. The first way is to ascertain how the tourism and economic growth relationship changes at different levels of tourism specialization. A good example of this is the study by Po and Huang (2008). They identify three non-overlapping ranges of tourism specialization (known as *regimes*) in their sample of 88 countries between 1995 and 2005. The authors document that tourism specialization has a *s*-shaped relationship with economic growth; increasing only in the extreme regimes and is invariant to growth in the intermediate regime. In a similar fashion, using a sample of 131 countries over the period 1991–2008 and the ratio of real Travel and Tourism GDP to real national GDP as a measure of tourism specialization, Chang et al. (2010) identify three distinct tourism specialization regimes with widely different returns to economic growth. They find a positive, albeit lower, elasticity to growth in the lowest regime, a steep positive elasticity to growth in the intermediate regime, and no discernible relationship in the highest regime. Chiu and Yeh (2017) document a dichotomous growth elasticity with respect to tourism specialization in a sample of 84 countries between 1995 and 2008. They find that a significant positive relationship between tourism and growth only exists above the empirically determined kink point, below which the same relationship is nonexistent.

Panel threshold studies on tourism and economic growth are sparse in Africa, Asia, and Latin America. Sahni et al. (2021b) find a kinked relationship between tourism and economic growth for a sample of 23 African countries. Specifically, they document a positive effect of tourism on growth only for lower levels of tourism specialization. In a recent study by Maneejuk et al. (2022), the authors employ the panel kinked regression model with a generalized maximum entropy estimator to analyze the nonlinear relationship between tourism and economic growth for 10 southeast Asian countries between 2004 and 2018. They consider three measures of tourism (arrivals, international expenditure, and receipts) and find that the nonlinear relationship exists only when arrivals is used as a tourism proxy. Specifically, they find a positive association above the threshold kink point. In a sample of 33 Asia-Pacific countries between 1996 and 2009, Chiang et al. (2017) find that tourism's effect on economic growth is more pronounced in the medium degree of tourism specialization countries.

The second way to capture the nonlinear aspect is to examine whether a country's current stage of economic development affects its returns to economic growth. By utilizing the Arellano and Bond (1991) dynamic panel estimation technique in a sample of 21 Latin American countries between 1985 and 1998, Eugenio-Martin et al. (2004) document that, even though there is a robust association between tourism and growth, there are systematic variations in that association based on a country's income level. More specifically, they find that tourism and growth elasticities are positive only for low-income and middle-income countries. Conversely, for high-income countries, the relationship between tourism and growth is nonexistent.

Certain studies combine the first and the second ways of capturing nonlinearity (discussed above) in assessing the tourism and growth relationship. In the study by Brau et al. (2007), by examining a sample of 143 countries between 1980 and 2003, the authors find that the combination of the size of a country and the level of tourism specialization are necessary for economic growth. They observed that, out of the 143 countries studied, only 15 "small tourism countries" (i.e., small countries with a high degree of tourism specialization) had a positive effect of tourism on economic growth. Similarly, Sahni et al. (2021b) find a positive effect of tourism on growth only for low-tourism specialization countries in the African context, an effect that gradually decreases as we move from low-growth countries to high-growth countries.

Not much has been done in terms of nonlinear modeling in African, Asian, and Latin American regions. Few that do have concentrated in doing so for a group of countries within one geographical region (e.g., Eugenio-Martin et al., 2004; Maneejuk et al., 2022) or a single country (e.g., Lee and Chien, 2008; Zhang and Cheng, 2019), thus making it challenging to perform inter-regional comparisons. Therefore, a study that repeats the analyses using the same methodology across three individual continental samples to compare and contrast the findings is valuable. Our study addresses this gap.

Methodology

We use two techniques, Hansen's (1999) endogenous threshold analysis and Firpo et al.'s (2009) unconditional quantile regression analysis, to investigate the possible sources of nonlinearity in the relationship between tourism and economic growth. The threshold analysis describes a realm where the tourism and economic growth relationship is regime-dependent based on certain endogenously determined truncation points of tourism specialization. Furthermore, each of these regimes has its own tourism contribution to growth. Equation (1) provides the threshold model.

$$y_{it} = \alpha + \sum_{l=0}^{j} \delta_l R_{it} I_{itl} + \beta X_{it} + u_i + \epsilon_{it} \tag{1}$$

where y_{it}, R_{it}, X_{it}, u_i, and ϵ_{it} represent the real growth rate, tourism receipts, the vector of serially and mutually uncorrelated covariates, country-specific effects assumed to be time invariant, and the term that represents random disturbances for country i at time t, respectively. The covariates are described in Section 4.

