

## Article

# Calibrating the Impacts of Regional Trade Integration and Renewable Energy Transition on the Sustainability of International Inbound Tourism Demand in South Asia

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**Abstract:** This paper aims to evaluate the overarching relationships between International Inbound Tourism Demand (IITD), regional trade integration and Renewable Energy Transition (RET) in the context of selected South Asian economies between 1990 and 2016. The results from the panel data econometric analyses, accounting for cross-sectional dependency and slope heterogeneity issues, showed that higher degrees of intra-regional trade between the South Asian economies exert positive impacts on the IITD in South Asia. Similarly, undergoing a RET was found to stimulate the IITD further. Besides, the joint favorable impacts of regional trade integration and RET on South Asia's IITD were also ascertained. Therefore, these findings impose key policy implications concerning the pertinence of strengthening regional trade cooperation between the South Asian neighbors and boosting renewable energy consumption for enhancing the IITD further.

**Keywords:** energy sustainability; sustainable tourism; renewable energy transition; energy security; regional integration; South Asia; cross-sectional dependency; slope heterogeneity

## 1. Introduction

Sustainable international tourism, intra-regional trade integration and renewable energy consumption have been acknowledged to exhibit overarching relationships. These three-way associations are of greater relevance for South Asian economies, particularly due to South Asia being a prime tourist destination for foreign tourists in particular. This can be understood from the statistical estimates that the International Inbound Tourism Demand (IITD), in terms of the number of tourist arrivals in South Asia, has surged by almost six-fold over the last decade or so [1]. Simultaneously, this growth in the IITD, to some extent, has also amplified the overall demand for energy across this region [2]. Therefore, the sustainability of international tourism influx into South Asia can be hypothesized to be influenced by the reliability of the energy supplies within the South Asian economies of concern.

However, most South Asian nations have traditionally failed to ensure energy security on their own whereby acute shortages of energy supplies have often marginalized the prospects of

socio-economic development in South Asia [3]. Moreover, the existent low electrification rates and insufficient grid-connectivity across South Asia have also dampened the number of tourist inflows within this region [4]. Under such circumstances, augmentation of renewable energy into the national energy-mixes of South Asian countries is thought to be a credible means of facilitating off-grid electrification across the tourist destinations which, in turn, can be hypothesized to simultaneously harness the sustainability of IITD in South Asia [5]. This process of replacing the use of non-renewable energy resources with renewable alternatives is referred to as the Renewable Energy Transition (RET) phenomenon [6] which is pertinent in relieving the monotonic fossil fuel dependency of developing economies in particular.

Although undergoing RET is a contemporary solution to mitigation of the energy crises faced by the South Asian economies, undergoing this transition is somewhat cumbersome for most of the South Asian economies particularly due to the dismal state of their energy infrastructure and technological backwardness [7]. Hence, to overcome these constraints, execution of trade and financial liberalization policies, respectively facilitating cross-border renewable energy trade and foreign direct investment inflows in South Asia, is often recommended in the literature [8]. More importantly, promoting regional cooperation, through greater intra-regional trade participation between the South Asian neighbors, is also postulated to play a key role in developing South Asia's international tourism industry [9,10]. Besides, intra-regional energy trade can also be anticipated to improve the dismal state of regional integration among the South Asian nations [11]. Hence, keeping these notions in mind, it can be hypothesized that promoting intra-regional trade and undergoing RET can ideally safeguard the region's energy security issues and therefore develop the tourism industry in tandem.

Against this milieu, this paper aims to probe into the dynamic impacts of regional trade integration and RET on IITD in the context of selected South Asian economies, namely Bangladesh, India, Pakistan, Sri Lanka and Nepal, between 1990 and 2016. This paper contributes to the literature in multiple aspects. Firstly, it evaluates the impacts of promoting intra-regional trade between the South Asian nations on the sustainability of IITD within this region. Although a plethora of existing studies have analyzed the overall impacts of international trade in this regard [12], this is the only study that specifically addresses the impacts of intra-regional trade on the prospects of achieving international tourism sustainability targets in South Asia. Secondly, the potential effects of RET on South Asia's IITD are also evaluated. To the best of our knowledge, no existing study has attempted to empirically test this critically important relationship in the South Asian context. Finally, this paper also aims to investigate both the direct impacts of regional trade integration, as well as the indirect impacts of regional trade integration-induced RET, on South Asia's IITD. The preceding studies, in the global context, have primarily focused on the direct channel while ignoring the indirect channels through which IITD can be synthesized. The following questions are specifically addressed in this paper:

1. Does regional trade integration boost IITD in South Asia?
2. Does RET facilitate the sustainability of South Asia's international tourism sector?
3. Are there any joint impacts of regional trade integration and RET on the IITD?
4. Is there any causal link between IITD, regional trade integration and RET?

The remainder of the paper is structured as follows. Section 2 provides an overview of the international tourist arrivals and energy consumption trends in the context of Bangladesh. A review of the relevant literature is presented in Section 3. Section 4 explains the empirical model and discusses the attributes of the data used in the study. The methodological outline is presented in Section 5 while Section 6 reports the findings from the econometric analyses. Finally, Section 7 concludes by highlighting key policy recommendations in line with the findings.

## 2. Some Stylized Facts on the International Tourist Arrivals and Energy Consumption Trends

The trends in the international tourist arrivals in the selected South Asian economies are presented in Table 1. India has been the major tourist destination in South Asia which is primarily because

India is the largest of the South Asian economies. Apart from the comparative enormity of India in terms of its geographic boundary, the high IITD of India could be attributed to the availability of relatively better healthcare facilities which have attracted a large number of foreign tourists into India for medical purposes. Moreover, the cultural diversity in India has also assisted in the development of India's international tourism industry. Between the 1990/95 and 2011.2015 periods, the number of international tourist arrivals in India has surged by more than 4-fold as opposed to the corresponding growths in Sri Lanka, Pakistan, Bangladesh and Nepal by around 3.5-fold, 2.75-fold, 2-fold and 1.5-fold, respectively. Therefore, it is apparent that although the growth in the number of international tourist arrivals has increased in all the five South Asian nations, there is significant heterogeneity in the growth rates. Therefore, it is pertinent to identify the macroeconomic factors that enhance the overall IITD within South Asia.

**Table 1.** Trends in the international tourist arrivals across South Asia.

| Period    | Bangladesh | India | Nepal | Pakistan | Sri Lanka |
|-----------|------------|-------|-------|----------|-----------|
| 1990–1995 | 164        | 2228  | 385   | 374      | 361       |
| 1996–2000 | 178        | 2430  | 447   | 432      | 377       |
| 2001–2005 | 228        | 3005  | 347   | 589      | 469       |
| 2006–2010 | 305        | 5151  | 505   | 865      | 519       |
| 2011–2015 | 239        | 9249  | 733   | 1038     | 1292      |

Note: The tourist arrival figures are simple averages of the respective periods and the figures are in thousands.  
Source: World Bank [1].

Among the several factors that influence the IITD within an economy, overall energy consumption levels are acknowledged to be the major factor that drives growth in the number of inbound tourists. Hence, it is critically important to look into the energy consumption trends across the South Asian economies. Table 2 reports the trends in the electrification rates, per capita electricity consumption levels and the renewable energy shares in the context of the selected South Asian countries. As far as access to electricity is concerned, the national electrification rates show that Sri Lanka has almost managed to extend electricity access to almost its entire population by the end of 2016. In contrast, both India and Nepal have registered corresponding electrification rates of almost 90% while in Bangladesh and Pakistan the electrification rates are around 76% and 71.5%, respectively. However, if we look into the growth in the electrification rates between 2005 and 2016, it is apparent that Nepal has been the most impressive South Asian economy, improving its electrification rates by more than 44 percentage points, followed by Bangladesh almost registering a 32 percentage point rise in its electrification rates. In contrast, Pakistan has been the worst performer among the selected South Asian economies, merely improving its electrification rates by just a little more than 1 percentage point. The electrification rates of Pakistan over the 2005–2016 period have largely stagnated around the 70% mark. One reason behind Pakistan's failure to improve its electrification rates could be the lack of opportunities for the nation to import electricity from the regional neighbors. Particularly due to the inherent geopolitical tensions with India. The overall electrification rates in the South Asian economies imply that there is still significant scope for the majority of South Asian countries to try and improve their respective access to electricity figures, which could be ideal in facilitating the sustainability of South Asia's IITD.

