South Asian Journal of Management Sciences
Vol: 17(1): 61-81, 2023
DOI: 10.21621/sajms.2023171.04

Threshold Nonlinear Impact of Control on Corruption and Government Effectiveness on Tourism Development in different Income Level Countries: Evidence from Panel Smooth Transition Regression Models

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Abstract: *Control on corruption and government effectiveness are considered significant predictors of tourism development. However, despite its importance, a conspicuous gap exists in the literature on how these two indicators support tourism development for the economies in the long run. This research fills this gap by studying the influence of government effectiveness and control on corruption on tourism development for a sample of annual panel data of 149 countries of different income levels. The study utilizes the data set of 2002 – 2019, and the advanced econometric technique is applied. The PSTR technique provides the following results (i) the positive and significant association between the government effectiveness, control on corruption, and tourism development. (ii) The threshold values where the link between the control on corruption and tourism development changed in the lower, lower-middle, upper-middle, and higher-income nations are 27.222, 31.274, 46.766, and 88.615. Moreover, for government and tourism development, the values are 22.951, 36.228, 54.481, and 81.096. Thus, the study recommends that each income level country has to develop policies based on their threshold value to promote tourism development.*

Keywords: *Control on Corruption, Government Effectiveness, Tourism Development, different Income Level Countries, PSTR technique.*

Introduction

Tourism and travel are among the fastest growing and highly profitable sectors worldwide (Chaudhry, Nazar, Ali, Meo, & Faheem, 2022; Fernandes, Pacheco, & Fernandes, 2019), resulting in a high amount of revenue for private establishments and governments (Osinubi, Ajide, & Osinubi, 2022). This sector is considered an ever-widening, ever-growing, and a source of development. It addresses numerous social and economic issues such as monetary instabilities, unemployment, infrastructural development, foreign exchange, poverty, and financial debt. It is also one of the primary factors of international trade, foreign exchange, and wealth creation (Andrades & Dimanche, 2017; Liu & Wu, 2019). Furthermore, tourism diversifies income among economies through creating connections with the industry of other nations, such as those of restaurants, hotel, and entertainment. Moreover, tourism contributes to the economies directly, induced, and indirectly. For instance, directly concerning commodities, induced concerning necessities,

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and indirectly concerning investment.

Currently, tourism industry exerts a significant impact on the tourist economies, and along with macro-economic factors, the institutional quality indicators play a significant role (Adedoyin, Erum, & Bekun, 2022). As stated by the World Bank (2013), UNDP (2017), and OECD (2016), to achieve the desired impact of the tourism sector, the role of good institutional quality needs to be realized. For instance, a sound institution helps to establish the stage for economic change, social cohesiveness, and tourist stays growth (Khan 2012). Moreover, good institutional quality helps sustain, integrate, and attract investors and helps minimize investment risk (Ofori & Asongu, 2021) and guarantee investment returns (Ofori, Dossou, & Akadiri, 2022).

The institutional quality affects the tourism sector's performance in many ways. The institutional quality comprises high-quality regulations and services, individual rights, law and order, government stability, and no corruption (Paliska, Mušič, Ćeklić, & Mekinc, 2020). Good institutional quality promotes economic development by developing trust, deterring free movement, searching for rent, and building cooperation, whereas bad institutional quality results in corruption, political instability, economic recessions, and religious tensions. For local and international businesses that provide tourism products, the poor institutional quality raises uncertainty and transaction costs. To sum up, a good institutional quality represents an economy's image, a sign of stability, safety, and security. This representation impacts the tourist's decision to choose the destinations as tourists avoid those destinations with poor institutional quality (Ghalia, Fidrmuc, Samargandi, & Sohag, 2019).

Institutional quality is determined by six factors i.e. regulatory quality, government efficacy, and political stability, the rule of law, voice, accountability, and corruption control. Moreover, these dimensions can be bifurcated into two aspects, i.e., aspects that are focused on governance and aspects that are focused on politics. Government effectiveness, regulatory effectiveness, and rule of law represent the Governance-oriented aspects and explain the economy's capability to provide quality civil and private services, design and propagate policies and regulations, and support policies that support the growth and development of the private sectors. It also covers the people's acceptance of laws, property rights and regulations, and trust. While voice, political stability, and accountability, control on corruption represents politics-oriented aspects and explains the economy's capability in controlling corruption, stability, and freedom of speech.

Government effectiveness explains the government efficiency related to operations (Zuo, Zhu, Wang, Wei, & Bondar, 2017) and is considered one of the significant determinants to strengthen tourism activities (Liu & Wu, 2019). Furthermore, government plays a vital role as it is involved in analysis of risk treatments, evaluation, and identification which minimizes negative effect of risk on tourism sector. Moreover, government's effectiveness contributes to tourist attraction to the country by providing them with a better environment and infrastructure and making it more competitive.

Control on corruption is also identified as a crucial factor that fosters a decline or increase in tourism demand (Tang & Lau, 2021). It invariably implies economies with good control over corruption attract more tourists. In contrast, the economies with weak control on corruption do not compete in tourism industry for two reasons. First, the high level

of corruption destroys the economy's national image and negatively impacts business therefore, a flourishing tourism industry needs a successful business climate. Therefore, the association between government effectiveness, control on corruption, and tourism development is topical, and understanding this nexus is crucial (Kubickova & Martin, 2020). It is also imperative to understand the potential role of income levels across countries in understanding these variables. An improvement in the government policies and low corruption level is likely to boost the tourism flows for middle-income, and lower-middle countered compared to the upper-middle and high-income economies. This is because these economies have better government policies and have high control over corruption. Given the preceding, the purpose of this study is to determine how government effectiveness and control on corruption on tourism development and whether this effect varies by income level of the countries.