I_{itl} is the indicator variable for a regime $l \in (0, j)$, which equals one if tourism receipts lie between the regime bounds (i.e., $\overline{R}_l < R_{it} \leq \overline{R}_{l+1}$, where $\overline{R}_0 := 0$, $\overline{R}_{j+1} := \infty$) and zero, otherwise. And, δ_l is the coefficient of tourism receipts in that regime. As a standard practice in literature, we set $j = 3$ (e.g, Sahni et al., 2021a; 2021b). That is, to find the existence of at least one tourism threshold value in our data, we first solve for the model validity of the single threshold model; and then the double and triple threshold models sequentially, using the STATA command XTHREG developed by Wang (2015).

The unconditional quantile regression (UQR) analysis explores the possibility of whether the regime-dependent relationship of tourism and growth also varies across the growth distribution, specifically in the upper tail of the distribution (high-growth countries) and in the lower tail of the distribution (low-growth countries). In contrast to conditional quantile regression techniques that use the levels of the dependent variable y, Firpo et al.'s (2009) UQR estimation methodology utilizes the concept of influence functions (IF), derived from cumulative distribution functions of the dependent variable y. In general, IF are more resilient to modeling conditions, such as changes to the set of covariates used and sampling size; therefore, this technique produces reliable estimates. The IF for each quantile τ is given as

$$\mathrm{IF}\left(y; q_\tau, F_y\right) = \frac{\tau - I(y \leq q_\tau)}{f_y(q_\tau)}, \tag{2}$$

where q_τ is the sample quantile estimated by the kernel approach, F_y denotes the cumulative distribution function of y, $f_y(q_\tau)$ and $I(y \leq q_\tau)$ denote the marginal density of y at the point q_τ and an indicator function reflecting whether the outcome value is below q_τ, respectively. Our modified dependent variable, $\mathrm{RIF}(y;\, q_\tau,\, F_y)$, is the re-centered influence function (RIF), specified as follows:

$$\mathrm{RIF}\left(y; q_\tau, F_y\right) = q_\tau + \mathrm{IF}\left(y; q_\tau, F_y\right). \tag{3}$$

Finally, our estimation UQR model is written as

$$\mathrm{RIF}(Y_{it}; q_\tau | X_{it}) = X_{it}\beta_{\tau,i} + \xi_{it}, \tag{4}$$

where β_τ, i denotes the vector of unconditional quantile estimates that correspond to the τ^{th} growth quantile. Our UQR analysis is performed using STATA's XTRIFREG estimation function developed by Borgen (2016).

Data and empirical results

In this section, we conduct the threshold analysis and UQR analysis on the three continental samples, Africa (23 countries), Asia (15 countries), and Latin America (20 countries) from 2003 to 2017. Continental memberships, that is, to which continent a country belongs, is obtained from the World Bank database. The countries included in our study are based on data availability on key variables over the study period. Ideally we would have liked to include data from more countries. Because our methodological strategy requires a balanced panel, we were prepared to make a trade-off between the number of countries included and the length of the time period used in the study. Supplemental Table A1 lists the sample of countries used in this study.

The data is mainly assimilated from the World Bank's World Development Indicators and World Governance Indicators. The dependent variable is the per capita GDP growth rate in real terms (PCIG). The main variable of interest is tourism specialization, measured by tourism receipts as a percentage of GDP (TOURGDP). We use the standard set of covariates as in the growth literature including the one-period lag of per capita income (PCIL), population growth rate (POPG), mean years of schooling (MYSCH), trade as a percentage of GDP (TRADE), net barter terms of trade and its standard deviation (TOT, TOTSTD), semi-log inflation (πlog), and an index of the country's overall governance (GINDEX) (Barro, 2003; Ndoricimpa, 2017).

Two variables require special mention:

1. πlog is computed by the inflation augmentation process described in Ibarra and Trupkin (2016) and is expressed analytically as follows:

$$\pi\log = \begin{cases} \mathrm{INF}_{it} - 1, & \mathrm{INF}_{it} \leq 1 \\ ln(\mathrm{INF}_{it}), & \mathrm{INF}_{it} > 1, \end{cases} \tag{5}$$

where INF_{it} denotes the inflation rate for country i at time t.

