Journal of Economic Sciences
Volume 3, Issue 1
https://www.jesciences.com

Tourism Nexus with Economic Growth and Factors Derives Tourism in Pakistan: Insights from ARDL

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Timeline

Received: Mar 02, 2024
Revised: Apr 16, 2024
Accepted: Apr 18, 2024
Published: May 06, 2024

DOI
https://doi.org/10.55603/jes.v3i1.a6

Abstract

Tourism plays a central role in the economic growth of numerous countries. It encourages foreign exchange, investment, and employment opportunities in the host country. Numerous studies have been published on factors driving the tourism industry in Pakistan. However, they left the research gap and made unexplored the effect of the crime index and military regime and technology on the tourism industry in Pakistan. Therefore, this study utilized two models, multiple and simple regressions from the period of 1996 to 2021 and 1995 to 2020, to fill gape this study employed autoregressive and distributive lags model (ARDL) and other statistical tools, such as augmented Dickey fuller test (ADF), White and autoregressive conditional heteroscedasticity (ARCH) tests, Serial LM test, principal components analysis (PCA). The findings of the study reveal that there is a positive and statistically significant association between tourism and economic growth in the short run as well as in the long run. In addition to this, the results of the tourism determinants model outlined that, terrorism, crime, and military regime, adversely affect tourism in Pakistan in the long run. While fixed telephone subscription (FTS) proxy for technology, hard infrastructure (HI), inflation positively determines tourism in Pakistan both in the short run and long run. Thus, this study recommends that government needs to design sustainable and effective policies to boost tourism in Pakistan.

Keywords: *Tourism, Terrorism, military regime, Crime, Economic Growth, ICT infrastructure*

JEL Classification: Z32, F43, H54, O1

1. Introduction

The tourism industry is a vital industry for the economic prosperity of numerous countries in the world Naseem (2021), which they strive to develop. It helps and improves economies in several ways such as foreign exchange, employment opportunities, and increases income level (Nguyen, 2021, Nadeem et al., 2020, Bayar and Yener, 2019, Khan and Rasheed, 2016). Thus, the improvement in the tourism industry has been very crucial for developed and underdeveloped countries; along with this, it has become the most important agenda for policymakers, because of its major contribution to the economies. At the world level, governments are trying to make better policies to reduce macroeconomic hitches concerning their economies, such as low growth, unemployment, poverty, and current account deficits, but the tourism industry can reduce these problems. Moreover, by developing the tourism industry, the "income inequality" in the world can be tackled, because it can facilitate the movement of income from developed countries to non-developed countries. Furthermore, its development can enhance the livelihoods of the rural areas. According to the "World Tourism Organization (UNWTO)", the tourism sector is the lifeline for rural communities in under-developed nations.

The spillover effect of the tourism industry in the world is undeniable because it provides abundant nourishment to the economies through different links, first and foremost, its development reduces poverty, encourages investment in infrastructure, improves sustainable development, and enhances household income (Badulescu et al., 2020, Brida et al., 2020). Furthermore, it is the source of foreign exchange that facilitates the procurement of capital goods and technology to help expand production in the economy. Therefore, many governments pay much importance to supporting and making advanced tourism a credible source of employment generation and economic growth (Brida et al., 2020).

In previous years, the Corona pandemic became a major obstacle for global industries, including the tourism industry (Abbas et al., 2021). Due to this alarming pandemic, the contribution of tourism to world economies declined. According to the World Travel and Tourism Council (Economic Impact, 2022) in 2020, 62 (million) jobs vanished, and its contribution to world GDP declined by 50.4% year in one year. However, after Corona pandemic, the world was back to normal in 2021, the tourism contribution to world GDP rose from 5.3% in 2020 to 6.3% in 2021, and 18.2 (million) jobs were recovered.

Pakistan is an underdeveloped country but rich with immense tourist destinations due to its history, culture, biological and geographical diversity. these tourist destinations include Neelum Valley, Gilgit Baltistan, Hunza Valley, Ayubia, Kaghan, Naran, Muree, Malam Jabba, Chitral, Shandor festival, camel and jeep safari in the Cholistan Desert, gorgeous glaciers, k2 world second highest mountain (Arshad et al., 2018). However, despite such great potential, the tourism sector has not been able to bear its fruits. many factors have been responsible for mainstreaming tourism; notably, the poor infrastructure and lack of necessities in the tourist destinations, lack of marketing for tourism, high inflation, and due to security issues, since 2000, international tourist arrivals declined in Pakistan (Arif and Shikirullah, 2019).

Furthermore, after 9/11 Pakistan has faced a drastic decline in tourism and has shifted its focus from tourism to terrorism which has resulted in spending millions of dollars in its fight against terrorism. (Rauf et al., 2020). Although, in recent years terrorism has been curtailed. Antonio Guterres head of UNO (2020) has addressed at a summit in Islamabad, that transformation of Pakistan from terrorism to tourism is unambiguously remarkable. Furthermore, to enrich the tourism industry, Pakistan has taken the following steps, (1) establishment National Tourism Coordination Board (NTCB) in 2018, to help the provincial governments in tourism development. Moreover, to make strategic planning for tourism development nationally. (2) Launching of a web portal to provide information and accessibility to international tourists, (3) allocation of Rs.1 billion to the Pakistan Tourism Development Endowment Fund (PTDEF) to advertise the historical spots and cultural beauty of Pakistan. Moreover, Pakistan held a tourism summit in 2019 in Islamabad, and great facilities were offered to international tourists by eliminating administrative problems. The announcement "E-Visa to 175 countries" would enhance the inflow of international tourists to Pakistan (Azam et al., 2022).

