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

Macroeconomic Instability and Terrorism Nexus; Empirical Evidence in Case of Pakistan

Hafsa Jabeen[1] and Ayesha Naz [1]

Affiliations
1. Department of Economics, International Islamic University, Islamabad.

Corresponding Author Email:
ayesha.naz@iiu.edu.pk

Timeline
Received: Mar 07, 2022
Revised: Mar 10, 2022
Accepted: April 1, 2022
Published: Jun 25, 2022

DOI
https://doi.org/10.55603/jes.v1i1.a6

Abstract
The current study is an attempt to analyze the association between macroeconomic instability and terrorism in Pakistan over the period of 1970 to 2020. Six important variables are taken as a proxy to measure macroeconomic instability which includes external debt, budget deficit, trade deficit, real effective exchange rate (REER), inflation and unemployment. Results indicate that there exists a long run cointegration relationship between the indictors of macroeconomic instability and terrorism. FMOLS is employed to obtain the estimates and it reveals that budget deficit and external debt is negatively associated with terrorism. It indicates that government expenditures on different project such as infrastructure create economic opportunities, therefore, reduces terrorism. Furthermore, welfare programmes also improve the performance of socioeconomic variables that translates into harmonized environment which lessens violence. The variable of trade deficit, inflation and unemployment has positive impact on terrorism while REER is insignificant. In context of trade deficit, higher imports results in job loss of domestic industries, hence, it hits the vulnerable groups. Therefore, the opportunity cost of life of these groups reduces and it increases the probability to become a part of terrorist activities. Inflation also pushes the vulnerable groups in poverty by reduces the purchasing power and unemployed individuals are also easy target to get involve themselves in acts of aggression. This study also constructs the macroeconomic instability index including the six variables through principal component analysis (PCA). Results of this model show that macroeconomic instability index and GDP has positive effect on terrorism. In case of GDP, the plausible reason could be uneven income distribution that increases terrorist activities. For the policy implications, government need to divert the resources from non-productive to productive uses through the investment in such projects which has direct and indirect impact on the welfare. In this way deprived group will enjoy economic perks and engage themselves in productive activities rather than becoming a helping hand in terrorism.

Keywords: Terrorism, Budget deficit, External debt, Unemployment, Macroeconomic instability

JEL Classification: E24, F10, F31, H62, H63

1. Introduction
Pakistan is facing the problem of terrorism from 1947 but in 1980s this issue increased due to Afghan War. The border of Pakistan is connected with Afghanistan, Iran, China and India. However, largest border of Pakistan is shared with India and Afghanistan. It is evident from history that Pakistan has been in clash with India since after its independence. Likewise, Afghanistan has also remained in war or threat of war in different periods. Consequently, transnational terrorism is the central distress for the government of both countries. Afghanistan has fought the wars namely as the Union of Soviet Socialist

Republic (USSR) and Anglo-Afghan war which was against Russia and British. The basic purpose of these wars was to fight against terrorism. US government wanted to interfere and weakened the Soviet Union economically and politically by giving armed and monetary support to Afghan activist and Pakistan (which is known as Mujahidin). The reason behind the intervention of the US government was that America wants to become the superpower all over the World. Pakistan and the US agencies are the helping hand in the formation of Al-Qaeda organization. When Afghanistan defeated Russia, the Afghan militant (Taliban) announced their government by taking the control in Afghanistan. At that time Afghan militants were politically and economically strong meanwhile the incident of 9\11 took place. After 9\11 attacks America announced that Al-Qaeda group and Afghan activist are terrorists. In response to 9\11 attack, America attacked on Afghanistan in 2001 to fight against terrorism. Pakistan was unwilling to fight against Afghanistan because of same religion and culture. But Pakistan was under pressure of US government and decided to involve in war against terrorism. America provided financial and military support to Pakistan. Under this condition, Pakistan foreign policy changed which is not in favor of Taliban. This started terrorist activities in Pakistan. At initial stage, there were attacks on FATA (Federally Administered Tribal Areas). Later on, the network of terrorist activities is increased throughout Pakistan. In this situation, government of Pakistan took rapid steps to control the war against terrorism and started operation Zarb-e-Azb in June 2014 (Shahzad et al., 2016).

According to South Asia Terrorism Portal Database, 1600 civilian killed in 2003 to 2006 while 2650 civilians killed in 2010 to 2011 due to terrorist attacks. The rationale behind this was the financial deprivation in the society and response of terrorist organization to the counter terrorism measures of government (Shahbaz et al., 2013). Financial support to internally displaced persons (IDPs) due to terrorism and counter-terrorism expenditures created financial pressure which lead to fiscal deficit and hamper the economic development of Pakistan. According to the Economic Survey (2010-2011), Pakistan incurred huge cost (direct and indirect) which is $67.93 billion during last ten years due to terrorism (Ismail and Amjad, 2014).

Macroeconomic instability damages the private investment and productivity of a country. It decreases public resources due to high inflation and excessive debt that can be used for current expenditure and capital (Ismihan et al., 2005). Macroeconomic stability plays very vital role for sustainable economic growth. It can be defined in terms of inflation, unemployment, trade deficit and budget deficit. Sameti et al. (2012) pointed out fluctuation in inflation, instability of real exchange rate and inappropriate fiscal policy are the reasons of macroeconomic instability.

