



*Research Article*

# What Explains Our Slow Economic Growth? Causality Analysis between Economic Growth and Defense Spending in Pakistan

**Sabeen Anwar**

Department of Economics, The Institute of Business Management (IOBM), Karachi.  
Korangi Creek, Karachi, Pakistan

Email: [sabeen.anwer29@gmail.com](mailto:sabeen.anwer29@gmail.com)

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## **Abstract**

Pakistan is faced with budget deficits, high unemployment and slow growth. This study provides a link between defense spending, debt servicing, development expenditures and economic growth for Pakistan. We examine whether there is a causality between defense expenditures and debt servicing on the one hand and economic growth on the other during the period 1988-2011, using Toda Yamamoto-Modified Standard Granger Causality technique. The unidirectional causality found between economic growth-defense spending and debt servicing - economic growth while bidirectional causality is found between development expenditure-economic growth and between current expenditure-economic growth. Research suggested to be self-sufficient in domestic defense industry which leads to curtail in import budget and it will create employment resources and funds will available for developing programs.

**Keywords:** Causality, Economic Growth, Defense Spending, Toda-Yamamoto.

**JEL code:** H5, O4.

## **Introduction**

Less Developed Countries (LDCs) often face the criticism that heavy defense spending

slows economic growth. That spending on non-productive activities has insignificant impact on economic growth. Moreover, defense spending absorbs a large

proportion of financial resources of these countries. However, spending on defense may have other geopolitical considerations. When a hungry and poor country has to choose between bread and butter or gun which one should it opt for? The former is required for filling up the belly, but the latter is required for survival. If the country opts to allocate more resources to defense, it will have less resources available for civilian consumption. However, it may be argued, that unless you are protected, how can you enjoy the civilian goods and services? For example, if the law and order is bad, can high economic growth become a reality?

The military expenditure is an extremely important part of any country. It shows how much a country feels vulnerable to the outside world. There has been an upward trend in the defense expenditure, especially after the World War II and the significant change in the geopolitical scenario. Over the last fifteen years, it is highly observed declining trend followed by development expenditure because of huge defense expenditure in comparison with health, education and other developing expenditure, defense spending stands with higher percentage. In Pakistan, on average GDP growth consists of 5.06 percent, inflation 8.80 percent and saving 15.11 percent. (Economic Survey of Pakistan, 2012, 2013). Furthermore, defense spending for fiscal year 2014-15 was 11.6 percent and now in fiscal year 2016, it is announced 11 percent.

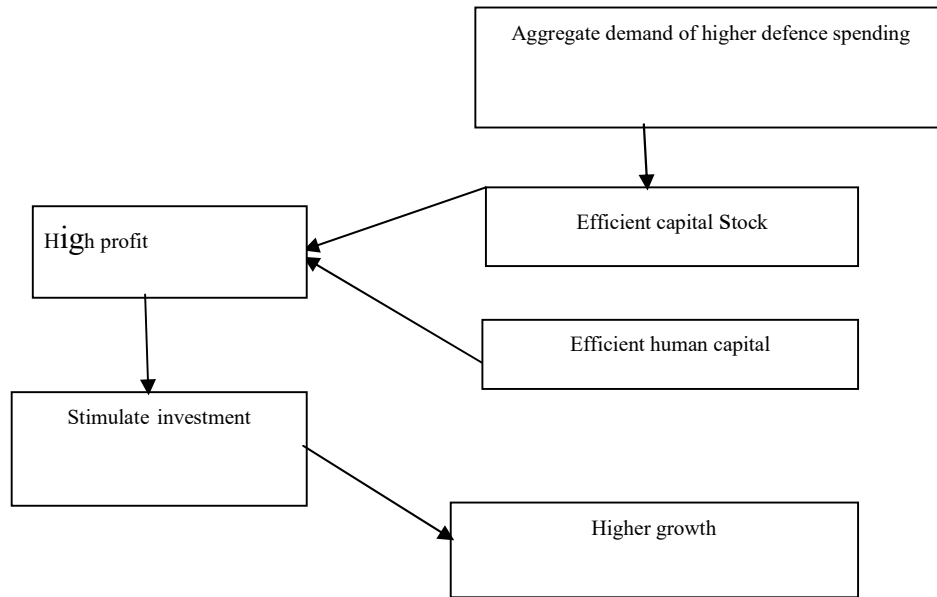
Although the behaviour of increasing defense expenditure around the world can be tackled by argument of internal and external security, threats and fighting terrorism, the way arms related spending is rising is suspicious. World's Defense spending in 2007 was \$1339 billions which is 2.5 percent of the world's GDP (SIPRI, 2008). During 1998 to 2007, defense spending increased by 45 percent in real

term because of the second world war and after 9/11 terrorist attack in USA (Agostino and Dunne and Pieroni, 2010).

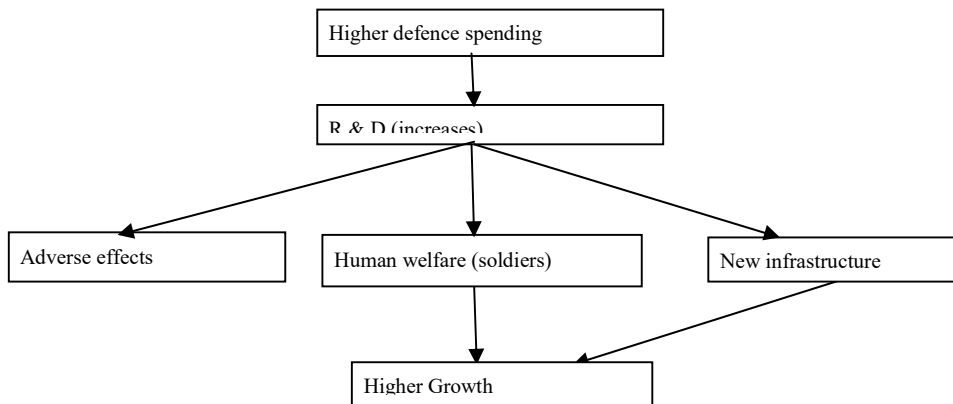
According to UNDP, Pakistan ranked 145 out of 187 countries in terms of human development index (HDI). Furthermore, multidimensional poverty index (MPI) explored numerous deprivations in education, health and living standard. The UNDP (2011) indicated in a report approximately 50 percent Pakistanis are suffering from multiple deprivations and 11 percent vulnerable to multiple deprivations (Kalim and Hassan).

