



Impact Of Life Expectancy And Terrorism On Capital Formation: Empirical Evidence From Pakistan

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Abstract:

This study investigates the association among no of terrorism incidents, age dependency ratio, life expectancy, GDP, growth of population and capital formation percent of GDP in Pakistan for the period 1980–2011. Johansen method of cointegration is used to find the relationship between dependent and explanatory variables. However, the impact of explanatory variables on capital formation percent of GDP except no of terrorism and age dependency ratio is positive in the long run during the period of study. In addition, the negative impact of terrorism on capital formation percent of GDP reflects the fact that terrorist attacks a feasible choice measure up to open war in face of improved state capacity.

Key words: *No of terrorism incidents, age dependency ratio, life expectancy, literacy rate capital formation percent of GDP, growth of population*

1.Introduction

Enders and Sandler (2000) emphasized that in the 21st century, researchers, academicians, politicians, philosophers, sociologists and economists focused their attention on many burning issues, but the case of intimidation is the most imperative. The word “aggression” is being quoted frequently on the floor of international foundation, as the humankind went through terrible and political unsteadiness in the penalty of September 11, 2001. The interpretation of the term “violence,” is tremendously comprehensive and notorious. Nonetheless, undecided account, combining the main characters and images of terrorism as “the planned use or threat of aggression or viciousness by sub state groups to get political, spiritual, ideological, geographical or sociological benefits. In fact terrorism plays negative impact on the formation of capital. Humankind from all states believes that intimidation to be a gloomy threat for their safety. They make the best endeavor to manage or anticipate takes action of terrorism, this is so because we know very well that 9/11 occurrence that claim approximately 3,000 civilian lives. All the social scientists, researchers, political agents and thinkers think regarding incidence of terrorism that how humankind can save theirs lives from risk of violence or aggression. It is stated that any strategy, rules , tactic or principal which strengthening the protection scheme of a nation, which may give security from terrorism and provide peaceful, cool, nonviolent and tranquil to the public of a state. Nonetheless, this is not a durable solution. The durable and appropriate technique to eradicate violence and terrorism is to be familiar with instrument of its grounds. Regarding this study many social researchers, analysts, criminal researchers and investigators have made experimental investigation in different areas to find the causes of intimidation in separate era of occasions. But they have not detected identical findings. From conclusions, some researchers find economic circumstances, others says political instability in a society, on other hands, some says internal and external conflicts to be a major root of terrorism. For that reason, it is difficult to detect the accurate results of studies of different researchers. Nevertheless, empirical evidence from studies suggests that a series of studies be carried out in dissimilar areas. The criteria for such type of work may exist in regions of the South Asian countries. The socio-political, religious and cultural activities in this region are kindhearted, which provide good opportunities for terrorist activities. Therefore, most terrorism incidents occur in this area.

The population of South Asia is more than 1,470 million. In the world, this is most populous area. The geographical, historical, sociological, political and cultural resemblances between different people of this region formulate a homogenous unit. Unluckily, the intimidation activities have been stated in this region for the last four decades. The terrorists group such as Baluchistan Liberation Army (BLA) and Taliban are present in Pakistan, while Tamil Tigers and Sikh separatist movement in Sri Lanka and in India respectively. These terrorists groups have not only created restless but also created difficulties for these countries. Recently no of terrorist activities have been faced by Bangladesh and Nepal. Similarly, Pakistan has been faced several terrorist activities for last four decades and have also blamed for providing safe haven to terrorists. Regrettably up to this point, researchers have not made proper empirical study to find basic factors for promoting terrorism in this region. Thus this study will full this gap. The main objective of this study to find the impact of no of terrorisms, growth of income, life expectancy, age dependency ratio, growth of population and literacy rate on capital formation percent of GDP.