Macroeconomic stability can also be defined by achieving balance between savings & investment, domestic demand & output and fiscal revenues & expenditure. There are different factors which are helpful in identifying the country stability or instability. The variable of international reserves, fiscal deficit, growth, current account deficit and inflation can be used to explain the macroeconomic condition of a country. Macroeconomic conditions would be stable in case of rise in GDP per capita, decline in inflation and reduction in the level of debt along with current account and fiscal balances. However, macroeconomic conditions would be considered as instable with double-digit inflation, short term borrowing, higher level of public debt and lower GDP per capita. Additionally, it includes the seigniorage financing to current account deficits (Sameti et al., 2012).

There are several factors such as fiscal deficit, high inflation, political instability, lack of physical and human capital, increase in foreign debt, low exchange rate, natural disasters and poor law and order conditions that characterize unstable macroeconomic environment and hampers the economic growth of a country. Likewise, external, and internal shocks have the direct effect on economic growth. The rise and fall of financial markets and term of trade are considered as exogenous shock that reduces the gross domestic product. Internal or domestic factors have more noticeable effect in producing macroeconomic instability as compared to external shocks. Moreover, limited resources of developing countries, usage of old technology and unskilled labor negatively affect the output. These shocks have negative effect on

the market efficiency of developing and low-income economies. However, economic progress can be achieved through the production of quality products. Technological progress and accumulation of factor of production can also play crucial role in enhancing economic growth (Ali and Rehman, 2015).

Local as well as foreign investors are reluctant to invest in a host country due to the existence of macroeconomic instability. Since 1972, macroeconomic instability remained a major problem in Pakistan due to multiple factors. It includes persistent increase in inflation, fiscal account deficit, increase in exchange rate, current account deficit, low economic growth and low trade openness. Terrorism is also associated with macroeconomic instability as inflation affects terrorist activities. The rationale behind is that inflation decreases the purchasing power of individuals which in turns pushes them below poverty line. The inability to fulfill the basic needs ultimately indulge them toward the terrorist activities (Shamshir et al., 2019). In developing countries, higher fiscal account deficit is due to terrorist activities that creates the more pressure on the respective government towards the optimal allocation of resources. Government spending increases to rebuild the infrastructure which is damaged due to terrorist activities. Hence, government spending shifts from the development expenditure towards the military spending. Consequently, fiscal deficit increases due to increases in terrorist activities (Mukhtar and Jehan, 2021).

The significance of the study is that macroeconomic factors namely as gross domestic product, inflation, external debt, budget deficit, real effective exchange rate, trade balance, unemployment which may contribute positively or negatively towards terrorist activities in Pakistan. So, there is need to evaluate and analyze the impact of macroeconomic performance on terrorist activities in Pakistan. Literature shows that there are various studies that have tested the relationship between macroeconomic indicators and economic growth, but limited efforts have been done in determining the association between macroeconomic instability and terrorism. Therefore, the objective of current study is to determine the association between different indicators of macroeconomic instability and terrorism. In this context, total six indicators are chosen which include budget deficit, external debt, trade deficit, REER, inflation, and unemployment.

The present paper contributes to existing literature in two ways: Firstly, effort has been made to empirically find out the association between different indicators of macroeconomic instability and terrorist activities in Pakistan using the latest data set over the period of 1970 to 2020. Secondly, this paper develops the index of macroeconomic instability rather than just relying on single proxies of macroeconomic instability. Although, there are some studies that have constructed the macroeconomic instability index, but present study constructs this index by using a comprehensive set of variables. Moreover, terrorism index is also constructed by using three variables i.e. number of incidents, number of fatalities and number of injuries. Thirdly, this study provides policy guidelines to curtail terrorism. The study highlights internal socioeconomic factors that destabilize the economy which results in terrorism.

2. Review of Literature

There are multidimensional causes for the terrorism such as religious extremism, illiteracy and military expenditures. In South Asia region, GDP per capita, population, unemployment, poverty, inflation, inequality, and political volatility are considered to be the major reasons of terrorism (Akhmat et al., 2014). Ismail and Amjad (2014) analyzed the causes of terrorism in Pakistan and included various socioeconomic indicators like literacy level, GDP per capita, inflation, political rights, poverty, inequality, and unemployment in the analysis. The study found long run association of terrorism with socioeconomic variables.

Different indicators are used to measure macroeconomic instability; it includes inflation, unemployment, budget deficit, public expenditure, and trade deficit (Sanchez-Robels, 1998 and Bleaney, 1996). Several studies have used single indicator i.e., inflation as a proxy of macroeconomic variables while others measure it by constructing composite index using two or more variables. Bukhari and Masih (2016)

explored the relationship of domestic terrorism and macroeconomic variables in Pakistan. Results show that GDP growth is positively related to terrorism in the long run. The terrorism increases due to uneven income distribution in country. Similarly, Ali and Li (2016) investigated the influence of economic factors in terrorism for Pakistan and found positive association among GDP per capita, inflation, unemployment, population, income inequality, poverty and terrorism.