When there is a very low literacy rate, unavailability of basic necessities, and declining medical facilities, then on average 4.88 percent on defense which is almost 10 times larger as compared to education expenditure and health sectors, which is truly a luxury that costs Pakistan substantially.

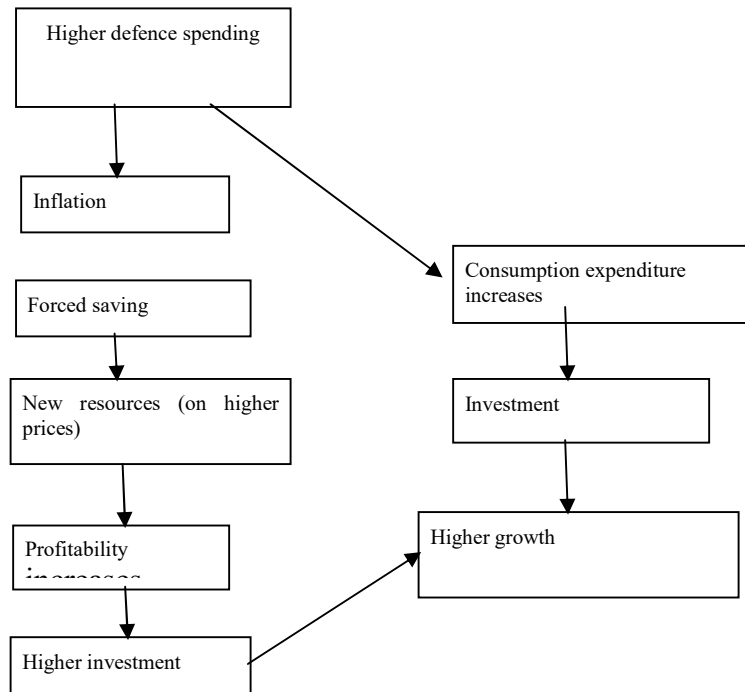
The direction of causation between economic growth and defense spending is not predicted theoretically. However, there are two opposing views. First the Keynesian-type argument that changes in aggregate demand brings fluctuations in the level of income, output and employment. Aggregate demand created by increase in defense spending leads to increase in the development of the infrastructure and creates more employment opportunities. There is, therefore, a positive relationship between economic growth and defense spending. The way defense spending leads to higher economic growth (Keynesian notation) is shown in Figure 1.1. Figure 1.2 shows the spin-off effect while Figure 1.3 shows inflation and consumption effects. The second view argues that creation of employment through defense spending is very small because most of LDCs expenditure on defense consists of buying weapons from abroad.



**Figure 1.1 : Growth in the economy through higher defense spending (Keynesian notation)**



**Figure 2.1: Growth in the economy through higher defense spending (spin-offs effect)**



**Figure 3.1: Growth in the economy through higher defense spending (inflation & consumption effects)**

The areas of research on defense spending and economic growth can be divided into three parts:

1. The relationship between defense spending and economic growth.
2. Causality between defense spending and economic growth.
3. Political stability/instability's link with defense spending and economic growth

The present study deals with causality between defense spending, debt servicing and development expenditures and economic growth in the case of Pakistan. Section 2 reviews the existing literature; Section 3 gives a brief overview of Pakistan's economy with emphasis on defense, development and debt servicing

expenditures. Section 4 analyses the data and methodology, while conclusions and policy implications are presented in Section 5.

#### Literature Review

Al-Jarrah (2005), using the Johansen's cointegration procedure, Standard Granger Causality and VECM reports the presence of cointegration between economic growth and defense spending in the Saudi Arabian economy for the period of 1970-2003, bi-directional causality with real GDP and uni-directional causality with non-oil real GDP. AL-JARRAH recommended reduction in defense expenditure for making more financial resources for education, health and other essential economic and social activities.

Künü, Hopoğlu and Bozma (2016), a panel analysis of twelve Middle Eastern countries, i.e. United Arab Emirates, Saudi Arabia, Iran, Israel, Jordan, Lebanon, Oman, Turkey, Bahrain, Egypt, Kuwait and Yemen during the period 1998-2012 found the negative relationship between economic growth and defense spending, whereas external conflict and FDI are positively related to economic growth.

Farhani (2016), a time series analysis in case of India during 1970-2012, found the relationship between external debt and military spending. Auto-Regressive Distributed Lag (ARDL), Vector Error Correction Model (VECM) and Granger Causality Test, explored that defence spending and economic growth are causing external debt. Empirical finding suggested the Indian government to reduce military expenditure.

Habibullah, et al (2008) panel and time series analyses for twelve Asian countries, Bangladesh, China, India, Indonesia, Japan, Malaysia, Philippines, Singapore, Sri Lanka, Thailand, Pakistan, South Korea for the period 1989 to 2004 used unit root, cointegration and error-correction technique. Empirical results from the panel suggested that economic growth and defense expenditure are not related to each other. However, there is a long run relationship and a causal relationship between economic growth and military expenditure. Whereas, in the time series analysis, defense spending and real GDP per capita are integrated of order one.

For Pakistan Khilji and Mahmood's (1997) study for the period 1972-1995, using Granger causality results, they found bi-directional causality between defense expenditure and economic growth. Their result reveals that defense expenditure and GDP growth are negatively related to each other. In the single equation model defense ratio is positively affected by the saving ratio and negatively affected by the inflation rate.