Besides, the per capita electricity consumption figures, as reported in Table 2, show that India leads among the five South Asian economies with respect to its per capita electricity consumption figures. During the 2011–2015 period, the average per capita electricity use in India stood at around 750 kilowatt hours as opposed to the corresponding figures of around 521 kilowatt hours for Sri Lanka, 442 kilowatt hours for Pakistan, 293 kilowatt hours for Bangladesh and 130 kilowatt hours for Nepal. However, the growth rates in the per capita electricity consumption figures reveal that between the 1990/95 and 2011/15 periods, Bangladesh has managed to register a rise in its per capita energy consumption figures by more than 4.5-fold. The rest of the South Asian economies had, at most, elevated their corresponding electricity consumption per capita figures by a little more than three-fold.

**Table 2.** Trends in electrification rates, electricity consumption and renewable energy consumption shares.

| Panel A: Electrification Rates (% of Population)               |            |        |        |          |           |
|----------------------------------------------------------------|------------|--------|--------|----------|-----------|
| Year                                                           | Bangladesh | India  | Nepal  | Pakistan | Sri Lanka |
| 2005                                                           | 44.23      | 67.44  | 46.50  | 70.49    | 77.47     |
| 2006                                                           | 50.53      | 67.90  | 51.20  | 70.45    | 79.04     |
| 2007                                                           | 46.50      | 70.65  | 53.90  | 70.41    | 80.00     |
| 2008                                                           | 52.66      | 72.25  | 57.60  | 70.39    | 82.16     |
| 2009                                                           | 55.15      | 75.00  | 61.32  | 70.39    | 83.75     |
| 2010                                                           | 55.26      | 76.30  | 68.60  | 70.42    | 85.30     |
| 2011                                                           | 59.60      | 67.60  | 67.26  | 70.51    | 87.76     |
| 2012                                                           | 62.85      | 79.90  | 74.94  | 70.64    | 87.00     |
| 2013                                                           | 61.50      | 80.79  | 78.25  | 70.80    | 90.20     |
| 2014                                                           | 62.40      | 83.53  | 84.90  | 70.99    | 92.26     |
| 2015                                                           | 73.13      | 88.00  | 85.24  | 71.20    | 94.08     |
| 2016                                                           | 75.92      | 88.67  | 89.88  | 71.41    | 97.50     |
| Panel B: Electricity Consumption Per Capita (Kilowatt Hours)   |            |        |        |          |           |
| Period                                                         | Bangladesh | India  | Nepal  | Pakistan | Sri Lanka |
| 1990–1995                                                      | 62.85      | 314.66 | 38.83  | 323.47   | 178.87    |
| 1996–2000                                                      | 91.25      | 381.37 | 51.12  | 352.19   | 248.27    |
| 2001–2005                                                      | 141.78     | 430.92 | 70.81  | 398.40   | 334.93    |
| 2006–2010                                                      | 216.78     | 570.22 | 90.88  | 445.34   | 426.92    |
| 2011–2015                                                      | 292.82     | 747.20 | 129.96 | 441.44   | 520.82    |
| Panel C: Renewable Energy Shares (% of Total Final Energy Use) |            |        |        |          |           |
| Period                                                         | Bangladesh | India  | Nepal  | Pakistan | Sri Lanka |
| 1990–1995                                                      | 69.97      | 56.75  | 93.52  | 55.51    | 74.34     |
| 1996–2000                                                      | 60.37      | 52.45  | 89.81  | 51.38    | 64.37     |
| 2001–2005                                                      | 53.13      | 50.30  | 89.39  | 49.43    | 61.60     |
| 2006–2010                                                      | 45.34      | 43.44  | 89.85  | 45.86    | 61.86     |
| 2011–2015                                                      | 37.84      | 37.57  | 85.51  | 46.63    | 58.05     |

Source: World Bank [1].

Since undergoing RET has been acknowledged in the literature to facilitate off-grid electrification, particularly across the tourist destinations, it is important to analyze the trends in the states of renewable energy use in the South Asian economies. Table 2 also presents the shares of renewable energy in the aggregate final energy consumption figures of the selected South Asian economies. The figures portray that Nepal has been the forerunner among the South Asian economies, sourcing a majority of the nation's total final energy demand from renewable resources. Likewise, Sri Lanka has also sourced almost 60% of its final energy demand from renewables during the 2011–2015 period. In contrast, Bangladesh, India and Pakistan have been predominantly reliant on non-renewable energy resources. However, it is interesting to note that the renewable energy shares of all the South Asian nations have drastically deteriorated between 1990 and 2015. Hence, the energy policies of these nations do not complement their respective RET strategies. These RET-inhibiting trends could be posing problems for the sustainability of IITD in South Asia.

### 3. Literature Review

International tourism is believed to be determined by a diverse set of macroeconomic aggregates that inextricably motivate the travelling decisions of foreign tourists [13,14]. Among these, a plethora of existing studies within the international tourism narrative have pointed out the importance of enhancing trade openness to facilitate tourist inflows [15]. For instance, Ibrahim [16] argued that greater openness to trade is synonymous with greater business opportunities whereby it can be expected to stimulate business travel. In another study by Kulendran and Witt [17], the authors assert

that the extent to which a nation opens its economy to international trade determines the volume of business tourist inflows. Similarly, Wong and Tang [18] reported that in response to a rise in some key macroeconomic aggregates including openness to trade, the tourist inflows in Singapore surged by 36% between 2002 and 2007. Furthermore, the authors also claimed that trade openness is likely to facilitate imports of relevant equipment and instruments that are necessary to support tourism activities in Singapore.

Fernandes et al. [19] claimed that almost 51% of the total variation in Brazil's international tourism demand can be explained by the nation's level of trade openness and currency-purchasing power. Besides, the authors also found evidence of a unidirectional causality stemming from trade openness to international tourist flows in Brazil. Similar remarks were put forward in other studies [20,21]. On the other hand, Eugenio-Martin et al. [22] expressed that higher degrees of trade indirectly stimulate international tourism growth by contributing to the economic development of the tourist-host nation. Hence, these aforementioned studies collectively advocate for IITD being positively correlated to higher volumes of international trade flows. However, although these studies emphasize on opening up to international trade in general, the specific impacts of opening up to intra-regional trade among regional neighbors on the IITD are yet to be comprehensively explored in the literature.

The relevance of enhancing intra-regional trade for facilitating international tourism, as opposed to enhancing the overall openness to trade, is relatively greater in the sense that such trade liberalization policies are expected to trigger cross-border trade of energy resources among the neighboring economies. Hence, intra-regional trade openness, along with directly stimulating international tourism, is also likely to indirectly induce greater tourist inflows by facilitating the RET phenomenon in South Asia. Hence, keeping these direct channels in consideration, Khamung [23] explored the channels through which regional integration among the Association for Southeast Asian Nations (ASEAN) members can contribute to sustainable coastal tourism in Thailand. Similarly, Koh and Kwok [24] asserted that regional integration in Central Asia is pertinent in developing tourism within this region. In the same vein, Gülzau et al. [25] argued that visa waivers for regionally integrated economies are effective in boosting regional tourism flows. Recently, Li et al. [26] attempted to analyze the impacts of regional integration, in the form of the Belt and Road Initiative (BRI), on IITD of 155 nations under the BRI. The results revealed that the execution of the BRI is likely to increase the number of international tourist inflows and the inbound tourism revenue by 17.2% and 8%, respectively. The positive impacts on the IITD were found to particularly benefit the South Asian, Western Asian and Middle Eastern economies.