The study of Malik and Zaman (2013) examined the macroeconomic effects of terrorism in Pakistan and the outcomes of study show the macroeconomic factors namely political instability, population growth, poverty, and price level as a source of terrorism. However, unemployment, trade openness and income inequality are found to have no long run association with terrorism. Furthermore, study shows unidirectional causality between macroeconomic factors and bidirectional causality between unemployment and terrorism. Shahbaz (2013) investigated the connection among terrorism, economic growth and inflation in Pakistan and results show bidirectional causality from inflation to terrorism. Ismail and Amjad (2014) explored the connection of terrorism and macroeconomic variables in Pakistan. The study used the macroeconomic indicators such as inflation, unemployment, and GDP per capita. The results show long run association of terrorism with macroeconomic indicator. Similarly, the study of Shamshir et al. (2019) shows that inflation decreases the purchasing power and results in deprivation of basic need, therefore, it causes higher terrorism. The study of Naz et al. (2021) also investigated the relationship between macroeconomic instability and terrorism by using ARDL approach. The results show the presence of long-run association among terrorism, macroeconomic instability, political instability, and GDP per capita in Pakistan.

Azam (2001) used economic model with rational prospect to analyze the connection between inflation and macroeconomic instability in case of Madagascar. The variable of unbalanced real exchange rate, fiscal deficit, inflation, overestimated currency, and balance of payment deficit are used as a proxy of macroeconomic instability. The study found that inflation is positively related to macroeconomic instability. Rasul et al. (2016) analyzed the relationship among output growth, inflation and macroeconomic uncertainties in India and Pakistan. Results reveal that output growth is negatively related to inflation and macroeconomic uncertainties.

The issue of budget deficit and economic growth is discussed by various studies in Pakistan. Budget deficit is used as a proxy to measure the macroeconomic instability. The study of Mukhtar and Jehan (2021) found positive association between fiscal deficit increases due to and terrorist activities. Fiscal burden increases due to more spending on military equipment in order to halt terrorist activities. Ahmad (2013) examined the impact of budget deficit in the GDP of Pakistan during the period of 1971 to 2007 and results show bidirectional causality between budget deficit and GDP. Fatima et al. (2012) investigated the influence of budget deficit on economic growth for the period 1978 to 2009 and found negative association between budget deficit and economic growth. However, the study of Nayab (2015) shows positive association between budget deficit and economic growth. Dao and Bui (2016) analyzed the effect of budget deficit and economic growth of Vietnam. The results show that productive expenditures are positively correlated with economic growth. While non-valuable expenditures have negative link with economic growth.

Unemployment is an influential factor in macroeconomic instability and its prevalence creates social and economic problem in an economy. Shahid (2014) examined the consequence of unemployment and inflation on economic growth of Pakistan. The results reveal the long run correlation among economic growth, unemployment, and inflation. Similarly, Hussain et al. (2010) determine the causal link between unemployment and economic growth of Pakistan for the period of 1972 to 2006. The results of the study show that the variable of unemployment and economic growth are correlated in short run and long run.

Different studies have been conducted on the issue of external debt/foreign debt and showed mixed results on the relationship of external debt and economic growth. In this regard, the study of Hassan and Mamman (2013) and Zaman and Arslan (2014) show that external debt is positively linked with

economic growth. While the studies of Atique and Malik (2012), Malik et al. (2010) and Asghar (2016) found the negative relationship of external debt and economic growth in Pakistan. Nawaz et al. (2012) examined the causal relationship of external debt and economic growth and found bidirectional causality between them.

The main contributing factor to the trade deficit is an insufficient capability of domestic producers and fluctuation in oil prices which lowers the production of value-added products of Pakistan (Hassan et al., 2017). Iqbal and Zahid (1998) examined the macroeconomic determinant of economic growth in Pakistan. Results indicate negative relationship of budget deficit and external debt to economic growth. The quantitative analysis shows that higher economic growth can be achieved through primary education and stock of physical capital. Hussain et al. (2016) explored the influence of macroeconomic indicators like interest rate, inflation and real exchange rate on GDP of Pakistan and concluded that inflation and interest rate are negatively related to GDP while, the real exchange rate is positively correlated to GDP. Awounang and Foning (2014) analyzed the impact of macroeconomic instability on capital stock accumulation in Sub-Saharan African countries. The study used four macroeconomic indicators namely GDP growth, inflation rate, term of trade and real effective exchange rate to measure macroeconomic volatility. Results show positive impact of GDP growth on macroeconomic volatility, while inflation rate, term of trade and real effective exchange rate appeared to slow down the physical capital accumulation. The study of Ghura and Grennes (1993) investigated the relationship between macroeconomic performance and real exchange rate and found that real exchange rate is negatively related to macroeconomic performance in Sub-Saharan Africa. Similarly, Khan et al. (2015) explored the effect of exchange rate on macroeconomic variables and found long run association of real exchange rate and GDP in Pakistan. On the other hand, Abudalu et al. (2014) analyzed the effect of real effective exchange rate on economic growth and found that real effective exchange rate is positively related to economic growth.

Literature shows that most of the studies have established a link between different indicators of macroeconomic instability and economic growth. Limited literature is observed to examine the relationship between different indicators of macroeconomic instability (budget deficit, external debt, trade deficit and REER) and terrorism. Therefore, literature has yet to come up with empirical studies to examine the relationship of these indicators to terrorism. Hence, this study fills this gap by taking the comprehensive set of the indicators of macroeconomic instability and determining their impact on terrorism.

