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ECONOMIC IMPACT OF DEFENSE EXPENDITURE ON THE GROWTH PROSPECTS OF INDIA

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ABSTRACT

Budget allocation for defense expenditure has been given significant importance in terms to measure the real growth of the countries in the globe. India is concerned more about budget allocation for defense and every plan period which would impact both ways. Earlier studies on Defense expenditure of various countries as well as studies in India have viewed differently in terms of impacts on growth of economy. Hence it is needed to investigate the budget allocation for defense in India and to see that whether it or not would affect growth of the economy. In order to probe the data relating to defense expenditure of India over a period of nearly 27 years and see the impact and implication of the growth the study gets significant. To investigate the impact of Defense expenditure the cointegration test has been adopted to find the long run and short run relationship between defense expenditure, external debt and GDP. The CUSUM test determines the Recursive Residuals of the model and results that there is both long run and short run relationship among the variables.

KEYWORDS: *Defense Expenditure, External Debt, Gross Domestic Product, Cointegration, Vector Error correction Model.*

INTRODUCTION

India after independence opted for a path of economic development based on centralized planning with a leading role assigned to the defense expenditure on the consideration that it shall be used for planned investment to achieve rapid economic growth. Developing countries like India allocates a significant portion of its resources for national security purposes and it is an important component in the government budget allocation of national security. Defense expenditure is one of the commonly used indicators to calculate the defense burden on the economy of a country and a change in a country's defense expenditure reflects the country's socio-economic conditions. The relationship between defense expenditure and economic growth has frequently been explored empirically in the defense economics literature since the influential expenditure is beneficial or determined to a country's economy. Following this a vast majority of research has targeted defense expenditure and economic growth in recent past. The results are empirical research of **Benoit (1973, 1978),** this suggested that defense budget had a positive impact on economic growth. There is an ongoing debate on whether increase in defense diverse and inconclusive and the diversity of result is due to the country specific factors, nature of data, different alternatives used represent defense budget and different methodologies employed in the analysis. Defense expenditure can affect economic growth either positively or negatively. Theoretically there is no clear-cut prediction of the direction of

causation between defense expenditure and economic growth.

LITERATURE REVIEW

There exists much literature that analyses the relationship between defense expenditure, economic growth and external debt between different social groups and across generations with in a society. In the literature, there is much controversy over whether defense expenditure is associated with higher or lower growth rates (Chang et.al., 2001). First group argue that the effect of defense expenditure on economic growth is positive (Benoit (1973). Second group argue that the effect of defense expenditure on economic growth is negative (Deger, 1986, Grobar and Porter, 1989). Third group tends to give context- specific explanations that vary from positive and negative effects (Frederiksen and Looney, 1982, Derouen, 1995). But there is no consensus among researchers about the existence of casual ordering between the variables or, when it exists, its nature and direction. In the Indian context there is bi-directional causality between GDP and defense expenditure (Tiwari 2010, Yildirim, 2006).

Considering external debt and defense expenditure as major variables Selami Sezgin (2004)showed a negative relationship between external debt and defense expenditure in the long run and in the short run external debt is positive related to arms imports, implying Turkish arms imports have contributed Turkey's indebtness. Alexander and Hellen (2014) in the study implied that any innovation in military policy that does not create spin-off effect will trigger external burden stock in Nigeria and the response external debt due to random shock military spending was positive from the first period upto the fifth period thereafter became negative all through.

The relationship between defense expenditure with economic growth is well discussed in the international research studies but the relationship between defense expenditure and economic in Indian context is not vey mush focused. Aviral Kumar and Tiwari (2010) have studied the defense expenditure and economic growth for India by using Deger model and found an bi-directional causality between economic growth and defense expenditure, by using gross domestic savings, merchandise trade and domestic savings as the variables. Thus this research aims to fill gap by carrying out a study on the contribution of defense expenditure to external debt in India.