With a focus on literature, it has been noted that research have looked at the impact of all the six determinants of institutional quality on tourism, targeting only Politics-oriented aspects of tourism or government-oriented aspects of tourism. However, exploring only particular determinants of institutional quality is very limited. Analyzing the determinants, the literature shows that majority of studies have looked into the effect of political stability (Causevic & Lynch, 2013; Tang & Lau, 2021; Khan et al., 2021) and control on corruption on tourism. While, very few studies have explored the impact of the rule of law and government effectiveness. Also, studies have been conducted focusing on individual countries, but targeting different income level countries has been overlooked. Therefore, this study examines the impact of one politics-oriented aspect (control on corruption) and one government-oriented aspect (government effectiveness) on tourism development in different income-level countries. The reason for choosing these variables is based on their importance; as stated by Lee, Sin Yee, and Har (2020), institutional issues, namely government effectiveness and control on corruption, are positively linked with tourism.

This research adds to previous research in a variety of ways. To the best of our knowledge, no study has been done that examines the relationship between government effectiveness, corruption control, and tourism. Our first contribution is connected to the selection of the sample. However, research done only focused these two variables with tourism in different income level countries. Our second contribution is related to the selection of the techniques, namely the panel smooth threshold regression (PSTR) methodology. The reason for choosing this technique is due to its two advantages. (i) It allows us to explore changes in estimated coefficients across considered economies and over time. In this manner, we can explore the government effectiveness, control on corruption, and tourism development nexus in different income level economies and over time. (ii) This technique simplifies exploring the smooth change in country-specific correlation depending on threshold variables. Due to these unique attributes, the PSTR technique is considered an attractive methodology for analyzing regime government effectiveness, control on corruption, and tourism development nexus. Moreover, we have applied the sub-sample threshold analysis for each income level country to get more practical information. As a result, our findings explain the nexus between the global and income-specific samples. Lastly, this study elaborates the practical mechanism related to government effectiveness, control on corruption, and tourism nexus, which will guide the policymakers and officials

in drafting new and revamping old strategies.

Literature Review

Control on Corruption and Tourism Development

In the literature, conflicting views have been found concerning tourism and the corruption nexus. One strand of studies stated that the link amongst the two variables is positive, i.e., grease the wheels (Mahmood, Hassan, Tanveer, & Furqan, 2022). Second strand of studies stated link amongst two variables is negative, i.e., sands the wheels. Finally, the third strand of literate claimed that the association between the two variables is an inverted U-shaped curve (Lv & Xu, 2017; Saha & Yap, 2015).

Das and Dirienzo (2010) used the data of 119 countries and claimed that the decrease in corruption increases tourism competitiveness. Lau and Hazari (2011) applied the ordinary least square technique and stated that the link between tourism arrivals and corruption is negative. They reported that a 1% decrease in corruption increases tourism arrivals by 8%. Poprawe (2015) looked into the relationship between tourism arrivals and corruption in 100 economies and stated that the link between the two variables is negative. Moreover, a 1% decrease in corruption increases tourism arrivals by 6-7%. Demir and Gozgor (2017) examined the nexus between relative corruption and tourism development by taking the data of tourist inflows from 70 countries to Turkey. They claimed that there is a negative link between them. By using the ARDL approach, Osinubi, Osinubi, Tabash, Ajayi, and Tran (2022) looked into the relationship between corruption and the growth of the tourism industry. They said that there is a negative correlation between the two factors.

Saha and Yap (2015) also studied tourism demand and corruption nexus in panel countries and stated that the link between the two variables is asymmetric and U inverted. At a lower level, corruption increases the tourism demand, but after reaching the threshold value, corruption minimizes the tourism demand. Lv and Xu (2017) studied the corruption-tourism demand nexus in 62 economies and stated that the link between the two variables is asymmetric. They further reported that the association between them is U inverted relationship, which implies that corruption increases tourism demand at the initial level. Though, after reaching a threshold value, corruption decreases tourism demand. Maria, Ioanna, and Salomi (2022) studied the non-linear relationship between corruption and tourism development in 83 economies using PSTR technique and stated that link between the variables is non-linear. Moreover, in low regime, link among corruption and tourism is positive and in high regime it is negative. Gholipour and Foroughi (2020) applied the fixed effect technique to 62 economies. They reported that the association between outbound business travel and corruption is positive, implying that a higher level of corruption increases outbound business travel.

Government Effectiveness and Tourism Development

In the majority of the studies, government effectiveness has been taken as a sub-dimension of institutional quality, and very limited studies have examined the individual impact of government effectiveness and tourism development (Hue & Tung-Wen Sun, 2022; Yuan, Li, Yin, & Zeng, 2022). Hall and Campos (2014) stated that government involvement in tourism growth depends upon limits among citizens, society and states. Moreover, effective public policies impact tourism growth. Lee et al. (2020) studied the government quality and international tourism competitiveness in 117 economies and reported there is a positive correlation between the two factors. Di Matteo (2019) studied nexus between tourism, government effectiveness, and economic growth by using eight-year data of Italian provinces. The study concluded that the high level of government effectiveness results in more tourism, which improves the economic growth at the provincial level.

Kubickova and Martin (2020) studied the government effectiveness and tourism competitiveness and stated that the association between them is S-curve and depends on the type of government. Overall, the studies related to tourism and government effectiveness report that government involvement in tourism is important, especially for new destinations.

Tourism and Economic Growth

There has been extensive research into relationship between two variables in developing and developed countries, and mixed result has been reported. However, broadly the association between the two variables is divided into four hypotheses (i) tourism-led growth hypothesis, (ii) growth-led tourism hypothesis, (iii) bidirectional hypothesis, and (iv) no casual hypothesis.

Wu and Wu (2020) studied nexus among economic growth and tourism development in 20 provinces of China by applying the Granger causality. The outcome shows growth-led tourism in 5 provinces of China, namely, Shaanxi, Anhui, Ningxia, Henan, and Hubei. While, the tourism led-growth is accepted in 3 provinces, namely, Inner Mongolia and Hunan. The bi-directional causality is found in Yunnan, Guangxi, Tibet, and Qinghai, and no causal relationship is found in 9 provinces. Gričar, Bojnec, Karadžić, and Backović Vulić (2021) studied association among growth and tourism in Montenegro and Slovenia. They reported that growth–led hypothesis is accepted in Montenegro, while no association is found in Slovenia. Kyara, Rahman, and Khanam (2021) applied impulse response function and granger calamity test and reported tourism-led growth hypothesis is accepted in Tanzania. Nyasha, Odhiambo, and Asongu (2021) used the sub-African countries' data and bifurcated them into low-income and high-income economies to study economic growth and tourism nexus. They reported that tourist receipts and economic growth are positively associated, whereas the association between tourist expenditure and economic growth is negative.