Along with this, the Tourism industry has emerged as a new industry in Pakistan. The World Travel and Tourism Council (WTTC), annual research report (2022) highlighted that international visitor spending has contributed 2.9% to total exports and 5.1% of jobs have been created, which became 3.34 million in 2021. The contribution of the tourism industry to Pakistan's economy is not satisfactory. However, it can be attributed to political instability, poor infrastructure, and inflation. Many studies were conducted on Pakistan's economy (Azam et al., 2022, Khan et al., 2022, Rehman et al., 2020), proposed in their policy recommendations, that Pakistan needs to eliminate high inflation, political instability and spend on infrastructure to attract foreign tourists to increase the contribution of the tourism industry to Pakistan GDP.

This research is based on the introduction section which covered tourism and economic growth nexus. Second, it contains a literature review on all variables that are examined in this study and adds research contribution to the existing literature. Third, it includes the theoretical framework, methodology, results, conclusion, and policy recommendation.

2. Review of Literature

The association between tourism and economic growth has been extensively studied in the last two decades at the world level. For example, Selimi et al. (2017), Mishra et al. (2011), Fayissa et al. (2008), Kostakis and Theodoropoulou (2017), Brida et al. (2020), Badulescu et al. (2020), Garidzirai and Pasara (2020), Naseem (2021), Huseynli (2022), Destek and Aydın (2022), and these studies have concluded that tourism has substantial positive impact on the economic growth. However, the effects were different in magnitude.

Moreover, many researchers have tested the tourism-led economic growth hypothesis in their studies, and they accepted that this hypothesis is true. For example, Lean and Tang (2010), Tang and Tan (2018), Jalil et al. (2013), Tang et al. (2016), these studies used advanced econometrics techniques and models and revealed that economic growth has strong links with tourism. Further, he argues that a rise in tourism will lead to an upsurge in economic growth. Therefore, Fayissa et al. (2008) and Brida et al. (2020) proposed policy guidelines, that governments need to develop and promote tourism to flourish the economic growth.

In addition to this, the existing literature was not free of contradictory results, but however, it may be due to different methodologies, the geographical differentiation of the study areas, and the business cycle condition of each country or region. For example, Lin et al. (2019) found in their empirical study both tourism-led growth hypothesis and economy-driven tourism-led growth hypothesis. This study reveals that 9 regions have experienced economy-driven tourism growth, while 10 regions have experienced tourism-led growth hypothesis in China. Moreover, it has been disclosed that tourism development can be an effective way of reducing the income gap among regions. Similarly, Işik et al. (2017) found both hypotheses for different countries.

The tourism-led growth hypothesis was presented in China, the USA, Germany, and Turkey, and the growth-led tourism exists in Spain and the UK. However, the bi-directional causality emerges for Germany between tourism and economic growth. This study further argues that tourism and economic growth are dependent on each other and recommends two guidelines for policymakers to promote tourism for sustainable economic growth or vice versa. Whereas, the tourism-led growth hypothesis was rejected by Katircioglu (2009) in the context of Turkey and also did not find any co-integration between tourism and economic growth.

Furthermore, the bidirectional causality was found in many studies (Badulescu et al., 2020, Dogru and Bulut, 2018, Katircioglu, 2009). On the other hand, the negative impact of tourism also emerges in the literature regarding the environment. Anser et al. (2020) used different variables to assess its link with different hypotheses but they found that international tourism receipt increases Co2 emission and verified the pollution haven hypothesis (PPHH) in G7 countries.

In the context of Pakistan, Jalil et al. (2013), Aleemi (2015), Manzoor et al. (2019), Rehman et al. (2020), and Azam et al. (2022) revealed that tourism has a positive relationship with economic growth. An increase in tourism activities will aggrandize economic growth. Moreover, being a divergent sector tourism not only contributes to the internal sector of the economy but also flourishes the external sector as well, but attention is needed. Currently, Pakistan is facing a severe Balance of Payment deficit and the lowest foreign exchange reserves in history ever. However, with inbound tourism development, the

deficit (BOP) can be tackled. A study conducted by Rasheed et al. (2019) found long run and statistically significant negative relationship between BOP deficit and tourism. Further, recommended that the government formulate the best policies for tourism development it will help in reducing the balance of payment deficit and will increase the foreign exchange reserves.

2.1. Tourism and Inflation

Inflation is one factor from which tourists judge the economic stability of any country. An increase in inflation decreases the purchasing power of tourists which ultimately has an impact t on the tourism industry because goods and services prices become expensive to afford. Khan et al. (2022) and Achyar and Hakim (2021) argue that inflation is a vulnerable factor, which discourages investment in tourism infrastructure and tourists visits. Hence, it has a negative influence on the tourism industry.

Furthermore, Pektas and Unluonen (2020) reveal that an increase in inflation exerts an effect on per-person spending which may cause a reduction in tourism demand. Similarly, Athari et al. (2021) used panel data for 76 countries from the period of 1995-2017 and concluded that inflation has a significant negative impact on tourism in the sample countries. An increase in prices obstructs tourism. More interestingly, the marvelous hypothesis tourism led to inflation was found in the existing literature. Shaari et al. (2018) highlight that expansion in the tourism industry triggered inflation in Malaysia. Therefore, they concluded that the government needs to take proactive measures to impede the over-expansion of the tourism industry to maintain a stable inflation rate.