2. GINDEX is an equally weighted measure of seven governance components: voice/accountability, political stability, government effectiveness, regulatory quality, rule of law, corruption control, and the political regime authority spectrum index. These measures are compiled by Kaufmann et al. (2010) and Marshall and Gurr (2018).

Our final sample comprises of country-level data observed annually, forming a balanced panel with 345, 225, and 300 observations for Africa, Asia, and Latin America, respectively. Table 1 describes and summarizes all the variables used in this study.

Our analysis starts with the estimation of the single threshold model. Table 2 shows this result. We find that a single threshold value exists for each of the continental samples, attesting to the presence of nonlinearity in the relationship between tourism and growth. The threshold estimate is the highest for Africa (3.82% of tourism specialization) and lowest for Asia (2.19% of tourism specialization). The threshold estimate for Latin America is at 2.58% of tourism specialization.

Now, it is quite possible that the samples exhibit more than one tourism threshold cutoff. To test this assertion, we re-run the model specified in equation (1) with j = 3, that is, a triple threshold model. Table 3 shows this result. While the F-statistic for single thresholds are largely statistically significant, the F-statistic for double and triple thresholds are insignificant. This summary indicates the absence of multiple thresholds.

Table 4 shows the estimates of the single threshold model. The estimated empirical model is as follows:

Table 1. Descriptive statistics.

Variable	Description	Africa N = 345 Mean	Asia N = 225 Mean	Latin America N = 300 Mean
PCIG	Growth rate of real GDP per capita (%)	2.28	4.61	2.55
TOURGDP	Tourism receipts (% of GDP)	3.41	3.86	3089
PCIL	One-period lag GDP per capita ($US, constant 2010)	2299.30	5368.52	6541.02
POPG	Population growth (annual %)	2.27	1.18	1.12
GFCF	Gross fixed capital formation (% of GDP)	22.08	26.47	20.50
MYSCH	Mean years of schooling (years)	5.22	7.16	8.07
TRADE	Trade (% of GDP)	69.30	80.18	67.89
TOT	Net barter terms of trade (2000=100)	133.04	96.01	144.15
TOTSTD	Square-root of TOT	11.42	9.71	11.79
πlog	Semi-log transformation of Inflation	−0.93	−0.94	−0.90
GINDEX	Governance index	335.96	358.38	402.99

Source: World Development Indicators (2019) and World Governance Indicators (2020) database.
Note: Detailed descriptive statistics (means, medians, minimum, maximum, skewness, and kurtosis) and pair-wise correlations of all key study variables are provided in Supplemental Tables A2 and A3, respectively.

Table 2. Single threshold analysis.

	Threshold estimator (level = 95)			Threshold effect test (bootstrap = 1000)			
	Threshold	Lower	Upper	Fstat	Crit10	Crit5	Crit1
Africa	3.82	3.76	3.83	17.48**	14.36	17.12	24.10
Asia	2.19	2.11	2.19	17.59**	14.13	16.75	21.78
Latin America	2.58	2.50	2.63	17.58**	13.39	16.46	21.62

Note: *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.10$.

Table 3. Triple threshold analysis.

	F-Statistic for threshold effect test (bootstrap = 1000)		
Region	Single threshold	Double threshold	Triple threshold
Africa	17.48**	7.70	3.79
Asia	17.59**	−1.78	10.47
Latin America	17.58**	6.35	7.51

Note: *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.10$.

Table 4. Single threshold regression.

	Africa (N = 345)		Asia (N = 225)		Latin America (N = 300)	
	b	se	b	se	b	se
TOURGDP_1	0.844***	(0.250)	0.933***	(0.293)	1.109***	(0.418)
TOURGDP_2	0.190	(0.150)	−0.056	(0.095)	−0.015	(0.177)
log(PCIL)	−0.121***	(0.021)	−0.050***	(0.014)	−0.157***	(0.023)
GFCF	0.036	(0.037)	2.206***	(0.037)	0.316***	(0.067)
TRADE	−0.019	(0.014)	0.032***	(0.010)	−0.015	(0.011)
πlog	−0.021	(0.018)	−0.009	(0.031)	−0.084***	(0.011)
POPG	−1.872***	(0.724)	−2.359***	(0.626)	−1.956**	(0.902)
TOT	−0.001	(0.028)	0.012	(0.085)	−0.012	(0.018)
TOTSTD	0.035	(0.066)	0.037	(0.179)	0.051	(0.055)
log(MYSCH)	0.055**	(0.028)	−0.011	(0.021)	−0.047	(0.029)
log(GINDEX)	0.110***	(0.019)	0.027	(0.019)	0.111***	(0.035)
Constant	0.144	(0.167)	0.171	(0.162)	0.619	(0.265)
Year dummies	yes		yes		yes	