Population and Tourism Development

Getz and Page (2016) studied the nexus between tourism growth and host population and concluded that tourism helps attain the population-related objective of regional development. However, tourism is not considered an ideal mechanism for managing population stability. Deng, Liu, and Hu (2022) used the data of China's 54 shrinking cities and reported that no significant association is found between tourism and population.

Inflation and Tourism Development

The association between the two variables is negatively reported in the literature. According to the studies of Tang and Lau (2021) an upsurge in inflation increases the living cost, which minimizes the purchasing power, ultimately resulting in a decrease in tourist inflows. Meo, Chowdhury, Shaikh, Ali, and Masood Sheikh (2018) studied inflation and tourism growth nexus in Pakistan and concluded association among two variables is asymmetric.

Methodology

This research incorporates Panel Smooth Transition Regression (PSTR) technique. The approach is two-fold and considered as a non-linear homogeneous or a linear heterogeneous panel method. This technique is a simpler version/ extended version of model Panel Threshold Regression (PTR). PSTR has exogenous regressors and acts as a fixed-effect model. Also, it removes heterogeneity from a non-linear model. In this technique, the coefficients vary across countries and time and permit heterogeneity in regression coefficients, hence, assuming that the coefficients of an observable variable, which is represented by the transition function, are continuous and change between maximum states. Below is the main PSTR equation with two regimes:

$$y_{i,t} = u_i + \beta_0 x_{i,t} + \beta_1' x_{i,t} g(q_{i,t}, \gamma, c) + \epsilon_{i,t} \tag{1}$$

Where i=1,...N, T=1...T; N represents number of cross-sections and T indicates time dimensions, $y_{i,t}$ exhibits independent variable, u_i shows fixed individual effect, $x_{i,t}$ is vector of explanatory and control variables, $g(q_{i,t}, \gamma, c)$ is transition function and depends on $q_{i,t}$ (threshold variable),C (threshold parameter), γ (Pramater which defines slope of transition function), $\epsilon_{i,t}$ is error term.

In this article, a connection among control on corruption and government effectiveness with tourism development for a sample of annual panel data of 149 countries of different income levels from 2002 to 2019 is elucidate. Based on the assumption link among variables is non-linear, a non-linear approach is applied to authenticate their non-linearity.

This article also takes population density, inflation, and gross domestic product into account as the control variables that influence control on corruption and government ef-

fectiveness, and tourism development. Thus, basic PSTR function is mentioned below:

$$TDE_{i,t} = u_i + COCx_{i,t} + COC_1 x_{i,t} g(q_{i,t}, \gamma, c) + \alpha PDE_{i,t} + \beta INF_{i,t} + \zeta GDP_{i,t} + \epsilon_{i,t} \quad (2)$$

$$TDE_{i,t} = u_i + GEFx_{i,t} + GEF_1 x_{i,t} g(q_{i,t}, \gamma, c) + \alpha PDE_{i,t} + \beta INF_{i,t} + \zeta GDP_{i,t} + \epsilon_{i,t} \quad (3)$$

Where i represents no. of cross-sections (it is 149 different income level countries), t is the time range (2002 - 2019). TDE is tourism development, INF is Inflation, GDP is economic growth, PDE is population density, COC is control on corruption, GEF is the government effectiveness. $g(q_{i,t}, \gamma, c)$ is transition function and in which $q_{i,t}$ is COC and GEF, used as a threshold variable. The value of threshold function restricted between 0 and 1. As a matter of fact, the afore-mentioned function is justified in terms of $q_{i,t}$ which is threshold variable, g justifies slope parameter, and depicts efficiency of transition from one regime to another.

The logistic function is stated below:

$$g(q_{i,t}, \gamma, c) = \frac{1}{1 + exp[-\gamma(q_{i,t} - c)]} \quad (4)$$

Where, C determines threshold parameter and $\gamma > 0$ determines gradient of transition function.

The transition function tends to turn into an indicator function when $\gamma \to \infty$. Moreover, $(q_{i,t}, \gamma, c) = 1$, if $q_i t \geq c$ and $g(q_{i,t}, \gamma, c) = 0$ if $q_i t < c$. The PSTR model is applied when the leveling function and leveling parameter move towards zero $(\gamma \to 0)$ and $(\gamma = 0)$, respectively making transition function constant.

The rise in threshold variable (COC and GEF) changes the coefficients of COC, GEF and TDE easily and progressively from the first regime (β_0) corresponding to low levels of income to second regime $(\beta_0 + \beta_1)$ corresponding to high levels of income. In panel smooth transition regression approach, parameter of threshold switches with cross –section and time. Thus, below mentioned equation depicts sensitivity of TDE, COC and GEF for a known number of countries (i) and time(t):

$$\epsilon_{it} = \beta_0 + \beta_1 x g(q_{i,t}, \gamma, c) \quad (5)$$

PSTR Technique

PSTR model can be investigated in three steps. The first step evaluates linearity of model that whether TDE, COC and GEF are associated with each other as a linear model (simple panel model) or a non-linear one (PSTR approach) and so the H_0 is proposed as linear model is appropriate whereas the H_1 is PSTR with two regimes or one transition is appropriate. Owing to the unidentified ambiguity of null hypothesis parameter, the correlated test is non-standardized. In order to deal with this problem an equation of regression is

created in which the transition function $(q_{i,t}, \gamma, c)$ in equation (1) is changed by the first order Taylor expansion around $\gamma = 0$ and the new regression is mentioned below:

$$y_{i,t} = u_i + \beta_0^* Z_{it} + \beta_1^* Z_{it} q_{it} + \beta_2^* Z_{it} q_{it}^2 + ... + \beta_m^* Z_{it} q_{it}^m + \epsilon_{it}^* \tag{6}$$