3. Data and Methodology

3.1 Study Area and Duration of Study

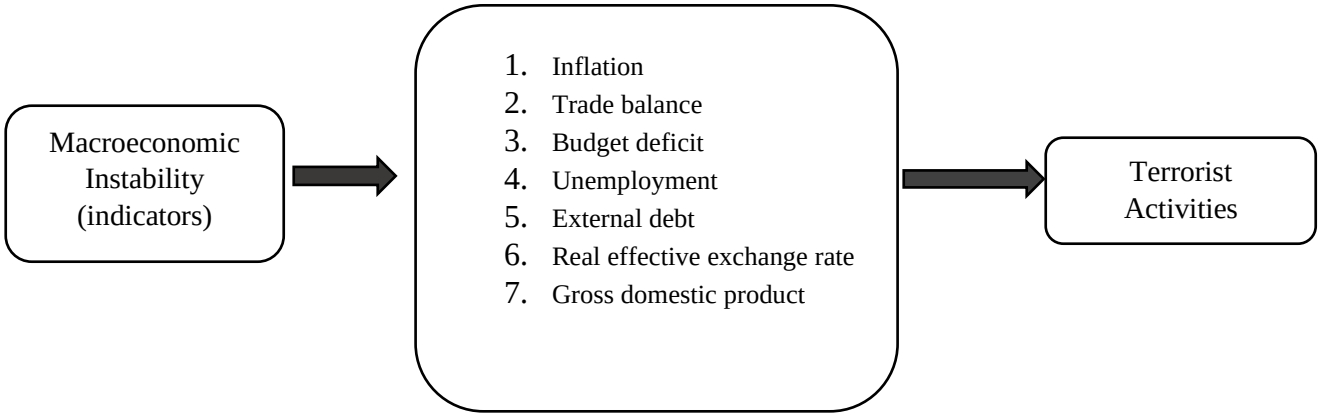
The study is conducted for the case of Pakistan covering the period of 51 years. The data ranges from 1970 to 2020. In this study large sample size is used to show better results that can be generalized for policy perception in developing countries like Pakistan.

3.2 Theoretical Framework

There are multiple channels through which macroeconomic instability can affect the terrorist activities. Macroeconomic instability is measured with the help of six indicators which include budget deficit, external debt, trade deficit, REER, inflation, and unemployment. Moreover, GDP is also considered as a control variable. It is important to include GDP in this specification as the size of the economy matter in socioeconomic repercussions. Inflation has direct and indirect effect on terrorism via the channel of reduction in purchasing power (Bukhari and Masih, 2016). Trade deficit can affect terrorist activities through job destruction which can occur due to replacement of domestically produce commodities with imported commodities. External debt, budget deficit, REER can be associated with management policies and the composition of government expenditure. It has direct implications on socioeconomic variables

(Khan et al., 2015; Hussain et al., 2016 and Naz et al., 2021) which consequently affects terrorist activities. The relationship between indicators of macroeconomic instability and terrorism is displayed in Figure 1.

Figure 1: Relationship between Macroeconomic instability and Terrorism



3.3 Empirical Model

3.3.1 Model-1

The current study develops model 1 by following the specifications of Shahbaz (2013), Amjad (2014) and Bukhari and Masih (2016). However, all the previous studies have used only one or two proxies of macroeconomic instability to establish its link to terrorism activities. In this study a wider set of the indicators of macroeconomic instability has been used. The model 1 is given in specification (1).

$$TI_t = \varphi_1 + \varphi_2 BD_t + \varphi_3 ED_t + \varphi_4 TD_t + \varphi_5 REER_t + \varphi_6 unemloy_t + \varphi_7 infla_t + \varphi_7 GDP_t + \mu_t \quad (1)$$

Where, TI is showing terrorism index, BD is representing budget deficit, ED is used for external debt, REER is real effective exchange rate, TD refers to trade deficit, Unemloy indicates unemployment, infla is a symbol for inflation and GDP is showing real GDP. GDP is used as a control variable.

3.3.2 Model-2

In model 2, macroeconomic instability index is developed by six indicators through PCA. The model is given in equation 2. In this specification, MII is representing macroeconomic instability index while GDP is a control variable.

$$TI_t = \beta_1 + \beta_2 MII_t + \beta_3 GDP_t + \mu_t \quad (2)$$

3.4 Data and Variables

3.4.1 Inflation (% of CPI)

Consumer price index as an annual percentage is used for Inflation rate. Price is taken an annual percentage change that is bear by average consumer for obtaining the goods and services which may be constant or change for particular time horizon. Data on inflation is collected from World Bank database.

3.4.2 Unemployment (% of total labor force)

Unemployment is taken as the percentage of total labor force and obtained from World Bank database. Missing values are obtained by using several volumes of Economic Survey of Pakistan.

3.4.3 Budget deficit (% of GDP)

Budget deficit is the gap between total government revenue to total government spending and data of budget deficit is taken from various volumes of Economic Survey of Pakistan.

3.4.4 External debt Stock (% of GNI)

According to international debt statistics, total external debt is debt which can return to the creditor in the form of currency, goods, and services. The sum of private nonguaranteed long-term debt, public, use of IMF credit, publicly guaranteed and short-term debt are considered under the definition of total external debt. All the debt which has the maturity of one year or less and interest in amount overdue on long-term debt are included in short-term debt. External debt stock is collected from World Bank database and international debt statistics.

