

## Relationship among Globalization, Terrorism, and Economic Growth in Pakistan

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### Abstract

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*The current study investigates the interconnection of globalization, terrorism, and economic growth in Pakistan over the period of 1972 to 2019. ARDL co-integration bound test is used to establish the relationship among these variables. Limited empirical evidence is available on terrorism and globalization, particularly with reference to Pakistan. The empirical evidence confirms the long-run association among globalization, terrorism, and economic growth. Growth in per capita GDP increases terrorism because higher economic growth is not evenly distributed in Pakistan, while globalization reduces terrorist activities. Globalization, particularly political integration with rest of the world provides technical and financial assistance to overcome terrorism in Pakistan. Moreover, there is unidirectional causality from GDP growth to terrorism and bidirectional causality between globalization and terrorism. However, no evidence of causality is found between globalization and economic growth. This indicates that Pakistan is unable to get economic benefit from globalization because of its internal structural issues.*

**Keywords:** Economic Growth, Globalization, Terrorism,

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## 1. INTRODUCTION

Globalization is a complicated phenomenon and may be translated in different ways. It is the international interaction, interdependence, and integration of domestic economies across world. The movement and exchange have speeded up due to deepening and widening of global interconnectedness. The newly formed global system of mutual interdependence has created a flat world. Globalization is thought to be an imperative feature which can affect the economies of the countries. Nevertheless, its influence on economic growth is considered to be one of the most debatable issues. Some studies indicate promising effects of globalization on economic growth (Dollar, 1992; Dreher, 2006; Sapkota, 2011; Dogan, 2013; Lee, 2014; Hasan, 2019), whereas others argue weak and adverse effects (Rodriguez and Rodrik, 2000 and Umaru *et al.*, 2013).

Globalization provides opportunities for economic development and at the same time it imposes challenges within the domestic economics. Its impact is not uniform in all the regions of the world. Some countries or groups have benefitted significantly from economic integration in the form of higher growth, lower unemployment, poverty, and income inequality (Bhalla, 2002; Nissanke and Throbecke, 2006; Sapkota, 2011; Dogan 2013 and Lee, 2014), while others show adverse impact on these variables (Bourguignon and Morrisson, 2002 and Bensidoun *et al.*, 2011). Generally, if the benefits of liberalization policies are concentrated and not evenly distributed among mass population, certain groups may oppose economic, political, and social systems linked with globalization. Occasionally, these opponent groups can create an instable environment to attain their objectives. Hence, globalization can be viewed as a cause of clash in the form of terrorist attacks (Wilkinson, 2005). This, in turn, weakens a government's capability to attain its socio-economic and political goals.

The current wave of globalization has declined the importance of nation state due to a higher degree of interdependence of domestic economics in the economic, social, and political structures of global system. According to the finding of Li and Schaub (2004), highly integrated economies tend to become more vulnerable to terrorist attacks. Growing flow of international trade through various modes of transportation can increase the likelihood of a terrorist to smuggle people, banned material, or weapons undetected among or between the borders in question. On the contrary, a few researchers argue that economic liberalization decreases the terrorist attacks. They believe that globalization soars economic development that sequentially reduce the number

of terrorist attacks. Some form of international integration with the global system is linked with lower number of terrorist activities (Li and Schaub, 2004). However, this argument is not well established and needs systematic empirical investigation. Terrorism can be defined as use of violence and unlawful force by non-state agents to attain economic, social, political, or religious aims through intimidation and fear. Terrorism creates severe problems in determining the economic growth of the economy. Both the developed and developing economies incur huge costs of terrorism in terms of loss of human life, damage to infrastructure and other valuable assets. Moreover, it is found that terrorism and violence have an adverse effect on future consumption because individuals prefer to consume in the current time period so they replace their savings for current consumption. Therefore, it reduces the process of capital accumulation and economic development (Shahbaz *et al.*, 2013). Several studies mentioned poverty, unemployment, trade in addition to other economic factors as the main causes of terrorism (Bukhari and Masih, 2016). There are different sources of terrorism including social, economic, political, religious, demographic, geographical, and psychological factors (Ismail and Amjad, 2014). Government organizations, religious bodies, police, military, transport, media, and airport are among the most targeted areas. Terrorists use various types of strategies i.e., suicide attacks, bomb blasts, armed attacks, kidnapping, and hijacking to achieve their goals. All forms of terrorist activities badly affect the physical capital and human capital stock of a country (Abadie and Gardeazabal, 2008 and Khan *et al.*, 2016). It increases the counter-terrorism expenditure and uncertainty about future.

