



How Can Economic Factors Influence the Tourism Demand in The Economy? A Panel Data Analysis of South Asian Countries

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Abstract

This study uses panel data and econometric models to analyse the relationship between macroeconomic factors and tourism demand. The main concern of this study is to investigate the tourism demand by taking as dependent variable and carbon emission, education, food security, renewable energy resources and trade openness as independent variables. To fulfill the objective of this study panel data of South Asian by employed the unit root test to check the stationarity and employed the fully modified least square used for the causality test. The results of this study guided the short run as well as long run relationship exists in the data. This study found opportunity to contribution in the literature and helpful for the authorities and researcher to make the policies related to control the pollution and make the better relationship between South Asian countries so improve the demand of the tourism in the countries.

Keywords: Carbon Emission, tourism, economic factors, panel data analysis, FMOLS, DOLS

1. Introduction

In today's era, tourism has become the backbone for the development of any country, whether it is China, Dubai, America, Central Asian countries or Pakistan. Where today we can see everything from all over the world or through the internet using our modern devices at home, exploring it is a different kind of fun. Various distinctive sectors are impacted by tourism, which plays a significant role in economic growth. Traditional businesses like civil aviation, rail transportation, and transportation by road, commerce, food, and lodging are directly impacted by tourism. Additionally, it promotes the growth of contemporary services including global banking, logistics, information consulting, cultural realism, film production, entertainment, conferences, and exhibitions. Tourism fosters economic prospects, supports infrastructure development, infuses the economy with new managerial and technological know-how, and generates foreign exchange that may be used to import capital and intermediate products in addition to consumer items. The tourist industry is heavily involved in digital transformations as well, increasingly defining them with terms like Smart Tourism and modern Tourism (Pencarelli, 2020). The international travel, tourist, and hospitality industries, which were among the biggest global providers of full-time and temporary employment prior to COVID-19, are among the industry's most severely impacted by this regulation. The COVID-19 epidemic has had a catastrophic effect on the tourist and hospitality industries as many nations and regions have set limits on internal and international travel, as well as on social distance and other types of travel. Providers of tourism must devise plans to revive the industry following the COVID-19 epidemic (Okafor, Adeola, & Folarin, 2021). Although the future of tourism in the COVID-19 period is still unknown, extensive research will be needed to determine how the sector might rebuild and survive in a world where COVID-19 is the new normal. (Chang, McAleer, & Ramos, 2020)

Globally, tourism demand rapidly grew in last few decades and dynamic observed with macroeconomic environments (Santamaria & Filis, 2019). Last few decades tourism had been studied by different economist and researchers try to create the significant links between tourism and different factors of the economy (Beer, Rybár, & Kaľavský, 2017; Ben Jebli & Hadhri, 2018; Chaisumpunsakul & Pholphirul, 2017; Frantál & Urbánková, 2017; Himmelgreen, Romero Daza, Vega, Brenes Cambronero, & Amador, 2006; Jensen & Zhang, 2013; Santamaria & Filis, 2019). According to the report of United Nations World Tourism Organization (UNWTO) found remarkable growth in the tourism activities in 2017 which was 7% worldwide increased and further they aspect that this growth will be increased by 4% to 5% in 2018. UNWTO experts figure out that in Europe alone, 671 million international tourists arrived in 2017. Furthermore, 13% growth rate found in Mediterranean and southern Europe, both eastern and central Europe and northern Europe recorded 5% growth. In 2017, 324 million tourists visited, 10% in South Asia, 8% in South East Asia and 3% North East Asia increased. In 2017, 207 million tourists visited the Americas, 7% in South America, 4% in Caribbean and Central America and 2% in North America. 8% growth noted in Africa and Middle East welcomed the 58 million tourists in 2017, which remarkable growth. The tourism business has expanded even more as a result of adaptation mechanisms put in place recently. The country's economy, which has significant tourism potential, is heavily reliant on the tourism sector. The World Bank database indicates that the proportion of tourism-related revenues to GDP was 2.92% in 1995 and climbed to 4.15% in 2014. The contribution of the tourist sector, one of the key pillars of the Turkish economy, to economic growth needs to be given more attention (Gövdeli, 2019).