Note: *** p < 0.01, ** p < 0.05, and * p < 0.10.

$$\begin{aligned}\text{PCIG}_{it} = {} & \alpha + \delta_1\text{TOURGDP}_1 + \delta_2\text{TOURGDP}_2 + \beta_1\log(\text{PCIL}_{it}) \\ & + \beta_2\text{GFCF}_{it} + \beta_3\text{TRADE}_{it} + \beta_4\pi\text{log}_{it} + \beta_5\text{POPG}_{it} \\ & + \beta_6\text{TOT}_{it} + \beta_7\text{TOTSTD}_{it} + \beta_8\log(\text{MYSCH}_{it}) \\ & + \beta_9\log(\text{GINDEX}_{it}) + u_i + D_t + \epsilon_{it}\end{aligned}$$

where $\text{TOURGDP}_1 = \text{TOURGDP}_{it}\text{I}(\text{TOURGDP}_{it} \le \overline{R}_1)$ and $\text{TOURGDP}_2 = \text{TOURGDP}_{it}\,\text{I}(\text{TOURGDP}_{it} \le \overline{R}_1)$ represent tourism specialization values in regime 1 (i.e., below threshold cutoff) and regime 2 (i.e., above threshold cutoff), respectively. $\overline{R}_1 \in \{3.82, 2.19, 2.58\}$ denotes the numerical value of the endogenously determined single threshold for the respective samples. u_i represents country fixed effects. D is the vector of time dummies.

The effect of control variables on PCIG is as follows. The first is the finding of growth convergence in all three continental samples – that is, significant negative relationship between PCIL and PCIG. Next, as expected, an increase in POPG is associated with a decline in PCIG.

Generally speaking, we expected that GINDEX, GFCF, and TRADE are positively related to economic growth. However, we find a significant positive relationship between governance and growth only for Africa and Latin America. In the case of Asia, this relationship is positive but insignificant. Although unexpected, there is increasing empirical evidence for a weak governance-growth relationship in Asian countries (e.g., Sen, 2013). In a similar fashion, we find a significant positive relationship between GFCF and growth for Asia and Latin America. For Africa, the effect of GFCF on growth is positive and insignificant. Straub (2008) substantiates this result for Africa by showing that results are more mixed among growth studies using public capital stocks or direct infrastructure spending flows as measures of capital investments. In a similar note, African Capacity Building Foundation [ACBF] (2016) argues that, when it comes to Africa, the focus should be more on quality rather than the bulk of infrastructure presumably due to leakages. While assessing the trade-growth relationship, we find a positive significant relationship for Asia and a negative insignificant relationship for the other two continental samples, Africa and Latin America. The latter finding is not an outlier for developing countries. Other studies have found either no association or a negative relationship between trade and growth (Menyah et al., 2014; Musila and Yiheyis, 2015; Ulaşan, 2014), for reasons ranging from methodology (for example, Zahonogo, 2017, for non-linearity) to institutional imperfections (for example, Mullings and Mahabir, 2018, for imperfections pertaining to the under-utilization of resources or the concentration of resources in extractive industries).

We present the results of the main variables of interest, $TOURGDP_1$ and $TOURGDP_2$. While we find that the coefficient estimates of $TOURGDP_1$ are positive and statistically significant, those of $TOURGDP_2$ are not significant. This suggests that the share of tourism receipts in GDP influences economic growth up to the threshold cutoff point and does not influence economic growth beyond the threshold cutoff point. While this result appears to be valid for all three continental regions, we note that Africa has the lowest estimate of $TOURGDP_1$.

Now that we have established that the tourism effect on growth is only significant below the threshold cutoff, we now turn our attention to variations in this effect across the growth distribution. Figure 1 provides the UQR coefficient estimates of $TOURGDP_1$ and $TOURGDP_2$.