If we look historically, there are many academicians and researchers put their concentration on snapshot of war and conflicts on the economy of countries. Nevertheless, there is very less amount of literature available in detail on terrorism and its impact on economic growth, investment and expenditure. Theoretically background shows a negative relationship between the events of terrorism and capital formation percent of GDP, slow down economic activities, less productive expenditures on defense, reduce growth of investment, devastation of physical infrastructure, low literacy rate, raise of poverty and destabilization of the economy as result of terrorism and bad governance. In addition, with the- raise of terrorist activities, individual substitute their savings with current consumption which reduce capital formation and slowed down economic intensification. Terrorism can cause of less economic development, asymmetrical allocation of wealth, and high unemployment rate. This paper investigates the association between capital formation percent of GDP and explanatory variables in Pakistan. This study will provide new directions for policy maker to raise capital formation under the umbrella of terrorism activities.

2. Terrorism In Pakistan

Pakistan allocates its boundary with Afghanistan, China, Iran and India. She divides its lengthened boundary with India. The bilateral relationship between India and Pakistan

has been remained and are unfavorable since birth of Pakistan. The government of India and Pakistan has blamed on each other for backing and financial supporting to terrorists, and organizations. Similarly, Pakistan and Afghanistan share an immense border stretching 2430 km along the southern and eastern edges of Afghanistan. Issues of Pashtunistan, the Soviet war, the advent of Taliban and America-Afghan war affected security atmosphere in Pakistan. At present Khyber Pakhtunkwah (KPK) province, is the main source of all terrorist activities in Pakistan. So the military operations are launched by Pakistan Armed forces under the direction of U.S forces. Consequently Pakistan has been faced the largest terrorist activities in the present and past decades. The sample period for our analysis is based from 1980 to 2011.

The organization of the paper is given as follows. The next section is based on review of the literature. Section third depicts the foundation of the theoretical model. The fourth gives sketch of the estimation strategy. Section 5 is based on selection of data and variables. Section 6 shows nomenclature of results and discussion.

3.Literature Review

The rich and extensive literature is available on this theme. Terrorism is the use of aggression and threats to intimidate or pressurize, especially for political purposes.

Terrorism is defined as use of threats to create supernatural horror in society in order to get specific target. Therefore, they use illicit, illegal and usually clandestine political, spiritual, religious, ideological, revolutionist or separatist organization in order to induce political and economic disruption for short term objective and long run objectives. The economic literature does not provide a conclusive answer regarding bidirectional causal linkage between terrorism and economic growth. In hindsight, an increase in economic growth rate should lead to decline in terrorism by increasing the opportunity cost of engaging in terrorist activities, however, on the other hand if benefits of economic growth are not widespread and there is unequal distribution of wealth, geographically or otherwise, it may cause to increase domestic terrorism. Alternatively, an increase in terrorist activities may lead to a decline in economic growth. It is also possible that causality exists from both sides or there may be no causality at all between economic growth and terrorism.

Inter alia, Collier (1999), Frey et al. (2007), Enders and Sandler (2008), Eckstein and Tsiddon (2004) and Mirza and Verdier (2008) suggest that terrorism slow down economic growth. Collier (1999) stated that terrorism destruct physical capital formation

as well as damage infrastructure of public assets. Gaibullov and Sandler (2008) stated that terrorism activities reduce investment spending, government spending and creates instability in the economy of a nation. Knight et al. (1996) quantified the impact of military spending on gross domestic product (GDP) which leads to a permanent loss of GDP. Abadie and Gardeazabal (2008) suggest that significant reduction take place in net foreign investment owing to terrorist activities. Enders and Sandler (1996) explored the impact of terrorism on net foreign direct investment in Spain and Greece. (Abadie and Gardeazabal 2003) and Collier et al. (2002) estimated the share of private wealth held abroad increases from 9% to 20% for countries experiencing sustained period of internal conflict. Araz-Takay et al. (2009) investigated the macroeconomic effects of terrorism relationship between political instability, culture and economic growth.