2.2. Physical Infrastructure and Tourism

Well-developed infrastructure is not only crucial for manufacturing industries but for the tourism industry to grow as well. A country with having quality infrastructure will enjoy more fruits from the tourism industry, the best example is the United Arab Emirates. Khan and Rasheed (2016) demonstrated that tourism and infrastructure positively correlated with each other's. Further, their results revealed that a 1 percent increase in infrastructure encourages tourism by 1.76 percent. The same conclusions were given by Seetanah et al. (2011) and Fareed et al. (2016) regarding the bond between infrastructure and tourist arrivals but the magnitudes were different. Improved infrastructure attracts the inflow of tourists because they feel comfortable if the best infrastructure services are available.

Nguyen (2021) argues that investing in tourism infrastructure such as hoteling and restaurant industry, recreational facilities, transport, and communication, has a major and positive impact on the inflow of international tourists. In addition to this, the results indicated that in the long run, a 1 percent increase in the tourism infrastructure boosted the inflow of international tourists by 0.7503%, 0.4026%, and 0.7836% to Vietnam. Moreover, Mandić et al. (2018) gathered data through a questionnaire from 312 respondents, and for most of the respondents, recreational facilities and tourism infrastructure are influential factors in improving the tourism industry. Furthermore, the short-run and long-run positive impact of infrastructure on tourism was confirmed by (Ahmed and Anwar, 2016).

2.3. ICT Infrastructure and Tourism

In the 20th century, Technology has got much attention due to its revolutionary role in the digitalization of world economies and the advancement of Global industries including the tourism industry as well. Many studies have used different proxies for ICT infrastructure to analyze its impact on tourism development. For example, Lee et al. (2021) used proxies for ICT infrastructure such as mobile cellular subscription, fixed broadband subscription; and secure internet servers and revealed that an increase in these variables has a positive impact on tourism. Similarly, Sharma et al. (2022) constructed an index through principle component analysis and pointed out that ICT infrastructure has a positive impact on tourism in the short and long run in India. Furthermore, Adeleye (2023) gathered data for 33 countries and created an index by using principle component analysis and applied the GMM technique. They

found that the effect of ICT is positive, and it moderated the tourism-led growth hypothesis (TLGH) in East Asia and the Pacific.

Adeola and Evans (2020) used data from the period of 1996 to 2016 for Africa and applied the dynamic panel gravity model and found that ICT infrastructure has a statistically significant and positive nexus with the advancement of tourism. Further, revealed if ICT infrastructure increases it leads to an increase in the arrival of tourists. Moreover, software applications and the fastest speed of ICT infrastructure are very important for tourism development. In addition to this, the theoretical study of Khan and Hossain (2018) indicated that it is very crucial for the development of the tourism and hospitality industries. Further, highlighted, that it has a significant impact on organizations if they can use ICT for processing and dispersing information, managing distribution, internal efficiencies, and creating new directions for future commercial growth with a worldwide audience. However, a negative impact of ICT infrastructure on tourism also emerged in the study of Nadeem et al. (2020) in the case of Pakistan.

2.4. Terrorism and Tourism

Terrorism has serious consequences in terms of creating fear in the minds of tourists. Due to terrorism, tourists fear traveling to tourist spots. Further, their results indicated that there is a negative relationship between tourist arrival and terrorism. If a 1% increase occurs in terrorism tourism will decline by – 0.61 percent (Khan and Rasheed, 2016). Furthermore, the negative impact of terrorism has emerged in various studies (Nadeem et al., 2020, PK and Sanjeev, 2020, Santana-Gallego et al., 2016, Raza and Jawaid, 2013, Drakos and Kutan, 2003).

Moreover, an increase in terrorism slows down globalization, rise in military spending, endangers the lives of people and prosperity, and increases the risk for international investors (Fareed et al., 2018). Terrorism created uncertainty and safety problems and imposed limitations on the tourism industry's growth. The study by Manrique-de-Lara-Peñate et al. (2022) showed that the expansion in the tourism industry is associated with insecurity and uncertainty, if insecurity and uncertainty come down to their minimum level in the countries; the value added, which is generated by tourism would rise by 14.3%. Whereas in case of increasing to the maximum level, the value added would decline by 17.5%.

Göktuğ Kaya et al. (2022) explored the connection between tourism and terrorism in the context of Turkey from the period of 2012- 2018 on a monthly basis by using (ARDL). Further, they found that there was no short-run effect of terrorism on tourism revenue but indicated that in the long run, terrorism negatively affects tourism. However, Zeman and Urban (2019) that the impact of terrorism is not significant on international tourism in the developed countries having strong political regimes as compared to politically unstable and under-developed countries. Further, argued that in a similar way developed countries may be affected, if terrorist attacks prevail.

2.5. Crime and Tourism

Since 2000, crime and tourism relationships have become one of the omnipresent topics of tourism literature. A theoretical study by Mataković and Cunjak Mataković (2019) demonstrates that the impact of crime can be on two levels, micro-level and macro-level. At the micro level, it adversely affects the image of tourists' destinations and the decision power of individuals to go or not, to the tourist's destination, where, criminal incidents take place, while on the macro level, it has a general effect on social community. Further, revealed, that for tourism development a safe environment is necessary. An empirical study conducted by Santana-Gallego et al. (2016) from the period of 1995 to 2013 for 171 countries confirmed that crime negatively affects tourism.

Similarly, Altindag (2014) used a panel data set for European countries and revealed that tourism and crime are negatively associated with each other. Further, explained that international tourists are more

responsive to crime. In the case of Pakistan Rauf et al. (2022) used time series data and indicated that there is an asymmetric and significant association between crime and tourism. Further, argued if the crime rate increases, tourism will decline in the country. Moyo and Ziramba (2013) used Monthly data from the period 2003 to 2011 to analyze the impact of various types of crimes on tourism in South Africa. They found that sexual crimes, kidnapping and murder, and car hijacking hurt tourism in South Africa, both in the short run and long run. However, Shchokin et al. (2023) disclosed that the impact of crime on tourism is a multi-dimensional problem that needs the development of appropriate preventive policies.