On the other hand, several preceding studies have acknowledged the pertinence of regional integration on the RET phenomenon within the regionally integrated nations. Huang et al. [27] performed a grid flexibility assessment to unearth the possibilities of increasing the renewable energy shares of the ASEAN states through regional cooperation. The authors stressed enhancing regional cooperation and boosting cross-border electricity trade between the regionally integrated ASEAN states for the attainment of their RET targets. Similarly, Mamat et al. [28] recommended integration of regional markets to facilitate the augmentation of renewable energy into the energy-mixes of the ASEAN members. Besides, Akinyemi et al. [29] showed how regional integration can be a viable tool for facilitating energy trade and ensuring energy sustainability within the Economic Community of West African States (ECOWAS) in Africa. Hence, it is evident that regional integration creates opportunities for renewable energy trade among the regionally integrated nations which, in turn, can be expected to boost the IITD as well.

Among the existing studies that have linked renewable energy use to international tourism, Balsalobre-Lorente and Leitão [30] found evidence of a bidirectional causal association between renewable energy use and IITD in the context of 28 European nations. Similarly, Isik et al. [31] asserted that renewable energy consumption influences the IITD in the context of China. Besides, some studies have also advocated in favor of generating electricity from renewable resources which can be used to electrify rural tourist destinations. In this regard, Jahangiri et al. [32] showed how solar power can be used to provide off-grid electrification within Khuzestan province, a prime tourist



destination in Iran. The authors estimated that almost 49% of the electricity demand in Khuzestan was sourced from solar power which, in turn, played a key role in enhancing Iran's IITD. Similarly, Mbaiwa et al. [33] recommended integration of solar and other renewable energy resources for ensuring off-grid electrification of tourist lodges and camps located in the Okavango Delta in Botswana. The authors also stressed undergoing RET for the sake of sustainable tourism across Botswana. Similar conclusions were also put forward by Calderón-Vargas et al. [34] in the context of renewable energy use safeguarding tourism sustainability across the Cocachimba region in Peru. Therefore, it can be explicitly understood from these studies that RET can mitigate the energy crises to promote international tourism to a large extent. However, there are few studies that have empirically tested this association, especially in the context of the South Asian economies. Hence, this gap in the literature needs to be bridged.

#### 4. Empirical Model and Data

Strengthening intra-regional cooperation between the South Asian economies can be expected to create business opportunities among these regional neighbors. Consequently, the number of intra-regional tourist flows across South Asia can also be expected to go up. Besides, greater degrees of regional trade integration can facilitate cross-border electricity trade; thus, influencing the intra-regional trade of renewable electricity between the South Asian economies. Such trade of energy resources can bridge the energy deficits within the South Asian economies while facilitating the RET in tandem. As a result, mitigating the energy crises and enhancing access to electricity, especially across the tourist destination within South Asia, could be anticipated to further develop the South Asian international tourism industries. Hence, taking these theoretical underpinnings into consideration, this study employs a multiple linear econometric model in which the IITD in South Asia is expressed as a function of the degree of regional integration among the selected South Asian economies, the extent of RET within these economies and other key macroeconomic control variables. Similar linear modeling of the IITD was considered in the studies by Martins et al. [14], Ibrahim [16] and Sayman and Sayman [35]. The corresponding model used in this paper is specified as follows:

$$\begin{aligned} \ln TA_{it} = & \partial_0 + \partial_1 \ln IRTS_{it} + \partial_2 \ln RES_{it} \\ & + \partial_3 (\ln IRTS * \ln RES)_{it} + \partial_4 \ln ELPC_{it} + \partial_5 \ln GDPPC_{it} \\ & + \partial_6 \ln RER_{it} + \partial_7 \ln INF_{it} + \partial_8 \ln FUEL_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

where the subscripts  $i$  and  $t$  refer to the cross-section (country) and the corresponding time period, respectively. The random error term is denoted by  $\varepsilon_{it}$ . The parameters  $\partial_0$  and  $\partial_i (i = 1, 2, \dots, 7)$  are the intercept and the conditional elasticities to be estimated, respectively. The dependent variable  $TA$  refers to the annual number of international tourist arrivals in each of the South Asian economies; the figures are used to proxy for the IITD of the respective nations. Several studies in the literature have used tourist arrival figures to measure IITD [12]. Among the dependent variables,  $IRTS$  refers to the intra-regional trade share of each of the South Asian economies which are used to proxy for their respective degree of regional integration. It is estimated in terms of the percentage share of each country's aggregate trade that is conducted with its South Asian neighbors. Higher intra-regional trade shares can be interpreted as greater degrees of regional integration and vice-versa. The variable  $RES$  refers to each country's percentage share of renewables in its respective aggregate energy consumption figures. This variable captures the effects of RET on the IITD since higher values of  $RES$  can be interpreted as a mechanism for replacing the consumption of non-renewable energy resources with renewable alternatives [8]. Moreover, the variable  $IRTS$  is interacted with  $RES$  and augmented into the model to evaluate the joint impacts of regional integration and RET on the IITD in South Asia. Besides, to assess the impacts of electricity consumption on the IITD of South Asia, the econometric model controls for the per capita electricity consumption levels. The variable  $ELPC$  refers to the per capita electricity consumption measured in terms of kilowatt hours per capita. Since sufficient availability of electricity, particularly across the tourist spots, influences the travel decisions of the international

tourists, it is pertinent to control for this key macroeconomic aggregate in modeling the IITD [2]. Thus, a positive association between electricity use and IITD can be anticipated.

Moreover, the econometric model is controlled for the level of economic growth of the South Asian economies as proxied by their respective per capita real GDP levels (*GDPPC*) and measured in constant 2010 US dollars. It is pertinent to control for the economic growth level of the host country because it is positively linked to infrastructural development which, in turn, determines the inflow of foreign tourists [35]. Moreover, the model also controls for the real exchange rate as abbreviated by *RER*. The inclusion of the real exchange rate is justified by the understanding that it influences the travel decisions of the international tourists who tend to make the decision to travel based on the value of their domestic currency relative to that of the currency in the tourist destination [36]. Similarly, the model also controls for the domestic inflationary rates (*INF*), proxied by the consumer price level, within the host nations. The inflation rate influences the tourism decisions of foreign tourists, providing an understanding of the cost of living in the host country [14]. Finally, the international jet fuel prices (*JFUEL*), which are the United States Gulf Coast Kerosene-Type Jet Fuel spot prices in terms of dollars per gallon, are also included in the model to account for the impacts of transportation cost on IITD [37].

The study used annual frequency data spanning from 1990 to 2016. All the variables have been transformed into their natural logarithms or the ease of the elasticity estimation purposes. The data for the intra-regional trade shares are retrieved from the Asia Regional Integration Center database of the Asian Development Bank while the annual jet oil prices are sourced from the website of the United States Energy Information Administration. For the rest of the variables, the data is compiled from the World Development Indicators database of the World Bank.

## 5. Econometric Methodology

### 5.1. The Cross-Sectional Dependency and Slope Heterogeneity Analyses

As part of the econometric methodology, the data set is first tested for Cross-sectional Dependency (CD) among the panels using the Breusch-Pagan [38] Lagrange Multiplier method. This technique is suited for the panel data sets used in this paper since it generates efficient estimates in the context of panel data with smaller number of cross-sections and larger time periods. The presence of CD, if not accounted for, results in the estimation of spurious stationarity properties whereby the first-generation unit root and cointegration techniques become inappropriate due to these tests not accounting for the CD issues within the estimation processes [39]. The results from the CD analysis, as reported in Table 3, provide statistical support to the panels being cross-sectionally dependent. The statistical significance of the predicted test statistics rejects the null hypothesis of cross-sectional independence to affirm the existence of the CD issues.