Piazza (2006) evaluated that hypothesis explore deficiency, scarcity, inequality, poor infrastructures program, poverty, injustices and unemployment are the prime grounds of terrorism. However, the results did not indicate any causality between economic growth and terrorism. Instead the structure of party politics was found to be the most significant predictor of terrorism. Similarly, Pinar (2011) scrutinized the causes of separatist terrorism in South-Eastern parts of Turkey, where the government policies are geared to improve economic conditions of the country widely accepted hypothesis that poverty is the main driving force behind separatist terrorism. However, there was no causal relationship found between economic development and separatist terrorism in South-Eastern Turkey. Recently Nasir et al. (2008) investigated the direction of causal association among economic growth and terrorism and found no causality running either from economic growth to terrorism or from terrorism to economic growth.

The United States Department of Defense defines terrorism as “the intended use of unlawful aggression or jeopardy of unlawful brutality to inculcate fear; intended to pressurize or threaten governments or societies in the chase of objectives that are usually political, religious, or ideological. The terrorists provide sufficient harm in terms of human and economic losses to a society to grant their demands from selected governments and other institutions. Both types of losses expose a government’s inability to protect a country’s assets, by this means causing a loss in citizen confidence and government legitimacy (World Net Daily, 2003). Terrorism through number of channels has heavily an effect on economic growth in the short run and long run.

Such kind of attacks can increase uncertainty which influences macroeconomics variables very badly (Abadie and Gardeazabal, 2003, 2008; Enders and Sandler, 1996).

4.Theoretical frame work

This study seeks to answer the questions in Pakistan that how capital formation percent of GDP is affected by explanatory variables like no of terrorism incidents (nti), life expectancy (le), age dependency ratio (ad), growth of population(gp), growth of income (gi) and literacy rate (lr). So in this regard, the study will try to examine the shock of explanatory variables on capital formation percent of GDP (cf).

5.Research Questions And Hypothesis

- Does terrorism reduce capital formation percent of GDP?
- Do age dependency ratio, life expectancy, growth of income per capita, literacy rate, age dependency ratio and growth of population increase the formation of capital?

Thus our main equation for regression is as follow:

$$lcf = lgi + lgp + l le + lnti + \epsilon \quad (1)$$

$$gi, gp, le > 0 \text{ and } nti < 0$$

Where l shows log of each variable. The heteroskedasticity problem can be controlled with taking log of series.

We also estimate above model by including three variables literacy rate (le), age dependency ratio (ad) and number of terrorisms incidents and see how these variables impact formation of capital percent of GDP.

6.Methodology

This study investigates the association between the capital formation percent of GDP and no of terrorist incidents in Pakistan, growth of income per capita (gi), the expectation is that high level of growth of income per capita income should be gone together with high level of capital formation percent of GDP, the association of growth of population (gp) may be positive or negative. On other hand life expectancy (le) and age dependency ratio (ad) have positive relationship with the regressed. Similarly, no of incidents (nti) have negative impact on the growth of capital formations percent of GDP.

The Johansen maximum likelihood technique is used to detect the association between dependent and explanatory variables. The spurious regression problems can be controlled with the checking of stationarity of all the variables of time series data. If the series of

variables have same order of integration, then the Johansen technique of cointegration is used to detect the association of dependent and explanatory variables.

The Johanson technique is useful in two ways:

- It finds long-run association among the relevant variables.
- It measures the long-run value of the coefficients of the variables.