2.6. Contribution to the literature

A bulk of theoretical and empirical studies have been published in developed nations and under-developed nations to examine the factors that influence the tourism industry. For example KILIÇ and Ünzüle (2018) in Turkey, Khan and Rasheed (2016) in Pakistan, Mazrekaj (2020) in Kosovo, (Hamilton and Tol, 2007) for Germany, UK, Ireland, Nuseira and Aljumahb (2020) in UAE, Khan et al. (2022) in Pakistan and in many more countries.

However, in the case of Pakistan, this study is diverse from the existing studies in many ways. First, we have constructed the tourism and crime index by using principal components analysis. Secondly, we estimated the impact of the military regime and crime index on tourism for the first time in this study. Third, the impact of technological advancement was only studied by Nadeem et al. (2020) using quarterly data and found, that technological improvement negatively affects the tourism industry in Pakistan. Thus, we have used a proxy for technology and utilized annual data that really its impact is negative.

3. Methodology

The link between tourism and economic growth has been explored through various theories and paradigms by previous studies.

3.1. Theoretical Framework

Modernization theory (MT) is the most important theory in this regard, which received a prominent status in the 19th century and the mid-20th century. It was used by Khan et al. (2022). This theory sheds light on the fact that progress toward the development of a region depends on the efficient use of inner sources. Tourism is reflected as a key internal source that holds the potential to enlarge the economic growth of a country (Khan et al., 2022).

Furthermore, Sharpley (2000) revealed that it continues to support the rationale for the inducement of tourism development. Further, argued, foreign exchange earnings, backward linkages, and multiplier concepts in the whole economy are soundly embedded in it. Similarly, this theory was linked with Rostow's steps of economic growth. They stated that this theory is also called the 'Rostow theory of growth' which follows various sequential stages that help in emerging tourism projects. Thus, this theory has principal applications in public policy and the economic field.

3.2. Data Sources

To empirically analyze the nexus between tourism and economic growth, we have gathered time series data from the period of 1995 to 2021 from WDI. While, for determinants of tourism, we have gathered time series data from the period of 1996 to 2020. The data on GDP per capita and tourism was collected from World Development Indicators (WDI) crime data was gathered from Pakistan Social Indicators (PSI) and terrorism data was collected manually from Wikipedia.

3.3. Tourism Economic Growth Model

$PCI_t = \beta_1 + \beta_2 Tindex_t + \varepsilon_t$ (1)

β_1 *is* Constant

PCI is the per capita proxy for economic growth, and $Tindex$ is the tourism index.

$\varepsilon_t = error\ term$

We have constructed the 'tourism index' by using principal component analysis from the variables, international tourism recipe in dollars, international tourism recipe for passenger transport items in current US dollars, international tourism recipes for travel items in current USD, International tourism expenditures for passenger items in USD, International tourism expenditures for travel items in USD, total expenditures for international tourism in USD. Many studies (Khan et al., 2022, Naseem, 2021, Brida et al., 2020, Nadeem et al., 2020, Rehman et al., 2020, KILIÇ and Ünzüle, 2018) have used proxies for tourism from the above variables. However, instead of taking, 1 or 2 variables as proxies for tourism from the above variables like the existing studies. We have constructed an index by using principal components analysis (PCA) from all these variables because all variables are measured in USD. It may be a contribution to the existing literature.

3.4. ARDL Specification for Tourism Economic Growth Model

$\Delta(PCI)_t = \alpha_0 + \alpha_1(TINDEX)_{t-1} + \alpha_2(PCI)_{t-1} + \sum_{i=1}^{n} \delta_i \Delta(TINDEX)_{t-i} + \sum_{i=1}^{n} \gamma_i \Delta(PCI)_{t-i} + \varepsilon_t$ (2)

In eq (1) α_0 drift parameter and α_i are the long run coefficients i= 1, 2 and γ_i, δ_i are the short run coefficients and ε_t is the error term.

If cointegration exists in eq (2) then the following model will be estimated

$$(PCI)_t = \alpha_0 + \sum_{i=1}^{n} \beta_i CPI_{t-i} + \sum_{i=0}^{n} \theta_i TINDEX_{t-i} + \varepsilon_t \quad (3)$$

For the long-run adjustment and short-run dynamics, the following model will be estimated.

$$\Delta(PCI)_t = \sum_{i=1}^{n} \beta_i \Delta(PCI)_{t-i} + \sum_{i=0}^{n} \sigma_i \Delta(TINDEX)_{t-i} + \theta(ECM)_{t-1} + \varepsilon_t \quad (4)$$

Eq (4) estimates the short-run relationship and the speed of adjustment toward the long run. If $\theta(ECM)_{t-1}$ is negative and statistically significant then the dependent variable will converge to its equilibrium in the long run by the speed of $\theta(ECM)_{t-1}$.

3.5. Basic Model for Tourism and its Determinants

$Tindex_t = \beta_1 + \beta_2 FTS_t + \beta_3 TERR_t + \beta_4 CI_t + \beta_5 MR_t + \beta_6 HI_t + \beta_7 CPI_T + U_t$ (5)

Where in equation (5), $Tindex$ is the tourism index, FTS represents fixed telephone subscription proxy for ICT infrastructure, $TERR$ represents numbers of terrorism incidents, CI is the crime index, MR is the military regime, HI is the transport and storage communication proxy for hard infrastructure, CPI represents inflation.