**Table 3.** The Breusch-Pagan (1980) Lagrange Multiplier CD test results.

| Variable       | lnTA     | lnIRTS   | lnRES    | lnELPC    | lnGDPPC   | lnRER    | lnINF    | lnJFUEL   |
|----------------|----------|----------|----------|-----------|-----------|----------|----------|-----------|
| Test Statistic | 62.272 * | 58.623 * | 69.591 * | 44.010 ** | 43.183 ** | 55.128 * | 62.809 * | 41.281 ** |

Note: The test statistics are estimated under the null hypothesis of cross-sectional independence against the alternative hypothesis of cross-sectional dependence among the panels; \* and \*\* denote statistical significance at 1% and 5%, respectively.

Once the presence of CD is confirmed, it is pertinent to check for the slope homogeneity properties as well. Ignoring this critically important issue of possible heterogeneity across the slope coefficients is likely to produce biased elasticity estimates [40]. Hence, the Pesaran and Yamagata [41] test for slope homogeneity was used in this study. The corresponding results are reported in Table 4. The statistical significance, at the 1% level, of the estimated test statistics, rejects the null hypothesis of slope homogeneity to affirm the existence of heterogeneous slope coefficients in the model.

**Table 4.** The Pesaran and Yamagata [41] slope homogeneity test results.

| Test Statistic             | Value    | p-Value |
|----------------------------|----------|---------|
| $\widetilde{\Delta}$       | 21.221 * | 0.000   |
| $\widetilde{\Delta}_{adj}$ | 22.032 * | 0.000   |

Notes: \* indicates statistical significance at 1% level.

### 5.2. The Panel Unit Root Analysis

Following the confirmation of the CD issues in the data set, the second generation unit root test proposed by Smith et al. [42] was applied. This test is a variant of the conventionally used second-generation panel Cointegrated Augmented Dickey-Fuller (CADF) and Cross-Sectional Augmented Im-Pesaran-Shin (CIPS) techniques proposed by Pesaran [43]. In contrast to these commonly used tests, Smith et al. [42] developed a panel unit root estimation technique that allows for general forms of CD using bootstrap replications. Once the stationarity properties are ascertained, it is pertinent to assess the cointegrating associations between the variables included in the model. Evidence of the presence of cointegrating equations implies long run associations between the variables whereby the variables can be assumed to move together in the long run [40].

### 5.3. Panel Cointegration Analysis

The popularly used panel cointegration methods, such as the Pedroni [44] residual-based cointegration technique, do not take the CD among the panels into account. Thus, the Westerlund [45] panel cointegration analysis, which is robust when handling cross-sectionally dependent panel datasets, is employed to investigate the long-run associations between the concerned variables included in the econometric models. The CD is accounted for under the Westerlund [45] cointegration approach via estimation of the probability values of the test statistics using bootstrapping methods. A total of two group-mean tests and two panel tests are performed under the null hypothesis of no cointegration against the alternative hypothesis of cointegration among at least one cross-sectional unit or cointegration among the whole panel, respectively. The four tests under the Westerlund [45] panel cointegration approach are structured in the context of an error-correction model which can be expressed as:

$$\Delta y_{it} = \delta'_i d_t + \alpha_i (y_{i,t-1} - \beta'_i x_{i,t-1}) + \sum_{j=1}^{p_i} \alpha_{ij} \Delta y_{i,t-j} + \sum_{-q_i}^{p_i} \gamma_{ij} \Delta x_{i,t-j} + e_{it} \quad (2)$$

where  $d_t$  stands for the deterministic components and  $p_i$  and  $q_i$  are the lag lengths and lead orders which are allowed to vary across individual cross-sections. The two group-mean test statistics  $G_t$  and  $G_a$  and the two panel test statistics  $P_t$  and  $P_a$  within the Westerlund [45] cointegration analysis can be specified as:

$$G_t = \frac{1}{N} \sum_{i=1}^N \frac{\hat{\alpha}_l}{SE(\hat{\alpha}_i)} \quad (3)$$

$$G_a = \frac{1}{N} \sum_{i=1}^N \frac{T \hat{\alpha}_l}{\hat{\alpha}_i(1)} \quad (4)$$

$$P_t = \frac{\hat{\alpha}_l}{SE(\hat{\alpha}_i)} \quad (5)$$

$$P_a = T \hat{\alpha} \quad (6)$$



The statistical significance of these test statistics rejects the null hypothesis to suggest long-run associations between the variables included in the model. The presence of cointegrating relationships is a prerequisite to estimating the long-run estimates using appropriate regression methods.

#### 5.4. Panel Regression Analysis

The presence of CD issues in the dataset is likely to be translated into misspecification problems resulting in biased regression outputs [46]. Similarly, the slope heterogeneity issues are also likely to generate similar problems as well [41]. Although the conventionally used panel data estimation techniques, namely the Fully-Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS), are claimed to be able to handle the cross-sectional correlations among the panels, such methods overlook the slope heterogeneity issues by inappropriately assuming the existence of the homogeneous slope coefficients across all the cross-sections. To account for this problem, this paper uses two alternative panel data regression estimators which, in addition to handling the CD issues, allow the slope coefficients to vary across the cross-sectional units [47].

The first of the two panel regression techniques considered in this paper is the Common Correlated Effects Mean Group (CCEMG) estimator, proposed by Pesaran [48]. The CCEMG estimation process is a cross-sectionally augmented version of the conventionally used Mean Group (MG) estimator developed by Pesaran and Smith [49] to handle the CD issues in the data. The MG estimator can be specified as:

$$\hat{\beta}_{MG} = N^{-1} \sum_{i=1}^N \hat{\beta}_i \quad (7)$$

where  $\hat{\beta}_{MG}$  is the simple mean of the individual slope estimators from each cross-sectional unit. However, although the MG estimator handles the slope heterogeneity issues it does not account for the CD in the data. Thus, it is not suitable in the case of this paper.

The CCEMG technique corrects the limitations of the MG estimator by considering the time-variant unobserved common factors stemming from the CD issues in the estimation process. The correction is done by augmenting these unobserved common factors into the regression model before estimating the individual slope coefficients for each of the cross-sections and then averaging them across the panel units. Similar to the MG estimator, the CCEMG estimator can also be specified as:

$$\hat{\beta}_{CCEMG} = N^{-1} \sum_{i=1}^N \hat{\beta}_i \quad (8)$$

where  $\hat{\beta}_{CCEMG}$  is once again the mean of the individual slope estimates from each cross-sectional unit. The only difference between the MG and the CCEMG estimators, respectively expressed in Equations (7) and (8), is that the CCEMG estimator estimates and averages the individual slope coefficients by augmenting the common factors across the cross-sections into the empirical model, which is not the case in the context the MG estimator.

Besides, for robustness checks of the long-run elasticity estimates, the Augmented Mean Group (AMG) estimator proposed by Bond and Eberhardt [50] is also tapped. The AMG estimator, much like the CCEMG estimator, allows for both slope heterogeneity and CD issues. However, the AMG estimator augments the year dummies into the model and assumes the time-variant unobserved common factors to exhibit a dynamic process whereas the CCEMG estimator includes the unobserved common factors in the error term [51].

#### 5.5. Panel Causality Analysis

Following Murshed et al. [46], causality analyses were performed to understand the pairwise causal dynamics between the variables of concern. The newly developed Dumitrescu-Hurlin panel causality estimation technique developed by Dumitrescu and Hurlin [52] was applied in this study.