The above fact shown that tourism fast growing industries in worldwide (UNWTO, 2017). According to the above facts tourism industry known as important driver (Lim & Zhu, 2018) in this regard tourism demand one of the major concern while taking in to account the food security, sanitation, health, education and also concern with macro-economic variables like foreign direct investment and trade openness (Lee & Brahmashrene, 2013). According to the FAO Acemoglu and Robinson (2006) life style in area which concern with the access to safe food, lack of safe food can affect the life style of individuals which also de-attract the tourist. Tourism activities in the country increase the demand of renewable source of energy and CO₂ emission also increased (Qureshi, Hughes, Maddox, & Cotta, 2005). In this context Solarin (2014) suggested to authorities to improve policies related to environment for development of tourism industry, tourism and renewable energy sources both are positive link with each other. According to the Khan and Hashemi (2017) trade also link with the renewable energy source because trade refer technological in the economy (Semančíková, 2016). Pointed out the important of tourism while discussing the development of economies of scales, in this context trade openness, income considered one of the important factor for development and trade openness increase the scale of the

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economies and income also to be considered one of the main component of development and tourism also or reward again tourism activities. This research follows the recommendation of (Ali, Khan, & Khan, 2018) and also show the relation between environment Kuznets curve and foreign reserve and tourism.

2. Literature Review

2.1. Tourism and Trade Openness

(Gövdeli, 2019) investigated the connection between the environmental indicator CO₂ emissions, economic expansion, trade openness, and visitor numbers, and investigate how tourism contributes to climate change mitigation. This study found that Economic growth, trade openness, and tourist arrivals have been found to have a long-term, unidirectional causal link with CO₂ emissions. International trade generally encourages the flow of tourists around the world (Okafor et al., 2021). International tourism revenue, trade openness, and the creation of physical capital, in this case represented by investment, all significantly impacted Gross Domestic Product (GDP), but the Consumer Price Index had little immediate impact (Prayogo & Haryanto, 2020). (Fernandes, Pacheco, & Fernandes, 2019) explored the positive and significant relationship between the trade openness and tourism openness. Chaisumpunsakul and Pholphirul (2018) explored the relationship between trade and tourism by taking the 207-trading partnership with Thailand. The result of this study indicated positive and significant relationship between tourism and trade openness. The result suggested to government of Thailand to improve their policies to increase the volume of trade by increase or supporting the tourism industry. Pacheco and Fernandes (2017) explored the relationship between trade and tourism, tourism taking as passenger visited in Brazil. In this research, Pacheco and Fernandes (2017) suggested to Brazilian government to rethinks the policies to encourage the international tourist which have long term causality with international trade. Fernandes et al. (2019) reported short run and long run relationship tourism and trade openness by Johanssen cointegration and vector error correction model. According to the results of this study there is short as well as long run relationship exists in the trade openness.

2.2. Tourism and food security

This study taken the food security as critical issues because gulf countries are importing most of the consumer good for their visitor in the countries. Rapidly growth in the tourism industry in gulf county like; Qatar, UAE, Kuwait, Bahrain and Saudi Arabia had increase the demand of food. Development of educational tourism (edutourism) based on food security and community empowerment. The major resource to build agrotourism places that can increase the welfare and independence of the community is rural areas with food security and local knowledge (Sulaiman, Chusmeru, & Kuncoro, 2019). Santafe-Troncoso and Loring (2021) discussed the idea of "food sovereignty" as a framework to examine how tourism affects indigenous people's food systems along the Chakra Chocolate and Tourism Route. The government encourage the tourist they need to focused on food security which is significant impact on tourist (Pirani & Arafat, 2016).The researchers were focused the food security and tourism industry, furthermore, this research taken food as platform to encourage the tourism education(Mair & Sumner, 2017). Costa Rica known as economy which changes from the agriculture economy to tourism-based economy. Furthermore, in this research, the researchers Himmelgreen et al. (2006)also indicated the difference between socio economic which based on tourism based economy by 73% and 67 % on agrarian economy. According to the above discussion economy of Costa Rica economy change to tourism economy and there is found the insecurity in food which were de motivate the visitors (Himmelgreen et al., 2006).Mak, Lumbers, and Eves (2012) explored the positive relationship between food security and tourism demand. One of the most important yet unaddressed aspects of sustainable tourist development policy, particularly for poor nations, is the relationship between tourism and food security. While maintaining food security as the top national development goal, the government has recently given tourism as a sector more attention (Degarege & Lovelock, 2019).

2.3. Tourism and education

Mair and Sumner (2017) explored the relationship between tourism and tourism education by taking the student who were taking the education related to tourism education. The result indicated that there is positive and significant impact of tourism education on tourism industry. Walmsley (2012) explored the education and tourism relationship and the result of this study has positive and significant relationship. Undergraduate students of hospitality interviewed from UK University taken as sample to fulfillment of the requirement of this study. Li and Liu (2016) developed the framework and create the understanding between hospitality education and tourism in china. This study based on survey-based questionnaire filled by 771 respondents from the 4 major university of china. According to the result of this study which indicated that there is positive link between tourism and hospitality education. These studies collectively underscore the crucial role of educational frameworks (Akram & Li, 2024; Akram, 2020; Ramzan et al., 2023) and ICT tools (Akram et al., 2021, 2022; Ramzan et al., 2023) in enhancing students' understanding and skills, thereby positively influencing related industries.