$\beta_1\ is\ constant$

MR = Dummy variable. For military regime periods, we assign 1, and for democratic government, we assign 0.

CI = crime index, this index has been made from, murders, kidnapping, and robberies through principal components analysis (PCA)

U_t is the error term.

For ICT infrastructure we have used a proxy fixed telephone subscription. This variable was part of PCA indexes constructed by many other studies (Adeleye, 2023, Sharma et al., 2022). Moreover, different variables and PCA indexes constructed from different variables were used by the existing studies as a

proxy for ICT infrastructure (Lee et al., 2022, Lee et al., 2021). However, due to data limitations on other variables, this study has used only FTS as a proxy for ICT infrastructure.

3.6. ARDL Specification for Tourism Determinants Model

In the model below, α_0 is the drift term and α_i are the long-run coefficients where i= 1, ……, 7, the σ_i, $\delta_i, \gamma_i, \phi i, \theta i, ¥i$, representing short-run coefficients of the model and ε_t is the error term.MR is a dummy variable used for military regimes. Therefore, there are no lags, and no differences form of the MR.

$$\Delta(Tindex)_{t=}\ \alpha_0 + \alpha_1(FTS)_{t-1} + \alpha_2(TINDEX)_{t-1} + \alpha_3(HI)_{t-1} + \alpha_4(MR)_t + \alpha_5(CINDEX)_{t-1} + \alpha_6(CPI)_{t-1} + \alpha_7(TERR)_{t-1} + \sum_{i=0}^{n} \beta_i \Delta(FTS)_{t-i} + \sum_{i=1}^{n} \sigma_i \Delta(TINDEX)_{t-i} + \sum_{i=0}^{n} \delta_i \Delta(HI)_{t-i} + \sum_{i=0}^{n} \phi i \Delta(CINDEX)_{t-i} + \sum_{i=0}^{n} \theta i \Delta(CPI)_{t-i} + \sum_{i=0}^{n} ¥i \Delta(TERR)_{t-i} + \varepsilon_t \quad (6)$$

The existence and absence of long-run relationships through testing hypothesis will be formulated as. The null hypothesis of (no long-run relationship):

$$H_o: \sum_{i-1}^{N} \alpha_i = 0$$

Alternative hypothesis of (long-run relationship)

$$H_1: \sum_{i-1}^{N} \alpha_i \neq 0$$

For checking the evidence of long-run relationship F-test is used. In case of evidence of finding co-integration among the variables in the model (7) the next long-run model (8) will be estimated

$$(Tindex)_t = \alpha_0 + \sum_{i=0}^{n} \beta_i FTS_{t-i} + \sum_{i=1}^{n} \theta_i TINDEX_{t-i} + \sum_{i=0}^{n} \delta_i (TERR)_{t-i} + \sum_{i=0}^{n} \gamma_i (HI)_{t-i} + \lambda_i(MR)_t + \sum_{i=0}^{n} \phi_i (CI)_{t-i} + \varepsilon_t \quad (7)$$

If equation 7 is satisfied, then we will use the following one.

$$\Delta(Tindex)_t = \sum_{i=0}^{n} \beta_i \Delta(FTS)_{t-i} + \sum_{i=1}^{n} \sigma_i \Delta(TINDEX)_{t-i} + \sum_{i=0}^{n} \delta_i \Delta(HINF)_{t-i} + \sum_{i=0}^{n} \gamma_i \Delta(CINDEX)_{t-i} + \sum_{i=0}^{n} \phi i \Delta(CINDEX)_{t-i} + \sum_{i=0}^{n} \theta i \Delta(CPI)_{t-i} + \sum_{i=0}^{n} ¥i \Delta(TERR)_{t-i} + \alpha_4(MSTABILITY)_t + \theta(ECM)_{t-1} + \varepsilon_t \quad (8)$$

Equation (8) estimates the short-run results and the error correction term ($\theta(ECM)_{t-1}$) shows conversion to equilibrium in the long run, where the value of θ is theoretically said to be negative.

4. Results and Discussions

Table 1 represents the descriptive statistics of all variables. The mean value of the dependent variables per capita income is 1131.687 and the tourism index (Tindex) is 652.141. Moreover, RERR terrorism incidents have the smallest value which is 2 and it is also not normally distributed the p-value of Jarq-Bera is 0. However, of these all variables, TERR is the most uncertain variable.

Table 1. Descriptive statistics

	PCI	**TINDEX**	**HI**	**FTS**	**CINDEX**	**CPI**	**RERR**
Mean	1131.687	652.141	248913.5	4034908	13033.18	7.942	35
Median	1144.664	577.378	230184	3596537	13262.55	7.645	16.5
Minimum	931.701	274.719	13259	2376786	7217.41	2.529	2
Maximum	1452.852	1061.375	690140	6370860	24131.01	20.286	213

S-Deviation	171.680	134.943	205822.7	1300313	4399.188	4.153	49.489
Jarq-Bera	1.873	2.143	1.975	2.622	0.749	4.708	53.246
J-P Value	0.392	0.396	0.372	0.270	0.688	0.095	0
Skewness	0.446	-0.219	0.494	0.457	0.356	0.904	0.219
Kurtosis	2.034	1.661	2.080	1.740	2.570	0.378	8.208

Source: Authors' Calculation

Table 2. Augmented Dickey-Fuller Test Results

	At level		At first difference		
Variables	**t-statistics**	**p-value**	**t-statistics**	**p-value**	**Conclusion**
PCI	-4.360821	0.0107	…	…	I(0)
TINDEX	-1.739541	0.703	-3.959798	0.0004	I(1)
FTS	-0.224426	0.5953	-3.761894	0.0006	I(1)
HI	-0.86804	0.9407	-4.853715	0.0007	I(1)
CINDEX	-4.926239	0.0043	…	…	I(0)
TR	-2.856817	0.1926	-7.78542	0	I(1)
CPI	-2.369967	0.1598	-7.795726	0.0001	I(1)

Source: Authors' Calculation

Table 2 shows the result of the unit root test that reveals that GDP per capita and crime index are stationary at a level. While other variables are stationary at first difference.