In Farzanegan's (2012) study for Iran for the period 1959-2007 using Impulse Response Functions (IRF) and Variance Decomposition Analysis (VDA), Granger causality analysis reveals unidirectional causality between growth rates of military expenditure and GDP. The response of income growth to increasing shocks in the military budget is positive and statistically significant.

Pradhan (2010) studied five Far Eastern Asian countries: Philippines, Malaysia, Indonesia, Thailand and Singapore over the period of 1988-2007. Empirical analysis at the individual level and panel level is based on cointegration and causality tests. The author finds unidirectional causality from economic growth and defense spending in Malaysia, Indonesia, Thailand and Singapore and bidirectional causality for the panel of five Asian countries. However, there is feedback between defense spending and economic growth in the Philippines at the individual and panel level. Moreover, neither defense spending nor economic growth can be considered as exogenously determined. Furthermore, the long run relationship between economic growth and defense spending exists at the individual level and for the panel.

Dimitraki and Liu (2011) for China for the period of 1950-2011 used the augmented Dickey-Fuller test, the Breusch-Pagan test, Engle ARCH test and the Breusch-Godfrey LM test. Empirical results suggested military spending has an overall net positive influence on economic growth. Moreover, the magnitude of the positive impact tends to increase over time. Furthermore, China's military spending is via the Keynesian effect (expansion of aggregate demand) leading to government capital allocation in such a way that enhances employment and profits in the Chinese economy, which in turn leads to increase in investment which has an overall positive impact on economic growth.

Hasan (2004) tried to use defense expenditure as a macroeconomic stabilization tool in the case of Pakistan for the period of 1951- 2003. The annual time series data analyzed using Johansen's co-integration and granger causality techniques on the variable, namely, defense spending, development expenditure, CPI, GDP and income. Results found long run relationship and bidirectional causality among the variables. Furthermore, long run economic growth is not hurt by defense spending. However, defense expenditure does not significantly explain GDP and inflation dynamics in the short run. Furthermore, long run and short run causality suggested Military Keynesian Hypothesis (MKH) does not hold over the period of the study.

Pradhan's (2010) case study of four Asian countries, namely, Pakistan, India, Nepal and China over the period of 1988-2007 at the individual country level and panel for four Asian nations. The study uses integration and co-integration techniques and Granger causality test. He finds cointegration between defense spending for the four Asian countries. In the co-integration framework there is a long run relationship between defense spending and economic growth at the individual level and for the panel for the four Asian nations, implying that defense spending of a country can affect the defense spending of other countries. Moreover, there is a bidirectional causality between China and India; unidirectional causality from defense spending to economic growth in China and Nepal, unidirectional causality from economic growth to public debt in Pakistan and unidirectional causality from public debt to defense spending in India. There is short run bidirectional causality between public debt and economic growth at the panel level for the four Asian countries.

Shenggen Fan and Saurkar (2003) analyse government expenditure of 44 developing countries with the help of macroeconomic variable for the period 1980 to 2002. Their

results suggest that governments should curtail their expenses on non-productive sectors such as defense.

Looney and Frederickson (1990), empirical analysis of six East Asian countries, namely Singapore (1965-85), Malaysia (1960-1986), Philippines, Thailand, South Korea and Indonesia suggested expected increase in GNP to increase in defense budget.

Brasoveanu (2010) used cluster analysis, quintile analysis and regression techniques and Granger causality in the case of Romania for the period of 1998 to 2007. The Empirical analysis suggested a negative correlation between defense expenditure and economic growth (GDP). However, according to the Granger causality test economic growth does not cause defense expenditure in the case of Romania.

Dunne (2010) analysed the economic effect on military spending in Sub Saharan Africa (SSA) for the period of 1988 to 2006 with the help of growth models. The result suggested unequivocal negative impacts of military spending on economic growth in Sub Saharan Africa (SSA).

Dunne (2009) provides a review of research based on the link between arms spending and economic growth for developing countries. The Empirical analysis suggested no evidence for a positive effect of military spending on economic growth in the case of developing countries the study found a negative effect of arms spending on economic growth for selected developing countries for the period. The authors suggested reducing arms and military spending for the increasing economic growth.

Cholifihani (2008) analysed long run and short run relationship between debt servicing and economic growth for Indonesia during 1980 to 2005 and found debt overhanging in the long term and increase in public external debt servicing causing slowdown in economic growth.

However, in the short run, Indonesia did not face debt overhang.

Shah and Pervin (2012) investigated the effect of debt stock and debt service for Bangladesh during 1974 to 2008. Results suggested positive effects of debt stock and an adverse effect of debt servicing on economic growth. Shabbir's (2008) case study for 24 developing countries tried to explore the relationship between economic growth and external debt and found external debt stock adversely affecting economic growth.

Time series analyses for Nigeria from the period 1970-2007 by Ogunmuyiwa (2011) revealed no causality between external debt and economic growth. However, causation between the variables was weak. Dandan (2011) found government expenditure to have a positive impact on aggregate economic growth in the period 1990 to 2006 for Jordan, which is compatible with Keynesian fiscal theory. He recommended that human capital should have a higher priority.

Using Granger causality analysis, Dogan (2006) studied government expenditure and national income for five Asian countries i.e. Indonesia, Malaysia, Philippines, Singapore, and Thailand for the last four decades (1960 to 2002). The author found that government expenditure does not have a significant impact on economic growth.

Rehman, Iqbal, Siddiqi (2010) analysed the nature and direction of causality between public expenditure and national income in Pakistan for the period 1971 to 2006. Their results supported Wagner's Law as they found unidirectional causality between GDP and public expenditure. However, at a disaggregate level GDP only causes administrative expenditure as no causality is found between development expenditure, debt servicing and defense expenditure. Empirical analysis cannot

support the Keynesian hypothesis at the aggregate or disaggregate levels.

