

# Accounting for the Efficacy of Defense Expenditure to Economic Growth in India

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## Abstract

In present era, to preserve a security and sovereignty of the country, it is necessary to spend a significant amount of national income on defense sector. This study instigates the increasing demand of defense expenditure and also to study the growth performance of India's with special focus on the efficacy of defense expenditure on economic growth. This study adopts an Autoregressive Distributed Lag and Toda-Yamamoto granger non-causality model during the period 1961 to 2017. Overall, the results suggest that India is affected both internally and externally issues and also verifies that defense expenditure and economic growth are positively and significantly affect to each other in both period short run and long run. It advocates that increment in defense expenditure by 1% in current period will help to boost economic growth by 1.15 per cent in the long run. For to the directional relationship the Toda-Yamamoto Granger causality outcomes suggest that causality running from DE to GDP which means shows the unidirectional relationship. Accordingly, this designates that defense sector has a crucial efficacy in the development of Indian economies.

**Keywords:** Defense Expenditure; Gross Domestic Product; Demand, ARDL, Co-integration, Toda-Yamamoto Granger Causality, India.

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## Introduction

*“The single and most massive obstacle to development is the worldwide expenditure on national defense activity.”<sup>1</sup>*

Defense expenditure plays a significant and dominant role in government expenditure in India which often far surpasses health and education outlay. Thus, on the one side, there are still numerous problems in the front of India such as poverty, insignificant infrastructure and inadequate health status, while since 1990's it takes a place in the fastest growing economies in the world. On the other side, on defense huge share are expended in India which might exploit the scarce resources and crowd out that spending which are important for development of any country such as health and education expenditure and by the means of spin-off effects also might spur economic growth. Thus, there is a latent issue of trade-off between military security and human security.

According to SIPRI year book 2018, world military expenditure was associated calculable \$1739 billion, for the year 2017 and total expenditure share in world was 2.2 per cent of GDP. However, in 2017 India spending was \$ 63.9 billion which improved by 5.5 per cent and reached in fifth position of defense spenders while in the world, India put the first position in import of major weapon with 12 per cent global share.

My objectives in this paper are in India what factors are responsible for increasing demand of defense outlay? And what is the growth performance of India's with special focus on how is the Indian economic growth influenced by defense expenditure?

1. Quotation which was mentioned in Degar and Sen (1983), from a report allotted by a UN Committee for Developing Planning in the 1970's.

### **An overview of India's growth and defense policies**

Before 1960, defense sector was a not dominant role in Indian industry and also it was ignored by the India government. The GDP share was only 2 per cent in defense expenditure whereas, 7 per cent of CGE. In short, during the 1950's the defense sector was totally neglected by the Indian government thereby India had to pay a very heavy consequences in 1962 as a Chinese invasion.

The consequences of the Chinese aggression in 1962 took forefront some incapability of Indian defense which helped of Indian government to awake from dead slumber. As a result, Indian government enhanced the defense budget from Rs 2.90 in 1961-62 to Rs 8.16 bn in 1963-64. As share of CGE it improved 25.45 per cent under the same period from 19.63 per cent.

After highlighting of the India's weakness in 1962 Pakistan also availed and attacked in mid-1965 in India. But finally, after all that things Indian defense forces did nicely and war ended with settlement. These two experiences prepared Indian government to consider wisely on defense sector and ending of the period high priority was given to the defense sector, India recuperated her dignity. After that in 1964 to 1969 India's First Five Year Defense Plan was framed but this was dislocated due to resources constraints, low

economic development, drought and rupees devaluation in mid-1960. As a consequence, GDP growth dropped to 2 per cent during this period which was not sufficient for allocation to defense because of the defense expenditure which was 3.71 per cent in 1963-64, deteriorated to a little over 2 per cent ending of the 1970's decade (Economic Survey of India 1991-92).

During the 1971-80 periods, again India was trapped in bad economic situation and due to Indo-Pakistan war of 1971 and uncertain political situation the second Five Year Defense Plan (1969-74) had to abdicated again, of emergency by Smt. Indira Gandhi (Economic Survey of India 1991-92).