Table 3. ARDL Bound Test for Economic Growth and Tourism

Lower Bound	**Upper Bound**	**Significance**
3.02	3.51	10%
3.62	4.16	5%
4.18	4.79	2.5%
4.94	5.58	1%
F-statistics = 4.15 (10%)		

Source: Authors' Calculation

Table 3 represents the results of the bound test for the long-run relationship between tourism and per capita income, which is a proxy for economic growth. Based on the F statistics which exceed the upper bound limit at a 10% level of significance. Hence, we reject the null hypothesis of no co-integration and accept the alternative hypothesis of co-integration between economic growth and tourism.

Table 4. Long Run Coefficient of ARDL

Variable	**Coefficient**	**Std-Error**	**T-Statistics**	**P-Value**
Tindex	0.75404	0.187417	4.023325	0.007
C	706.3955	99.1174	7.126857	0.000

Source: Authors' Calculation

Table 4 indicates that there is a positive and statistically significant long-term association between economic growth and tourism. If 1 unit increase occurs in tourism the economic growth will grow by 0.75 percent. Moreover, our results are steady with the results of many other existing studies in terms of

sign For example, Fareed et al. (2018), Rehman et al. (2020), Naseem (2021), Azam et al. (2022) and Khan et al. (2022), these studies confirmed the long-run link between economic growth and tourism.

Table 5. ECM Results between Tourism and Economic Growth

Variables	coefficient	std-error	t-statistics	p-value
D(PCI(-1))	0.394567	0.15404	2.56146	0.0186
cointEq(-1)	-0.122671	0.033122	-3.173644	0.0014
R-Squared = 0.57 Adjusted-R = 0.55				

Source: Authors' Calculation

Table 5 shows that there is a positive short-run relationship between economic growth and tourism based on statistical evidence. Further, the ECM value is negative and statistically significant, meaning that the dependent variable will move from disequilibrium to equilibrium with a 12 percent speed of adjustment after one year.

Figure 1. CUSUM Test

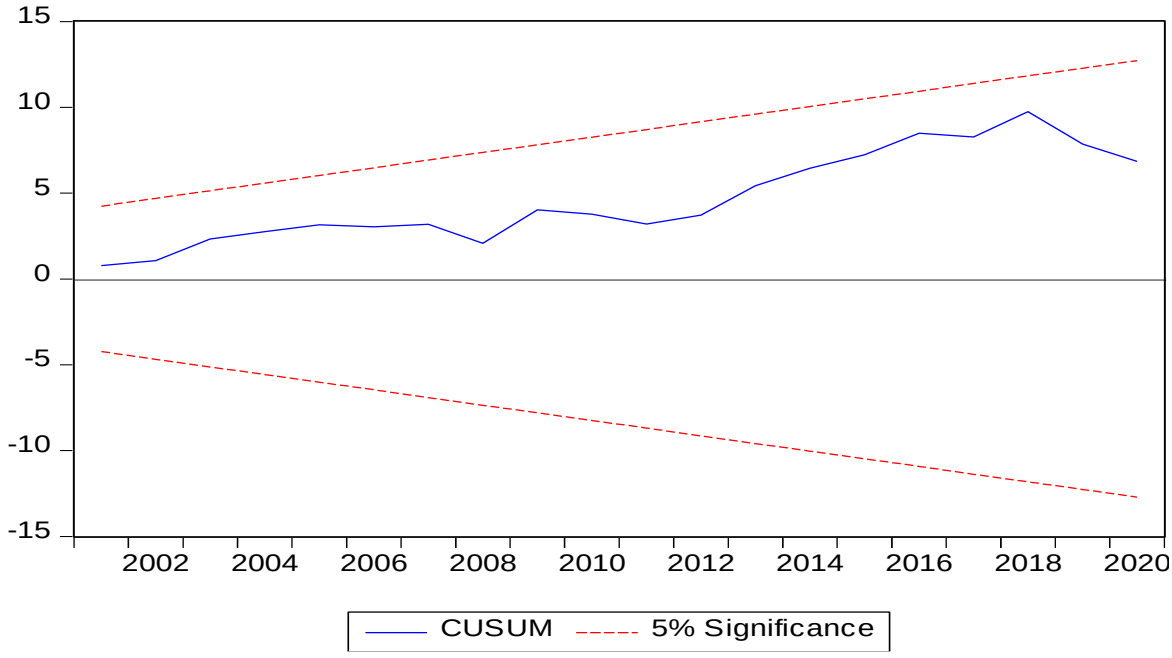


Figure 1 CUSSUM test confirms the stability of coefficients over a period of time. Whenever the coefficients are stable, we accept that the model is stable.

Table 6. Other diagnostic test results

Test	f-statistics	p-value
White heteroscedasticity	0.791945	0.6292
Ramsey specification	0.510793	0.2474
Serial LM test	0.49387	0.6183

Source: Authors' Calculation

Table 6 indicates that there is no heteroscedasticity and nor there is a miss specification of the model. In the white test, we accept the null hypothesis of homoscedasticity. While in Ramsey reset, we accept the null hypothesis of no miss specification and in the serial LM test we accept the null hypothesis of no autocorrelation at all levels of significance.