3.4.5 Trade Deficit (% of GDP)

Trade deficit is defined as exports are less than the imports of goods and services. Data on trade deficit are obtained from World Bank database.

3.4.6 Real Effective Exchange Rate (REER)

Real effective exchange rate is the nominal effective exchange rate divided by the index of costs or price deflator. It is a measure of domestic currency value against a weighted average of numerous foreign currencies. Data of REER is extracted from Bruegel database.

3.4.7 Macroeconomic Instability Index (MII)

In line with the study of Ali and Bibi (2016), macroeconomic instability index is extended by including six indicators as mentioned above. The index is generated by adopting the statistical procedure of PCA. The index ranges from 0 to 1, values closer to zero (1) shows low (high) macroeconomic instability.

3.4.8 Terrorism Index (TI)

The current study constructs terrorism index by using three indicators; (i) number of events (ii) number of people injured and (iii) number of people died. PCA is applied to generate this index which ranges from 0 to 1. Values which are closer to zero (1) shows low (high) terrorist activities. Data is obtained from global terrorism database (GTD).

3.4.9 GDP

Data on real GDP is collected from World Bank Database. Data is transformed into index ranges from 0 to 1.

4. Results and Discussions

To check the stationarity of data, Augmented Dickey Fuller (ADF) unit root test is applied to time series data of the variables under consideration. The results are displayed Table 1.

Table 1: Unit Root Test

Variables	At level	At first difference	Conclusion
BD	-2.847	-5.059***	I(1)
ED	-2.197	-3.258*	I(1)
TD	-1.862	-6.150***	I(1)
REER	-1.711	-6.211***	I(1)
Infla	-1.441	-5.437***	I(1)

Unemploy	-2.213	-5.394***	I(1)
GDP	0.402	-5.084***	I(1)
TI	-1.871	-7.648***	I(1)
MII	-1.218	-4.527***	I(1)

Note: t-statistics are reported and the symbol *** and * shows the level of significance at 1% and 10% respectively.

Results shows all the variables of the study are stationary at first difference as we reject the null hypothesis of non-stationary against the alternate hypothesis of stationary. This result implies that Johansen test of cointegration can be applied to the variables under consideration. The results of Johansen test is shown in Table 2.

Table 2: Results of Johansen Test

Hypothesis	Eigenvalue	Trace Statistics	C.V	Prob.	Max-Eigen Statistic	C.V	Prob.
None	0.839872	234.9796	159.5297	0.0000	87.92561	52.36261	0.0000
At most 1	0.634260	147.0540	125.6154	0.0013	48.27990	46.23142	0.0298
At most 2	0.518894	98.77405	95.75366	0.0305	35.12009	40.07757	0.1629
At most 3	0.381703	63.65396	69.81889	0.1406	23.07774	33.87687	0.5245

Johansen test of cointegration determine whether the time series data are mutually co-integrated by a common factor. Trace test indicates the presence of three co-integrating vectors and λmax is also validating the long run association between the different indicators of macroeconomic instability and terrorism. The next stage is the estimation of the parameters using fully modified ordinary least square (FMOLS).

Several recent econometric estimation techniques have been advanced to analyze the association among variables. However, current study employs FMOLS approach to determine relationship between terrorism and macroeconomic instability indicators. The FMOLS method yields reliable estimates even for small data set. The FMOLS method has various benefits over other contemporary techniques. This technique introduces suitable correction to handle the inference problem in Engle Granger, thereby generates valid long-run estimates (Himansu, 2007). Moreover, it considers Kernal estimators of the Nuisance parameters to affect the asymptotic distribution of the OLS estimator. It modifies least squares in order to tackle serial correlation and endogeneity for asymptotic efficiency (Rukhsana andShahbaz, 2008).

Table 3: Results of FMOLS

Model 1: Dependent variable is Terrorism Index (TI)			
Variable	Coefficient	Std. Error	Prob.
C	8.953***	2.059	0.000
BD	-0.228**	0.085	0.011
ED	-0.171***	0.031	0.000
TD	0.358***	0.087	0.000
INF	0.137***	0.045	0.004
REEF	0.015	0.022	0.504
Unemploy	5.530**	0.206	0.014
GDP	1.177	0.859	0.178
Model 2: Dependent variable is Terrorism Index (TI)			

MII	2.243**	0.976	0.026
GDP	1.786***	0.603	0.004

The symbol ***, ** & * shows the level of significance at 1%, 5%and 10% respectively.

Budget deficit is inversely related to terrorism. It shows that if budget deficit increases, it lessens the terrorist activities in Pakistan. This result can be explained through the cannel of government expenditure composition. According to Keynesian framework, government spending are directly associated with short term growth. In expansionary fiscal policy, government increases spending on various projects such as infrastructure, therefore, it creates more economic opportunities for public. It results in reduction in unemployment, hence, reduces terrorist activities. Furthermore, government also follows the policy of tax cuts, rebates, subsidies, direct transfer payments, and welfare program. All these policies are effective in creating social and economic equalization, therefore, reduces the violence and terrorism. Government purchase of military equipment and technology also contributes in moderating terrorism. Counter terrorism expenditures directly help in reduction of terrorism activities.