Literature indicates various studies that show negative interconnection between growth and terrorism. For example, Afonso-Rodríguez (2017) demonstrated an inverse association between the two variables in Turkey. Similarly, Fareed *et al.* (2018) also elucidated a negative interrelation between the same variables in case of Thailand. Furthermore, Zakaria *et al.* (2019), Saleem *et al.* (2020) and Korotayev *et al.* (2020) also explained a negative connection between terrorism and economic growth. On the other hand, literature has yet to come up with empirical findings on globalization-terrorism nexus. However, few studies describe the relationship between these two variables but the results are inconclusive. For instance, according to Asongu and Biekpe (2018), globalization is giving rise to terrorism in African region whereas Bajaj and Rao (2018) could not prove a direct correlation between globalization and terrorism. While, Rajput *et al.* (2021) found that economic globalization is helping to decrease terrorism activities but social and political

globalization is nurturing the terrorism activities, even though the said result is not significant.

Limited literature on terrorism, economic growth, and globalization motivated the researchers to examine the relationship among the said indicators. It is essential to highlight that the interconnection among these variables is not clear in Pakistan's case. Pakistan is facing the challenge of terrorism for several years and at the same time the pace of globalization has drastically increased. Hence, the question of how the global economic and political networks are associated with terrorism and how it can influence terrorist activities in Pakistan is a major concern of policy makers. Furthermore, another important issue is how the forces of globalization and terrorism is affecting economic growth of Pakistan. Therefore, it is critical to establish the relationship among these variables so that policies can be designed regarding the direction and nature of association among terrorism, globalization, and economic development. In this respect, the present study is providing profound insights in various ways to the existing strand of literature in case of developing economies. The first goal of the present study is to inspect and determine the direction of association among globalization, terrorism, and economic growth in Pakistan. Second, this study develops a comprehensive index of terrorism by incorporating three major indicators: number of incidents, fatalities, and injuries. Third, the study will add to the smaller pool of the prior literature focused on globalization and terrorism nexus in Pakistan by using the latest available data. Finally, the present empirical analysis will provide suitable policy suggestions not only for Pakistan but also for other developing economies.

## **2. LITERATURE REVIEW**

Existing literature is distributed into three parts to understand the relationship among the selected variables. Part one of this section deals with the studies that establish a connection between globalization and economic growth. Part two of the literature review present the studies dealing with terrorism and economic growth. Finally, the relationship of globalization and terrorism is provided in the last part of this section.

### **2.1. Globalization and Economic Growth**

Available literature regarding the connection between globalization and economic growth discloses inconclusive and contradictory outcomes. Some studies show favourable effect of globalization on economic progress

(Dreher, 2006; Georgiou, 2011; Hasan, 2019), while others show weak or even negative effects. Therefore, the literature is further forked into two categories on the basis of empirical and theoretical findings. The first category deals with the studies that provide evidence to support globalization for fostering economic growth. In this regard, the studies of Dollar (1992), Greenway *et al.* (1999) and Brunner (2003) showed that trade liberalization is positively related to economic growth.

Later, Dreher (2006) used a broad index of globalization, Konjunkturforschungsstelle (KOF), to determine the association among globalization and economic growth. The results show promising outcome of globalization on economic growth. Similarly, the studies of Afzal (2007); Shaik and Shah (2008); Rao and Vadlamannatio (2011); Mutascu and Fleisher (2011); Leitao (2012) and Meraj (2013) also found positive connotations between economic growth and globalization. In the same perspective, Latif *et al.* (2018) postulated the globalization – growth nexus for BRICS block and postulated a favourable association between these two variables. Santiago *et al.* (2020) took the sample of Latin America and Caribbean countries and elucidated a positive connection between globalization and economic growth. For OECD economies, Kurniawati (2020) also postulated a positive association between the variables of discussion.

The second group of literature comprises of studies that reject the favourable effect of globalization on economic growth. In this respect, Rodriguez and Rodrik (2000) negated the findings of Dollar (1992) and others and highlighted that these studies used incomprehensive and inappropriate measure of trade openness. Likewise, the study of Umaru *et al.* (2013) also presented the harmful result of globalization on petroleum, solid mineral, and manufacturing sectors of Nigerian economy. Ghosh (2017) also supported the unfavourable interrelation between the said variables. However, Titalessy (2018) inferred a mix evidence for selected Asian Pacific economies. The study interpreted that economic and political globalization exerts a positive effect on growth process while the social globalization exerts a detrimental effect on growth. In a comparatively recent study, Acheampong *et al.* (2021) illustrated the asymmetric interconnection between globalization and growth for the case of 23 developing economies.

## **2.2. Globalization and Terrorism**

Pakistan's economy has been suffering from internal and external shocks throughout the history but the effects of these shocks have increased

after 9/11. Unstable economic factors such as high inflation, fiscal deficit, lack of human and physical capital, political instability, high foreign debt, low exchange rate, natural disasters, and unfavourable law and order adversely affect the economic growth of Pakistan (Ali and Rehman, 2015).

Little systematic empirical evidence is available on the association between globalization and terrorism. Although studies are available on how terrorism affects international integration (Murphy, 2002; Blomberg and Hess, 2005; Khan and Estrada, 2016) but such studies came up with limited empirical signs on how globalization affects terrorism.