Application of the conventionally used Granger [53] causality test was inappropriate following the slope heterogeneity issues in the data since this technique assumes the slopes to be homogeneous across the cross-sectional units. The Granger [53] causality test statistic is estimated under the null hypothesis that causality does not exist between a pair of stationary variables belonging to all the cross-sections, against the alternative hypothesis of causality existing between these variables homogeneously across all the cross-sections. In contrast, the Dumitrescu-Hurlin causality technique allows for heterogeneity across the cross-sections to estimate the z-bar statistics using the null hypothesis that causality does not exist between a pair of stationary variables in all the cross-sections, referred to as the Homogenous Non-Causality (HNC) null hypothesis, against the non-homogenous alternative hypothesis of causality existing between these variables in at least one of the cross-sections. The mean statistic used to test the HNC null hypothesis can be specified as:

$$W_{N,T}^{HNC} = \frac{1}{N} \sum_{i=1}^N W_{i,t} \quad (9)$$

where  $W_{N,T}^{HNC}$  is the mean value of the individual Wald statistics  $W_{i,t}$ . According to Dumitrescu and Hurlin [52], under the assumption that the individual residuals are independently distributed across all the cross-sections and their covariances are equal to zero, the mean statistic sequentially converges to the equation below when  $T$  and  $N$  tend to approach infinity:

$$Z_{N,T}^{HNC} = \sqrt{\frac{N}{2K}} (W_{N,T}^{HNC} - K) \xrightarrow{d}_{T,N \rightarrow \infty} N(0,1) \quad (10)$$

where  $Z_{N,T}^{HNC}$  is the z-statistic,  $N$  is the number of cross-sections and  $K$  is the optimal lag length. Moreover, Dumitrescu and Hurlin [52] also argue that if  $T$  tends to infinity, the individual Wald statistics are independently identically distributed with the mean individual Wald statistic being equal to  $K$  and its variance being equal to  $2K$ . A standardized Z-statistic ( $\bar{Z}_{N,T}^{HNC}$ ) is then approximately calculated for the mean Wald statistic of the HNC null hypothesis which can be specified as:

$$\bar{Z}_{N,T}^{HNC} = \frac{\sqrt{N}}{\sqrt{\text{Var}(\tilde{W}_{i,T})}} [W_{N,T}^{HNC} - E\tilde{W}_{i,T}] \quad (11)$$

## 6. Results

The results from the Smith et al. [42] second-generation panel unit root test, reported in Table 5, confirm a common order of integration, at the first difference, among the variables. This implies that the variables are mean-reverting. The statistical significance of the corresponding predicted test statistics affirm this claim. The stationarity properties of the variables nullify the possibility of the long-run elasticity estimates from the regression analysis being spurious. The unit root analysis is followed by the panel cointegration analysis.

**Table 5.** The Smith et al. (2004) bootstrap panel unit root test results.

| Variable                              | $\Psi$ t-Bar | $\Psi$ Max | $\Psi$ LM | $\Psi$ Min | $\Psi$ WS | Stationarity |
|---------------------------------------|--------------|------------|-----------|------------|-----------|--------------|
| <b>Panel A: Not Considering Trend</b> |              |            |           |            |           |              |
| lnTA                                  | −1.13        | −0.341     | 1.301     | 0.356      | −0.501    | No           |
| $\Delta$ lnTA                         | −5.334 *     | −5.992 *   | 15.892 *  | 15.818 *   | −5.728 *  | Yes          |
| lnIRTS                                | −0.88        | −0.919     | 1.221     | 1.419      | −1.200    | No           |
| $\Delta$ lnIRTS                       | −3.890 *     | −3.718 *   | 12.239 *  | 12.102 *   | −4.910 *  | Yes          |
| lnRES                                 | −1.02        | −1.141     | 1.291     | 2.422      | −1.501    | No           |
| $\Delta$ lnRES                        | −5.499 *     | −5.323 *   | 15.822 *  | 16.434 *   | −5.123 *  | Yes          |
| lnELPC                                | −1.112       | −1.492     | 1.310     | 2.230      | −1.601    | No           |
| $\Delta$ lnELPC                       | −5.601 *     | −5.550 *   | 16.101 *  | 16.539 *   | −5.519 *  | Yes          |
| lnGDPPC                               | −2.139       | −0.529     | 1.828     | 1.672      | −1.212    | No           |
| $\Delta$ lnGDPPC                      | −3.818 *     | −3.900 *   | 12.010 *  | 11.890 *   | −4.881 *  | Yes          |
| lnRER                                 | −0.984       | −0.441     | 1.021     | 0.853      | −0.771    | No           |
| $\Delta$ lnRER                        | −5.401 *     | −5.679 *   | 14.992 *  | 14.218 *   | −5.499 *  | Yes          |
| lnINF                                 | −0.820       | −1.021     | 1.300     | 2.122      | −1.601    | No           |
| $\Delta$ lnINF                        | −6.124 *     | −6.021 *   | 15.228 *  | 15.828 *   | −5.412 *  | Yes          |
| lnJFUEL                               | −1.335       | −0.776     | 1.999     | 2.172      | −0.918    | No           |
| $\Delta$ lnJFUEL                      | −4.120 *     | −4.450 *   | 12.910 *  | 13.330 *   | −4.901 *  | Yes          |
| <b>Panel B: Considering Trend</b>     |              |            |           |            |           |              |
| lnTA                                  | −1.875       | −1.782     | 3.289     | 3.442      | −1.982    | No           |
| $\Delta$ lnTA                         | −5.980 *     | −5.309 *   | 17.181 *  | 16.980 *   | −5.552 *  | Yes          |
| lnIRTS                                | −1.876       | −1.829     | 2.886     | 2.565      | −1.767    | No           |
| $\Delta$ lnIRTS                       | −6.123 *     | −6.109 *   | 18.121 *  | 17.229 *   | −5.710 *  | Yes          |
| lnRES                                 | −1.67        | −1.988     | 2.786     | 3.292      | −1.589    | No           |
| $\Delta$ lnRES                        | −5.980 *     | −5.509 *   | 16.881 *  | 16.894 *   | −6.830 *  | Yes          |
| lnELPC                                | −1.620       | −1.992     | 2.223     | 2.450      | −1.400    | No           |
| $\Delta$ lnELPC                       | −5.102 *     | −5.224 *   | 14.012 *  | 14.920 *   | −5.839 *  | Yes          |
| lnGDPPC                               | −1.673       | −1.616     | 2.892     | 2.709      | −1.632    | No           |
| $\Delta$ lnGDPPC                      | −4.819 *     | −4.990 *   | 12.400 *  | 12.610 *   | −5.102 *  | Yes          |
| lnRER                                 | −1.565       | −1.702     | 3.450     | 3.667      | −1.480    | No           |
| $\Delta$ lnRER                        | −6.680 *     | −6.700 *   | 16.884 *  | 16.996 *   | −5.959 *  | Yes          |
| lnINF                                 | −1.272       | −1.288     | 1.416     | 2.925      | −1.889    | No           |
| $\Delta$ lnINF                        | −6.921 *     | −6.302 *   | 16.121 *  | 16.021 *   | −5.812 *  | Yes          |
| lnJFUEL                               | −1.610       | −1.916     | 2.212     | 2.451      | −1.133    | No           |
| $\Delta$ lnJFUEL                      | −4.519 *     | −4.554 *   | 13.123 *  | 14.665 *   | −5.322 *  | Yes          |

Notes:  $\Delta$  denotes first difference; The test statistics are estimated under the null hypothesis of a non-stationarity in all the cross-sections against the alternative hypothesis of stationarity in at least one cross-section; The  $p$ -values are predicted using 20,000 bootstrap replications with a block size equal to 30; The optimal lag selection is based on AIC; \* denote statistical significance at 1% level.