External debt is also appeared to be significant in reducing terrorism activities. There are various studies which shows that there exists a positive correlation between debt and economic growth (Faraji and Said, 2013; Ogunmuyiwa, , 2011). Many scholars have shown that debt contributes to stimulate growth up to a certain level and then it shows negative effect, a typical Laffer curve. The causality from debt to growth can explained the inverse relationship between terrorism and debt. Higher growth directly improves the socioeconomic performance of a country. Individuals having better access to goods and public services are likely to be less engaged in violence.

Trade deficit is positively associated with terrorism. It is generally believed that trade deficit has adverse effect on employment. If the imports are greater than exports, it is the indication that that some of the sectors of the economy are at a risk of international competition. It may result in job reduction in these sectors, hence, increases unemployment which can be associated with terrorism. Trade deficit also reduces economic growth even stronger negative effects are observed in case of twin deficit (Blavasciunaite et al., 2020).

The next coefficient is inflation; it is also positively associated with terrorism. Higher prices decrease the purchasing power of individuals particularly those in middle- and lower-income groups. The deprived segment of the society is assumed to be an easy target to be persuaded for terrorist activities. Under poor macroeconomic performance of the economy, the opportunity cost of life reduces and these fuels the activities of terrorism.

Real effective exchange rate and GDP is appeared to be insignificant in effecting terrorism. However, unemployment shows adverse effect on terrorism. There are multiple channels through which employment can affect terrorism. Unemployed individuals have higher probability to become a part of violence as they have nothing to loss. Moreover, psychological impact of chronic unemployment can turn out to be more devastating.

The Model 2 is showing the relationship between macroeconomic instability index on terrorism. This analysis reports positive relationship between macroeconomic instability and terrorism. Unfavorable economic circumstances result in higher terrorism. GDP is turn out to be significant in this case and it is positively associated with terrorism. It is indicating that the benefit of GDP is not evenly distributed within the society, hence, creating a group of rich and poor. Therefore, the cost of this uneven distribution can be observed in the form of violence and aggression.

5. Conclusions and Policy Implications

There are various internal and external shocks which destabilizes the economic performance of an economy. Internal factors have more powerful affect in producing instable macroeconomic situation as compared to external shocks. Moreover, limited resources of developing countries, usage of old technology and unskilled labor negatively affect the output. These shocks have adverse effect on market efficiency of developing and low-income countries (Ali and Rehman, 2015). Macroeconomic instability damages the private investment and productivity of a country. It decreases public resources due to high

inflation and excessive debt that can be used for current expenditure and capital (Ismihan et al., 2005). Macroeconomic instability can be defined in terms of inflation, unemployment, trade deficit and budget deficit. Sameti et al. (2012) pointed out fluctuation in inflation, instability of real exchange rate and inappropriate fiscal policy are the reasons of macroeconomic instability.

Macroeconomic performance of a country is significant in determining the future growth path. However, instability in macroeconomic variables has various repercussions and terrorism is among one of them. There are multiple channels through which macroeconomic instability is associated with terrorist activities. For instance, if inflation increases, it directly reduces the purchasing power and stimulates criminal activities. The objective of current study is to inspect the association between different indicators of macroeconomic instability and terrorism over the period of 1970 to 2020. This study contributes to the existing literature by including six variables to measure macroeconomic instability. It includes, budget deficit, external debt, trade deficit, REER, inflation, and unemployment. Another contribution of the study is that terrorism index developed with the help of three variables namely as number of events, number of people injured, and number of people died. Two models are constructed to determine the influence of macroeconomic instability on terrorism. Model 1 shows the relation between different indicators of macroeconomic instability and terrorism while model 2 uses the macroeconomic instability index to examine its impact on terrorism. This index is constructed through PCA by taking the six indicators of macroeconomic instability.

Johansen test of cointegration shows the existence of long run cointegration relationship between the indictors of macroeconomic instability and terrorism. The technique of FMOLS shows that budget deficit and external debt has negative relationship with terrorism. It indicates that government expenditures on different welfare program generate harmonized environment which improves the performance of socioeconomic indicators as a result terrorist activities decreases. The coefficient of trade deficit, inflation and unemployment has positive relationship with terrorism, whereas REER and GDP turn out to be insignificant. Job losses in domestic economy due to trade deficit hurt vulnerable groups. Therefore, the probability of these groups increases to become a part of terrorist activities. Inflation and unemployment are responsible to stimulate aggression. Results of model 2 show that macroeconomic instability index and GDP has positive impact on terrorism. In case of GDP, the uneven income distribution can be linked with terrorist activities.

In general, it is believed that vulnerable segment of the society is an easy target for external forces to involve them in violence and terrorism. Therefore, it is necessary to improve the social and economic status of individuals as the results show inflation and unemployment are positively associated with terrorism. Moreover, government budget should be channelized in such projects which has direct impact on the welfare so that deprived group can enjoy economic perks. Consequently, they engage themselves in productive activities rather than becoming a helping hand in terrorism. Macroeconomic instability destabilizes domestic economy which results in terrorism. For the policy implication, government should focus on the targeting macroeconomic performance which is important in combating terrorism in Pakistan. In addition, government should focus on optimal allocation of resources to overcome the problem of macroeconomic instability that leads towards terrorist activities.

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

References

Ali, H. S., Hashmi, S. H., & Hassan, A. (2013). Relationship between Political Instability and Domestic Private Investment in Pakistan: A Time Series Analysis (1972-2009). *Pakistan Business Review*, 15(1), 1-26.