2.4. Tourism and Climate Change

Long-term viability of tourism depends on environmental protection and improvement. Wildfires and environmental changes are given very little consideration, which is reflective of how little interest sea and sun visitors seem to have in what goes on behind their backs and far from the beach.(Arabadzhyan et al., 2021). Kubo et al. (2020) adapted that how visitors encounter issues in severe weather and why not taking use of opportunities also contributes to terrible weather. Pandy and Rogerson (2019) investigated the effect of climate change on urban tourism that mainly take thirty tourist stakeholders were questioned the risk perceptions of climate change are investigated.

Ben Jebli and Hadhri (2018) explored the dynamic relationship between CO₂ emission and tourism. The result indicated the negative relationship between tourism and corban dioxide.Alam and Paramati (2017) investigated the association between development of tourism and investment with the corban dioxide emissions by taking ten countries which have major ingratiante was tourism. According to the result of this study there is negative and significant relationship between tourism and CO₂ emissions. Ng, Lye, and Lim (2016) explored the relationship between tourism and travel industry and corban emission by taking the Malaysian economy. The result of this study by using the method of bound test indicated long run relationship between CO₂ and tourism. Sharif, Afshan,

and Nisha (2017) explored the carbon dioxide emission and tourism from the evidence from Pakistan. The result indicated the positive and long-term relationship between CO₂ and tourism and furthermore, the result of granger causality indicated that unidirectional causality among tourist and CO₂.

2.5. Tourism and Renewable energy resources

Ben Jebli and Hadhri (2018) explored the bidirectional causality between tourism and energy. Beer et al. (2017) created the interaction among renewable energy sources and tourism. Furthermore, this research indicated that renewable energy sources considered one of the important elements to boost the tourism industry. In this research suggested that most of the visitor is visited to the renewable sources (geothermal power plants and wind parks) mentioned that there is impact of tourism and renewable energy resources. Frantál and Urbánková (2017) not even discussed the concept of the terminology of energy and tourism but also analysis that who were visited to the energy sector. Otgaar (2012) explored the major factor of tourism industry and the research indicate that renewable energy sources considered one of the major element which boost the tourism industry because new innovation in technologies to producing energy are most visited sited found.

3. Empirical Approach

This section includes a description of the data and the econometric techniques we employ to produce our estimates.

3.1. Data

International Tourism is defined with respect to the expenditure in US dollars, the primary reserve currency in the global financial system (Martins, Gan, & Ferreira-Lopes, 2017). Trade openness is the base factor of international tourism that modified with the % of GDP. Education plays a vital role for the development of the country (Akram & Yang, 2021; Ramzan et al., 2023), literacy rate take as % of educated young generation at the age of 15 to 24 years on maturity level. Food production index tracks variations in food commodity production from base year to a given year. For the sake of improvement and development, renewable energy consumption is expressed as a percentage of overall final energy consumption. International tourism is directly impacted by climate change when you look at data on carbon emissions in the form of kt. The production of cement and the burning of fossil fuels both contribute to carbon dioxide emissions, but land use activities like deforestation are not included in the data. Kt is the measuring unit (kiloton). Emissions of carbon dioxide are frequently measured and reported as elemental carbon.

3.2. Methodology

The variables that made up the sample for the models were from secondary data sources. Tourism was used as a dependent variable in this study, whereas carbon dioxide (CO₂) emissions, education, food security, renewable energy sources (RES), and Trade openness (TO) were used as independent variables. Data of these variables taken from world development indicators (WDI). The selected south Asian countries included in this research are; Pakistan, Bangladesh, India, Sri Lanka, Bhutan and Maldives. These variables' data were compiled from the World Development Indicators (WDI) throughout the years 1981 to 2020. The selected south Asian countries included in this research are; Pakistan, Bangladesh, India, Sri Lanka, Bhutan and Maldives and due to absence of abundant data collection Afghanistan not include in the model. To check the stationarity in the data used modern tools of unit root of Levin, Lin, and Chu (2002) based on ADF;

3.3. Econometric Model

$$\Delta y_{it} = c_i + \partial_i y_{i,t-1} + \sum_{j=1}^k c_j \Delta y_{i,t-1} + e_{it}$$