Cronin *et al.* (2006) provided a theoretical framework on the association between globalization and international terrorism. According to this study, pragmatic approach regarding global networks of intelligence sharing and law enforcement can halt terrorism. The study of Li and Schaub (2004) examined the impact of economic globalization on transnational terrorism. The results reveal that foreign direct investment (FDI), management of portfolio investment and trade have no direct influence on terrorist activities inside the borders for the dataset of 112 countries over the period of 1975 to 1997. However, globalization has an indirect adverse effect on transnational terrorism. In contrast, Lutz and Lutz (2015) show that globalization is positively associated with terrorism in Middle East. Asongu and Biekpe (2018) examined the same nexus for African economies and inferred that globalization is positively connected with terrorism. Bajaj and Rao, (2020) could not find a direct interconnection between these two variables. Naseer *et al.* (2021) discussed the case study of a developing economy and elucidated that globalization is one of the leading factors of terrorism. Rajput *et al.* (2021) also illustrated the globalization- terrorism nexus for 195 economies. The empirical analysis revealed that economic globalization exerts a negative influence of terrorism; however, the study could not find the significant correlation between political and social globalization and terrorism.

### **2.3. Terrorism and Economic growth**

This section describes the existing literature on terrorism and economic growth. Terrorism influences the equilibrium decision of international investors in an integrated world economy. It hurts the economy through open-economy channel. The terrorist risk shifts the capital across other countries, which reduces the net foreign investment (Abadie and Gardeazabal, 2008).

Shahzad *et al.* (2013) analyzed the casual association between terrorism and economic growth by including the variable of trade liberalization and capital in conventional production function in Pakistan. The results

illustrate bidirectional causality among trade liberalization, terrorism and capital, whereas unidirectional causality is found from terrorism to economic growth. Later on, Shahzad *et al.* (2016) carried out a study on foreign direct investment complimented with terrorism's impact on economic growth. It inferred analogy among FDI, terrorism, and economic growth in the long term and also came up with the findings that there is two-way causality between FDI and economic growth. Ismail and Amjad (2014) also shows a long-run association between terrorism and macroeconomic indicators. Findings of this study indicate one-way causality from per capita GDP, GDP growth, unemployment to terrorism, and two-way causality between inflation and terrorism.

Hyder *et al.* (2015), Khan *et al.* (2016) and Khan and Estrada (2015) show negative influence of terrorism on economic growth. However, Caruso and Schneider (2011) validate the favourable relationship between terrorism and per capita GDP in Western Europe. Bukhari and Masih (2016) indicated a strong tie between GDP growth and terrorism in the long run in Pakistan. Rising per capita income is related with higher income inequality; therefore, it contributes to terrorism. In contrast, Malik and Zaman (2013) show that unemployment, trade openness, and income inequality have no long-run association with terrorism in Pakistan. Afonso-Rodríguez also illustrated an inverse impact of terrorism on growth in Turkish economy. Çınar (2017) confirmed a negative connectedness between terrorism and growth for 122 developing economies. Fareed *et al.* (2018) discussed a case study of Thailand and revealed that terrorism is showing a harmful impact on growth. Zakaria *et al.* (2019) explored the same nexus for Pakistani economy and highlighted that terrorism diminishes economic growth. On the same lines, for Pakistani economy, Saleem *et al.* (2020) illustrated the same nexus and inferred the inverse connotation between these two variables. Korotayev *et al.* (2020) also confabulated the terrorism-growth nexus and concluded that terrorism exerts an unfavourable influence on growth in a group of developing economies.

The relationship among globalization, terrorism, and economic growth is complex in a way, that globalization increases economic growth and in turn higher growth rate and global networks are helpful in reducing terrorism, while its adverse effect on economic growth and transnational terrorist activities cannot be ignored. Economic and socio-political liberalization under the umbrella of globalization increases the coincidental of terrorism.

### 3. THEORETICAL FRAMEWORK

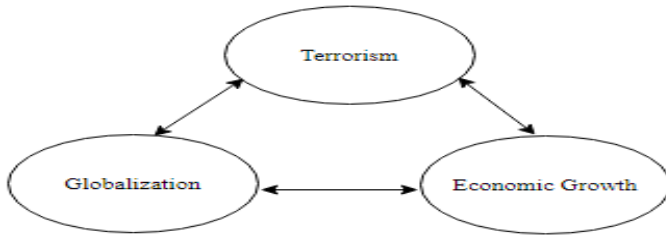
It is observed in literature that direct or indirect link can be established among globalization, economic growth, and terrorism. Various studies show that these variables may affect each other. However, the direction and relationship between these variables is not clear. In this regard, the studies of Fareed *et al.* (2018) and Saleem *et al.* (2020) concluded negative connotation between terrorism and economic growth. While, Bukhari and Masih (2016), Caruso and Schneider (2011), Amjad and Ismail (2014) found positive link between terrorism and GDP growth. The association between globalization and growth is also indecisive. Greenway *et al.* (1999) and Hasan (2019) showed that globalization is directly related to economic growth while, Rodriguez and Rodrik (2000) showed negative association between these two variables. Furthermore, the relationship between terrorism and globalization also showed mixed results. Hence, it can be concluded from the above discussion that globalization can be a blessing and a curse simultaneously. Thus, globalization, terrorism, and economic growth seem to affect each other. Given the issues discussed above, we hypothesize the following:

- i. Globalization and economic growth do not affect terrorism.
- ii. Globalization and terrorism do not affect economic growth.
- iii. Economic growth and terrorism do not affect globalization.

Figure 1 shows the relationship among terrorism, globalization, and economic growth. Three possible links are highlighted among the selected variables. First, Globalization may have an impact on terrorism while there is also a possibility that terrorism affects the level of integration of the economy with the rest of the world. For example, if there are more terrorist activities in any country then the global political network becomes active to rectify the conflict for global peace. In addition, more global integration increases the threat of cross broader terrorism. Hence, the link between globalization and terrorism can be established. Second, economic growth can affect the terrorist activities and terrorist activities may also influence economic growth. Pro-poor economic growth may minimize the violence and terrorism. However, higher terrorist activities are always associated with harmful effects on growth either in the form of loss of capital, assets, or uncertainty in investment decision. Third, globalization may cause growth or in some cases growth may increase global integration. For instance, higher growth of economy creates more linkages with the rest of the world, therefore, increasing globalization.



Figure 1. Relationship among Terrorism, Globalization and Economic Growth



It can be concluded from the above analysis and existing literature that a relationship exists among terrorism, globalization, and growth but the direction of relationship is not conclusive as it depends on the structure and ongoing policies of the economy. The international relations and global interdependence of domestic economies are critical in exerting a favourable effect on economic growth particularly in developing economies such as Pakistan. Economic growth can serve as an instrument to strengthen the international relations at various levels. Moreover, these global relationships are also important in affecting the terrorism inside and outside border and economic growth is also influential to effect terrorism.

#### 4. ECONOMETRIC METHODOLOGY

Standard time series econometric procedure is followed in order to establish a relationship among terrorism, globalization, and economic growth.

Figure 2. Empirical Test Procedure

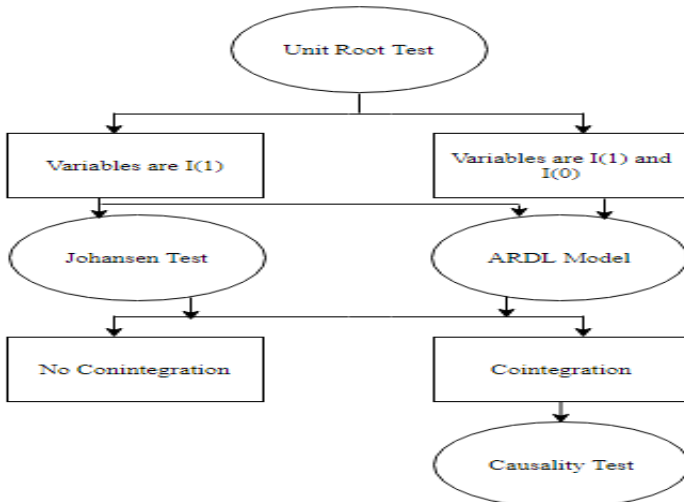


Figure 2 shows the empirical test procedure of the time series data. The standard procedure reveals that if the variables are integrated of order 1 then Johansen test of cointegration or ARDL bound test can be applied. Further, in case of cointegration the causality test can determine the direction of causality. Therefore, in this study, empirical equation is modeled as follows:

$$\ln TER_t = \phi_1 + \phi_2 \ln GLOB_t + \phi_3 \ln GDP_t + \mu_t \quad \dots(1)$$

$TER_t$ ,  $GLOB_t$  and  $GDP_t$  indicate terrorism index, globalization index, and real per capita GDP respectively. The specification will observe the impact of globalization and economic growth on terrorism. Hence, we estimate the given equation through ARDL model. The estimation results will also provide the short-run and long-run coefficients that how economic growth and globalization are affecting terrorism in case of Pakistan.