Awounang, A. C., & Foning, M. N. (2014). Macroeconomic Volatility and Physical Capital Accumulation in Sub-Saharan Africa. *International Journal of Economic Sciences*, *3*(2), 1-19.

Ahmed, M. U., & Pulok, M. H. (2013). The role of political stability on economic performance: the case of Bangladesh. *Journal of Economic Cooperation & Development*, *34*(3), 61-99.

Azam, J.-P. (2001). *Inflation and macroeconomic instability in Madagascar*: Univ., Centre for the Study of African Economies, 13(2), 175-201.

Abu Dalu, A., Ahmed, E., Almasaied, S., & Elgazoli, A. (2014). The Real Effective Exchange Rate Impact on ASEAN-5 Economic Growth. *International Journal of Economics and Management Sciences*, 3(2), 1-11.

Ali, A., & Rehman, H. U. (2015). Macroeconomic Instability and Its Impact on Gross Domestic Product: An Empirical Analysis of Pakistan. *Pakistan Economic and Social Review, 53*(2), 285-316.

Akhmat, G., Zaman, K., Shukui, T., & Sajjad, F. (2014). Exploring the Root Causes of Terrorism in South Asia: Everybody Should be Concerned. *Quality & Quantity*, 48(6), 3065-3079.

Ali, G., & Li, Z. (2016). Role of Economic Factors in Terrorism in Pakistan. *Quality & Quantity*, 50(5), 2237-2250.

Atique, R., & Malik, K. (2012). Impact of Domestic and External Debt on the Economic Growth of Pakistan. *World Applied Sciences Journal*, 20(1), 120-129.

Asghar, M. S. (2016). The Effect of External Debt in the Economic Growth of Pakistan. *ABC Journal of Advanced Research*, 5(2), 71-76.

Blavasciunaite, D., Garsviene, L., & Matuzeviciute, K. (2020). Trade balance effects on economic growth: Evidence from European Union Countries. *Economies*, *8*(3), 54.

Bruno, M., & Easterly, W. (1998). Inflation crises and long-run growth. *Journal of Monetary Economics, 41*(1), 3-26.

Blomberg, S. B., Hess, G. D., & Orphanides, A. (2004). The Macroeconomic Consequences of Terrorism. *Journal of Monetary Economics*, 51(5), 1007-1032.

Behera, J., & Mishra, A. K. (2016). Inflation and Economic Growth Nexus in BRICS: Evidence from ARDL Bound Testing Approach. *Asian Journal of Economic Modelling, 4*(1), 1-17.

Bukhari, N., & Masih, M. (2016). An empirical investigation of causal linkages between domestic terrorism and macroeconomic variables: a case for Pakistan. MPRA Paper 69768.

Caruso, R., & Schneider, F. (2011). The socio-economic determinants of terrorism and political violence in Western Europe (1994–2007). *European Journal of Political Economy, 27*, S37-S49.

Chaudhry, I. S., Malik, S., & Ramzan, M. (2009). Impact of Foreign Debt on Savings and Investment in Pakistan. *Journal of Quality and Technology Management*, 5(2), 101-115.

De Gregorio, J. (1993). Inflation, taxation, and long-run growth. *Journal of Monetary Economics, 31*(3), 271-298.

Dao, B. T., & Bui, T. (2016). Budget Deficit and Economic Growth Prediction in the Case of Vietnam. SSRN 2816710, 1-21.

Estrada, M. A. R., Park, D., Kim, J. S., & Khan, A. (2015). The economic impact of terrorism: A new model and its application to Pakistan. *Journal of Policy Modeling*, *37*(6), 1065-1080.

Freytag, A., Krüger, J. J., Meierrieks, D., & Schneider, F. (2011). The Origins of Terrorism: Cross-Country Estimates of Socio-economic Determinants of Terrorism. *European Journal of Political Economy*, 27, S5-S16.

Fatima, G., Ahmed, M., & Rehman, W. U. (2012). Consequential Effects of Budget Deficit on Economic Growth of Pakistan. *International Journal of Business and Social Science*, 3(7), 203-208.

Faraji, K., & Said, M. (2013). Impact of external debt on Economic Growth: a Case Study of Tanzania. *Advances in Management and Applied Economics*, 3(4), 363–380.

Gul, T. G., Hussain, A. H., Bangash, S. B., & Khattak, S. W. K. (2010). Impact of terrorism on financial markets of Pakistan (2006-2008). *European Journal of Social Sciences,*18(1), 98-108

Ghura, D., & Grennes, T. J. (1993). The Real Exchange Rate and Macroeconomic Performance in Sub-Saharan Africa. Journal of development economics, 42(1), 155-174.

Hyder, S., Akram, N., & Padda, I. U. H. (2015). Impact of terrorism on economic development in Pakistan. *Pakistan Business Review*, *839*(1), 704-722.

Haghighi, H. K., Sameti, M., & Isfahani, R. D. (2012). The effect of macroeconomic instability on economic growth in Iran. *Research in Applied Economics*, *4*(3), 39-61.

Hassan, S., & Mamman, A. (2013). External Debt and Economic Growth: Evidence from Nigeria. *International Journal of Economics, Business, and Finance*, 1(10), 360-370.

Himanshu A. Amarawickrama and Lester C. Hunt, (2007), "Electricity Demand for Sri Lanka: A Time Series Analysis", Surrey Energy Economics Discussion Paper Series, No.118.