Based on

$$t_{\partial} = \frac{\hat{\partial}}{se(\hat{\partial})}$$

Im, Pesaran, and Shin (2003)

$$\Delta Y_{it} = \gamma_i y_{i,t-1} + \sum_{k=1}^{pt} \alpha_{ik} \Delta y_{it-k} + Z_{it} \phi + e_{it}$$

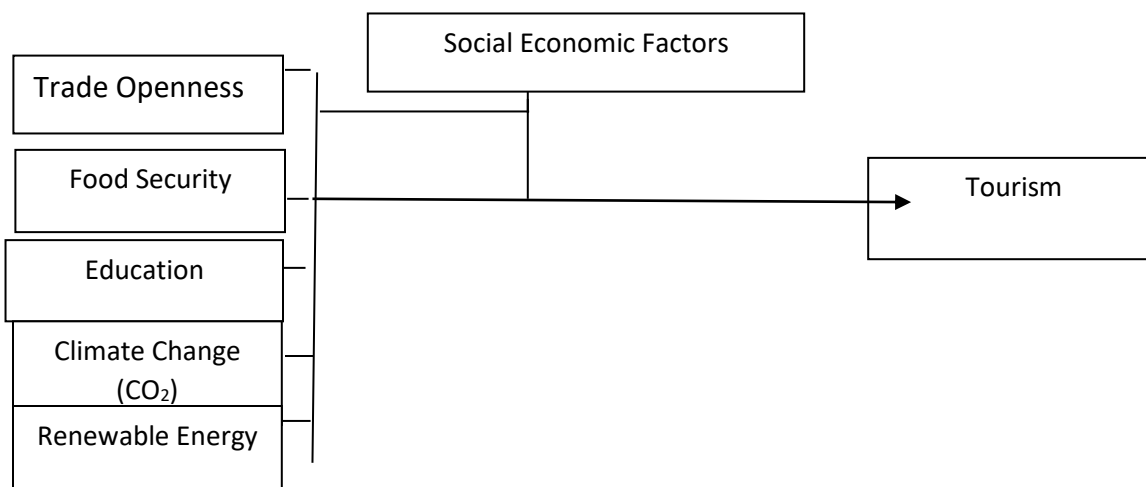
According to Im et al. (2003); Levin et al. (2002) selected variables are found in same order of integration I(1). In this regard fully modified least squares (FM-OLS) regression proposed (Kao & Chiang, 2001) and this test designed by (Phillips & Hansen, 1990) to provide optimal estimates of cointegrating regressions. The method modifies least squares to account for serial correlation effects and for the endogeneity in the regressors that result from the existence of a cointegrating relationship following is the linear equation of FMOLS.

$$\hat{\beta}_{FM} = \left[\sum_{i=1}^N \sum_{t=1}^T (x_{it} - \bar{x}_i) \right]^{-1} \left[\sum_{i=1}^N \sum_{t=1}^T (x_{it} - \bar{x}_i) \hat{y}_{it} + \Delta \hat{T}_{eu} \right]$$

y_{it} is the endogeneity correlation and ΔT is known as serial correlation and following is the DOLS;

$$\hat{\beta}_{DOLS} = \left[\sum_{i=1}^N \sum_{t=1}^T z_{it} z_{it}' \right]^{-1} \left(\sum_{t=1}^T z_{it} \hat{y}_{it} \right)$$

3.4. Conceptual Model



4. Result and Findings

4.1. Unit Root Test

The panel data of south Asian countries is selected to investigate the association between selected variables. In this regard, unit root is the obligatory to check the stationarity or random walk in the data. According to the literature related to panel unit root, the major problem faced by research is how to deal with non-stationary variables (Im et al., 2003; Levin et al., 2002). Tourism, carbon emission, education, food security, trade openness are integrated at I(1) and renewable resources, is integrated at I(0). According to the Nepal, al Irsyad, and Nepal (2019) autoregressive distribution lag model is most appropriate, if there is mixture of the integration process.

Table 1: Descriptive Statistics

	TOURISM	CO2_P	EDU	FS	RR	TRADE
Mean	3.794248	25.566095	3.381785	78.50579	3.775643	5.494903
Maximum	2.193303	3.269560	1165.125	142.5500	171.9122	143.1884
Minimum	0.000000	0.000000	0.000000	0.000000	-15.42128	0.000000
Std. Dev.	3.864249	0.574256	127.6863	32.36585	10.90701	18.72730
Skewness	1.015192	1.926507	5.340770	-0.711470	13.86195	4.509453

In the above table descriptive statistics shown the bird eye view of the data mean values shown the central tendency of the data and standard deviation shown the deviation in data from mean value. The value of skewness presented the data is normal distributed or negative skewed or positive skewed.