During 1981-1993, the country's economic situation which had worsened due to consecutive droughts and increase in crude oil price in 1973, was carried under control by intensive efforts of the government. India's defense expenditure showed the increment from 2.83 per cent in 1980-81 to 3.60 per cent in 1987-88 as per of GDP. However, in CGE shares it reduced from 17.19 per cent in 1980-81 to 13.96 per cent (Economic Survey of India 1991-92).

Then the expenditure reduced once again in 1990 and reached to less 3 per cent. It was 2.47 per cent of value in 1998-99, before Kargil war. In 1998 the defense expenditure inflated from Rs 412.00 to 456.94 billion in 1999 wherever the rate of increment is 10.91 per cent and the defense expenditure touched up from Rs 1056.00 billion to Rs 1417.03 billion in 2008 to 2009 where growth was 34.19 per cent. Major fallout of the November 2008 attack has been a conventional increase in military outlay. However, defense expenditure showed the decreasing trend as per GDP from 1987s to 2017-18 from the extent of 3.60 per cent to 1.56 per cent. Eventually, in GDP share defense expenditure of India has fluctuated around 2 per cent in the 21<sup>st</sup> century. Figure I illustrate the tendency of India's defense expenditure in billion \$US.

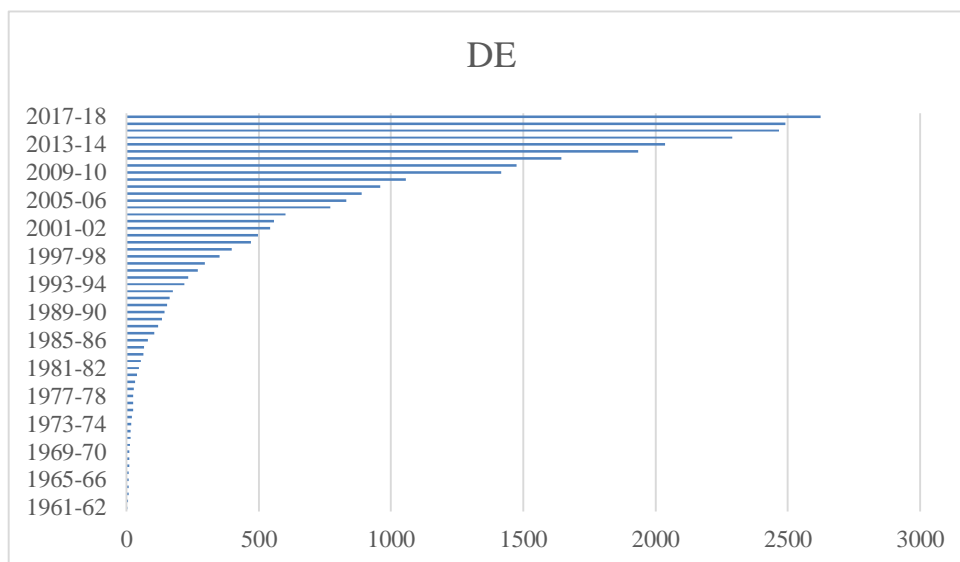


Figure 1. India's Defense Expenditure Tendency since 1961  
 Sources: Data collected from DSE and Economic Survey of India

## Reason for Defense Expenditures in India

Adam Smith, (as cited in Dunne et al., 2003), remarks that the prime responsibility of national is “that of defensive the society from the violence and attack of other sovereign societies...that of defending, as far as possible, every member of society from the injustice or oppression of every member of it.”

Every country spends a lot of amount on defense expenditure because of a different reason. For example, Castillo *et al.* (2001) defines the three hypotheses of causing the defense expenditure. First is the desire hypothesis which explains that countries facing a fast-economic growth acquire better international motivations and thus raise their defense. The second is fear hypothesis which explains that countries improve their defense expenditure when they find increasing menace to their country’s safety. The lawfulness hypothesis makes clear that governments uses an aggressive foreign policy when they find a danger for their survival by domestic conflict and for providing security increases the level of defense expenditure. Regardless of the reality that these hypotheses might also be appropriate for India.