Yet, the parameters $\beta_0^* ... \beta_m^*$ are multiple of γ, and $u_i t^* = u_i t + R_m \beta_1 Z_{it}$ where R_m expresses the rest of Taylor function. In this case, testing of $H_0 : \gamma = 0$ in equation (1) is similar to test H_0 in equation (6) $H_0^* = \beta_1^* = ... = \beta_m^*$. The likelihood test, Wald test and Fischer LM test are applied to validate H_0 of linearity that are estimated as follows:

$$Fischer\ LM\ test = LM_f = \frac{SSR_0 - SSR_1}{K} / \frac{SSR_0}{NT - N - K} \tag{7}$$

$$Wald\ LM\ test = LM_W = \frac{NT(SSR_0 - SSR_1)}{SSR_0} \tag{8}$$

$$Likelihood\ ratio\ test = -2[log(SSR_1) - log(SSR_0)] \tag{9}$$

Whereas, in null hypothesis (H_0) the sum of squared residuals is explained by SR_0, in alternative hypothesis (H_1) the sum of squared residuals is explained by SSR_1. $F(K, NT - N - K)$ distribution is employed in Fischer LM test, in which number of explanatory variables is characterized by K, number of countries is characterized by N and time is characterized by T. x^2 (K) distribution is described in likelihood and Wald test.

The main purpose for applying PSTR technique with at least two regimes, is rejection of null hypothesis in a non-linear model. In next step, null hypothesis of no remaining non-linearity is assessed where the applied test investigates whether non-linear link of variables can be corrected by PSTR model or not. The H_0 is PSTR with two extreme regimes is appropriate whereas H_1 is PSTR with at least three regimes is appropriate. Hence, equation for this is mentioned below: The model considered for this is mentioned below:

$$y_{i,t} = u_i + \beta_0 Z_{it} + \beta_1 Z_{it} g_1(q_{it}, \gamma_1, c_1) + \beta_2 Z_{it} g_2(q_{it}, \gamma_2, c_2) + \epsilon_{it} \tag{10}$$

The aforementioned equation demonstrates H_0 being calculated as $H_0 : \gamma_2 = 0$. and once more the issue of identification is eradicated by applying Taylor expansion of $g_2(q_i t, \gamma_2, c_2)$ around $\gamma_2 = 0$. Which provides following equation:

$$y_{i,t} = u_i + \beta_0^* Z_{it} + \beta_1^* Z_{it} g_1(q_{it}, \gamma_1, c_1) + \beta_{21}^* Z_{it} q_{it} + ... + \beta_{2m}^* Z_{it} q_{it}^m + \epsilon_{it}^* \tag{11}$$

Equation (11) depicts that the null hypothesis $H_0 : \gamma_2 = 0$ of the PSTR model with one transition or two regimes is restated as $H_0^* : \beta_2 1^* = ... = \beta_2 m^* = 0$ and these calculations are done through Wald, Fischer and likelihood tests. In the scenario where null hypothesis is accepted, it is concluded PSTR technique, for analysing the association among the variables, of one transition is appropriate. On the other hand, upon rejection of null hypothesis, the process is repeated until hypotheses are accepted. Finally, after selecting of regimes in last step, nonlinear least square method is considered to be feasible to inspect the association among given variables of the model.

Data and Variable Description

In this study, we used annual panel data of 149 countries comprised of the years 2002 to 2019. The sample of 149 countries has been bifurcated into four income level countries given by the World Bank, namely (i) High income, (ii) upper middle income, (iii) lower middle income, (iv) low-income countries. Specifically, 50 countries from high income, 41 upper middle income, 43 lower middle income, and 15 countries from low income.

Table 1
List of countries

Low Income		Lower Middle Income		Upper Middle Income		High Income	
S. No.	**Name**	**S. No.**	**Name**	**S. No.**	**Name**	**S. No.**	**Name**
1	Burkina Faso	1	Algeria	1	Albania	1	Aruba
2	Congo, Dem. Rep.	2	Angola	2	Argentina	2	Australia
3	Ethiopia	3	Bangladesh	3	Armenia	3	Bahamas, The
4	Gambia, The	4	Benin	4	Azerbaijan	4	Bahrain
5	Guinea	5	Bhutan	5	Belarus	5	Barbados
6	Madagascar	6	Bolivia	6	Bosnia and Herzegovina	6	Belgium
7	Malawi	7	Cabo Verde	7	Botswana	7	Brunei Darussalam
8	Mali	8	Cambodia	8	Brazil	8	Canada
9	Mozambique	9	Cameroon	9	Bulgaria	9	Chile
10	Niger	10	Congo, Rep.	10	Colombia	10	Croatia
11	Rwanda	11	Cote d'Ivoire	11	Costa Rica	11	Cyprus
12	Sierra Leone	12	Djibouti	12	Cuba	12	Czech Republic
13	Sudan	13	Egypt, Arab Rep.	13	Dominica	13	Denmark
14	Togo	14	El Salvador	14	Dominican Republic	14	Estonia
15	Uganda	15	Eswatini	15	Ecuador	15	Finland
		16	Ghana	16	Fiji	16	France
		17	Haiti	17	Georgia	17	Germany
		18	Honduras	18	Grenada	18	Greece
		19	India	19	Guatemala	19	Hong Kong SAR, China
		20	Indonesia	20	Iraq	20	Hungary
		21	Iran, Islamic Rep.	21	Jordan	21	Iceland
		22	Kenya	22	Kazakhstan	22	Ireland
		23	Kyrgyz Republic	23	Lebanon	23	Israel
		24	Lao PDR	24	Malaysia	24	Italy
		25	Mongolia	25	Mauritius	25	Japan
		26	Morocco	26	Mexico	26	Korea, Rep.
		27	Myanmar	27	Moldova	27	Kuwait
		28	Nepal	28	Namibia	28	Luxembourg
		29	Nigeria	29	North Macedonia	29	Macao SAR, China
		30	Pakistan	30	Panama	30	Netherlands
		31	Philippines	31	Paraguay	31	New Zealand
		32	Samoa	32	Peru	32	Norway
		33	Sao Tome and Principe	33	Romania	33	Oman
		34	Senegal	34	Russian Federation	34	Poland
		35	Solomon Islands	35	Serbia	35	Portugal
		36	Sri Lanka	36	South Africa	36	Puerto Rico
		37	Tajikistan	37	St. Lucia	37	Saudi Arabia
		38	Tanzania	38	Suriname	38	Seychelles
		39	Tunisia	39	Thailand	39	Singapore
		40	Ukraine	40	Tonga	40	Slovak Republic
		41	Vanuatu	41	Turkey	41	Solvenia
		42	Vietnam			42	Spain
		43	West Bank & Gaza			43	St. Kitts and Nevis
						44	Sweden
						45	Switzerland
						46	Trinidad and Tobago
						47	United Arab Emirates
						48	United Kingdom
						49	United States
						50	Uruguay