We note two strikingly clear features. One, the effect of tourism on growth is heterogeneous along the growth distribution. Second, tourism's responsiveness profile across the growth distribution is remarkably dissimilar across the different continents. All interpretations are based on $TOURGDP_1$ estimates only. For Africa, while the high-growth countries experience little to no tourism effect on growth rate, the countries in the low-growth and middle-growth spectrum (especially between the 30th percentile and the 50th percentile) experience a large effect. For instance, the biggest impact on growth rate, as much as 1.4%, occurs for countries in the 40th growth rate percentile. In contrast to Africa where most of the quantile estimates (seven out of nine) are positive and statistically significant, the same estimates for Asia and Latin America are largely statistically insignificant. In the case of Asia, the countries in the lower end of the growth rate spectrum experience the largest tourism effect, as much as 2.1% at the 10th percentile and, at the same time, the countries in the middle-growth and the high-growth spectrum have no discernible effect of tourism on growth. Finally, most Latin American countries have near-zero tourism effect on growth, except for those in the 60th percentile (0.9%).

Next, we interpret the $TOURGDP_2$ estimates. While most of these estimates are statistically insignificant here, a few are noteworthy. In the case of Africa, the $TOURGDP_2$ estimates are similar yet smaller than the $TOURGDP_1$ estimates presented above, peaking at the 40th percentile with a magnitude of 0.65%. However, Asian countries and Latin American countries predominantly record negative estimates, with −0.26% at the 70th percentile and −0.25% at the 80th percentile for the former, and −0.52% at the 30th percentile for the latter, respectively. Apart from these, the only other statistically significant estimate is at the 10th percentile for Asian countries with a value of 0.76%.

Discussion

In this section, we discuss the findings of this study and its policy implications.

Threshold analysis

The threshold analysis reveals the presence of a single threshold cutoff point in all three continental regions. While the threshold cutoff point describes the point up to which receiving additional