Fan and Rao (2003) found mix performance between government spending and economic growth in forty three developing countries during the period 1980 to 2002. Sevitenyi (2012) analysed the relationship and direction of causality between economic growth and government expenditure in Nigeria during the period 1961 to 2009. The Results support the Keynesian hypothesis as the author found unidirectional causality between economic growth and government expenditure. However, there is no support for Wagner's law in Nigeria both at the aggregate and disaggregated levels.

Zaman, Shah, M. Khan, Ahmad, 2012 found external debt is negatively related to economic growth whereas it has a statistically significant positive relationship to military expenditure in the short run. SAARC external debt in the short and long-run have a significant positive relationship to military expenditure. The relationship is elastic in the long-run, but inelastic in the short-run.

Shahbaz, Afza a & Shabbir; 2012 ,corroborated with the view by Abu-Bader and Abu-Qarm (2003) who found that a rise in government non-military spending will stimulate the pace of economic growth and in turn, the government allocates more resources to productive and efficient ventures to sustain the rate of economic growth. The study explored that defense expenditure financed by borrowing and budget deficit will lead to increase in interest rates causing inflation and makes the government non-military spending less efficient and expensive.

Kalim and Hassan, the study revealed military expenditure exerts positive and significant impact on poverty. For example, one unit increase in defense expenditure leads to increase in poverty by 0.44. The inherent justification may be that the

defence expenditure in Pakistan may be done at the expense of development expenditure and thus may have a negative impact on economic growth in Pakistan as the studies by Smith (1980) and Dunne (1996) have found a negative relationship between defense spending and economic growth for the case of developing countries. It is evident from the results that poverty lagged by one year accentuates poverty in the current year. It is quite possible that because defense expenditure on social development is hampered, poverty accelerates.

Haseeb, Bakar, Azam, Hassan & Hariyatie, (2014) elaborated that economic growth and the defense expenditure are negatively related, and savings have a positive impact on economic growth. Therefore, one (1) percent increase in defense expenditure causes a 0.57 percent decrease in economic growth and one percent increase in saving causes 0.73 percent increase in economic growth. The Study suggested defense expenditure must be financed by borrowing and increasing the money supply, and at the same time reducing other social and public expenditures. This scenario is the cause of the inflation eroding the savings real worth and eventually leading to a decrease in it, investments are also affected and in turn they further affect economic growth.

Tekeoglu (2008) suggested military regimes most dominate with less open trade or in some cases closed economy and tighter controls over markets, whereas democratic governments highlighted with free market features and open trade policies. (Heo, 1998). Spending on defense budget could change as it depends on the country's regime and consequently affecting efficiency and effectiveness. Moreover, Heo (1998) was not able to find any valid and systematic pattern in the relationship between regime type and the economic effects of defense spending on growth.

On the contrary, Na Hou (2009) stated that India's higher and increasing military spending is the cause of Pakistan higher spending on arms and it shows the existence of rivalry and arms race between the two countries.

Agostino, Dunne and Pieroni, 2010, explained the state is mature enough to create an equilibrium between the opportunity cost and security benefits or military spending in order to achieve national interests which achieve the optimal social welfare.

On the opposite side, Keynesian states that the state, in order to improve macroeconomic stability in the economy, uses military spending which increases output, via multiplier effect. It leads to more R&D, increased capacity utilization. However, it has failed to consider the supply side factors.

### **Pakistan's Defense Budget**

In fiscal budget 2012-13, the Government of Pakistan allocated additional Rs.50 billion for the defense budget. According to official defense budget documents for fiscal year 2012-13, about 10% or nearly Rs.545 billion (about \$5.82) compared with Rs.495 billion in 2011-12 was allocated for defense. Furthermore, actual defense spending for fiscal year 2011-12 was Rs.509.32 billion (about \$5.45 billion) or Rs.14.32 billion more than the allocation for 2011-12. The main cause of Pakistan's defense budget deficit is the reduction in US defense aid. Table 1 & Figure 2.1 shows defense expenditure by South Asian countries as a percentage of their GDP during 1988-2010.

Pakistan's economy has passed through many critical challenges such as the sharp rise in food and oil prices combined with natural disasters in 2010 and 2011. Governance and security issues pose the most serious challenges to achieving decent growth rates and investment to GDP which was the lowest for 37 years. In 2011-12,



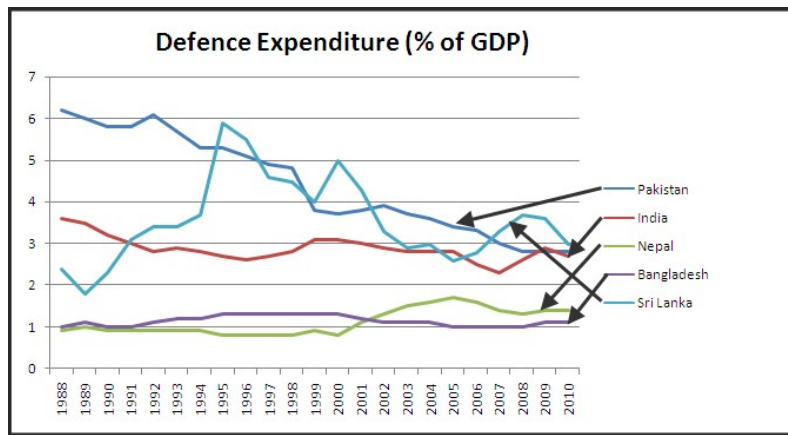
Pakistan's economy grew by 3.7 percent against the targeted growth rate of 4.2 percent. The country faces high public debt and the rate of inflation was double-digit for the last five years. Pakistan's defense and debt servicing expenditures have declined during the last two decades. Debt serving consumed about 39.9 percent of total revenues. During the last fiscal year the country's public debt stood at Rs.856 billion,

while debt servicing stood at Rs.1, 024 billion out of which Rs 821 billion was on account of domestic debt servicing. During the Musharraf era, Pakistan's total public debts increased from Rs 3,200 billion to Rs 6,700 billion. "The present government has pushed the tally to Rs 12,800 billion. Figure 2.3 shows the trend in debt servicing on external debt as a percent of GDP due to which new development projects could not be initiated