In the Asian continental India is a very interesting case to study the link about defense expenditure and economic growth. India is an emerging country, by means of numerous internal and external risk. The historical time perceived a noticeable rise in both the internal and external threats to Indian national security. Internal threat due to spread of terrorism in Punjab, particularly ‘Operation BLUE STAR’ in 1983-84 and it deteriorated the internal security environment. Coupled with this, the condition in North-east due to Naxalite/Maoist insurgency and J & K placed demands on Armed Forces, resulting in increased unforeseen expenditure (Sethi 1995). In the *Arthashastra*, Kautilya wrote Internal threats should be taken care of instantly, for internal dilemmas, like the terror of the hidden snake, are extremely serious than external threats. The most dangerous enemy is the enemy within. There are more challenges such as presence of rifts and caste differences, culture, language, ethnicity, religion and economic discrepancy for India’s internal security and affect its trend of defense outlay.

Although, for externally danger India is centrally vested in South Asia which is justificatory a high level of insecurity. India has a border with China, Pakistan, Bangladesh and Sri Lanka which it has a hostile relation in former. The relations of India’s with its bordering countries are not at all distress free. It has unsolvable main issues with Pakistan, China and Bangladesh. Therefore, the main objectives of Indian defense policy are to protect the country from internal and external threat for making self-assurance to game preserve its space as an energetic political actor in Asia. All these internal and external aspects are responsible to escalation India’s defense expenditure and stimulus India’s safety environment along with in the whole Asia and the entire world. With the purpose of dealing with the internal and external threat and issues, India has regularly increasing defense expenditures because, a lean India will not be dexterous to commence the peace and stability in the region and in the world.

## Background Literature

In several countries most significant part of the budget is defense expense. Consequently, numerous papers have been studied about defense expenditure and economic growth in the literature. Benoit (1973) was the first who studied about the defense expenditure and economic growth for 44 less developing countries over the period 1950-1965 and study concluded that there exists a positive causal relationship between both defenses outlay and economic growth. Hereafter study many researchers gave attention on this side and to a great extent of literature has developed since late 1970s. There is a numerous study about defense outlay and economic growth which expound a positive link in long run and concluded that defense expenditure encourages Research and Developments (R&D) in defense sector which takes technological innovations and this technological spill-overs useful to civil sector can enhance economic growth. Secondly, renders a safety which recommends a stable business environment, a necessary condition for encouraging foreign investment and market exchange. Furthermore, it helps to reduce the unemployment as a result expand the aggregate demand. The studies support the positive relationship between variables are: Stewart (1991), Oyinlola (1993), Donald and Shuanglin (1993), Batchelor (2002), Lai et al (2002), Candar (2003), Hassan et al (2003), Cuaresma et al. (2004), Ferda (2004), Tambudzai (2005), Hasani Sadrabadi and Kashmiri (2008), Gupta et al. (2009), Rashid and Arif (2012), Chairil et al. (2013), Khalid and Noor (2015).

Alternatively, there are some economist who confirms the adverse relation of defense expenditure and economic growth and determined that defense expenditure has the opportunity cost and hamper economic development by dropping savings and misusing the resources in unproductive uses in the public or private sector. Secondly, defense expenditure may further take restrictions on budget. Defense expenditure affects positively to economic growth when it is funded by non-distorting revenues however it can affect positively or negatively to economic growth if funded by distorting incomes, but it depends on the extent of the defense expenditure. Finally, from the fixed government expenditure, high defense expenditure demoralizes the government efforts to devote more on infrastructure, which is a precondition for growth of the economy. The studies show the negative relationship are: Smith (1977), Taylor et al. (1980), Lim (1983), Nabe (1983), Cappelen et al. (1984), Faini et al. (1984), Adams and Gold's (1987), Linden(1992), Blomber and Brock(1996), Dunne and Nikolaidou (1998), Dunne and Vougas (1999), Batchelor, Dunne and Saal (2000), Karagol and Palaz (2004), Cuaresma and Reitschuler (2006), Yakovlev (2007), Pieroni (2009), Yang et al. (2011), Shahbaz and Shabbir (2012), Haseeb (2014), Khalid and Razaq (2015) and Mangir and Kabaklarli (2016).