In spite of this, vector error correction technique (VECM) is used to find the short-run estimation of variables. The constraint shows long run association among regressed and regressor variables in restricted vector auto regression (VAR). All variables are taken in differenced forms as endogenous in an error correction model. Therefore, the quantity of variables in the system are equal the quantity of equations in VECM. The regressed variable has its own lags in each equation. Similarly, the regressors have also their own lags, the error correction term and a random error term. The five variables in VECM can be represented as.

$$\Delta lcf_t = \alpha_1 + \sum_{i=1}^p \beta_{1i} \Delta lcf_{t-i} + \sum_{i=1}^q \beta_{1i} \Delta lgi_{t-i} + \sum_{i=1}^r \beta_{1i} \Delta lgp_{t-i} + \sum_{i=1}^s \beta_{1i} \Delta lle_{t-i} + \sum_{i=1}^t \beta_{1i} \Delta lnti_{t-i} + \lambda_1 EC_{t-1} \quad (2)$$

$$\Delta lgit = \alpha_2 + \sum_{i=1}^p \beta_{2i} \Delta lcf_{t-i} + \sum_{i=1}^q \beta_{2i} \Delta lgi_{t-i} + \sum_{i=1}^r \beta_{2i} \Delta lgp_{t-i} + \sum_{i=1}^s \beta_{2i} \Delta lle_{t-i} + \sum_{i=1}^t \beta_{2i} \Delta lnti_{t-i} + \lambda_2 EC_{t-1} + \epsilon_{2t} \quad (3)$$

$$\Delta lgp_t = \alpha_3 + \sum_{i=1}^p \beta_{3i} \Delta lcf_{t-i} + \sum_{i=q}^q \Delta lgi_{t-i} + \sum_{i=1}^r$$

$$\beta_{3i} \Delta lgp_{t-i} + \sum_{i=1}^s \beta_{3i} \Delta lle_{t-i} + \sum_{i=1}^t \beta_{3i} \Delta lnti_{t-i} + \lambda_3 C_{t-1} + \epsilon_{3t} \quad (4)$$

$$\Delta llet = \alpha_4 + \sum_{i=1}^p \beta_{4i} \Delta lcf_{t-i} + \sum_{i=1}^q \beta_{4i} \Delta lgi_{t-i}$$

$$+ \sum_{i=1}^r \beta_{4i} \Delta lgp_{t-i} + \sum_{i=1}^s \beta_{4i} \Delta lle_{t-i} + \sum_{i=1}^t \beta_{4i}$$

$$\Delta lnti_{t-i} = + \lambda_4 E ct_{t-1} + \epsilon_{4t} \quad (5)$$

$$\Delta lnti_t = \alpha_5 + \sum_{i=1}^p \beta_{5i} \Delta lcf_{t-i} + \sum_{i=1}^q \beta_{5i} \Delta lgi_{t-i}$$

$$+ \sum_{i=1}^r \beta_{5i} \Delta lgp_{t-i} + \sum_{i=1}^s \beta_{5i} \Delta lle_{t-i} + \sum_{i=1}^t \beta_{5i}$$

$$\Delta I_{t-1} + \lambda_5 E_{ct-1} + \epsilon_{5t} \quad (6)$$

Where ϵ_{5t} is called uncorrelated random error terms and the E_{ct-1} stand for the cointegrating vectors. The speed of the adjustment of coefficient can be represented by λ_i . In response to random shocks E_{ct-1} estimates how long run equilibrium attains through short-run period. However, in VECM all variables are stationary. In the same way, the diagnostic tests are used to find the normality of models.

The mainly VECM is very useful in case of cointegrated series to identify associations among the variables. VECM detects the presence of the short-run and long-run relationship among variables.

The data for the current research study for the period 1980–2011 have been collected from various sources. The data for the number of terrorist incidents have been taken from the Global Terrorism Database (GTD) of the “National Consortium for the Study of Terrorism and Responses of Terrorism.” Furthermore, a study titled “Violence and Terrorism in South Asia: Chronology and Profiles 1971–2004” by purpose of receiving utmost likely updating regarding number of militant occasions took throughout the sample period Nasir et al,(2012).

The explanatory variables include gross capital formation percent of GDP, growth of gross domestic income (GDP) per capita, growth of population, life expectancy, age dependency ratio and literacy rate. Data for capital formation percent of GDP, growth of gross domestic income (GDP) per capita, growth of population, life expectancy, age dependency ratio and literacy rate have been collected from the World Development Indicators (WDI) (2012) and various issues of Economic Survey of Pakistan.