**Table 1: Defense Expenditure by South Asian Countries as Percentage of GDP 1988-2010**

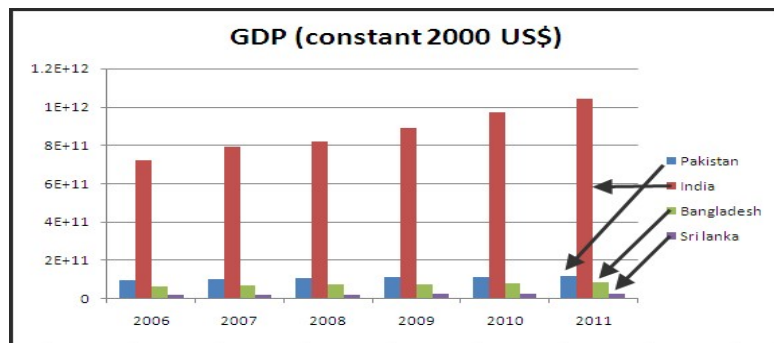
Year	Pakistan	India	Nepal	Bangladesh	Sri Lanka
1988	6.2	3.6	0.9	1	2.4
1989	6	3.5	1	1.1	1.8
1990	5.8	3.2	0.9	1	2.3
1991	5.8	3	0.9	1	3.1
1992	6.1	2.8	0.9	1.1	3.4
1993	5.7	2.9	0.9	1.2	3.4
1994	5.3	2.8	0.9	1.2	3.7
1995	5.3	2.7	0.8	1.3	5.9
1996	5.1	2.6	0.8	1.3	5.5
1997	4.9	2.7	0.8	1.3	4.6
1998	4.8	2.8	0.8	1.3	4.5
1999	3.8	3.1	0.9	1.3	4
2000	3.7	3.1	0.8	1.3	5
2001	3.8	3	1.1	1.2	4.3
2002	3.9	2.9	1.3	1.1	3.3
2003	3.7	2.8	1.5	1.1	2.9
2004	3.6	2.8	1.6	1.1	3
2005	3.4	2.8	1.7	1	2.6
2006	3.3	2.5	1.6	1	2.8
2007	3	2.3	1.4	1	3.3
2008	2.8	2.6	1.3	1	3.7
2009	2.8	2.9	1.4	1.1	3.6
2010	2.8	2.7	1.4	1.1	3

Source: SIPRI



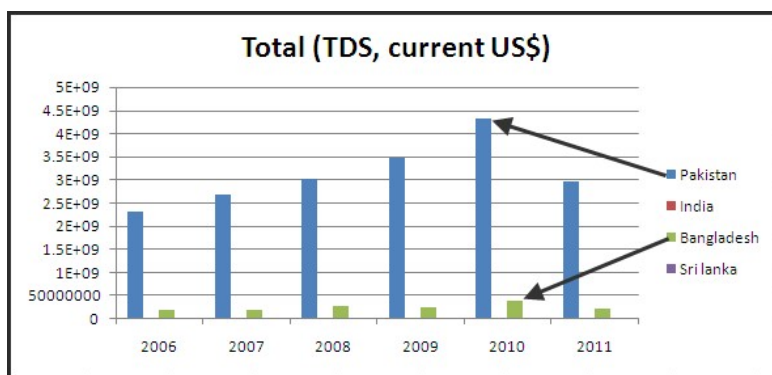
**Figure 2.1: Defence Expenditure by South Asian Countries as Percentage of Gross Domestic Product (constant 2000 US\$) 1990-2010.**

Source: SIPRI.



**Figure 2.2: Gross Domestic Product by South Asian Countries (constant 2000 US\$) 1990-2011**

Source: WDI.



**Figure 2.3: Debt Servicing on Total External Debt (TDS), current US\$ by South Asian Countries as Percentage of Gross Domestic Product (constant 2000 US\$) 1990-2011**

Source: WDI.

On the one hand, these countries are still facing serious problems such as poverty, unemployment, poor infrastructure and health and illiteracy. But they are spending a large percentage of their GDPs on non-productive activities. These might be crowding out growth as necessary expenditures and building physical and social infrastructure which can stimulate economic

growth are not being made due to the non-availability of resources.

**Table 2 contains Government of Pakistan's expenditures on development, debt servicing, defense and current expenditures as percent of GDP.**

**Table 2: Breakdown of Expenditures (as % of GDP)**

Year	Development Expenditure	Total Debt Servicing	Defense Expenditure	Current Expenditure
1999-00	2.5	2.1	3.9	16.4
2000-01	2.1	2.3	3.1	15.3
2001-02	2.8	1.8	3.3	15.7
2002-03	2.6	1.9	3.3	16.2
2003-04	2.8	3.3	3.3	13.7
2004-05	3.5	1.6	3.2	13.3
2005-06	4.8	1.7	3.2	13.6
2006-07	5	1.5	2.9	15.8
2007-08	4.4	1.3	2.7	18.1

2008-09	3.8	2.1	2.6	16
2009-10	3.5	1.7	2.5	16.8
2010-11	2.8	1.3	2.5	16.1
2011-12	3.6	0.7	2.4	14.4