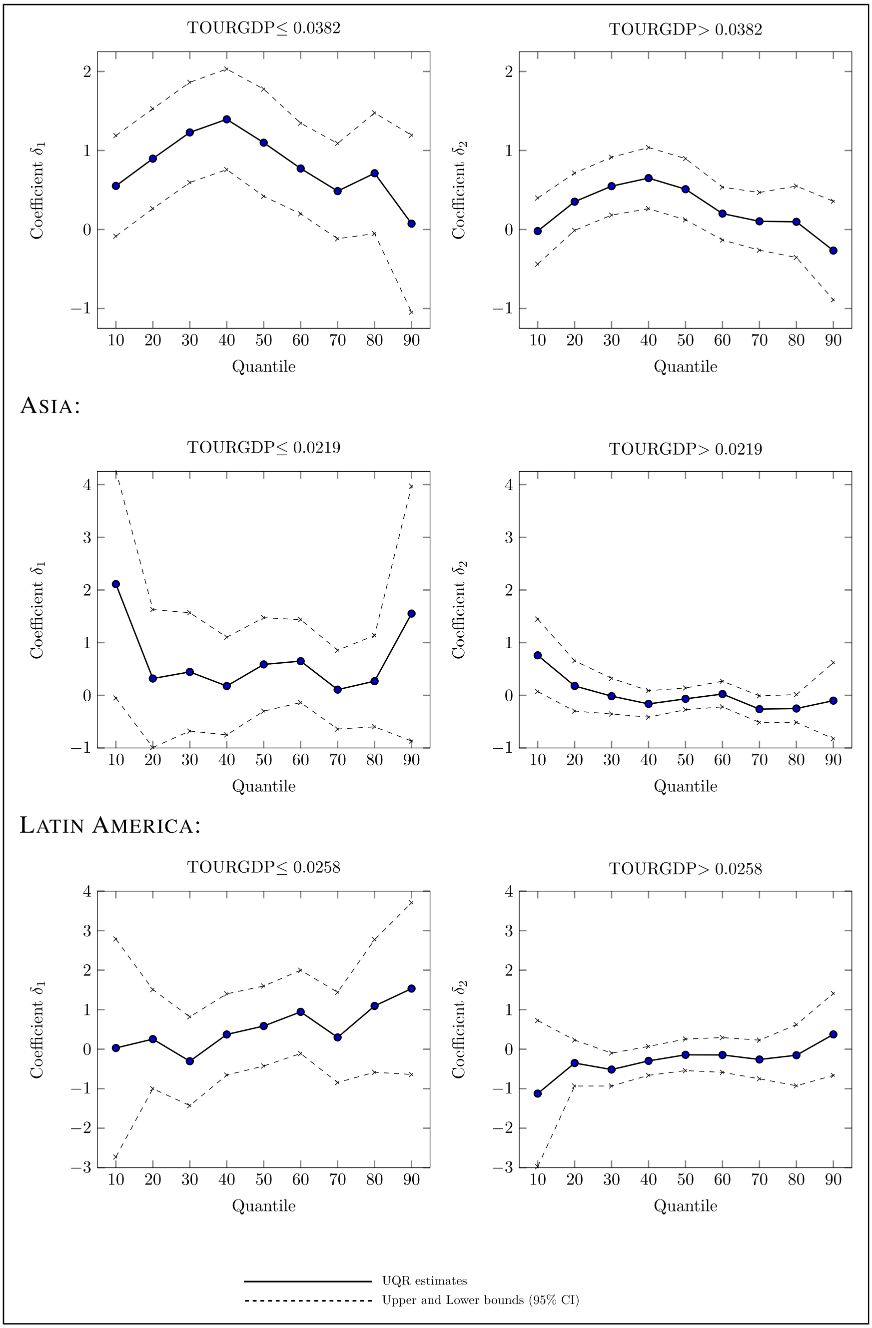

Figure 1. Unconditional quantile regression.
Note: Standard errors for the UQR estimation are based on 1000 bootstrap replications. The detailed UQR regression results are reported in the Supplemental Appendix Tables A4, A5, and A6 for Africa, Asia, and Latin America, respectively.

tourism revenue (as a % of GDP) is beneficial, the fact that this point for Africa (3.82%) is almost twice as large as in Asia (2.19%) and one-and-a-half times as large as in Latin America (2.58%) is noteworthy. One reason for this can be the unsubstitutable niche of wildlife, landscapes, and cultural heritage that Africa inherits (Christie et al., 2014). Conversely, some empirical evidence shows that most Asian and Latin American markets have successfully divested away from being tourism-centric economies (He and Zheng, 2011; Pablo-Romero and Molina, 2013; Shahzad et al., 2017), thereby justifying lower observed threshold cutoffs. We note from the univariate analysis that Africa is the only continent with a threshold cutoff point higher than its mean level of tourism specialization of 3.41% (see Table 1). The difference can, albeit crudely, be interpreted as the quantification of Africa's untapped tourism potential, which is broadly discussed in several works (e.g., Christie et al., 2014; Fayissa et al., 2008; Urquhart, 2004). But the same statistic for Asia and Latin America demonstrates a substantially larger-than-threshold averages (3.86% and 3.89%, respectively).

The policy implications here are as follows. The countries with their current level of tourism specialization notably lower than the threshold cutoff point must ascertain the extent of their untapped tourism resources and, consequently, examine more closely the problems that limit their tourism development. On the other hand, the countries with their current level of tourism specialization considerably more than the threshold cutoff point must either seek to reduce their tourism dependency as an economic growth vehicle or invest in technologies that make their tourism sector even more cost-effective. We find anecdotal evidence largely in favor of these implications.[3]

Additionally, we note that Africa (0.84%) also has a lower influence of tourism receipts on economic growth than Asia (0.93%) and Latin America (1.11%). This means that either Africa underinvests in tourism infrastructure, faces higher tourism production costs, or has more expatriation of financial revenue (commonly referred to as "leakages") than their Asian and Latin American counterparts. Reasonable evidence exists for all these claims. For example, Novelli et al. (2012) and World Bank (2017, 2018) document that political fragility and lack of infrastructure as reasons to why tourism resources remain unproductive in Africa. Other factors include the high cost of debt financing, lack of security, high crime, public health concerns, cumbersome visa requirements, government bureaucracy, and the losses in opportunities for tax collection due to weaker institutions (Arslanturk et al., 2011; Chen and Chiou-Wei, 2009; Christie et al., 2014; Lee and Chien, 2008; Li et al., 2018; Schneider et al., 2010). Though all three continents experience leakages of some sort from the tourism sector, the problem is more exacerbated in Africa, where there is a significant over-reliance on the import of goods and services, and the higher degree of expatriation of financial revenue by foreign investors (Daly and Gereffi, 2018; Mbaiwa, 2005). By comparison, the Asian and Latin American tourism markets have higher potential to generate economic growth by favoring tourism quality (i.e., higher receipts per capita) and tourist volume (i.e., higher arrivals).[4]