Autoregressive Distributed Lag Model (ARDL), proposed by Pesaran *et al.* (2001) is applied for examination of the linkages among globalization, terrorism, and economic growth. This test of cointegration is favoured over conventional cointegration methodologies due to some advantages. For example, ARDL bound test may be used irrespective of the order of integration of the variables as it may be integrated of order I (1) or I (0). ADRL bound test is appropriate for small data sample and provide better results in comparison with Engle and Granger (1987), Phillips and Hansen (1990) and the Johansen and Juselius (1990) approaches (Zhang and Yue, 2002). Cointegration techniques hold the advantage as they are not based on the presumptions of endogeneity and exogeneity of variable. The ARDL bound test to examine the presence of cointegration is as follows:

$$\begin{aligned} \Delta \ln GLOB_t &= \alpha_0 + \alpha_{GLOB} \ln GLOB_{t-1} + \alpha_{TER} \ln TER_{t-1} + \alpha_{GDP} \ln GDP_{t-1} \\ &+ \sum_{i=1}^p \alpha_i \Delta \ln GLOB_{t-i} + \sum_{k=1}^r \alpha_k \Delta \ln TER_{t-k} + \sum_{l=1}^s \alpha_l \Delta \ln GDP_{t-l} + \mu_t \quad \dots (2) \end{aligned}$$

$$\begin{aligned} \Delta \ln TER_t &= \gamma_0 + \gamma_{GLOB} \ln GLOB_{t-1} + \gamma_{TER} \ln TER_{t-1} + \gamma_{GDP} \ln GDP_{t-1} + \\ &\sum_{i=1}^p \gamma_i \Delta \ln GLOB_{t-i} + \sum_{k=1}^r \gamma_k \Delta \ln TER_{t-k} + \sum_{\ell=1}^s \gamma_\ell \Delta \ln GDP_{t-\ell} + \mu_t \quad \dots (3) \end{aligned}$$

$$\begin{aligned} \Delta \ln GDP_t &= \delta_0 + \delta_{GLOB} \ln GLOB_{t-1} + \delta_{TER} \ln TER_{t-1} + \delta_{GDP} \ln GDP_{t-1} + \\ &\sum_{i=1}^p \delta_i \Delta \ln GLOB_{t-i} + \sum_{k=1}^r \delta_k \Delta \ln TER_{t-k} + \sum_{\ell=1}^s \delta_\ell \Delta \ln GDP_{t-\ell} + \mu_t \quad \dots (4) \end{aligned}$$

The intercept term is shown by  $\alpha_0$ ,  $\gamma_0$  and  $\delta_0$ . To examine the cointegration existence, compare F-statistic with tabulated critical bounds provided by Pesaran *et al.* (2001). If F- statistic value is higher than upper critical bound, then it implies that there is cointegration relation. However, if calculated F-statistic is smaller than the lower critical bound, no cointegration hypothesis will be accepted. The result regarding cointegration is indecisive if the F-statistic value lies between higher and lower and critical bounds.

## 5. DATA AND CONSTRUCTION OF VARIABLES

### 5.1. Terrorism Index

In the current study we have developed a terrorism index with the help of principal component analysis (PCA). The index is developed by using three indicators of terrorism i.e. (i) incidents, (ii) fatalities, and (iii) injuries. Index is developed by standardizing each variable and then PCA is applied to obtain weight. This index is constructed as follows:

$$Terrorism\ index = \sum_{j=1}^m \alpha_j Z_j$$

$$Z_j = \frac{X - X^{min}}{X^{max} - X^{min}}$$

Where  $\alpha_j$  is the derived weight of each variable and  $Z_j$  is the scale free observation of  $j^{th}$  variable that follows the normalization technique.

$$Terrorism\ Index = \alpha_1 Z_1 + \alpha_2 Z_2 + \alpha_3 Z_3$$

$$Terrorism\ Index = \alpha_1(Incidents) + \alpha_2(Fatalities) + \alpha_3(Injuries)$$

$\alpha_1, \alpha_2$  and  $\alpha_3$  is the corresponding weight of each variable obtained through PCA.  $Z_1, Z_2$  and  $Z_3$  is number of incidents (events), number of fatalities, and number of injuries respectively. The constructed index lies between zero to one. Hence, values closer to zero show low terrorist activities while values close to one indicate high terrorism.

Goodness of fit of terrorism index is measured by various indicators. These indicators are mentioned below.

Discrepancy	0.018
Root mean square residual (RMSR)	0.024

Bentler-Bonnet normed fit index (NFI)	0.946
Bollen relative fit index (RFI)	0.911

Smaller values are desirable for Discrepancy and Root mean square residual (RMSR) whereas, the value should be 0.90 or greater for RFI and NFI. Results show that all the indicators are in desirable range (fit range). Data on incidents, fatalities, and injuries are collected from global terrorism database (GTD).

## 5.2. Globalization Index

The study uses the Konjunkturforschungsstelle (KOF) index of globalization. KOF index covers three major aspects comprised of economic, social, and political dimensions of globalization. It is considered as a comprehensive index among the indices and proxies (FDI, capital flows, trade flows and etc.) of globalization. The overall globalization index is derived by using three major dimensions of globalization. Economic dimension uses the variables such as trade and financial flows, while trade restraints are also used in the construction of the index. Political globalization comprises of a set of variables that are related to political collaboration at international level. Social globalization mentions the variables that indicate the flow of information, ideas, people, and culture. Hence, a total of 23 variables are used for the construction of KOF index. The data on KOF index is attained from ETH Zurich data base ([www.kof.ethz.ch](http://www.kof.ethz.ch)).