The selection of all the countries is based on the data availability. The detailed information related to countries is mentioned in table 1. Table 2 explains variable information of all variables used in this study, and the data of the variables are taken from multiple sources. For example, the data on tourism development is taken from World Travel and Tourism Council (WTTC), data on government effectiveness and control on corruption is taken from Worldwide Governance Indicators (WGI), and data of control variables, i.e., economic growth and population is taken from World Development Indicators (WDI).

Table 2
Variable Description

Symbol	Variable Name	Unit of Measurement
TDE	tourism development	amount of tourism receipts in billion US dollar
INF	Inflation	annual growth in Consumer Price Index
GDP	gross domestic product	per capita in thousand US dollar
PDE	population density	measured by Population per square kilometer
COC	control on corruption	measured on a percentile rank of 0-100 scale
GEF	Government Effectiveness	measured on a percentile rank of 0-100 scale

Source: Author's Estimation

Data Analysis and Discussion

The summary statistics are explained in table 3. Sample data contains 2681 observations for the full sample, 270 observations for low-income countries, 774 observations for lower-middle-income countries, 737 observations for upper-middle countries, and 900 observations for high-income countries. This table also explains mean, a measure of central tendency, and standard deviation, a measure of dispersion. The statistics shows mean value of tourism development (TRD) is higher in high-income countries, 15.826, compared to upper middle, lower middle income, and low-income countries, which is 4.410, 1.853, and 0.305. Similarly, mean value of control on corruption (COC) is higher in high-income countries, 81.790, compared to upper middle, lower middle income, and low-income countries, 45.447, 32.662, and 27.564. Moreover, the mean value of government effectiveness (GEF) is higher in high-income countries, 82.671, compared to upper middle, lower middle income, and low-income countries, 49.066, 33.397and 23.213. The mean value of population density (PDE) is higher in high-income countries, 825.087, compared to lower middle income, upper-middle, and low-income countries, 146.797, 105.166, and 97.068. In comparison, the mean value of economic growth is significantly higher in upper-middle countries, which is 4455.977, compared to high-income, lower-middle, and low-income countries, which are 34.129, 2.954, and 0.571. The skewness shows that the data is positively skewed and not normal. The value of Kurtosis is mixed, i.e., greater than 3 in some cases and less than 3 in some cases, depicting that distribution is leptokurtic and platykurtic and not normal. Jarque-Bera test also shows series is not normal.

PSTR Estimations

Pesaran's (2004) cross-sectional dependency test is applied to explore existence of cross-sectional dependence as it gives reliable and efficient results. The result shows that the

cross-sectional dependency exists in the data, implying that the second generation unit root test, namely cross-sectionally augmented Im, Pesaran, and Shin (2003), is used to explore stationary level data.

Table 3
Descriptive Statistics

Variables	Mean	Median	Max	Min	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability	Obs
Full Sample										
TDE	7.091	1.358	237.726	0.000	18.176	7.167	73.963	585481.2	0.000	2681
INF	5.358	3.437	108.897	-18.109	7.148	4.654	42.309	182290.9	0.000	2681
GDP	14.032	5.13	154.919	0.112	19.5	2.281	9.418	6927.428	0.000	2681
PDE	358.044	82.982	20213.57	1.573	1690.337	9.027	91.836	917995.8	0.000	2681
COC	52.155	51.707	100	0.474	28.1	0.031	1.848	148.655	0.000	2681
GEF	53.22	52.607	100	0.51	27.161	0.007	1.919	130.642	0.000	2681
Low Income										
TDE	0.305	0.116	3.548	0.000	0.509	3.39	17.08	2747.392	0.000	270
INF	9.077	7.145	63.293	-3.233	9.474	2.167	9.645	708.011	0.000	270
GDP	0.571	0.531	1.657	0.112	0.255	1.224	5.713	150.209	0.000	270
PDE	97.068	57.908	511.834	9.521	104.114	2.032	7.177	382.062	0.000	270
COC	27.564	26.341	75.481	0.948	16.004	0.719	3.467	25.694	0.000	270
GEF	23.213	23.789	64.423	0.948	13.883	0.382	2.6	8.376	0.015	270
Lower Middle Income										
TDE	1.853	0.479	31.661	0.001	3.64	3.799	21.805	13266.09	0.000	774
INF	6.949	5.204	108.897	-18.109	8.177	5.511	56.89	97577.57	0.000	774
GDP	2.954	1.737	154.919	0.19	9.586	11.996	159.453	807959.9	0.000	774
PDE	146.797	73.936	1252.563	1.573	203.104	3.17	14.861	5833.747	0.000	774
COC	32.662	31.354	91.827	0.474	19.742	0.516	2.671	37.85	0.000	774
GEF	33.397	32.227	76.02	0.962	16.908	0.222	2.264	23.813	0.000	774
Upper Middle Income										
TDE	4.41	1.557	65.082	0.011	7.829	3.65	19.931	10438.57	0.000	737
INF	5.971	4.201	59.22	-10.067	7.371	3.828	22.528	13511.14	0.000	737
GDP	4455.977	4379.659	15974.64	0.763	3696.807	0.451	2.505	32.518	0.000	737
PDE	105.166	79.44	670.519	2.249	126.199	2.793	11.113	2979.363	0.000	737
COC	45.447	46.919	85.167	1.515	19.873	-0.188	2.138	27.138	0.000	737
GEF	49.066	50.481	85.854	0.51	17.141	-0.433	2.77	24.617	0.000	737
High Income										
TDE	15.826	6.694	237.726	0.057	28.347	4.647	30.913	32456.66	0.000	900
INF	2.373	2.038	36.965	-7.225	2.811	4.234	43.268	63496.28	0.000	900
GDP	34.129	29.761	123.514	3.624	20.754	1.382	5.49	519.06	0.000	900
PDE	825.087	122.035	20213.57	2.558	2852.414	5.108	30.278	31816.63	0.000	900
COC	81.79	84.615	100	42.788	13.926	-0.551	2.179	70.764	0.000	900
GEF	82.671	85.096	100	42.647	12.805	-0.661	2.709	68.677	0.000	900