Table 7. Correlation Matrix

	CPI	**FTS**	**HI**	**CI**	**TERR**
CPI	1				
FTS	0.370254	1			
HINFRAS	0.099938	-0.079597	1		
CINDEX	0.443453	0.403575	0.7537445	1	
TERR	0.462526	0.568373	0.086893	0.4477411	1

Source: Authors' Calculation

Table 8. ARDL Bound Test for Tourism and Its Determinants

Lower Bound	**Upper Bound**	**Significance**
2.12	3.23	10%
2.45	3.61	5%
2.75	3.99	2.50%
3.15	4.43	1%
F-statistics = 7.806297		

Source: Authors' Calculation

Table 7 represents the correlation coefficients between explanatory variables. Further, it indicates that there is no severe multicollinearity, and all the coefficients are desirable.

Table 8 shows us the results of the bound test for tourism and its determinants model. Based on F-statistics which exceed the upper bound values at all levels of significance. Hence, we reject the null hypothesis of no cointegration and accept the alternative of cointegration among the variables.

Table 9. Long Run ARDL Results

Variable	**Coefficient**	**std-error**	**t-statistics**	**p-value**
FTS	0.00024	5.03859	4.7685	0.005
HI	0.0002348	0.000294	7.985401	0.0005
CPI	15.13381	7.00622	2.160053	0.0832
MR	-159.269	66.87544	-2.381577	0.063
CINDEX	-0.08284	0.025358	-3.266783	0.0223
TERR	-1.804773	0.446377	-4.043157	0.0099
C	242.3032	102.8352	2-356229	0.0651

Source: Authors' Calculation

Table 9 represents the long-run relationship between tourism and its determinants. Further, we obtained that FTS, which is a proxy for technology has a positive and statistically significant slender impact on tourism. Moreover, this result is consistent in terms of signs with other foreign studies such as Lee et al. (2021), Sharma et al. (2022), Adeleye (2023), and differs from Nadeem et al. (2020), results in terms of sign in case of Pakistan. Similarly, hard infrastructure has a positive and statistically significant weak impact on tourism in Pakistan.

However, the weak impact of FTS and HI may be due to two reasons. The first one is, that the government of Pakistan has not been able to fully concentrate on the long run-on soft infrastructure and hard infrastructure. Another, the weak impact of FTS and HI can be linked with terrorism. Khan and Rasheed (2016) revealed in their study that whatever, efforts made by the government for tourism development will be meaningless until terrorism is eliminated. I is found that terrorism has a strong statistically significant negative impact on tourism. If the number of incidents increases, it will create threats and uncertainty and will lead to a decrease in tourism by -1.80.

The results of terrorism are uniform in sign with many other studies, including Khan and Rasheed (2016), Raza and Jawaid (2013), Santana-Gallego et al. (2016), and Nadeem et al. (2020). Moreover, the relationship between tourism and CPI is positive and statistically significant in the long run and it differs from other study's findings. The logical reason behind this relationship may be the exchange rate depreciation in recent years. Researchers claimed that in Pakistan exchange rate depreciation has a major role in inflation in Pakistan (Khan and Gill, 2010). Maybe it's due to the indirect link of exchange rate depreciation with tourism. Thus, tourists may be replaced by exchange rate depreciation over inflation. Because, if changes in exchange rate depreciation are greater than changes in inflation rate, it will provide economic benefits for international tourists in the form of purchasing power.

The crime index has a statistically significant long-run negative relationship with tourism in Pakistan. Countries where crime activities prevail will destroy the soft image of those countries and will lead to a fall in the inflow of international tourists. Hence, in the case of Pakistan, if there is a unit increase in crimes, it will decline the tourism by -0.08. Moreover, this result aligns with other studies' findings in terms of sign (Rauf et al., 2022, Santana-Gallego et al., 2016, Moyo and Ziramba, 2013). Furthermore, it is found that MR, which is a proxy for military regimes, has a statistically significant negative impact on tourism in Pakistan.

The dictatorship comes into power by force, which deviates from democracy and foreign tourists are more sensitive towards the democratic system. The coefficient value of dictatorship is -159.2690. It means due to military regimes the tourism industry suffered a lot from dictatorship and is still suffering due to the poor decisions of the past. Further, it shows us, that if dictatorship gets control in Pakistan, it will have serious negative consequences on tourism and will decline tourism by -159.2690, in Pakistan.

Table 10. ECM Results of Tourism and Its Determinants

Variables	coefficient	std-error	t-statistics	p-value
D(fts)	8.743201	3.660015	2.384669	0.0298
d(HI)	0.001001	0.000454	2.206446	0.0423
d(CPI)	15.79089	7.309389	2.160358	0.0463
d(TERR)	0.208736	0.356798	0.585025	0.5667
MS	-18.58214	39.45617	-0.470956	0.644
d(CINDEX)	-0.040952	0.023486	-1.743702	0.1004
Ect(-1)	-0.941732	0.298124	-3.158855	0.0061
C	27.90695	26.82736	1.040242	0.3137

Source: Authors' Calculation

Table 10 represents the short-run relationship between tourism and its determinants. Further, the results revealed that FTS, HI, and CPI have a positive and statistically significant short-term impact on tourism. While military regime, cindex has a statistically insignificant negative impact on tourism in the short run. It is found that terrorism has a positive impact on tourism, but statistically insignificant. The value of the ect(-1) is -0.941732 and statistically significant. It means, that the dependent variable will move to its equilibrium by the speed of adjustment -0.941732 after one year. The overall model is significant at a 10 percent level of significance.