## 5.3. GDP Per Capita

Real GDP per capita is used to reflect economic growth of an economy. Data are taken from the data base of World Bank ([www.Data.worldbank.org](http://www.Data.worldbank.org)). All the indices and data used in this study are converted into log form. This study covers a time period from 1972 to 2019.

## 6. RESULTS AND DISCUSSION

Augmented Dickey-Fuller (ADF) test has been used to test the stationarity of data. The results are presented in Table 1. All the three series are found to be stationary at first difference at 1% level of significance.

Table 1. Results of ADF Unit Root Test

Variable	Test statistic at level	Test statistic at first difference	Conclusion
Real per capita GDP	-0.347	-5.428*	I (1)
Globalization index	-0.354	-6.187*	I (1)
Terrorism index	-1.031	-7.721*	I (1)

To apply ARDL, it is essential to choose lag length. The criteria for lag length are presented in Table 2. The table indicates Sequential Modified LR Test (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC), and Hannan-Quinn (HQ) Information Criterion for choosing appropriate lag length. It is important to note that all the criteria are choosing lag one. Hence, suitable lag length for the given model is one in case of Pakistan.

Table 2. Lag Selection Criteria

Lag	Log L	LR	FPE	AIC	SC	HQ
0	78.884	NA	6.38e-06	-3.449	-3.327	-3.404
1	261.993	332.924*	2.33e-09*	-11.363*	-10.876*	-11.182*
2	268.196	10.432	2.67e-09	-11.236	-10.384	-10.920
3	272.181	6.157	3.41e-09	-11.008	-9.791	-10.557

Results of ARDL bound test to cointegration is presented in Table 3. The value of Wald F-statistics is 6.777, and is greater than the upper bound at 1% level of significance. This shows that terrorism, globalization, and economic growth have a long-term relationship in case of Pakistan during 1972 to 2019. The present study uses the critical bound provided by Pesaran *et al.* (2001). Section II of this table shows diagnostic test. Breusch-Godfrey serial correlation LM test indicates no serial correlation. Moreover, white test and ARCH test of heteroskedasticity reveals that residuals are free from the problem of heteroskedasticity. Johansen test to cointegration is also employed to check the robustness of results for long-run association among terrorism, globalization, and economic growth. Johansen test results are shown in Table 4. Since all the under consideration variables are integrated of order one I (1), thus, we can also apply Johansen test. Trace test and Lmax test (critical value is less than trace statistic and Lmax statistic) indicates existence of one cointegration vector at 5% level of significance. Therefore, the time series data

are mutually cointegrated by a common vector. It endorses the robustness of long-term association among terrorism, globalization, and economic growth.

Table 3. Results of ARDL Bound Testing to Cointegration

Section I-Model: $TER_t/GDP_t, GLOB_t$			
Wald Test Stat	6.776670*		
Critical Bound	I(0)	I(1)	
1%		5.288	6.309
5%		3.739	4.855
10%		3.182	4.126
Section II-Diagnostic Test			
R <sup>2</sup>	0.603		
Adjusted R <sup>2</sup>	0.509		
$\chi^2$ LM Serial	0.707 (0.705)		
$\chi^2$ White Test	27.423 (0.441)		
$\chi^2$ ARCH	1.194 (0.275)		

Note:\* Indicates significance at 1% level. Values in brackets show probability.

Table 4. Results of Johansen Test

Rank	Eigen value	Trace test	Critical value	Prob.	Lmax test	Critical value	Prob.
0	0.380	30.644	29.797	0.04	21.577	21.131	0.043
1	0.127	7.066	15.494	0.57	6.136	14.264	0.595
2	0.020	0.929	3.841	0.335	0.929	3.841	0.335

Short-run analysis is displayed in Table 5. It shows that economic growth and globalization is decreasing terrorism in Pakistan but they are not statistically significant. Error correction term (ECT) is statistically significant at 1% level and the negative sign with ECT implies that the entire system converges to long-term equilibrium with the speed of 107%. Diagnostic tests show that there is no problem of serial correlation and heteroskedasticity. In order to check serial correlation, LM test is employed which shows no indication of serial correlation. ARCH test and White test is used to detect heteroskedasticity and the result implies that the model is free from the problem of heteroskedasticity. Coefficients of long-run estimates are given in Table 6. Economic growth is positively affecting terrorism in Pakistan. It means that if per capita GDP rises by 1%, it will raise terrorism by 7.13%. Surprisingly, the present study shows positive association between per capita GDP and terrorism but it is consistent with the finding of Caruso and Schneider (2011) and Shahbaz (2013). However, it can be noted that GDP per capita growth is linked with uneven income distribution

in Pakistan for the last few years (CIA Fact Book, 2016). Higher income inequality results in higher poverty and consequently, it encourages the poor segment to fulfill their basic needs through unfair mean. The unfair means can take the violent form of armed attack, bombing, and even suicide attacks. Social, economic, and political injustice are considered to be potential sources of terrorism and in case, if higher economic growth is concentrated to only upper segment of the society then its consequence can be seen in the shape of terrorism.