Quantile analysis

Though the discussion presented thus far appears agreeable, our quantile analysis imposes certain additional distribution-dependent restrictions for tourism productivity. That is, we deviate from the overall effect of tourism changes on the growth of a representative country (i.e., mean effect) to explore the tourism effect on specific locations of the growth distribution, in particular the lower and upper extremes. For Africa, the threshold analysis predicts that the tourism effect on growth occurs for all countries with tourism specializations below the threshold cutoff of 3.82%. But, the quantile regression finds that the effect is absent for fast-growing countries irrespective of their level of tourism exposure. Ghana is one such fast-growing country (average tourism specialization of

3.34%) that has been steadily decreasing its tourism specialization from 3.4% in 2008 to 1.6% in 2017, which is triggered by the discovery of oil reserves in 2007 (NTDP, 2012).

In a similar fashion, the quantile analysis on Asian countries predicts that the tourism effect is absent in most middle-growth countries (e.g., India, Indonesia, Thailand) and high-growth countries (e.g., China). Only slow-growing countries (e.g., Japan) gain from tourism exposure. There is some empirical support for this prediction. Using a sample of Asian countries (excluding Japan), Lee and Chang (2008) find no tourism effect on growth. For Latin American countries, the tourism effect is absent at both extremes – that is, for slow-growing countries such as Mexico, and fast-growing countries such as Peru. Only countries in the middle-growth range (e.g., Columbia) experience gains from tourism.

Country-specific studies have shown empirical support for these claims in the Asian and Latin American context and provide two reasons for documenting the null effect of tourism on growth. One, substantial expatriation of financial revenue and simultaneously facing the lion's share of liabilities (such as environmental cleanups) are sometimes posited as to why certain countries, such as India, Indonesia, and Thailand face low tourism returns (Kausar and Nishikawa, 2010; Lacher and Nepal, 2010a, 2010b). Some estimates put these leakages anywhere from 20% to 70% of tourism revenue (UNEP, 2010). Two, countries might face high tourism opportunity costs. For example, Shahzad et al. (2017) argue that China experiences low tourism returns because of the low importance it places on the tourism sector relative to other industries. Other researchers (e.g., Çağlayan et al., 2012; Ekanayake and Long, 2012) find similar results in Latin America.

Put simply, even though the premise of tourism-led growth is valid, our quantile analysis sheds light on why some studies find no tourism effect for certain specific countries and continental subsamples. Such a finding does not necessarily negate the premise but rather can pinpoint to a particular growth stage of the study sample that is not conducive for tourism as a growth vehicle. The policy implication is that irrespective of what we observe based on the threshold analysis it may or may not be prudent for a particular country to further specialize their tourism investments to aid economic growth based on where the country stands in the growth rate spectrum. Therefore, regulators and policymakers must examine their stock of tourism resources together with possible leakages that may hinder the net economic growth.

Why regional comparisons matter

A study that repeats the same analysis on three geographical regions has several advantages, most importantly, the opportunity for policymakers of a particular country to learn from the experiences of others. Many countries compete for the same tourism investments and, in some cases, the same pool of tourist visitors. For example, World Bank Group's (2013) report on *Global Investment Promotion Best Practices: Winning Tourism Investment* suggests that countries that rely on foreign tourism investments often make investment propositions more profitable than their closest competitors in order to secure developmental funds. Intermediaries, such as the World Bank, use studies that compare and contrast the regional economic prospects of tourism to vet these investment propositions and draw the attention of potential investors.

Conclusion

In this study, we investigate whether the relationship between tourism and economic growth is nonlinear using Hansen's (1999) threshold technique and Firpo et al.'s (2009) quantile regression technique on three regional samples of Africa, Asia, and Latin America. We select these regions because they have the highest share of developing countries and emerging economies and the tourism sector plays a vital role in local economic development. Hansen's technique does not apriori assume that the underlying relationship is nonlinear but instead checks for it by estimating the returns to tourism at different levels of tourism. Firpo et al.'s technique allows one to analyze whether the tourism effect varies across the entire spectrum of economic growth.