DATA DESCRIPTION

The data of Defense expenditures are taken from the Stockholm International Peace Research Institute (SIPRI) and the data of Gross Domestic Product and External debt were taken from Reserve Bank of India (RBI) annual report for the period of 1988-2015. Furthermore, all of the series variables transformed into log form tabulation in annexure 1. Log transformation can reduce the problem of heteroscedasticity because it compresses the scale in which the variables are measured, thereby log transformation has been taken for all the variables and named as Real Defense Expenditure, Real External Debt, Real Gross Domestic Product. In this research, a recent technique, the Johansen's co-integration test has been adopted to examine whether the variables under consideration share a common stochastic trend or not to explore the nature of long-run interrelationship among them. The basis of the Johansen Cointegration test Vector autoregressive (VAR) model is adopted with an order k with a (n*1) vector of the endogenous variable in a error correction form. The optimal lag length of the VAR model is based on information criteria such as the Akaike Information Criterion (AIC), Schwarz's Bayesian information criterion (SBIC) and the Hannan- Quinn information criterion (HQIC). The CUSUM test is based on the cumulative sum of the recursive residuals which plots the cumulative sum together with 5% critical lines. The test finds parameter instability if the cumulative sum goes outside the area between the two critical lines.

METHODOLOGICAL FRAMEWORK

The possible interdependence between the Defense expenditure and Gross Domestic Product is modeled along with additional control variable External Debt proposed in the literature Selami (2004) Greg et.al (2013) Rabia and Kamarn (2012) in a joint framework. The study applies Augmented Dickey Fuller test to test whether variables are stationary or needed to be differenced. If the variables under the study are non-stationary it may lead to unauthentic results and it is important to make the variable stationary. For the intention of investigating the long-run relationship among the variables, the variables must be co-integrated. In the multivariate case, if the I(1) variables are linked by more than one co-integrating vector, the Engle-Granger (1987) procedure is not applicable. Therefore, Johansen method(1995) is used in this study to identify the number of co-integrated vectors in the model. Johansen (1995) cointegration technique is used to examine whether the variables under consideration share a common trend and integration. The Johansen and Juselius method has been developed to imply maximum likelihood method to estimate and determine the existence of co-integrating vectors and it also

suggests two test statistics namely trace and eigenvalue to fund out the number of co-integrating vectors. If there is any difference between the results of trace test and maximum eigenvalue test, then the results of maximum eigenvalue test is preferred because it is more authentic in case of small samples. The effect of defense expenditures and external debt on economic growth can be expressed as follows:

RGDP = f (RDE, RED) (i)

where: GDP is the real Gross Domestic Product, DE is the Defense expenditure and ED is the external debt.

RESULTS AND DISCUSSION

The preliminary step in this analysis is to establish the degree of integration of each variable. To get reliable results for equation 1, the implicit assumption is that the variables in equation 1 are I(1) and co-integrated. The Augmented Dickey Fuller (ADF) is adopted to test for the existence of a unit root in the level I(0) and the first difference I(0) of each variable in the study. The results in Table 1 reveal that all the variables are non-stationary in their level data I(0), however it is stationarity in the first differencing level I(0) i.e., Real Defense Expenditure (RDE), Real External Debt (RED) and Real Gross domestic Product (RGDP). This indicates that the estimated regression line of this study is stationary, free of any spurious regression result and to be continued with the cointegration equation.

Table.1 Augmented Dickey Fuller Unit Root test estimation

	Intercept			Trend and Intercept		
Variable	**95% ADF Test**	**Critical Value**	**p-value**	**95% ADF Test**	**Critical Value**	**p-value**
RDE	-5.128852*	-3.711457 -2.981038 -2.629906	0.0003 I(1)	-5.021399*	-4.356068 -3.595026 -3.233456	0.0022 I(1)
RED	-4.415019*	-3.711457 -2.981038 -2.629906	0.0019 I(1)	-4.426187	-4.356068 -3.595026 -3.233456	0.0086 I(1)
RGDP	-10.33063*	-3.711457 -2.981038 -2.629906	0.0000 I(1)	-10.33879	-4.356068 -3.595026 -3.233456	0.0000 I(1)

Note: Mackinon et al (199) one- sided p-values. and ** show significance at the 1% and 5% levels of significance, while lag order is given in parentheses.*

The result of ADF test is stationary and the next procedure is finding the appropriate lag length is very important to have Gaussain error terms. The most common procedure in choosing the optimal lag length is to estimate a VAR model including all three variables in first difference I(1). Table 2 clearly articulates the existence of long run relationship between the variables as the maximum number of lags was set equal to 1 lag and the AIC value is greater than SC value.