Source: Pakistan Economic Survey 2011-12

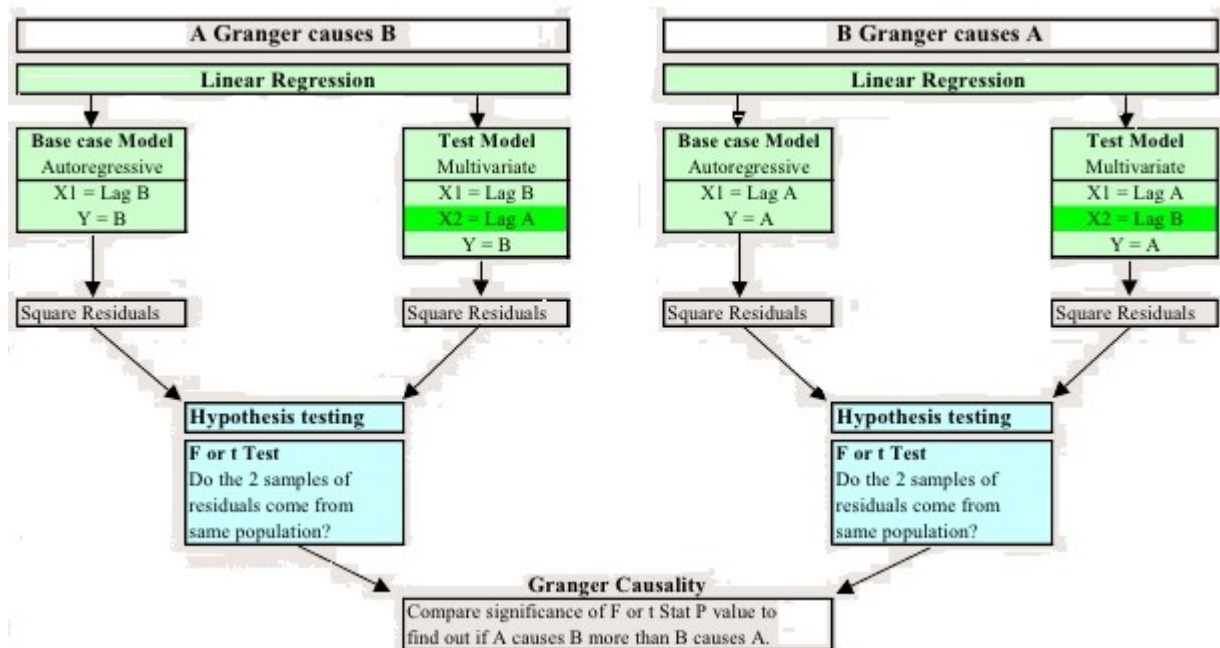
**Data and Methodology**

Data are taken from various issues of the Pakistan Economic Survey, except the data on GDP which are from World Development Indicators (WDI) (in constant \$ 2000 US) for the period 1981-82 to 2010-11.

Most of the studies used Granger causality test to determine causality between defense expenditure and growth. This paper uses modified Granger Toda and Yamamoto

(1995) test for long run causality. Toda and Yamamoto makes Granger causality test easier because it does not need to test for co-integration or transform VAR into ECM (error correction model) and Toda and Yamamoto procedure avoids Granger causality testing problem with respect to size and power of unit root and co-integration test. By using the methodology, we will try to explore the impact of defense expenditure (DS), development expenditure (DE), and total debt spending (TDS) on GDP growth.

**Figure 2.4: Model Fitting Flow Diagram**



**Testing for Unit Root Problem**

First we examine the presence of unit root with augmented Dickey-Fuller (ADF) t-test (Dickey & Fuller, 1997) for individual time

series and their differences are used for the presence of unit root test. The Augmented Dickey Fuller (ADF) test was applied on each time series to find the existence of unit root where the null hypothesis states that unit

root problem exists against the alternative hypothesis that there is no unit root problem. Table 3 presents the result of unit root test. The Table indicates that for all the variables we can not reject the null hypothesis i.e. unit

root problem exists in the level form. But by first differencing the variables, the null hypothesis is rejected at the 1%, 5% and 10% significant levels revealing that the unit root problem does not exist.

**Table 3 : Unit root test**

Variables	ADF-Statistics	
	Level	1st Difference
GDP	0.317732	-2.743686***
DS	0.076085	-4.257973*
DE	-0.060987	-3.062493**
TDS	0.749979	-4.696069*
log(CE)	-0.706382	-5.355757*

Note: MacKinnon (1996), the optimal lags for conducting the ADF tests were determined by SBIC (Schwarz Bayesian information criteria).

\*Denotes significance at 1% level

\*\* Denotes significance at 5% level

\*\*\* Denotes significance at 10% level

where,

GDP= Gross Domestic Product.

DS= Defense Spending.

TDS=Total Debt Servicing.

DE= Development Expenditures.

log (CE) = log of current expenditure.

#### ***The Toda-Yamamoto Approach to Granger Causality Test***

Gujrati (1995) causality test is not valid if the variables are non-stationary and the t-statistic does not have standard distribution. Causality test is sensitive to

model specification and the number of lags. Granger (1988) test is based on asymptotic theory; therefore, the critical values are only valid on stationary variables that are not bound together by a co-integrating relationship in the long run. Granger and Maekawa (1999) stated that when one or more time series are non-stationary, Granger-causality test by using F-statistics can lead to spurious causality.

Standard and Granger causality cannot be used in the presence of co-integration between two variables which has been modified by Toda and Yamamoto. Using this procedure, we can find the causality between integrated variables based on asymptotic theory. One advantage of Toda Yamamoto method is that we need not test for co-integration; the pretest bias can therefore be avoided.

To study the direction of causality between defense spending and GDP growth, we adopted today-Yamamoto version of the Granger causality test. Other variables for which causality needs to be tested are Total Debt Servicing

(TDS) and Development Expenditure (DE) which can be strongly related to Gross Domestic Product (GDP).