7.Results And Discussion

For empirical analysis stationarity of all variables are checked by unit roots. Therefore study uses the augmented Dickey–Fuller (ADF) test to find the order of integration of the selected variables. Thus, Table 1 shows that all the selected variables are non-stationary at level nevertheless they are stationary at first difference; they are all integrated of order one.

Variables	Level	First difference	Conclusion
Cf	-1.627	-4.765	1(1)
Gi	-0.762	-5.697	1(1)
Gp	-2.135	-6.051	1(1)
Le	-1.865	-5.223	1(1)
Nti	-2.135	-6.024	1(1)
Ad	-1.087	-5.061	1(1)
Lr	0.89	4.81	1(1)

Table1: Results of unit root tests

r	Trace statistics	Max. eigenvalues	Trace Statistics	Max. eigenvalues
$r_0 = 0$	78.261**	30.281* 7	0.943**	35.673**
$r_0 \leq 1$	47.602	23.433	38.187	19.154
$r_0 \leq 2$	24.369	16.602	17.833	10.018
$r_0 \leq 3$	7.766	6.622	7.815	6.741
$r_0 \leq 4$	1.143	1.143	1.073	1.073

Table2

Note: The regressions in first difference include intercept. *** indicates rejection of null hypothesis of non-stationarity of the variable at 1% level of significance

In next step the empirical analysis is used to find a long-run association among the dependent variable and explanatory variables. For detection of cointegration rank of the time series data, Maximum Eigenvalue test and Trace test of the Johansen (1988) and Johansen and Juselius (1990) Maximum Likelihood technique are used. The two tests are carried out under the null propositions of $r_0 = r$ against $r_0 > r$ and $r_0 \leq r$ against $r_0 > r$ respectively. As per condition of cointegration test, the level of optimal lag span is selected in the VAR by using the Akaike and Schwarz information criteria. Consequently, the Johansen technique is used to examine the long-run associations between the variables dependent and explanatory variables.

The consequences of Johansen technique are presented in Table 2. The ranks of cointegration are based on the statistical value of Maximum Eigenvalue statistics and

Trace test statistics. These show the presence of unique long-run associations between the dependent and explanatory variables in specific models.

Model 1

Model 2

Note: ** and * indicate the rejection of null hypothesis at 5% and 10% significance levels respectively.

Finally results of the long-run association between variables of the two models are presented in Table 5. In both model the coefficients of the variables are represented as elasticities. We compare the results of model 1 with result of model 2. Model 2 is alternative of model 1, which shows the impact of age of dependency ratio is positive but it is insignificant, nevertheless literacy rate shows positive relationship and it is statistical significant.

Dependant variable: lcf	Model 1		Model 2	
	Coefficient	t-values	Coefficient	t-values
Gi	3.652	9.13*	2.823	8.56*
Gp	-0.031	-3.96	-0.320	-4.24*
Le	0.236	3.91**	0.001	3.80**
Nti	-0.032	-0.852	-0.022	-0.850
Ad	-	-	0.289	1.46
Lr	-	-	0.387	3.97**

Table 3: Long-run estimation of Johansen cointegration

Note: ** and * show significance at 1% and 5% levels of significance, respectively.

With help of these two models robustness of results can be verified. In the first model, the coefficient of gi is 3.652, which shows positive relationship between dependent and explanatory variable. It explore that a 1% boost up in per capita real GDP will increase 3.6 percent of capital formation percent of GDP in long run