Also, some studies investigated the presence and the causality direction for defense spending and economic growth such as, Joerding (1986) directed the linkages for 57 underdeveloped countries used the Granger causality test for military spending and real GDP. Kusi (1994) also used the Granger causality test to check the causality between GDP and military expenditure and obtained the bi-directional causality in one country, uni-directional causality for 12 countries and no causality in 62 countries. Chang et al. (2001) estimated the bi-directional causality outcomes in Taiwan between military expenditure and real income and uni-directional results in case of China. Dritsakis (2004)

proposed a uni-directional relationship for Turkey and Greece running economic growth to defense spending. Though, causality runs from military expenditure to economic growth in the case of Turkey (Karagul and Palaz, 2004). Kollias et al. (2004) in short run for Cyprus obtained the bi-directional causality amid defense expenditure and economic growth. Smith and Tuttle (2008) discovered the uni-directional link between both variables output and defense expenditure for the United States which runs from output to defense expenditure. Safdari et al. (2011) also defined a uni-directional connection running from real GDP to defense spending in Malaysia and South Korea and no causality relationship among them for Iran and Saudi Arabia. These results exhibit the causality between both variables defense expenditure and economic growth.

Literature on India is comparatively limited and contradictory. Ward et al (1991) found the positive impact on economic growth due to spending on the armed sector but a negative effect when it spends on the non-military sector. However, Yildirim and Ocal (2006) found the outcomes that a bitter relationship amid India and Pakistan is the main reason of an arms race which is detrimental for economic growth of both countries for the period 1949 to 2003. Tiwari and Tiwari (2010) scrutinized the causality for economic growth and defense expenditure in the case of India by the way of Granger causality analysis. The results found the bidirectional causality between GDP and defense expenditure. Dutta (2011) studies show that for national security, integrity, peace, and harmony defense is obligatory but it does not help in India to spur economic growth over the period. However, Khalid (2014) found inconclusive links between economic growth and military outlay. Shah et. al (2015) scrutinized the connection of economic growth with civilian and military portions of government expenditure during the period 1988-2013 for two bordering nations; India and Pakistan. A positive effect was found from military spending to economic growth in the case of India. Destak (2016) also surveyed the relation about defense spending and economic growth in the case of Philippines, India, Mexico, China, Brazil, Malaysia, South Africa, Indonesia, Turkey and Thailand for the long run. This study showed that defense spending is significant for India, Mexico and South Africa and declining defense spending affects negatively economic activities and specifies that defense expenditure should not be declined. Zahir et. al (2017) in the case of India showed the negative relation amid defense expenditure and economic growth.

So far, there is still an unsolved debate between both defense expenditure and economic growth and neither a theoretical consent nor a decisive empirical suggestion about this relationship. These contradictory conclusions expose that the study about military spending and GDP growth deserves consideration.

### **Objectives and Methodology**

In this paper, I study the impact of defense expenditure on GDP and GDP to defense expenditure in India using a time series data set covering from 1961 to 2017. I choose this period since 1961 because after 1961 the Indian government focused on defense expenditure when China attacked India for the first time after independence. The examination of both economic growth and defense outlay for India is mostly insightful, as it is an emerging economy, with numerous internally and externally security problems (especially with Pakistan and China). Geographic situation is also another remarkable feature of the country because in the center of South Asia India is located which has a high level of

unsafety. India has a border with China, Pakistan, Bangladesh and Sri Lanka which it has a hostile relation of past. All the data are collected from Handbook of Statistics of Reserve Bank of India (RBI), World Development Indicator (WDI), SIPRI, Defense Expenditure Statistics, Ministry of Finance, Journals, Magazine including internet and Government web sites etc. for the study. For this paper two variables defense expenditure and economic growth are used and Gross Domestic Product is used as a substitution of economic growth in India and data are taken in current Indian rupees in billion. All the data are transformed in natural logarithmic form.

To scrutinize the defense expenditure and economic growth interrelation three steps are required. First is achieved by implementing the Augmented Dickey–Fuller tests (ADF) for checking the stationarity and the second step is assessed the long run cointegration amid defense expenditure and GDP growth applying the ARDL/bound testing. Finally, to check the direction of causality Toda and Yamamoto granger non-causality test are used.