Toda and Yamamoto (1995) Augmented Granger causality test is based on the following equations:

$$y_t = \alpha + \sum_{i=1}^{h+d} \beta_i Y_{t-i} + \sum_{j=1}^{k+d} \gamma_j X_{t-j} + \mu_{yt} \tag{A}$$

$$X_t = \alpha + \sum_{i=1}^{h+d} \theta_i X_{t-i} + \sum_{j=1}^{k+d} \delta_j Y_{t-j} + \mu_{xt} \tag{B}$$

Where, h and k are the optimal lag length of  $Y_t$  and  $X_t$ , d is maximal order of integration of the variables in the system and  $\mu$  are error terms that are assumed to be white noise with zero mean, no autocorrelation and constant variance. We add the maximum order of integration to the number of lags and carry out a Wald test for the first P-variables only with P-degree of freedom. For Toda-Yamamoto, the null hypothesis states that there is no causality whereas

the alternative states that there is causality.

The optimum lag length of VAR in models is  $k=2$  based on SIC criterion. However, all the variables are stationary in first difference. This means that  $d_{max} = 1$ . Therefore  $k+d_{max} = 2+1 = 3$  lags. The probability values of  $\chi^2$  statistics are given; the low P values suggest that we reject the null hypothesis.

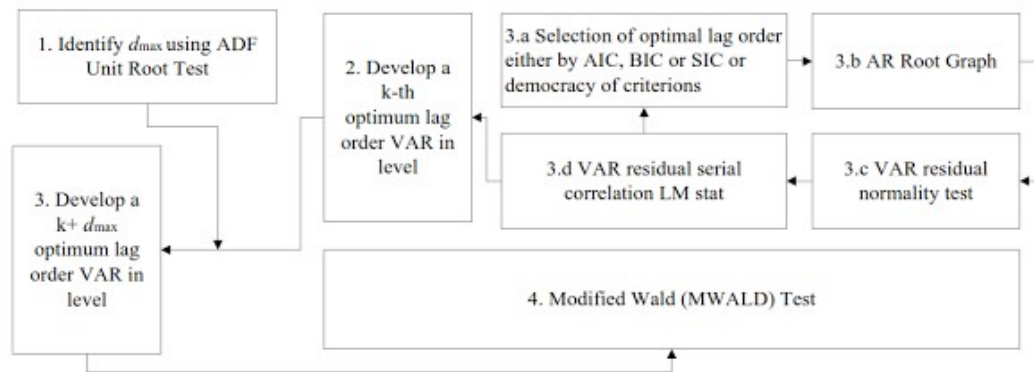


Figure 2.5: Model Fitting Flow Diagram

**Table 4: Toda-Yamamoto Causality Test**

Variables	X <sup>2</sup>	P-Value	Variables	X <sup>2</sup>	P-Value	Causality Direction
GDP to DS	6.222100	0.0446	DS to DGP	2.283133	0.5158	GDP → DS
GDP to DE	20.75764	0.0000	DE to GDP	24.82207	0.0000	GDP ↔ DE
GDP to TDS	0.969092	0.6160	TDS to GDP	25.95178	0.0000	GDP → TDS
GDP to log(CE)	9.023334	0.0110	log(CE) to GDP	10.65070	0.0138	GDP ↔ log(CE)

### ***Empirical Results***

The Toda Yamamoto causality test suggests that Gross Domestic Product (GDP) causes Defense Spending (DS) without feedback or unidirectional causality between Gross Domestic Product (GDP) and Defense Spending (DS). This means that high and stable economic growth leads to heavy defense spending, i.e. the Government of Pakistan increases the defense budget when economic growth increases. Kollias (1997) argues that high growth rate counties may divert their resources from defense to other productive economic activities. However, development expenditure (DE) and log of current expenditure (CE) causes gross domestic product (GDP) with feedback or bidirectional causality existing between the two, or we can say development expenditure and economic growth causes each other. Whereas, Gross Domestic Product (GDP) causes Total Debt Servicing (TDS) without feedback or unidirectional causality between the two. That is, economic growth causes debt servicing in the case of Pakistan.

### **Conclusion and Policy Implications**

The current research used annual data for Pakistan, we examined the direction of causality between economic growth and expenditure based on Toda Yamamoto (1995). On the basis of empirical results, we conclude that in the case of Pakistan there is

a unidirectional causality between GDP and DS. Furthermore, there is a bidirectional causality between development expenditure (DE) and economic growth (GDP), bidirectional causality between the log of current expenditure (CE) and economic growth (GDP). While economic growth (GDP) causes total debt servicing (TDS) but debt servicing does not cause GDP. defense expenditure was funded by taking a route to higher and deepening budget deficit. It is observed, after 9/11, high defense spending is badly needed in the state of Pakistan. However, due to high external debt and slow economic growth, there are huge obstacles for the defense budget. To maintain a strong armed force in order to control terrorism within a border and across borders. The Massive defense budget is not only due to 9/11, it was inherited in Pakistan's budget since establishment and was strongly recommended after Dhaka's partition. Other research studies discussed the existence of long run negative relationship between defense spending and economic growth in 1972-2009. The study referred to defense expenditure as the real opportunity cost and the country faces a tradeoff between defense spending and the public expenditures. Some argue that high military expenditure is a problem for a country with low income. (Khan ,2004). Pradhan(2010) found the relationship between long run relationship is not only in the case of Pakistan, but exists for all four Asian countries, namely: China, India,

Nepal and Pakistan. This is an indication of the causality between spending and economic growth. Moreover, this also points that changes in the defense spending of a country can cause the defense spending of another country.

Empirical finding highly suggested for policy recommendation, Pakistan badly needed to be self-sufficient in domestic defense industry, which can lead to curtail in defense budget, it will create employment resources and funds will be available for developing programs. Although, because of political and regional instability bound this region to pick guns not butter from guns verses butter dilemma. Although scarcity and inefficiency in productive sectors indicated to choose butter instead of guns. Internal and external terrorism are not allowed to curtail in defense budget, specially in the current situation where India is trying to create another big dispute against Pakistan. Mirza, Jaspal and Malik (2015) suggested Pakistan's defense industry needs to be self-sufficient with long-run sustainability by providing essential military equipment to armed force, through this import expenditure will reduce and it can provide support to overall military spending. Furthermore, another policy which needs to be done is to achieve efficiency level or increase efficiency in all economic sectors, by this Pakistan will be able to get rid of IMF's fund, which is the root cause of less developing expenditure. Künü, Hopoğlu and Bozma (2016), an empirical finding suggested increase in spending on public sectors and development of domestic defense industry in a way like Iran, Israel and Turkey.