Note: TDE is tourism development, INF is Inflation, GDP is gross domestic product, PDE is population density, COC is control on corruption, GEF is Government Effectiveness
Source: Authors' Estimation

It is essential to examine the stationary properties of the variable series before applying the PSTR technique. The specification procedure of the PSTR technique assumes that the variable series is stationary at a level. Then Im, Pesaran, Shin Panel Unit root test is employed, and the result is displayed in table 5. The results show the null hypothesis rejection and confirm that all the variable series do not posit a unit root problem at a 1% significance level.

Table 4
Cross-sectional dependence test

Variables	Test statistics	p value
Full Sample		
TDE	279.803	0.000
INF	122.235	0.000
GDP	340.888	0.000
PDE	246.45	0.000
COC	8.569	0.000
GEF	12.547	0.000
Low Income		
TDE	19.523	0.000
INF	5.375	0.000
GDP	32.377	0.000
PDE	43.057	0.000
COC	5.227	0.000
GEF	8.921	0.000
Lower Middle Income		
TDE	62.312	0.000
INF	33.384	0.000
GDP	101.043	0.000
PDE	114.803	0.000
COC	4.965	0.000
GEF	13.054	0.000
Upper Middle Income		
TDE	90.71	0.000
INF	29.597	0.000
GDP	105.09	0.000
PDE	33.763	0.000
COC	6.02	0.000
GEF	2.762	0.006
High Income		
TDE	106.339	0.000
INF	58.979	0.000
GDP	106.597	0.000
PDE	64.324	0.000
COC	9.558	0.000
GEF	11.028	0.000

Source: Authors' Estimation

After confirming the stationary properties of the variable series, the next step is to start with the PSTR technique analysis. The first step of this technique is to test linear model against non-linear model. The Wald test (LMW) and fisher test (LMF) is applied to test linearity of model and the number of transition function. Table 6 shows linearity test result and null hypothesis rejection at a 1% significance level and acceptance of alternative hypothesis. It implies that it is not appropriate to use linear model, and a model with one non-linear threshold is accepted.

After confirming that linear model is inappropriate, next step is to analyze number of regimes. The Wald test (LMW) and fisher test (LMF) are applied, and result is reported in table 7. The result shows null hypothesis cannot be rejected, and the model can be analyzed by having one threshold effect and applying PSTR approach with two regimes.

Table 5
Unit Root Test

Variables	Statistics	p-value
Full sample		
TDE	-24.080***	0.000
INF	-39.835***	0.000
GDP	-19.342***	0.000
PDE	-21.587***	0.000
COC	-32.281***	0.000
GEF	-32.814***	0.000
Low Income		
TDE	-9.324***	0.000
INF	-17.200***	0.000
GDP	-7.824***	0.000
PDE	-10.488***	0.000
COC	-10.901***	0.000
GEF	-10.994***	0.000
Lower Middle Income		
TDE	-10.486***	0.000
INF	-20.519***	0.000
GDP	-10.035***	0.000
PDE	-13.017***	0.000
COC	-16.323***	0.000
GEF	-16.335***	0.000
Upper Middle Income		
TDE	-12.278***	0.000
INF	-20.621***	0.000
GDP	-9.614***	0.000
PDE	-9.093***	0.000
COC	-17.319***	0.000
GEF	-14.434***	0.000
High Income		
TDE	-15.669***	0.000
INF	-21.576***	0.000
GDP	-11.097***	0.000
PDE	-11.149***	0.000
COC	-18.939***	0.000
GEF	-22.440***	0.000

Note: 1% significance level is shown by
***, 5% by **, and 10% by *.
The Lag selection (automatic) is based on SIC.

Table 6
Linearity test

Threshold variable	Lagrange multiplies-Wald tests (LMW)		Lagrange multiplies-Fisher tests (LMF)	
	Statistics	p-value	Statistics	p-value
Control on Corruption Model				
Low income	24.798	0.000	5.671	0.000
Lower middle income	42.377	0.000	9.895	0.000
Upper Middle income	26.482	0.000	11.256	0.000
High income	16.931	0.000	3.963	0.004
Full sample	131.254	0.000	30.826	0.000
Government Effectiveness Model				
Low income	23.5	0.000	5.374	0.000
Lower middle income	106.9	0.000	24.97	0.000
Upper Middle income	36.681	0.000	8.56	0.000
High income	64.398	0.000	19.227	0.000
Full sample	129.005	0.000	26.896	0.000

Note: Ho: Linear Panel model; H1: PSTR model with atleast two regimes

Table 7
Test of no remaining nonlinearity

Threshold Variable	Lagrange multiplies-Wald tests (LMW)		Lagrange multiplies-Fisher tests (LMF)	
	Statistics	**p-value**	**Statistics**	**p-value**
Control on Corruption Model				
Low income	10.598	0.226	1.172	0.316
Lower middle income	15.03	0.523	0.803	0.681
Upper Middle income	12.512	0.13	1.443	0.174
High income	9.355	0.313	1.08	0.374
Full sample	18.5	0.296	1.056	0.394
Government Effectiveness Model				
Low income	4.716	0.787	0.521	0.839
Lower middle income	13.169	0.106	1.52	0.147
Upper Middle income	15.556	0.485	0.888	0.583
High income	8.646	0.373	0.998	0.435
Full sample	17.25	0.369	0.984	0.471