### *Model Specification*

The following equation is used for the growth model:

$$\text{GDP} = f(\text{DE}) \dots \dots \dots (1)$$

Where, GDP stands for log gross domestic product and DE for log defense expenditure. The connection among all the variables can be described in the following linear model

$$\text{GDP}_t = \alpha + \beta_0 \text{DE}_t + \varepsilon_t \dots \dots \dots (2) \text{ Where } \alpha \text{ and } \beta > 0$$

$\text{GDP}_t$  and  $\text{DE}_t$  represents the log GDP and log defense expenditure at an exclusive time respectively whereas  $\varepsilon_t$  show the ‘noise’ or error term;  $\alpha$  and  $\beta$  represents the slope and coefficient of regression.  $\beta_0$  specify that how a quantity variation in the independent effects the dependent variable (GDP).

## **Empirical Results**

### *Descriptive Statistics*

Before going to the time series econometric analysis, a details statistical analysis is carried out. Our complete data consists of 57 years of annual observations from 1961-2017. The descriptive statistics are presented in the table I and shows that the mean of gross domestic product (GDP) is 8.494 with 2.086 standard deviation. However, 4.826 is the mean for defense expenditure with 1.952 standard deviation. The skewness which is a measure of the asymmetry of the distribution of the series around its mean has values less than 0 for defence expenditure which indicates skewness to the left whereas for the GDP its value is greater than 0 which shows that GDP is positively skewed. The kurtosis which measures the peakedness or flatness of the distribution with an expected value of 3.0 shows that both variables are platykurtic (short tailed or lower peak) because both variables value is less than 3. A Jarque-Bera test shows that the residuals for both variables are normally distributed. The next step is thus the unit root test.

Table I. Descriptive statistic of the variables

	GDP	DE
Mean	8.494	4.826
Median	8.426	4.971
Maximum	12.03	7.872
Minimum	5.192	1.064
Std. Dev	2.086	1.952
Skewness	0.082	-0.059
Kurtosis	1.742	1.771
Jarque-Bera	3.824	3.623
Probability	0.148	0.163
Obeservation	57	57

### Unit Root Test

The first phase of the ARDL model is to make all the variables stationary. For fulfill this objective Unit root test is used. This paper uses the Augmented Dickey–Fuller (ADF) and Phillips–Peron (PP) in unit root tests for checking the stationarity. The consequences of the stationarity tests with intercept and intercept with trend is showed in Table 2. The results display that both variables GDP and DE are non-stationary at levels, but it converts stationary at first difference. However, both variables are obtained significant at first difference and consequently it shows the variables are I (1).

Table 2. ADF and PP stationarity test

Variables	ADF		PP	
	Intercept	Intercept with Trend	Intercept	Intercept with Trend
GDP	0.592 (0.988)	-2.233 (0.461)	1.126 (0.997)	-2.378 (0.386)
DE	-1.904 (0.327)	-4.668 (0.002) <sup>0</sup>	-1.797 (0.378)	-4.945 (0.000) <sup>0</sup>
Ist Differences				
GDP	-5.436 (0.00) <sup>1</sup>	-5.428 (0.00) <sup>1</sup>	-5.407 (0.00) <sup>1</sup>	-5.395 (0.00) <sup>1</sup>
DE	-6.881 (0.00) <sup>1</sup>	-6.826 (0.00) <sup>1</sup>	-8.434 (0.00) <sup>1</sup>	-8.176 (0.00) <sup>1</sup>

Note: 0 stationary at level and 1 stationary at first difference at 5 per cent critical value.

### Auto Regressive Distributed Lag Model

After making all the data stationary at first differences further step to check that either there exists or not exist any relationship between defense expenditure and economic growth both in long run and short run by using the ARDL bound test.



To check whether the long-run relation exist between the variables F test is implemented and lag length are selected from SBC for the period 1960-2017. 1 is the maximum order of lag because data is annually and small sizes. Further the next step is to check the cointegration between variables through F test by comparing the F-test value with critical values Narayan (2005). Table 3 shows that F-statistic value is 5.114 for equation 1 at 10 per cent level which implies the existence of long run between both variables that is the objective of this paper.