This research only checked the direct effects of defense spending on economic growth. It ignored possible indirect effects, such as employment, investment, law and order and political aspects of defense spending. Economic growth can limit the growth of public debt burden and expenses and avoid future debt traps and stronger taxation mechanism.

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## Appendix

### Gross Domestic Product by Country (constant 2000 US\$) from 1990-2011

Year	Pakistan	India	Bangladesh	Sri Lanka
1990	50248972481	2.76E+11	29489968538	9821725438
1991	52792358269	2.79E+11	30474743435	10273524808
1992	56860483455	2.95E+11	32010406325	10725559900
1993	57859947294	3.09E+11	33474682526	11465623533
1994	60022413964	3.29E+11	34842024065	12107698451
1995	63001091770	3.54E+11	36558011931	12773621865
1996	66054490892	3.81E+11	38247711533	13259019496
1997	66724545016	3.96E+11	40308326777	14108314847
1998	68426177246	4.21E+11	42415457211	14771179512
1999	70930666164	4.57E+11	44480763467	15406424815
2000	73952374970	4.75E+11	47124925462	16330810304
2001	75418468995	4.98E+11	49610300682	16078438393
2002	77850284715	5.18E+11	51800799317	16715893245
2003	81623159361	5.59E+11	54523446362	17708862282
2004	87637620104	6.03E+11	57942340648	18673120685
2005	94357063094	6.59E+11	61393084272	19838649830
2006	1.00E+11	7.20E+11	65463038830	21359771931
2007	1.06E+11	7.90E+11	69670899876	22811733077
2008	1.08E+11	8.21E+11	73983829245	24169041086
2009	1.11E+11	8.88E+11	78231358239	25024372773
2010	1.15E+11	9.73E+11	82979485251	27030316336
2011	1.19E+11	1.04E+12	88545829824	29260877188

Data source: WDI

**Total Debt Servicing on External Debt (TDS) current US\$ by Country as Percentage of Gross Domestic Product (constant 2000 US\$) 1990-2011**

Year	Pakistan	India	Bangladesh	Sri Lanka
1990	95573316.58	8518.392257	8634129.279	4455.724342
1991	98479457.56	7979.044762	7426039.303	5609.504381
1992	116373192.8	6995.863743	10513197.9	4309.231163
1993	2383078000	329.7298704	179700734.8	214.0853794
1994	3448584000	236.0768942	311546372.5	133.708506
1995	3215513000	244.3690944	242472151.1	186.8412508
1996	3286142000	247.7467498	296871301.2	129.5891514
1997	4083292000	192.4359071	307908752	135.2881324
1998	2297771000	354.3133759	207581494.3	218.2458516
1999	2944827000	266.8312943	222060535.1	173.2469031
2000	2864219000	284.2418823	258754619.1	160.988044
2001	3001020000	261.8349761	226297880	200.1954238
2002	2894031000	281.3138491	261447846.4	147.1471291
2003	3079454000	255.1660132	232212351.7	179.3892517
2004	4286281000	189.9387838	387224233.7	116.9962932
2005	2447455000	321.0567712	184555210.5	208.4541525
2006	2321391000	350.7082607	209715333.9	198.6330671
2007	2674985000	293.7481892	201712562.6	224.595828
2008	3011623000	270.3296528	272071151.8	141.4016141
2009	3478474000	225.8956082	262301248.2	158.8112916
2010	4311330000	188.8352318	389487169.8	116.3165401
2011	2958601000	265.5890402	223099191	172.4403385

Data source: WDI

**Final consumption expenditure etc. by Country as Percentage of Gross Domestic Product (constant 2000 US\$) from 1990-2011**

year	Pakistan	India	Bangladesh	Sri Lanka
1990	88.89751	76.46664911	90.35441689	85.67641648
1991	82.53439	77.50793902	88.66864138	87.24355101
1992	82.93252	76.49201003	87.45561836	84.98764352
1993	85.31613	78.69703755	87.14021686	83.98826979

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<b>1994</b>	83.2156	77.1028351	86.46022078	84.77785606
<b>1995</b>	84.16729	75.10584644	87.36043346	84.70870297
<b>1996</b>	85.52727	79.08177591	87.61566162	84.67820467
<b>1997</b>	86.76916	76.70335205	85.30188385	82.67520188
<b>1998</b>	83.33094	78.11988932	83.31641398	80.87056207
<b>1999</b>	86.04802	75.69036936	83.27201406	80.49357845
<b>2000</b>	84.02033	77.36121483	82.22333293	82.56576211
<b>2001</b>	84.0561	75.81362208	83.03154768	84.23220648
<b>2002</b>	83.50763	76.49251042	81.62356653	84.479263
<b>2003</b>	82.64854	75.37997379	82.41616794	84.40515828
<b>2004</b>	82.38832	69.30063532	81.32545842	84.09051669
<b>2005</b>	84.79304	68.46526251	81.93724424	82.10277147
<b>2006</b>	85.84835	67.28715193	81.62038199	83.02421495
<b>2007</b>	84.5921	65.9802086	82.46155526	82.42436893
<b>2008</b>	88.98126	69.54158805	84.20396451	86.1336895
<b>2009</b>	89.33529	69.25243827	82.75254914	82.05853959
<b>2010</b>	90.29953	68.32626208	82.19631662	80.72990794
<b>2011</b>	91.99932	67.74163042	83.55875368	84.61531642

*Data source: WDI*