Note: Ho: PSTR model with 2 regimes; H1: PSTR model with atleast 3 regimes
Source: Authors' Estimation

Discussion

The non-linear association among the variables is analyzed in the next phase using the PSTR technique with two regimes. The result is reported in tables 8-12. Table 8 shows result of control on corruption, government effectiveness, and tourism development in low-income countries. The result shows that their association is positive in both low and high regimes. However, coefficient of COC increased to 0.549 from 0.301 when the threshold value reached 27.222. Similarly, the coefficient of GEF increased to 0.471 from 0.254 when the threshold value reached 22.951. It implies that the COC, GEF has a lesser impact on tourism development in a low regime; however, COC, GEF generates a higher impact on tourism development once it hits the threshold value.

Table 9 shows result of control on corruption, government effectiveness, and tourism development in lower-middle-income countries. The result shows that their association is positive in both low and high regimes. However, coefficient of COC increased to 0.395 from 0.247 when the threshold value reached 31.274. Similarly, the coefficient of GEF increased to 0.366 from 0.128 when the threshold value reached 36.228. It implies that the COC, GEF has a lesser impact on tourism development in a low regime; however, COC, GEF generates a higher impact on tourism development once it hits the threshold value.

Table 10 shows the result of control on corruption, government effectiveness, and tourism development in upper-middle-income countries. Result shows that their association is positive in both low and high regimes. However, coefficient of COC increased to 0.379 from 0.274 when the threshold value reached 46.766. Similarly, the coefficient of GEF increased to 0.741 from 0.428 when the threshold value reached 54.481. It implies that the COC, GEF has a lesser impact on tourism development in a low regime; however, COC, GEF generates a higher impact on tourism development once it hits the threshold value.

Table 8
Low income countries PSTR estimations

Variables	β**0**	**t-stats**	β**1**	**t-stats**
Control on Corruption Model				
INF	-0.011*	-1.906	-0.009*	-1.692
GDP	0.521***	4.256	0.909***	3.687
PDE	-0.024	-1.068	-0.013	-1.359
COC	0.301*	1.95	0.549***	2.865
Threshold (c)	27.222**	2.24		
Slope parameter (γ)	17.152***	3.084		
Government Effectiveness Model				
INF	-0.011**	-2.056	-0.009*	-1.869
GDP	0.671***	3.85	1.192***	4.009
PDE	-0.025	-1.164	-0.021	-0.669
GEF	0.254***	2.616	0.471***	2.986
Threshold (c)	22.951***	31.014		
Slope parameter (γ)	32.423***	4.692		

Note: β0 shows regime 1, and β1 shows regime 2.
Threshold variables are COC and GEF.
1% significance level is shown by ***, 5% by **, and 10% by *.

Table 9
Lower middle income countries PSTR estimations

Variables	β**0**	**t-stats**	β**1**	**t-stats**
Control on Corruption Model				
INF	-0.008*	-1.865	-0.003	-1.602
GDP	0.727**	2.134	0.737**	2.532
PDE	-0.024	-0.856	-0.014	-0.887
COC	0.247**	2.069	0.395***	2.875
Threshold (c)	31.274***	4.551		
Slope parameter (γ)	23.052***	2.697		
Government Effectiveness Model				
INF	-0.007	-1.354	-0.001	-1.302
GDP	1.457***	2.849	1.627***	3.265
PDE	-0.024	-1.069	-0.012	-1.249
GEF	0.128***	2.714	0.366***	2.958
Threshold (c)	36.228***	31.014		
Slope parameter (γ)	19.267***	3.249		

Note: β0 shows regime 1, and β1 shows regime 2.
Threshold variables are COC and GEF.
1% significance level is shown by ***, 5% by **, and 10% by *.

Table 11 shows the result of control on corruption, government effectiveness, and tourism development in high-income countries. Result shows that their association is positive in both low and high regimes. However, coefficient of COC increased to 0.419 from 0.267 when the threshold value reached 88.615. Similarly, the coefficient of GEF increased to 0.665 from 0.421 when the threshold value reached 81.096. It implies that the COC, GEF has a lesser impact on tourism development in a low regime; however, COC, GEF generates a higher impact on tourism development once it hits the threshold value.

Table 12 shows the result of control on corruption, government effectiveness, and tourism development in a full sample of countries. The result shows that their association is positive in both low and high regimes. However, coefficient of COC increased to 0.493 from 0.324 when the threshold value reached 47.707. Similarly, the coefficient of

GEF increased to 0.665 from 0.401 when the threshold value reached 48.607. The result shows that the COC generated a higher impact on tourism development in high regime when reached threshold value; however, the GEF enhances tourism development in the high regime, but the impact is quite minimal.

Table 10
Upper middle income countries PSTR estimations

Variables	$\beta 0$	t-stats	$\beta 1$	t-stats
Control on Corruption Model				
INF	-0.026*	-1.836	-0.013*	-1.725
GDP	0.921***	3.025	1.026***	3.254
PDE	-0.094*	-1.026	-0.065	-1.001
COC	0.274***	2.684	0.379***	2.846
Threshold (c)	46.766***	22.44		
Slope parameter (γ)	39.251***	4.521		
Government Effectiveness Model				
INF	-0.086*	-1.789	-0.073	-1.245
GDP	1.046***	2.856	1.236***	2.985
PDE	-0.025	-0.982	-0.011	-0.856
GEF	0.428***	3.013	0.741***	2.956
Threshold (c)	54.481***	11.246		
Slope parameter (γ)	26.775***	3.128		

Note: $\beta 0$ shows regime 1, and $\beta 1$ shows regime 2.
Threshold variables are COC and GEF.
1% significance level is shown by ***, 5% by **, and 10% by *.