Table 2: Panel Correlation

Probability	TOURISM	CO2_P	EDU	FS	RR	TRADE
TOURISM	1					
CO2_P	0.4769	1				
EDU	0.5158	0.7954	1			
FS	0.2305	0.3593	0.1053	1		
RR	0.1085	0.1273	0.0778	0.0653	1	
TRADE	0.0915	0.2240	-0.0285	0.2110	0.0353	1
	0.1364	0.0002	0.6434	0.0005	0.5663	-----

The above table shown the panel correlation results of selected variables and results indicated there is no strong correlations found in the data mean there is no chance of multicollinearity. Probability value of t statistics indicated to significant and insignificant relationship between variables if the value of $p > 0.05$ mean insignificant relationship or if the $p < 0.05$ shown the significant association among variables.

The table 3 results of fully modify ordinary least square which indicated that long run equilibrium relationship among selected word. The Value of R-square 0.42 and 0.58 and coefficient of the variables indicated the positive effect on tourism but trade and education have positive impact but insignificant. The value of coefficient guided the change in tourism due to selected independent change the +ve sign shows there is positive and significant relationship except trade openness.

The table 3 of autoregressive distribution lag model applied on selected variables, in this model tourism taken as dependent variable and education, food security, renewable energy resources taken as independent variables. According to the long run results there is long run relationship found but as per short rung result as well as short run relationship exist in the data.

Table 3

Variable	FMOLS			DOLS		
	Coefficient	Std. Error	t-Statistic	Coefficient	Std. Error	t-Statistic
TRADE	0.00876	0.027842	0.314776	0.00988	0.02421	0.407839
CO2_P	14.0426	3.938835	3.565161	7.08054	2.89833	2.442972
FS	0.07416	0.031728	2.337305	0.12115	0.02974	4.073227
EDU	0.00747	0.021867	0.341611	0.04958	0.01709	2.900603
RES	0.00635	0.002843	2.233399	0.04749	0.01713	2.771889

Table 4: Autoregressive distribution Lag Model

Variable	Selected Model: ARDL(1, 2, 2, 2, 2)				
	Coefficient	Std. Error	t-Statistic	Prob.*	
Long Run Equation					
CO2_P	-5.744717	2.288569	-2.510178	0.0130	
EDU	0.033944	0.014338	2.367422	0.0190	
FS	0.160355	0.025729	6.232565	0.0000	
RR	0.023540	0.009268	2.539902	0.0119	
Short Run Equation					
COINTEQ01	-0.250453	0.059735	-4.192762	0.0000	
D(CO2_P)	-4.290375	7.767400	-0.552357	0.5814	
D(CO2_P(-1))	-4.430202	4.653482	-0.952019	0.3424	
D(EDU)	0.126275	0.048035	2.628807	0.0093	
D(EDU(-1))	0.011371	0.019583	0.580646	0.5622	
D(FS)	-0.085958	0.031133	-2.760964	0.0064	
D(FS(-1))	-0.015777	0.026439	-0.596711	0.5515	
D(RR)	1.057324	1.078129	0.980703	0.3281	
D(RR(-1))	-2.113420	2.112582	-1.000397	0.3185	
C	-1.877797	0.575862	-3.260844	0.0013	

5. Conclusion

This research investigated the relationship between tourism and trade, corban emission, food security, education and renewable energy resources by using the data from 1981-2020. Autoregressive distribution lag model, FMOLS and DOLS used to identify the long run variance all selected variables are positive impact on tourism but trade and education are insignificant, in DOLS renewable energy resources have significant impact. Tourism sector can be develop by improving the renewable sources because (Beer et al., 2017) mention his research most of visitor are visited for watching the renewable energy sourcing. Food security also needs to address in positive manner to get improvement in tourism sector. Authorities need to focus on tourism industry by using the internal matters like sanitation, education, which need add in future research. The improvement of tourism may be aided by FDI inflow, and the quality of government institutions may also have a moderating effect in the future. The main concerned of this study is to investigate the tourism demand by taking as dependent variable and corban emission, education, food security, renewable energy resources and trade openness as independent variables. To fulfillment the objective of this study panel data of south Asian by employed the unit root test to check the stationarity and employed the fully modified the least square used for the causality test. The results of this study guided the short run as well as long run relationship exists in the data. This study found opportunity to contribution in the literature and helpful for the authorities and researcher to make the policies related to control the pollution and make the better relationship between south Asian countries so improve the demand of the tourism in the countries. There is some limitation found in this study because study is limited with south Asian countries more emerging economies need to address.

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