Hussain, A., Sabir, H. M., & Kashif, M. M. (2016). Impact of Macroeconomic Variables on GDP: Evidence from Pakistan. European Journal of Business and Innovation Research, 4(3), 38-52.

Ismail, A., & Amjad, S. (2014). Cointegration-causality analysis between terrorism and key macroeconomic indicators: Evidence from Pakistan. *International Journal of Social Economics*, *41*(8), 664-682.

Ismihan*, M., Metin-Ozcan, K., & Tansel, A. (2005). The role of macroeconomic instability in public and private capital accumulation and growth: the case of Turkey 1963–1999. *Applied Economics*, *37*(2), 239-251.

Iqbal, Z., & Zahid, G. M. (1998). Macroeconomic Determinants of Economic Growth in Pakistan. *The Pakistan Development Review*, 37(2), 125-148.

Sameti, M., Isfahani, R. D., & Haghighi, H. K. (2012). Outcome of Macroeconomic Instability (A Case for Iran). *Research in Applied Economics*, *4*(1), 33-48.

Ismail, A., & Amjad, S. (2014). Determinants of terrorism in Pakistan: An empirical investigation. *Economic Modelling*, *37*, 320-331.

Khan, A., Estrada, M. A. R., & Yusof, Z. (2016). How terrorism affects the economic performance? The case of Pakistan. *Quality & Quantity*, *50*(2), 867-883.

Khan, A., & Estrada, M. A. R. (2015). The effects of terrorism on economic performance: the case of Islamic State in Iraq and Syria (ISIS). *Quality & Quantity*, 50(4), 1-17.

Khan, R. E. A., Sattar, R., & Rehman, H. U. (2015). Effectiveness of Exchange Rate in Pakistan: causality analysis. *Pakistan Journal of Commerce and Socoal Science*, 6(1), 83-96.

Malik, Z., & Zaman, K. (2013). Macroeconomic consequences of terrorism in Pakistan. *Journal of Policy Modeling*, *35*(6), 1103-1123.

Malik, S., Hayat, M. K., & Hayat, M. U. (2010). External Debt and Economic Growth: Empirical Evidence from Pakistan. International Research Journal of Finance and Economics, 44(44), 1450-2887.

Mukhtar, T., & Jehan, Z. (2021). Terrorism and Fiscal Policy Instability in Pakistan: Role of Institutions. *Terrorism*, *4*(1), 18-37.

Nayab, H (2015). The Relationship between Budget Deficit and Economic Growth of Pakistan. *Journal of Economics and Sustainable Development*, *6*(11), 85-90.

Nawaz, M., Qureshi, M., & Awan, N. W. (2012). Does External Debt Causes Economic Growth: A Case Study of Pakistan. *The Romanian Economic Journal*, 15(43), 131-144.

Naz, A., Jabeen, H., & Nasir, A. (2021). Interlinkages among Terrorism, Macroeconomic Instability, Political Instability, and Economic Growth in Pakistan. *NUST Journal of Social Sciences and Humanities*, *7*(1), 37-62.

Ogunmuyiwa M.S. (2011). Does External Debt Promote Economic Growth in Nigeria? *Current Research Journal of Economic Theory*, 3(1), 29–35.

Rasul, S., Bhatti, A. A., Khan, H., & Jabeen, M. (2016). Inflation, Output Growth and Macroeconomic Uncertainties in Pakistan and India. *Pakistan Journal of Social Sciences (PJSS)*, 36(1), 151-164

Rukhsana Kalim and Mohammad Shahbaz, (2008), "Remittances and Poverty Nexus: Evidence from Pakistan", Oxford Business & Economics Conference Program

Shahid, M. (2014). Effect of Inflation and Unemployment on Economic Growth in Pakistan. *Journal of economics and sustainable development*, 5(15), 103-106.

Shahzad, S. J. H., Zakaria, M., Rehman, M. U., Ahmed, T., & Fida, B. A. (2016). Relationship Between FDI, Terrorism and Economic Growth in Pakistan: Pre and Post 9/11 Analysis. *Social Indicators Research, 127*(1), 179-194.

Shahbaz, M. (2013). Linkages between inflation, economic growth and terrorism in Pakistan. *Economic Modelling, 32*, 496-506.

Shahbaz, M., Shabbir, M. S., Malik, M. N., & Wolters, M. E. (2013). An analysis of a causal relationship between economic growth and terrorism in Pakistan. *Economic Modelling, 35*, 21-29.

Sanchez-Robles, B. (1998). Macroeconomic stability and economic growth: the case of Spain. *Applied Economics Letters, 5*(9), 587-591.

Smith, M. B., Murray, L., N Cho-Oguie, C., & Blakley, D. (2003). The effects of macroeconomic instability and inflation on sustainable real growth in South African firms. *South African Journal of Economic and Management Sciences, 6*(4), 666-692.

Shamshir, M., Sabir, S., & Khan, R. (2019). Impact of Macroeconomic Stability and Terrorism on Foreign Direct Investment in Pakistan. *New Horizons (1992-4399), 13*(2), 223-240.

Zaman, R., & Arslan, M. (2014). The Role of External Debt on Economic Growth: Evidence from Pakistan Economy. Journal of Economics and Sustainable Development, 5(24), 140-147.