Table 3. F-Bound Test and Cointegration

F-Statistics		I(0) Bound*	I(1) Bound*
5.114***	10%	4.04	4.78
	5%	4.94	5.73
	1%	6.84	7.84

Note: \*\*\* at 10 per cent level significant. Critical values attained from Pesaran et al. (2001) following unrestricted intercept and no trend. The lag selection is based on SC. \*\* \*denotes cointegration at 10 per cent level of significance.

### *Long-Run Estimating Results*

ARDL bound test is applied for confirming the long run relationship amid defense expenditure and GDP which is documented by Pesaran and Pesaran in 1997, Pesaran and Shin in 1999 and Pesaran, Shin and Smith in 2001. ARDL bounds test technique is selected as it is more effectual and attains better results in small data sizes rather Johansen and Juselius cointegration model which is effective in larger samples (Pesaran MH, Shin Y.1999). The long-run ARDL bound testing approach is inscribed in the under mentioned equation:

$$GDP = \alpha + \beta_1 DE_t + \epsilon_t \dots \dots \dots (3)$$

where for gross domestic product, GDP is denoted and DE symbolize the defense expenditure.  $\alpha$  is intercept terms,  $\beta_1$  is the coefficient and  $\epsilon_t$  is the error terms. The long-run coefficients outcomes of the variables are showed in Table IV.

$$Cointeq = GDP - (1.1155*DE + 4.1803)$$

The outcomes reveal that in the long run positive and significant connection is exist amid both variables at the 5 per cent of significant level. It advocates that increment in defense expenditure by 1% in current period will help to boost economic growth by 1.15 per cent in the long run. This implies that in India an increase in defense spending further benefit for escalating economic growth and this result imitates the outcomes of other different economist studies like Ward et al (1991), Wijeweera and Webb (2009), Zeman et al. (2013), Shah et al (2015), Destak (2016) and Ismail (2017) in the case of India. Benoit 1973, 1978, Kennedy 1983, Weede 1983, Atesoglu and Muller 1990, Biswas 1993, all economist studies show the positive and significant relation of military expenditure and economic growth and all are confirms that defense spending spurs

economic growth by means of spin-off effect or it might be contributing to economic growth of India by engaging resources, particularly population, in research and development activities, providing technical skills, educational training and generating an infrastructure necessary for economic development or might be due to combination of all the factors and generates demand for industries which may tolerate from underemployment of capital. Additionally, a secure environment is a requirement for an economic development of any country. A healthy security will not only provide a without calamity environment in a country but also it will provide a better position for the national guidance in consort with other countries in matter on economic, trade or security (Ram 1993). Destak (2016) scrutinized the long run relation of military expenditure and economic growth for India, China, Brazil, Malaysia, Indonesia, Mexico, South Africa, Philippines, Turkey and Thailand. This study calculated that falling rate of defense expenditure in India, Mexico and South Africa dominances negatively to economic activities and defense expenditure should not be diminished.

Table 4. Long run coefficient of ARDL (1,0) model dependent variable in GDP

Variables	Coefficient	Std.Error	t-Statistic	Prob.
DE	1.115	0.027	40.41	0.0000
C	4.180	0.356	11.71	0.0000

Note: p- value at 5 per cent level of significance.

#### *Short-Run Error Correction Estimating Results*

By means of transforming the model (3) into the ECM (error correction model), ECM is inscribed in the under mentioned equation:

$$\Delta GDP = \alpha_i + \beta_1 GDP_{t-1} + \beta_2 DE_{t-1} + \sum_{i=1}^m \beta_3 \Delta GDP_{t-j} + \sum_{i=1}^m \beta_4 \Delta DE_{t-1} + \epsilon_t \dots \dots \dots (4)$$

Table 5 represents the outcomes of short run error correction model (ECM). DGDP represented as a dependent variable where first differences of the variable are implied by D. It is found from the outcomes that preceding year spending positively affect to GDP which indicates that economy is led by the growing level of defense expenditure. The results also reveal that there exists a short run relationship amid both variable because the error correction term (ECM) is negative and significant at 5 per cent level. The value of ECM is -0.101 which imply that within one-year economic growth disequilibrium is corrected.