The results from the Westerlund [45] second-generation panel cointegration analysis are reported in Table 6. The statistical significance of the test statistics rejects the null hypothesis of no cointegrating relationships to confirm the presence of cointegrating equations in the model. Hence, this finding suggests that there are long-run associations between IITD, regional integration, RET, the national income level of the host economy, real exchange rate, domestic inflation within the host economy and jet fuel prices in the context of the South Asian economies.

**Table 6.** The Westerlund [45] panel cointegration test results.

| Test Statistic | Value     |
|----------------|-----------|
| $G_t$          | −2.712 *  |
| $G_a$          | −9.982    |
| $P_t$          | −20.880 * |
| $P_a$          | −12.692 * |

Notes: The four test statistics are estimated under the null hypothesis of no cointegrating relationships against the alternative hypothesis of cointegrating relationships among the variables; Both trend and intercept are considered; The optimal lag selection is based on the AIC; \* denote statistical significance at 1% level.

Table 7 reports the long-run elasticity estimates from the panel CCEMG and AMG regression analyses. The results, in general, show that the elasticity estimates are robust across the two different panel regression estimators used in this paper which can be perceived from the identical signs, magnitudes and statistical significance of the predicted elasticity parameters.

**Table 7.** The long-run elasticity estimates from the regression analysis.

| Dependent Variable: lnTA |                     |                      |
|--------------------------|---------------------|----------------------|
| Estimator                | CCEMG               | AMG                  |
| Regressor                |                     |                      |
| lnIRTS                   | 2.719 **<br>(1.360) | 2.323 *<br>(0.712)   |
| lnRES                    | 3.133 *<br>(1.121)  | 3.201 *<br>(1.214)   |
| (lnIRTS * lnRES)         | 1.114 **<br>(0.558) | 1.201 *<br>(0.489)   |
| lnELPC                   | 0.490 **<br>(0.246) | 0.501 **<br>(0.025)  |
| lnGDPPC                  | 1.888 **<br>(0.944) | 1.321 **<br>(0.660)  |
| lnRER                    | 1.249 *<br>(0.410)  | 1.345 *<br>(0.442)   |
| lnINF                    | 0.498<br>(0.410)    | 0.610<br>(0.539)     |
| lnJFUEL                  | −2.123 *<br>(0.511) | −1.945 **<br>(0.973) |
| Constant                 | 7.332<br>(5.921)    | 8.811<br>(6.992)     |

Notes: The robust standard errors are reported within the parentheses; \* and \*\* denote statistical significance at 1% and 5% levels, respectively.

As far as the impacts of regional integration on South Asia's IITD are concerned, the elasticity estimates show that a 1% rise in the intra-regional trade shares accounts for a rise in the number of tourist arrivals by 2.32–2.72%, *ceteris paribus*. Hence, it can be said that regional commitments to trade among the South Asian economies are likely to create business opportunities among the regional members, thus facilitating business tourism in South Asia. This finding is similar to the conclusions made by Kulendran and Witt [17]. Besides, undergoing RET was also found to be ideal in enhancing the IITD across this region. A percentage rise in renewable energy shares is accompanied by a rise in the number of foreign tourist arrivals by 3.13–3.20%, *ceteris paribus*. This finding can be understood based on the fact that the integration of renewable energy resources into the national energy-mixes of the South Asian economies can not only complement the non-renewable energy resources in meeting the overall energy demanded within this region, but also contribute to off-grid electrification across the tourist destinations that do not have grid connectivity. Similarly, Isik et al. [31] recommended the use of renewable energy to electrify rural tourist destinations to ensure the sustainability of the Chinese tourism industry. Furthermore, the statistical significance and positive signs of the estimated elasticity parameter attached to the interaction term imply a joint favorable impact of regional integration and RET on sustainable development of the international inbound tourism industry of South Asia. Hence, it is pertinent for the South Asian economies to be more integrated, particularly by liberalizing the barriers that impeded cross-border energy trade among themselves.

IITD in South Asia was found to be positively influenced by the per capita electricity consumption and national income levels of the South Asian host economies, which is similar to the findings reported by Ibrahim [16] for Egypt. On the other hand, a positive correlation between the real exchange rate and international tourist arrivals in South Asia was also ascertained. This implies that a rise in the real value of the nominal exchange rate is likely to raise the purchasing power capacities of the foreign tourists

and therefore incentivize them to travel to the South Asian nations. Similar findings were reported by Chao et al. [36]. In contrast, no statistically significant impact of domestic inflation within the South Asian economies on the IITD could be established as perceived from the statistical insignificance of the corresponding elasticity estimates. Finally, the long-run elasticity estimates signify that transportation cost plays a major role in determining the tourist arrivals in South Asia. A percentage rise in jet fuel prices is found to dampen the inbound tourism by 1.95–2.12%, on average, *ceteris paribus*. Thus, it can be asserted that rising airfares is detrimental to the sustainability of South Asia's IITD. This finding is similar to that opined by Kosnan et al. [54] for Malaysia.

The Dumitrescu-Hurlin [52] panel causality findings, reported in Table 8, provide evidence of a feedback causal linkage between international tourist arrivals and intra-regional trade shares of the South Asian nations. This implies that not only does regional integration facilitate the sustainability of South Asia's IITD, but also that greater tourist inflows also build a platform for strengthening the prospects of regional cooperation among the concerned economies. These findings are similar to the findings by Shahbaz et al. [15] in which the authors also unearthed a bidirectional causal association between the overall trade openness and international tourist arrivals in Malaysia. Similarly, bidirectional causality between international tourist arrivals and renewable energy shares highlights the interdependence between these key macroeconomic aggregates. This not only implies that undergoing RET does foster sustainability of South Asia's IITD, but also that the development of the international tourism industries of the South Asian economies is likely to aggravate the demand for energy which, in turn, could be met by the integration of renewable energy resources into the national energy mixes across this region.

**Table 8.** The Dumitrescu-Hurlin [52] panel Granger causality test results.

| Dependent Variable | Independent Variable | Z-Bar Statistic |
|--------------------|----------------------|-----------------|
| lnTA               | lnIRTS               | 9.649 *         |
| lnIRTS             | lnTA                 | 3.569 *         |
| lnTA               | lnRES                | 2.343 **        |
| lnRES              | lnTA                 | 7.788 *         |
| lnTA               | lnELPC               | 8.212 *         |
| lnELPC             | lnTA                 | 11.121 *        |
| lnTA               | lnGDPPC              | 1.625 **        |
| lnGDPPC            | lnTA                 | 1.187           |
| lnTA               | lnRER                | 5.247 *         |
| lnRER              | lnTA                 | 1.213           |
| lnTA               | lnINF                | 1.781           |
| lnINF              | lnTA                 | 0.910           |
| lnTA               | lnJFUEL              | 8.231 *         |
| lnJFUEL            | lnTA                 | 1.129           |

Note: The test statistics are estimated under the null hypothesis of the independent variable Granger causing the dependent variable against the alternative hypothesis of otherwise; The optimal lag selection is based on the AIC; \* & \*\* denote statistical significance at 1% and 5% levels, respectively.

The other key causality findings reveal that electricity consumption and IITD are interdependent, which can be perceived from the statistical evidence of the bidirectional causality between these variables. Moreover, the economic status of the South Asian economies was found to influence the number of foreign tourist arrivals into the respective economies. This is certified by the statistical evidence of unidirectional causality running from the real per capita GDP level to international tourist arrivals. The results corroborate the findings by Pan and Dossou [55] for Benin. Unidirectional causation from the real exchange rate to international tourist arrivals is also apparent. Hence, considering the corresponding elasticity estimate, it can be said that a rise in the real value of the nominal exchange rate exerts a positive influence on the tourism decision of the foreign tourists who intend to travel to South Asia. Pan and Dossou [55] also reported similar findings in the context of Benin. Finally, jet oil prices are also found to causally influence international tourist arrivals in South Asia. Therefore,



in line with the relevant elasticity estimate, higher air transport cost is likely to motivate the foreign tourists to refrain from travelling to the South Asian economies. The results are parallel to those by Hassani et al. [37] for the United States and nine European nations.