Table.2: VAR Lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	26.08851	NA	1.77e-05	-2.430369	-2.281248	-2.405132
1	94.84849	108.5684*	3.34e-08*	8.720894*	8.124406*	8.619944*
2	97.25649	3.041684	7.31e-08	-8.026999	-6.983145	-7.850337
3	107.0881	9.314123	8.54e-08	-8.114533	-6.623313	-7.862159
4	118.6274	7.288027	1.15e-07	-8.381836	-6.443250	-8.053750

*Note: * indicates lag order selected by the criterion. LR: sequence modified LR test statistic (each test at 5% level) FPE: final prediction error AIC: Akaike Information criterion SC: Schwarz information criterion HQ: Hannan-Quinn information criterion.*

The relationship between Real Defense Expenditure, Real External Debt and Real GDP is observes using the multivariate cointegration methodology proposed by Johansen (1988) and Johansen & Juselius (1990). The Johansen's Cointegration Test designates at least one cointegrating vector and thus, long run relationship is maintained by the data generating method. The analysis in Table 3 posits that Trace test indicates 2 cointegrating egn(s) at the 0.05 level, Max-

eigenvalue test indicates no cointegration at the 0.05 level.

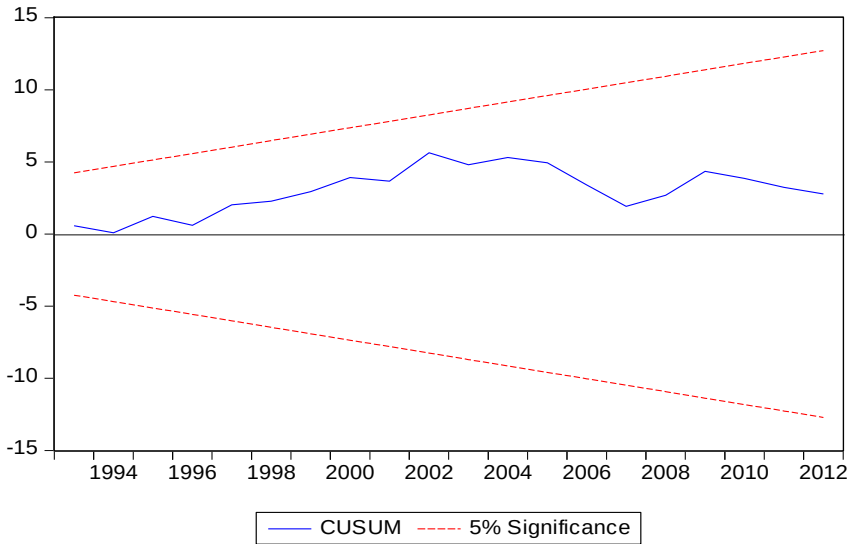
Table.3: Johansen Cointegration Test

H0	Eigen Value	Trace statistics	0.05 Critical Values	Maximum Eigenvalue Statistics	5% Critical Value
None	0.622700	39.59327*	29.79707	19.49427	21.13162
r= 1	0.569998	20.09900*	15.49471	16.87933*	14.26460
r= 2	0.148694	3.219674	3.841466	3.219674	3.841466

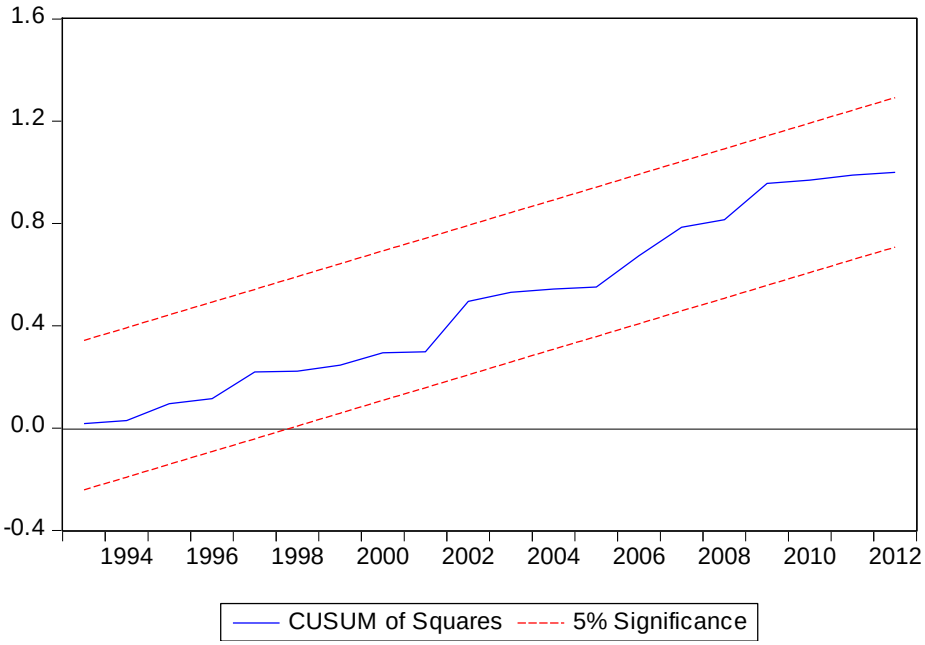
** denotes rejection of the hypothesus at the 0.05 level.*