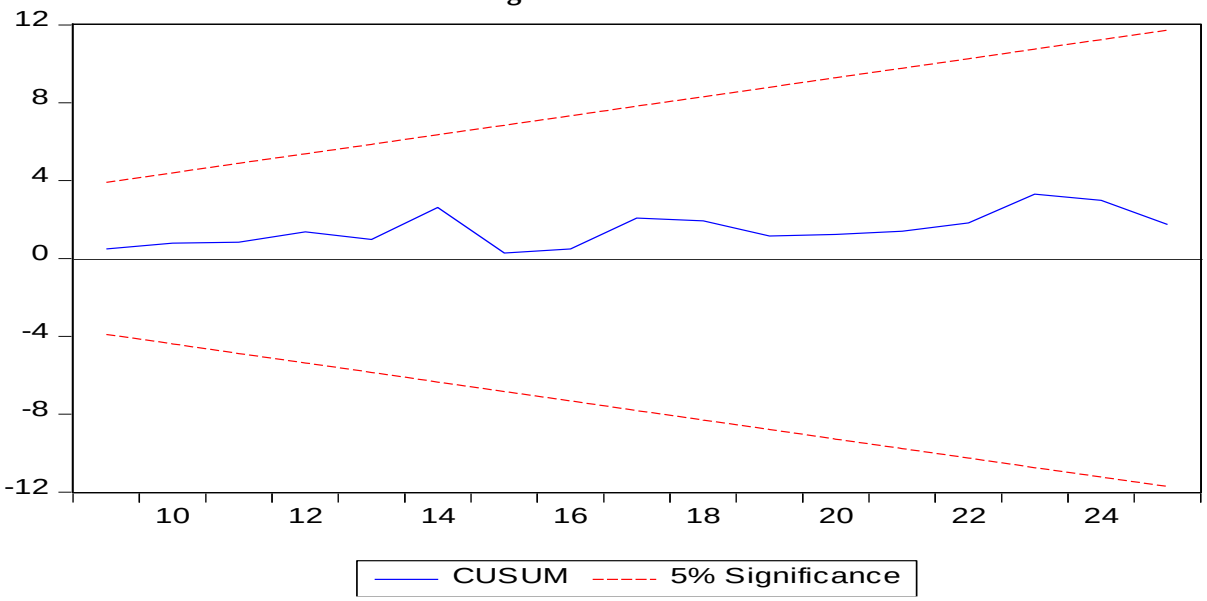
Table11. Diagnostic tests results

Test	f-statistics	p-value
ARCH	0.969660	0.3360
Ramsey specification	0.799561	0.4357

Source: Authors' Calculation

Based on table 11 we accept the null hypothesis of no heteroskedasticity and as well accept the null hypothesis of no miss specification of the model.

Figure 2. Cusum Test



The cusum test shows that a green line occurs between upper and lower red lines, and it confirms the stability of the model.

5. Conclusions and Policy Implications

Tourism plays a crucial role in the economic growth of the countries. It encourages foreign exchange reserve and income generation; and creates employment directly and indirectly, in the domestic economy. Therefore, this study has used two models to analyze the impact of tourism on economic growth and tourism determinants. For this purpose, we gathered time series data from the period 1995 to 2021 and estimated short-run and long-run results using ARDL. For obtaining valid results this study employed different statistical tools, such as the augmented Dickey-Fuller test (ADF) for unit root, White and ARCH for the detection of heteroscedasticity, Correlation Matrix for multicollinearity detection, CUSSUM Test for checking the stability of the models. Moreover, this study has constructed tourism and crime indexes for the first time.

In the first model, it is found that tourism has a statistically significant relationship with economic growth in the short run as well as in the long run. If a positive shock occurs in tourism, it will boost the economic growth of Pakistan While, in the second model, terrorism, crime index, and military regime, are influential factors, which adversely affect tourism in Pakistan in the long run. Furthermore, the nexus of tourism was positive with fixed telephone subscription (FTS) which is a proxy for technology infrastructure and transport and storage communication (HI) in the long run. However, its impact was negligible. In the short run the consumer price index (CPI), FTS, and HI have a positive effect on tourism. In addition, the model diagnostic tests show that there were no problems of autocorrelation and heteroscedasticity, Ramsey reset test and Serial LM test results were also satisfactory.

In light of the empirical findings the study suggests the following policy options: To increase the contribution of tourism to the economy, the government needs to explore the natural beauty,

archeological spots, and cultural beauty, in the world through different advertisements. Moreover, the government must overhaul the organization, which has been authorized for the development of the tourism industry in Pakistan. Furthermore, the government needs to pay more attention to the hard infrastructure and soft infrastructure which are necessary for boosting tourism in the economy. Soft infrastructure means that different artificial things with highly equipped technology should be developed in tourist destinations to attract tourists.

Secondly, the ICT infrastructure needs to be developed to provide accessibility to foreign tourists through different software applications- visa service should be advanced so that foreign tourists may not face any difficulty in getting visas. Tourism organizations need to provide all information regarding the different tourist destinations on software so that foreign tourists get information easily. However, before spending a significant amount on ICT infrastructure and hard infrastructure, the government should design an effective policy and plan to tackle terrorism in Pakistan. If the terrorism issue is resolved completely, then spending on both infrastructure for tourism, and advertisement for tourism will bring fruitful output.

Moreover, to provide a clean environment without criminal activities, the government must advance the police system to reduce criminal activities in tourist destinations. It will not only play an important role in the reduction of criminal activities but also will reduce terrorism in Pakistan.

Acknowledgments

The authors acknowledge the useful comments from the Editor and anonymous reviewers. Certainly, all remaining errors are our own.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding if any

Nil

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