## 7. Concluding Remarks

This paper investigated the overarching relationships between IITD, regional trade integration and RET in the context of selected South Asian economies between 1990 and 2016. Precisely speaking, the analysis focused on evaluating the impacts of strengthening regional integration within South Asia, particularly to facilitate cross-border renewable energy trade which, in turn, is likely to ensure the sustainability of the IITD in South Asia. The findings from the econometric analysis revealed that regional trade integration does boost the IITD of Bangladesh. Undergoing RET was also found to enhance the IITD further, whereby the sustainability of the international tourism sector of Bangladesh can be ensured. Moreover, the results also indicate that greater regional trade integration and RET collectively accounted for higher IITD. Furthermore, the findings from the causality analysis unearthed bidirectional causalities between regional trade integration and IITD and between RET and IITD in the context of Bangladesh. Hence, these results, in a nutshell, highlight the importance of strengthening regional cooperation among the South Asian economies to promote intra-regional trade and RET which, in turn, is ideal in safeguarding the sustainability of the IITD of Bangladesh.

In line with these findings, it is recommended that the South Asian economies reduce their geopolitical issues to induce greater degrees of regional cooperation. It is pertinent to restructure the preferential trading arrangements, particularly by reducing the tariffs imposed on energy trade between the South Asian neighbors. Consequently, these nations would become more regionally integrated and collaboratively develop the international tourism industries across South Asia. Besides, the feedback causality between IITD and RET calls for the adoption of relevant tourism policies that would promote international tourism in South Asia. This, in turn, can also be expected to catalyze the execution of the energy diversification whereby replacement of the non-renewable energy resources by the renewable alternatives could also tackle the energy crises faced by the majority of the South Asian countries. Moreover, international tourism can further be enhanced within this region by ensuring safety for the foreign tourists which can be achieved by improving the institutional quality across the South Asian economies. Such policies are also expected to mitigate the geopolitical tensions between these economies, and therefore strengthen regional cooperation among them further. More importantly, the regional integration strategies should be executed appropriately so that the associated benefits are equitably distributed among the South Asian economies. Furthermore, attention should also be given to regulate the unstable fluctuations in the real exchange rates since real exchange rate appreciations are not favorable for the development of the South Asian international tourism industries. Lastly, we recommend that the concerned governments safeguard their respective economies, within their respective capacities, from jet oil price volatilities in the international market, since positive shocks to the price of jet oil are detrimental to the sustainability of international inbound tourism across South Asia.

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## References

1. World Bank. *World Development Indicators Database*; World Bank: Washington, DC, USA, 2020.
2. Lee, C.G. Electricity consumption and international tourism: The case of Singapore. *Anatolia* **2013**, *24*, 91–94. [[CrossRef](#)]

3. Murshed, M. Does Improvement in Trade Openness Facilitate Renewable Energy Transition? Evidence from Selected South Asian Economies. *South Asia Econ. J.* **2018**, *19*, 151–170. [CrossRef]
4. Gosai, M.A.; Sulewski, L. Urban attraction: Bhutanese internal rural–urban migration. *Asian Geogr.* **2013**, *31*, 1–16. [CrossRef]
5. Shezan, S.A.; Saidur, R.; Ullah, K.R.; Hossain, A.; Chong, W.T.; Julai, S. Feasibility analysis of a hybrid off-grid wind–DG–battery energy system for the eco-tourism remote areas. *Clean Technol. Environ. Policy* **2015**, *17*, 2417–2430. [CrossRef]
6. Murshed, M. Are Trade Liberalization policies aligned with Renewable Energy Transition in low and middle income countries? An Instrumental Variable approach. *Renew. Energy* **2020**, *151*, 1110–1123. [CrossRef]
7. Murshed, M.; Tanha, M.M. Oil price shocks and renewable energy transition: Empirical evidence from net oil-importing South Asian economies. *Energy Ecol. Environ.* **2020**, 1–21. [CrossRef]
8. Murshed, M.; Abbass, K.; Rashid, S. Modelling renewable energy adoption across south Asian economies: Empirical evidence from Bangladesh, India, Pakistan and Sri Lanka. *Int. J. Financ. Econ.* **2020**. [CrossRef]
9. Wijayatunga, P.; Chattopadhyay, D.; Fernando, P.N. *Cross-Border Power Trading in South Asia: A Techno Economic Rationale*, ADB South Asia Working Paper Series 38; Asian Development Bank: Manila, Philippines, 2015.
10. Schafer, H. Regional Collaboration can Help South Asian Nations Rebuild and Strengthen the Tourism Industry. 2020. Available online: <https://blogs.worldbank.org/endpovertyinsouthasia/regional-collaboration-can-help-south-asian-nations-rebuild-and-strengthen> (accessed on 24 August 2020).
11. Srivastava, L.; Misra, N. Promoting regional energy co-operation in South Asia. *Energy Policy* **2007**, *35*, 3360–3368. [CrossRef]
12. Adeola, O.; Boso, N.; Evans, O. Drivers of international tourism demand in Africa. *Bus. Econ.* **2017**, *53*, 25–36. [CrossRef]
13. Turner, L.; Witt, S.F. Factors Influencing Demand for International Tourism: Tourism Demand Analysis Using Structural Equation Modelling, Revisited. *Tour. Econ.* **2001**, *7*, 21–38. [CrossRef]
14. Martins, L.F.; Gan, Y.; Ferreira-Lopes, A. An empirical analysis of the influence of macroeconomic determinants on World tourism demand. *Tour. Manag.* **2017**, *61*, 248–260. [CrossRef]
15. Shahbaz, M.; Kumar, R.R.; Ivanov, S.; Loganathan, N. The nexus between tourism demand and output per capita with the relative importance of trade openness and financial development: A study of Malaysia. *Tour. Econ.* **2017**, *23*, 168–186. [CrossRef]
16. Ibrahim, M.A. The Determinants of International Tourism Demand for Egypt: Panel Data Evidence. *Eur. J. Econ. Financ. Adm. Sci.* **2013**, 1450–2275. [CrossRef]
17. Kulendran, N.; Witt, S.F. Forecasting the Demand for International Business Tourism. *J. Travel Res.* **2003**, *41*, 265–271. [CrossRef]
18. Wong, K.N.; Tang, T.C. Tourism and openness to trade in Singapore: Evidence using aggregate and country-level data. *Tour. Econ.* **2010**, *16*, 965–980. [CrossRef]
19. Fernandes, E.; Pacheco, R.R.; Fernandes, V.A. Tourism openness, trade openness, and currency-purchasing power in Brazil: A causality analysis. *Int. J. Tour. Res.* **2018**, *21*, 197–205. [CrossRef]
20. Shan, J.; Wilson, K. Causality between trade and tourism: Empirical evidence from China. *Appl. Econ. Lett.* **2001**, *8*, 279–283. [CrossRef]
21. Sugiyarto, G.; Blake, A.; Sinclair, M. Tourism and globalization. *Ann. Tour. Res.* **2003**, *30*, 683–701. [CrossRef]
22. Eugenio-Martin, J.L.; Martín-Morales, N.; Sinclair, M.T. The Role of Economic Development in Tourism Demand. *Tour. Econ.* **2008**, *14*, 673–690. [CrossRef]
23. Khamung, R. Mature Coastal Destinations and Management Strategy for the ASEAN Regional Integration of Sustainable Coastal Tourism. *AJMI-ASEAN J. Manag. Innov.* **2018**, *5*, 113–127.
24. Koh, S.G.M.; Kwok, A.O.J. Regional integration in Central Asia: Rediscovering the Silk Road. *Tour. Manag. Perspect.* **2017**, *22*, 64–66. [CrossRef]
25. Gülzau, F.; Mau, S.; Zaun, N. Regional mobility spaces? Visa waiver policies and huangregional integration. *Int. Migr.* **2016**, *54*, 164–180. [CrossRef]
26. Li, T.; Shi, H.; Yang, Z.; Ren, Y. Does the belt and road initiative boost tourism economy? *Asia Pac. J. Tour. Res.* **2020**, *25*, 311–322. [CrossRef]
27. Huang, Y.W.; Kittner, N.; Kammen, D.M. ASEAN grid flexibility: Preparedness for grid integration of renewable energy. *Energy Policy* **2019**, *128*, 711–726. [CrossRef]