Our study makes three contributions. One, our findings are consistent with related studies (e.g., Chang et al., 2010; Chiu and Yeh, 2017; Po and Huang, 2008) and show a strong support for the existence of nonlinearity in the tourism and economic growth relationship for all three continental regions. Two, the nonlinearity exhibited in the relationship between tourism and economic growth is governed by a single threshold cutoff point, below which the relationship is positively related and above which no relationship exists. Therefore, regulators in each of the continental regions studied must realize that the gains they experience overwhelmingly take place at low levels of tourism specialization. Moreover, our threshold analysis shows that the magnitude of the threshold cutoff differs substantially among the three individual samples. Specifically, Africa (3.82%), Latin America (2.58%), and Asia (2.19%) rank from highest to lowest in that order. Hence, regional policymakers must devise clear exit strategies for divesting future resources to other industries when gains from tourism eventually dry up.

Lastly, our quantile estimation results show that the tourism returns occur within specific pockets of the economic growth rate distribution, outside which tourism's contribution to economic growth is almost entirely absent. This analysis shows that irrespective of what the overall regional forecast for tourism depicts, it sometimes may not be prudent for a particular country to further specialize their tourism investments to aid economic growth based on where the country stands on the economic growth rate spectrum. The reasons for this can be higher degree of leakages, higher tourism opportunity costs, and the magnitude of the elasticity of substitution between tourism and other industries (Lanza et al., 2003; Shahzad et al., 2017; UNEP, 2010).

This study has the following limitations. First, the study concentrates on three continents with a higher fractional share of developing countries. To obtain a comprehensive viewpoint, it might be beneficial for researchers to investigate the nonlinear hypothesis in other geographical regions. Second, as with any panel estimation technique, our models are sensitive to the period and duration of the study, sample size, and covariates used. Furthermore, Hansen's model is, by design, a static panel threshold model. Future research should re-estimate the nonlinear tourism and economic growth relationship by utilizing a dynamic threshold modeling technique. Finally, our study is conducted in the pre-COVID-19 period. Going forward, studies should investigate the tourism and economic growth relationship in periods of economic turmoil, especially those that have direct impacts on the tourism sector and on tourism-dependent small economies.

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Supplemental material

Supplemental material for this article is available online.

Notes

1. Lee and Chang (2008) and Wang and Liu (2020) also study spatial heterogeneities across continents in the tourism and growth relationship.
2. For studies on the linearity aspect of tourism and economic growth relationship, see Fayissa et al. (2008), Brida et al. (2010), Narayan et al. (2010), Kumar and Kumar (2012), Lee and Chien (2008), Chen and Chiou-Wei (2009), Schneider et al. (2010), Arslanturk et al. (2011), Li et al. (2018), and Sharma (2021). For a detailed review on the relationship between tourism and economic growth, see Pablo-Romero and Molina (2013), Castro-Nuño et al. (2013), Comerio and Strozzi (2019), Fonseca and Rivero (2020), and Nunkoo et al. (2020).
3. For instance, Benin and Burundi have lower-than-threshold tourism specializations during our sample period (2003–2017), with about 1.73% and 0.01% for the last year of our study, respectively. Our assessment based on the analyses discussed here places both of these countries as candidates with remarkable tourism potentials. World Bank (2017) for Benin, and Novelli et al. (2012) and World Bank (2018) for Burundi validate our assessment. On the other hand, Cambodia and Thailand for Asia and Costa Rica for Latin America have higher-than-threshold tourism specializations between 2003 and 2017, with about 18.1%, 13.7%, and 6.6% for the year 2017, respectively. We notice that these countries experience severe degrees of "tourism overcrowding" to the extent of capping the number of tourist visitors.
4. Even though Taiwan and Morocco experienced a similar number of tourist visitors (10.4 million for Taiwan and 10.5 million for Morocco) for the year 2015, tourism receipts were much higher in Taiwan (US$14.4 billion) than in Morocco (US$7.8 billion). Along the same lines, China was the largest market for luxury hotels in the world (GlobalData Industry Report, 2019), with one-in-five (89 out of 446) earning the prestigious Forbes five-star awards (Forbes Travel Guide, 2021). Asia, as a whole, hosted 139 hotels earning the same recognition; Africa had 10, and Latin America had 29.

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