Table 11
High income countries PSTR estimations

Variables	$\beta 0$	t-stats	$\beta 1$	t-stats
Control on Corruption Model				
INF	-0.045*	-1.836	-0.032*	-1.726
GDP	0.593***	2.781	0.812***	3.412
PDE	-0.013	-1.453	-0.011	-1.317
COC	0.267**	2.315	0.419***	2.864
Threshold (c)	88.615***	42.691		
Slope parameter (γ)	34.521***	6.239		
Government Effectiveness Model				
INF	-0.083*	-1.775	-0.075*	-1.699
GDP	0.812**	2.245	1.023***	2.72
PDE	-0.024	-1.382	-0.021	-1.593
GEF	0.421***	2.983	0.665***	3.045
Threshold (c)	81.096***	4.669		
Slope parameter (γ)	19.853***	2.961		

Note: $\beta 0$ shows regime 1, and $\beta 1$ shows regime 2.
Threshold variables are COC and GEF.
1% significance level is shown by ***, 5% by **, and 10% by *.

The positive association between the control on corruption and tourism development is justified by the studies of Poprawe (2015); Lv and Xu (2017); Chaudhry et al. (2022). The positive association implies that international tourists get attracted to economies with lower corruption levels. Moreover, positive association among government effectiveness and tourism development is justified by studies of Lee et al. (2020); Tang and Lau (2021). It implies that the government's high level of government effectiveness results in more

tourism. In addition, the government in these countries pays significant attention and ensures efficient services to the tourists.

Table 12
Full sample countries PSTR estimations

Variables	$\beta 0$	t-stats	$\beta 1$	t-stats
Control on Corruption Model				
INF	-0.068*	-1.922	-0.042*	-1.738
GDP	0.654***	3.405	0.923***	3.892
PDE	-0.019*	-1.708	-0.017	-1.228
COC	0.324***	2.77	0.583***	3.251
Threshold (c)	47.707***	4.338		
Slope parameter (γ)	36.938***	3.825		
Government Effectiveness Model				
INF	-0.102*	-1.726	-0.082	-1.501
GDP	0.736***	3.006	1.025***	3.589
PDE	-0.031	-0.986	-0.022	-1.215
GEF	0.401***	2.788	0.493***	3.253
Threshold (c)	48.607***	5.102		
Slope parameter (γ)	27.723***	4.209		

Note: $\beta 0$ shows regime 1, and $\beta 1$ shows regime 2.
Threshold variables are COC and GEF.
1% significance level is shown by ***, 5% by **, and 10% by *.

In all the five models, the association between inflation and tourism development is negative in low and high regimes. Results is supported with studies of Tang and Lau (2021). They reported that an upsurge in inflation increases the living cost, which minimizes the purchasing power, ultimately resulting in a decrease in tourist inflows. The association between the population and tourism development is also negative in both low and high regimes. Results is consist with studies of Getz and Page (2016), who argued that tourism is not considered an ideal mechanism for managing population stability. Moreover, densely populated regions result in overcrowded destinations, which usually causes damaged infrastructure and obsolete services, thus affecting tourism development badly. Furthermore, association among economic growth and tourism development is negative in low and high regimes. Results are consistent with studies of Adedoyin et al. (2022). It infers countries with well-designed trade policies, economic policies, and governance structures gain socioeconomic power and invest better in developing the tourism sector, thus attracting more tourists to their locations.

Conclusion

Control on corruption and government effectiveness is considered the important predictors that support tourism development for the economies in the long run. Therefore, this study examines this association in different income level countries by employing the PSTR technique. The study's outcome shows association among two variables is nonlinear. The threshold value shows control on corruption and government effectiveness affects tourism development positively in both low and high regimes. To enter high growth regime, the income level of countries should reach and maintain the minimum threshold values. The finding of this study underlines the message that the different income levels

countries should focus on maintaining government effectiveness and combating corruption.

Managerial Implications

From the policy standpoint, the governments should enforce regulations that enhance transparency to minimize corrupt practices and prevent the diversion of tourism revenues for personal gains. Similarly, the regulators such as tourist operators, entities such as Chambers of commerce, or any other responsible for national policies formulation ought to tackle corruption as a priority if they want to increase the tourist inflows. Moreover, the holistic approach should be implemented to address corruption by applying ethical and transparent lobbying, involving the stakeholders, and implementing social responsibility policies and whistle-blowing procedures. This study also supports the idea of Lyrio and Lunken (2018), who voiced that the tourist who witnesses corrupt practices should come forward and share it with the relevant authorities. Addressing the corruption will help the countries move to a low corruption regime, which increases the tourist inflows.

Moreover, the government should also increase its commitments and effectiveness in the tourism sector as the government policies affect this sector. Government should work in a team on the infrastructure development and marketing of the sector and should allocate specific funds for these promotions. Marketing in terms of new tourism offerings, new direct routes, and relaxing visa policies all help the tourism sector flourish, especially in low-income countries.

As a recommendation, the government and policymakers should strengthen their institutional qualities to boost the tourist sector. The governments that successfully develop a secure and trusted environment increase their tourist inflows and improve the well-being of their people and societies.

In addition, the study also recommends that to boost economic development via the tourism sector channel; the officials should enhance the sector's relevance, uniqueness, and visibility. It can be done by adopting contemporary tourism marketing and branding activities where the international and domestic influencers (celebrities, bloggers, and celebrities), restaurant managers, local authorities, and tour agents and operators merged into the tourism supply chain. Furthermore, free guided tours, free bus rides, and easy visa availability should be encouraged to minimize the tourist burden.

Limitations

Even though this study is unique, it still suffers some limitations that can give avenues for future research. First limitation is related to tourism development indicator as we measure tourism development with tourism receipts future researchers could use different indication such as (tourist trade, tourist aspects etc.) for measurement. Other variables, such as tourism expenditure and length of stay ignored, which can also be used for this analysis. Secondly, this study is not country-specific, so the within-country effects cannot be analyzed, so the generalizability of the result for one country is limited therefore future researcher could perform analysis by specifying the country.

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