Table 5. Results of Short-Run Analysis

Variable	Coefficient	t- stat
Dependent variable: lnTER		
Constant	0.078	0.692
$\Delta \ln \text{GDP}$	-3.323	-0.387
$\Delta \ln \text{GLOB}$	-1.156	-0.221
ECT	-1.072*	-4.231
Diagnostic test		
R <sup>2</sup>	0.561	
Adjusted R <sup>2</sup>	0.511	
$\chi^2$ LM Serial	0.136 (0.713)	
$\chi^2$ White Test	5.848 (0.970)	
$\chi^2$ ARCH	0.707 (0.400)	

Note: \* Indicates significance at 1% level. Probability values are given in parenthesis.

In the same perspective, a relatively recent finding of Lassoued *et al.* (2018) and Korotayev *et al.* (2021) also provide negative evidence on growth-terrorism nexus for a group of developing economies. Another possible explanation for this result can be through a link between growth and human capital. Growth without any increase in human capital indicator is a possible cause to bring an increase in terrorism in economies. However, economic growth accompanied with investment in human capital can help to reduce terrorism, i.e., higher level of schooling brings a decrease in terrorism attacks.

Another important result of the current study is the negative relationship between globalization and terrorism. If globalization increases by 1%, it will decrease terrorism by 0.127%. Although the negative impact has very low magnitude, the power of global networks in influencing the national economics cannot be ignored. International global networks appeared to be helpful in reducing terrorist activities in Pakistan. Globalization, particularly political integration with rest of the world, provides technical and financial assistance to overcome terrorism in Pakistan. Therefore, there is no harm for Pakistan to be in the modern wave of globalization. Our empirical findings are supported by the prior literature. For instance, Rajput *et al.* (2021) elucidated

the globalization- terrorism nexus for developing economies and concluded that economic globalization is inversely connected with terrorism activities. Similarly, Asongu and Biekpe (2018) also provide evidence regarding a negative interconnection between globalization and terrorism for African economies.

The second part of the result shows that there is no problem of heteroskedasticity and serial correlation as it is evident from LM serial, White test and ARCH test, presented in the diagnostic section of the Table.

Table 6. Results of Long-Run Analysis

Variable	Coefficient	t- stat
Dependent variable: lnTER		
Constant	-21.921*	-9.643
ln GDP	7.132*	3.732
ln GLOB	-0.127**	-2.089
Diagnostic test		
R <sup>2</sup>	0.892	
Adjusted R <sup>2</sup>	0.773	
χ <sup>2</sup> LM Serial	4.231 (0.116)	
χ <sup>2</sup> White Test	6.755 (0.229)	
χ <sup>2</sup> ARCH	0.036 (0.748)	

Note: \* and \*\* indicates 1% and 10% level of significance respectively. Probability values are provided in parenthesis.

The stability of short-run and long-run estimates are derived with help of CUSUM and CUSUM square test, suggested by Pesaran and Shin (1999). Figure 3 and Figure 4 show that CUSUM and CUSUM squares are between the critical boundaries, suggesting the accuracy of both long-run and short-run parameters.

Figure 3. Plot of CUSUM

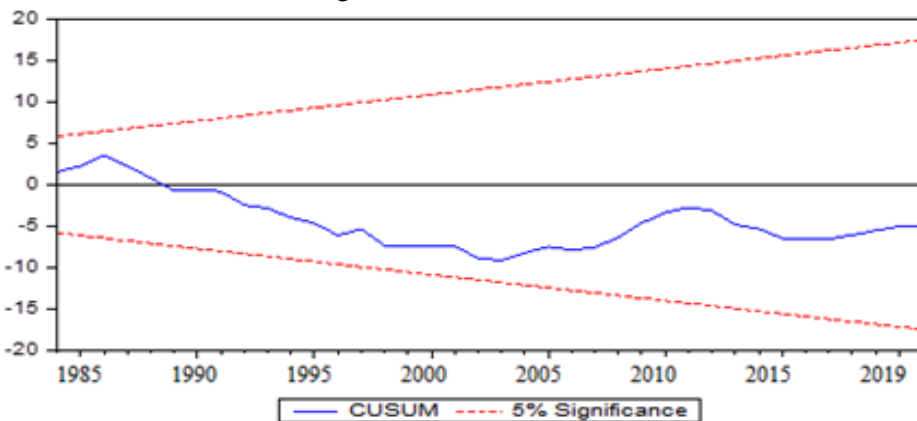
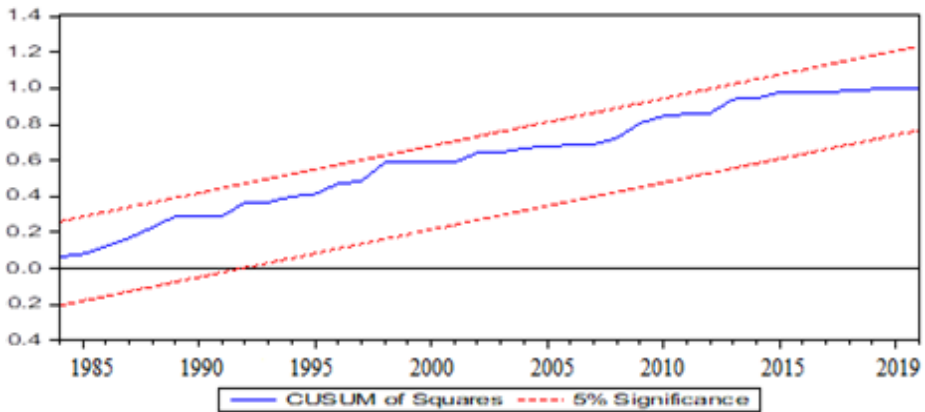