Table 5. Error Correction Representation of the Selected ARDL (1, 0) Model

Variable	Coefficient	Std.Error	t-Statistic	Prob.
D(DE)	0.112	0.036	3.131	0.002
CointEq (-1)	-0.101	0.033	-3.023	0.003

Notes: At 5 per cent level of significance.

### Diagnostic Test

The diagnostic and stability test are used in final phase to find the goodness of fit in the ARDL model. The diagnostic tests comprise the serial correlation, normality and heteroscedasticity accompanying with the models. The stability tests are directed by functioning the cumulative sum of recursive residuals (CUSUM).

Autocorrelation and heteroscedasticity are tested by diagnostic tests for the model. Table 6 shows the outcomes that the P-value is 0.122 and 0.087 for serial correlation and heteroscedasticity respectively which are higher than 5 per cent level of significance it means there is no auto correlation and heteroscedasticity in the model. Besides these results this model also verify the normality test.

Finally, the cumulative sum of recursive residuals (CUSUM) test is applied for checking the credibility of the model. This stability test is appropriate in time series data, exclusively when we are unassured about when structural change might have taken place (Pesaran MH, Pesaran B 1997). Figure II plots the CUSUM statistics for ARDL model. The plotted points for the CUSUM statistics stay within the ledge at 5% level of significance. Therefore, CUSUM test approves the constancy of the long-run coefficient.

Table 6. Diagnostic Test Statistics

ARDL (1,0)	Test Statistic	P-value
$\chi^2$ sc(1)	2.386	0.122
$\chi^2$ het(1)	4.867	0.087
Jarque-Bera Normality	0.913	0.633

Note: At 5 per cent level of significance, where sc-serial correlation, het-heteroscedasticity

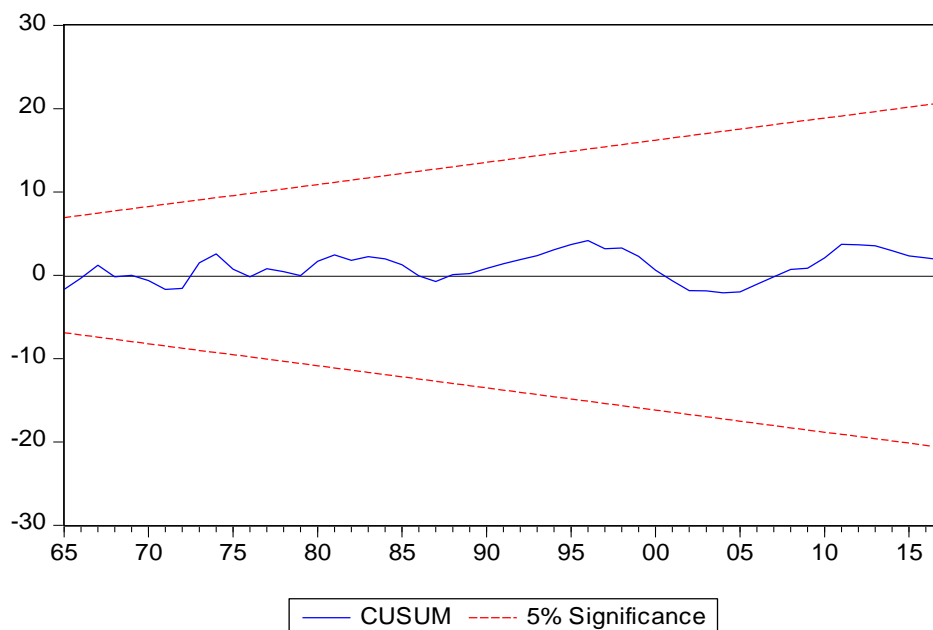


Figure 2. Plan of cumulative sum of recursive residuals

### Toda-Yamamoto Granger Causality Test

Directing causality for defense expenditure and economic growth Toda-Yamamoto Granger non causality test is enforced based on the following VAR ( $m + dmax$ ) model:

$$GDP_t = \alpha_0 + \sum_{i=1}^k \alpha_1 i GDP_{t-1} + \sum_{j=k+1}^{k+dmax} \alpha_2 i GDP_{t-j} + \sum_{i=1}^k \beta_1 i DE_{t-1} + \sum_{j=k+1}^{k+dmax} \beta_2 i DE_{t-j} + \epsilon_{it} \dots \dots \dots (5)$$

$$DE_t = \alpha_0 + \sum_{i=1}^k \alpha_1 i GDP_{t-1} + \sum_{j=k+1}^{k+dmax} \alpha_2 i GDP_{t-j} + \sum_{i=1}^k \beta_1 i DE_{t-1} + \sum_{j=k+1}^{k+dmax} \beta_2 i DE_{t-j} + \epsilon_{it} \dots \dots \dots (6)$$

where  $\alpha$  and  $\beta$  are parameters of the equation and the residual and  $k$  is the optimal time lag on the primary VAR model and  $dmax$  is the maximum integration order on variables system (VAR).

Table 7 provides the results on Toda and Yamamoto non-causality test based on equations 5 and 6. The results accept the alternative hypothesis that DE does cause GDP growth. Subsequently, it shows the unidirectional causality from DE to GDP growth rate (DE- led- GDP). The observed results are same with the conclusions of the Karagianni and Pempetzoglu (2009), Selvanthan & Selvanthan(2014), Duella (2014) and Das et al (2015). Benoit (1973; 1978) was the first who scrutinized the unidirectional and positive causality relationship from defense expenditure to economic growth.

Table 7. Results of Toda and Yamamoto Granger Non-Causality Test

Sample period: 1961-62 to 2017-18				
Include observations: 55				
Dependent variable: LGDP				
Null Hypotheses	Excluded	Chi-sq	Df	Prob.
LDE does not Granger cause LGDP	LDE	7.209	1	0.0073
	All	7.209	1	0.0073
Dependent variable: LDE				
Null Hypotheses	Excluded	Chi-sq	Df	Prob.
LGDP does not Granger cause LDE	LGDP	2.694	1	0.1007
	All	2.694	1	0.1007

Note: at 5% level of significance. The number of lags is 1.

### Conclusion

This paper describes the confirmation of accrescent requirement of defense expenditure since some decades. What illuminates the accrescent role of defense expenditure in India? The cause of this expenditure is internal and external threat of the country. Internally, Indian country is facing several problems such as in North-East region

Naxalist/Maoist rebellion and Jammu and Kashmir trans boarder security threat. However, externally, its neighbor countries with China and Pakistan India has a hostile relation. With the purpose of solving the problem of internal and external security, India has steady defense expenditures.

In this paper I have applied the ARDL bound approach in case of India for defense expenditure and economic growth during the period 1961 to 2017. For the long run and short run affiliation of defense expenditure and economic growth outcome shows the positive relation. It advocates that increment in defense expenditure by 1% in current period will help to boost economic growth by 1.15 per cent in the long run. The conclusions that for the economic growth of India defense expenditure plays a significant role. The causality result shows that there is only unidirectional relationship between variables and running from defense expenditure to GDP growth. It means that defense expenditure affects the economy growth through various channels. It stimulates economic growth through spin-off effects, by engaging resources, particularly population in R&D activities, providing technical skills, educational training and generating an infrastructure necessary for economic development.

Furthermore, security and good governance are pre-requisites for development of any country. Development of any countries and its people are also reliant on foreign investment and trade. Any countries do not invest to other countries if they have no assurance in the security of their investment. The investor warranty depends on the examination of the long-term stability and security that they have of the country in which they invest. Two factors effect this assurance are internal peace and stability or the efficiency of a country to preserve and secure its interest. Peace is crucial for all round development. Our ability to maintain peace for all Indians will underlet on our military force to protect our borders and the latent of our economy to produce growing employment and income opportunities for all citizens.

Finally, for the economic growth in India a protected situation is mandatory. A healthy security will not only provide a without calamity environment in a country but also it will provide a better position for the national guidance in consort with other countries in matter on economic, trade or security. Thus, the study of defense expenditure and economic growth is a dynamic issues for future research work.

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