28. Erdiwansyah, E.; Mamat, R.; Sani, M.; Sudhakar, K. Renewable energy in Southeast Asia: Policies and recommendations. *Sci. Total. Environ.* **2019**, *670*, 1095–1102. [\[CrossRef\]](#)
29. Akinyemi, O.; Efobi, U.; Osabuohien, E.; Alege, P. Regional Integration and Energy Sustainability in Africa: Exploring the Challenges and Prospects for ECOWAS. *Afr. Dev. Rev.* **2019**, *31*, 517–528. [\[CrossRef\]](#)
30. Balsalobre-Lorente, D.; Leitão, N.C. The role of tourism, trade, renewable energy use and carbon dioxide emissions on economic growth: Evidence of tourism-led growth hypothesis in EU-28. *Environ. Sci. Pollut. Res.* **2020**, 1–14. [\[CrossRef\]](#)
31. Isik, C.; Dogru, T.; Turk, E.S. A nexus of linear and non-linear relationships between tourism demand, renewable energy consumption, and economic growth: Theory and evidence. *Int. J. Tour. Res.* **2017**, *20*, 38–49. [\[CrossRef\]](#)
32. Jahangiri, M.; Haghani, A.; Heidarian, S.; Alidadi Shamsabadi, A.; Pomares, L.M. Electrification of a tourist village using hybrid renewable energy systems, Sarakhiyeh in Iran. *J. Solar Energy Res.* **2018**, *3*, 201–211.
33. Mbaiwa, J.E.; Motsholapheko, M.R.; Kgathi, D.L.; Monnamorwa, S. Tourism and energy use in lodges and camps in the Okavango Delta, Botswana. *Int. J. Tour. Policy* **2018**, *8*, 1–17. [\[CrossRef\]](#)
34. Calderón-Vargas, F.; Asmat-Campos, D.; Carretero-Gómez, A. Sustainable Tourism and Renewable Energy: Binomial for Local Development in Cocachimba, Amazonas, Peru. *Sustainability* **2019**, *11*, 4891. [\[CrossRef\]](#)
35. Saayman, A.; Saayman, M. Determinants of Inbound Tourism to South Africa. *Tour. Econ.* **2008**, *14*, 81–96. [\[CrossRef\]](#)
36. Chao, C.-C.; Lu, L.-J.; Lai, C.-C.; Hu, S.-W.; Wang, V. Devaluation, pass-through and foreign reserves dynamics in a tourism economy. *Econ. Model.* **2013**, *30*, 456–461. [\[CrossRef\]](#)
37. Hassani, H.; Ghodsi, M.; Huang, X.; Silva, E. Is there a causal relationship between oil prices and tourist arrivals? *J. Appl. Stat.* **2020**, 1–12. [\[CrossRef\]](#)
38. Breusch, T.S.; Pagan, A.R. The Lagrange Multiplier Test and its Applications to Model Specification in Econometrics. *Rev. Econ. Stud.* **1980**, *47*, 239–253. [\[CrossRef\]](#)
39. Murshed, M. An empirical analysis of the non-linear impacts of ICT-trade openness on renewable energy transition, energy efficiency, clean cooking fuel access and environmental sustainability in South Asia. *Environ. Sci. Pollut. Res.* **2020**, *27*, 1–28. [\[CrossRef\]](#) [\[PubMed\]](#)
40. Murshed, M.; Dao, N.T.T. Revisiting the CO2 emission-induced EKC hypothesis in South Asia: The role of Export Quality Improvement. *GeoJournal* **2020**, 1–29. [\[CrossRef\]](#)
41. Pesaran, M.H.; Yamagata, T. Testing slope homogeneity in large panels. *J. Econ.* **2008**, *142*, 50–93. [\[CrossRef\]](#)
42. Smith, L.V.; Leybourne, S.; Kim, T.-H.; Newbold, P. More powerful panel data unit root tests with an application to mean reversion in real exchange rates. *J. Appl. Econ.* **2004**, *19*, 147–170. [\[CrossRef\]](#)
43. Pesaran, M.H. A simple panel unit root test in the presence of cross-section dependence. *J. Appl. Econ.* **2007**, *22*, 265–312. [\[CrossRef\]](#)
44. Pedroni, P. Critical values for cointegration tests in heterogeneous panels with multiple regressors. *Oxf. Bull. Econ. Stat.* **1999**, *61*, 653–670. [\[CrossRef\]](#)
45. Westerlund, J. Testing for Error Correction in Panel Data. *Oxf. Bull. Econ. Stat.* **2007**, *69*, 709–748. [\[CrossRef\]](#)
46. Murshed, M.; Ali, S.R.; Banerjee, S. Consumption of liquefied petroleum gas and the EKC hypothesis in South Asia: Evidence from cross-sectionally dependent heterogeneous panel data with structural breaks. *Energy Ecol. Environ.* **2020**, 1–25. [\[CrossRef\]](#)
47. Damette, O.; Marques, A.C. Renewable energy drivers: A panel cointegration approach. *Appl. Econ.* **2018**, *51*, 2793–2806. [\[CrossRef\]](#)
48. Pesaran, M.H. Estimation and Inference in Large Heterogeneous Panels with a Multifactor Error Structure. *Econometrica* **2006**, *74*, 967–1012. [\[CrossRef\]](#)
49. Pesaran, M.; Smith, R. Estimating long-run relationships from dynamic heterogeneous panels. *J. Econ.* **1995**, *68*, 79–113. [\[CrossRef\]](#)
50. Bond, S.; Eberhardt, M. *Accounting for Unobserved Heterogeneity in Panel Time Series Models*; University of Oxford: Oxford, UK, 2013.
51. Mrabet, Z.; Alsamara, M.; Saleh, A.S.; Anwar, S. Urbanization and non-renewable energy demand: A comparison of developed and emerging countries. *Energy* **2019**, *170*, 832–839. [\[CrossRef\]](#)
52. Dumitrescu, E.-I.; Hurlin, C. Testing for Granger non-causality in heterogeneous panels. *Econ. Model.* **2012**, *29*, 1450–1460. [\[CrossRef\]](#)

53. Granger, C.W.J. Investigating Causal Relations by Econometric Models and Cross-spectral Methods. *Econometrica* **1969**, *37*, 424. [[CrossRef](#)]
54. Kosnan, S.S.A.; Ismail, N.W.; Kaniappan, S.R. Demand factors for international tourism in Malaysia: 1998–2009. *Prosiding Perkem VII Jilid* **2012**, *1*, 44–50.
55. Pan, X.M.; Dossou, T.A.M. The relationship between tourism and sustainable economic growth in the Republic of Benin. *Curr. Issues Tour.* **2019**, *23*, 785–794. [[CrossRef](#)]



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