Hence, from the evidences, it is confirmed that the positive impact of growth of population, life expectancy, growth of income on capital formation percent of GDP should neither be surprising nor objectionable because as well as they increase capital formation percent of GDP also increase. The coefficient of growth of population appears

to be statistically significant, suggesting the fact that growth of population has negatively affected capital formation percent of GDP in aforementioned period of analysis in Pakistan. These consequences are acceptable. Life expectancy is believed to increase capital formation percent of GDP by improving socio-economic status such as reducing poverty and enhancing level of education. The coefficients of no of incidents appear negative and statistically significant, stating that the increase of no of terrorism incidents has negatively affected capital formation percent of GDP. Similarly in model 2 the coefficient of age dependency ratio is positive but statistically insignificant, narrating that the raise of age dependency ratio has no impact on capital formation percent of GDP. In next step, the coefficient of gi has also positive impact on capital formation percent of GDP. Similarly, the impact of literacy rate on capital formation of percent of GDP is positive and significant. This is accomplished by using the interaction term of literacy rate and age dependency ratio.

The short-run results of Johansen for ECM are presented in Table 3. Starting with model 1, it is evident from the table that only growth of income and life expectancy are statistically significant in short-run. However, error correction term has expected sign and is statistically significant. In first model the coefficient of the error correction term is -0.47, which shows 47% of disequilibrium and in second model coefficient of the error correction term is -0.48, which shows 48% of disequilibrium from short run to long run in a year. The results of model 1 and model 2 are suitable in terms of statistical value, sign and significance.

Dependant variable: Δcf	Model 1		Model 2	
Regressors	Coefficient	t-values	Coefficient	t-values
$\Delta gi(1)$	4.725	11.03**	3.814	7.95***
$\Delta gp(1)$	-0.031	-0.18	-0.320	-4.24**
$\Delta le(1)$	-0.326	-3.81***	-0.001	-3.80***
$\Delta nti(1)$	-0.002	-1.48	-0.289	-1.46**
$\Delta ad(1)$	-	-	0.209	3.08
$\Delta lr(1)$	-	-	0.029	1.08
ECM-1	-0.47	-3.56	-0.48	-3.56

Table 4: ECM results based on Johansen cointegration

In the first model the value of the EC_m is -0.47 which 47% disequilibrium is corrected and in second model the value of EC_m is -0.48, which 48% disequilibrium is corrected in the first period respectively.

	Test-stats	p-value	Test-stats	p-value
Serial correlation	0.36	0.74	0.64	0.82
Normality	0.38	0.88	0.52	0.92
Heteroskedasticity	9.76	0.57	7.14	0.84
ARCH test	0.34	0.54	0.36	0.56
Model selection	0.12	0.76	0.13	0.78
R-square	-	0.49	—	0.49

Table 5: Diagnostic test statistics

The diagnostic and stability tests for both models are presented in Table 5. It is obvious that both models have not the problems of heteroskedasticity, autoregressive conditional heteroskedasticity and serial correlation. The statistical values of diagnostic tests and the normality test show that models are suitable for analysis.

8. Conclusion

The key purpose of the present study is to investigate the impact of no of terrorisms on gross capital formation percent of GDP in Pakistan for the period 1980–2011. We find the impact of terrorism on capital formation percent of GDP in two models. To avoid complications for findings, control economic and political conditions, growth of income, growth of population, literacy rate, life expectancy and age dependency ratio are included in the models to find impact of terrorism on capital formation percent of GDP. Johansen maximum likelihood technique is used to find associations among dependent and explanatory variables and investigated unique long-run relationship among all variables except no of terrorists incidents in model 1 and no of terrorists incidents and age dependency ratio in model 2.

For that reason, no of terrorist's incidents does not have an impact on capital formation percent of GDP in Pakistan in the long run in model 1. Similarly in the second model, all coefficients are seemed to be similar to that of the first model and have expected sign.

But no of terrorists incidents and age dependency ratio are statistically insignificant and have no impact on formation of capital percent of GDP. The short-run estimation is estimated through ECM, which is based on Johansen technique. The diagnostic tests are employed to detect the normality of the results. In the short-run, however, all variables are significant except growth of income and life expectancy in both models. These consequences should be used in order to make adequate health policies in Pakistan.

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