The Vector Error Correction Model is used to evaluate the short-run dynamics of the variables and the results determined that there is a uni-directional relationship between real defense expenditure, real external debt, and real gross domestic product. Testing for the stability of the long-run coefficients obtained is carried out by using the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMQ) tests. These tests utilize the CUSUM and CUSUMSQ, correspondingly, which are rationalized recursively and are plotted adjacent to the break points in the broken sample points to test the null hypothesis that all the coefficients in the selected VECM are stable. Implementation of the CUSUM and CUSUMSQ tests in the form of the VECM for the real output is carried out by the Microfit 4 routine suggested in Peseran and Peseran (1997). The graphical representations of the tests are presented in figure a and b. According to figures, neither CUSUM nor CUSUMSQ plots cross the 5% critical bounds, indicating no evidence of any structural instability in the real defense expenditure and its determinants.

a) Plot of Cumulative Sum of Recursive Residuals



b) Plot of Cumulative Sum of Squares of Recursive Residuals



CONCLUSION

Defense expenditure is an important component of national security and every country allocates a significant portion of its resources for this purpose. India's defense spending has increased substantially over the decades by an average of 10 percent per year. This study examined the influence of defense expenditure on economic growth with respect to external debt. From the study it is clearly noted that there is a negative relationship between defense expenditure and economic growth in the long run Faek (2015) and in short run, external debt is positively related to economic growth implying that India's defense expenditure cointegrating strongly with economic growth. As s result of this, the robust growth of the GDP and the consequent rise of defense expenditure have significantly enhanced the country's spending ability, the decreasing share of Defense in these resources indicates that the burden of Defense has reduced significantly. The implication of the study suggests that Indian government should reduce the defense expenditures to reduce the external debt.

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ANNEXURE I: Log Formation of Defense expenditure, External Debt, Gross domestic Product.

Year	LDEFENSEEXP	LEXTERNALDEBT	LGDP
1988	4.893427093190714		8.074381293263627
1989	4.970923793860027		8.078328474603456
1990	5.038639490505853	4.426043520090656	8.12021992534074
1991	5.096629487263117	4.447346100794524	8.096838785814088
1992	5.169460744423032	4.503137460422939	8.165033751512515
1993	5.386557155397445	4.546481189639412	8.196337578086665
1994	5.448675148136593	4.629862798578463	8.242648445156579
1995	5.593074352671779	4.548599834499697	8.2328203042329
1996	5.687144833503177	4.537961436294641	8.331771634583484
1997	5.865844633183331	4.546481189639412	8.301596093857429
1998	5.988886226093181	4.580877493419047	8.370360006632378
1999	6.154242193135749	4.588024027153121	8.394150598505886
2000	6.207019376773516	4.596129441335942	8.38806807687453
2001	6.296482972806629	4.579852378003801	8.45065801161509
2002	6.321882780893235	4.666265285347902	8.365793391114704
2003	6.398029050659448	4.730921391293652	8.468683387942071
2004	6.631421899153808	4.81380905109942	8.46933399376297
2005	6.69145078789068	4.789157022101107	8.523167310775883
2006	6.75121842116191	5.065754593317335	8.563590017645445
2007	6.820900253405351	5.312713246831769	8.625071335187087
2008	7.040737770988275	5.420092423473957	8.622349286181538
2009	7.256868706577028	5.521060837840906	8.6264331722086
2010	7.340297147210876	5.720311776607411	8.710863440833645
2011	7.443739748098528	5.84354441703136	8.749161688099606
2012	7.505360252821594	5.966146739123693	8.766182251456206
2013	7.618246183859707		
2014	7.706927754185386		
2015	7.810867555210365		