Figure 4. Plot of CUSUM square



In order to find the causality direction, Granger test of causality is undertaken. The results of causality are presented in Table 7.

Table 7. Results of Granger Causality Test

Null Hypothesis	F-Statistics	Conclusion
Terrorism does not cause economic growth	1.817	Uni-directional causality is found from economic growth to terrorism
Economic growth does not cause Terrorism	7.431*	
Globalization does not cause economic growth	0.523	No causality is found between globalization and economic growth
Economic growth does not cause globalization	2.023	
Globalization does not cause terrorism	3.111***	Bidirectional causality is found between terrorism and globalization
Terrorism does not cause globalization	3.517**	

Note: \*, \*\* and \*\*\* indicates 1% , 5% and 10% level significance respectively.

Results show one-way causality from economic growth to terrorism, while two-way causality is evident between globalization and terrorism. These results suggest that higher economic growth with unjust income distribution causes terrorism. Therefore, it is recommended to distribute the economic benefits evenly in order to halt the violent activities. No evidence of causality is found between globalization and economic growth. The probable reason of this result is that Pakistan is unable to get economic benefits from globalization because of its internal structural issues. Interestingly, the bidirectional causality between globalization and terrorism is showing the strength of global network in influencing the terrorism activities in Pakistan.

## 7. CONCLUSION

Globalization can be defined as a phenomenon in which socio-cultural, political, and economic relationships are recognized across the globe. It creates higher degree of interdependency across geographic distance. Globalization is indeed the most crucial concept of the current era. However, no significant or universal definition of globalization exists as it is perceived as a multilayered process. There is also lack of agreement on the benefits of globalization due to its diverse impacts on various economic and non-economic activities. Moreover, it has transformed the structure of developing economies through providing economic and technological assistance. The process of globalization has accelerated due to various technological innovations, strategies, and policies. Lower transportation and communication cost has increased the global integration at every level. However, according to Schaub (2004) more integrated economies are more likely to experience terrorist attacks. These terrorist activities result in the loss of valuable assets including human and physical capital. Pakistan is also among one of the economies that suffered severely from terrorist activities.

The current study inspects the possible link among globalization, terrorism, and economic growth. The cointegration test of ARDL is employed in order to check the long-run association between these variables. Empirical evidence shows that the three variables have long-run association. Robustness of long-run link among terrorism, globalization, and economic growth is also confirmed by applying Johansen test of cointegration. Results show that there is a positive association between terrorism and economic growth in Pakistan. The current study indicates that 1% increase in per capita GDP increases terrorist activities by 7.15%. Higher GDP per capita growth with uneven income distribution results in higher poverty and, therefore, terrorism. The benefits of economic growth must be distributed evenly in order to cope with the problem of terrorism. Results show that globalization and economic growth has no relationship. In order to derive the economic benefits of globalization, it is essential to manage the internal structural problems. Another important finding of the present study is that globalization reduces terrorism. Pakistan needs to further strengthen the global relations to fight terrorism at national and transnational levels.

The relationship among globalization, terrorism, and economic growth is complex. Findings show that Pakistan is unable to get economic benefits from the current wave of globalization while globalization appeared to be influential in decreasing the terrorist activities in Pakistan. Therefore, it is recommended that government need to facilitate the process of globalization as

the power of global networks is helpful in decreasing terrorism. Furthermore, Pakistan can participate in the economic benefits of globalization by smoothing the internal structural problems such as macroeconomic and political instability. A positive link between per capita GDP and terrorism serves as a challenge for policymakers. However, targeted growth with even distribution of income can halt the terrorist activities.

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