

Impact of Defense Expenditure on Economic Growth: Time Series Evidence from Pakistan

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Abstract

This paper investigates the impact of defense burden on economic growth in Pakistan economy over the period 1980-2013. A three equations model is estimated through two stage least square (2SLS) method in order to investigate the direct and indirect impact of defense burden on economic growth. The findings of the model show that defense expenditure directly as well as indirectly retard economic growth in Pakistan.

Index terms— defense expenditure, economic growth, 2SLS, Pakistan.

1 Introduction

Defense spending is one of the major concerns of developing as well as developed countries because a lion share of their budget is absorbed by defense sector. Literature shows that the effect of defense spending on economic growth is an important and controversial topic among the researchers. Pakistan spends a huge part of its expenditure on defense sector in order to maintain a credible level of security due to its vital geopolitical position and a long run outstanding dispute over territory of Kashmir with India as Pakistan has fought three major wars with India. In every year Pakistan has to set aside a big portion of its total expenditure for defense sector. Military expenditure is thus thought to be one the major components of total expenditure in Pakistan. Generally it is perceived that low economic growth in Pakistan is due to huge military expenditure and the supporters of this preposition are of view that increase in military expenditure reduces resources for other productive sectors like education, development projects etc. and hence ultimately low economic growth. However, defense sector can also have the potential to support the economic development of a country while generating employment opportunities for the unemployed people. In order to investigate the impact of defense expenditure on economic growth in Pakistan, this paper explores the empirical relationship between defense expenditure and economic growth by taking time series data for the period 1980 to 2013.

The organization of the paper is as follow: section 2 reviews the empirical literature on the subject, section 3 elaborates the theoretical discussion, section 4 discusses the model specification, section 5 shows empirical results of the model and section 6 explains the conclusion of the paper.

2 II.

3 Literature Review

Conventionally it is believed that defense expenditure is inversely related to economic development due to its high opportunity cost in term of forgone productive expenditure. Benoit (1978) conducted the first ever study regarding the relationship between defense and growth for 44 developing countries for the time period 1950-1965. The findings of Benoit's study show that there is significant cross country position correlation between defense expenditure and economic growth i.e. defense helps development. Benoit was of the view that high defense expenditure leads to high economic growth through the channel of aggregate demand i.e. if initial demand is inadequate as compare to potential supply then increase in defense spending may increase aggregate demand and thus has positive impact on growth. The Benoit's result of positive correlation between defense spending

and economic growth initiated a series of books, articles and papers to reanalysis this relationship. Degar and Smith (1983) investigate the relationship between military expenditure and economic growth in 50 less developed countries by estimating a macroeconomic model of cross sectional observation for the time period from 1965 to 1975. The findings of their study show that military spending has a small positive effect on growth through modernization channel and larger negative effect through saving channel. They show that the negative saving effect outweigh the positive modernized effect the net effect of military spending on economic growth is negative.

A similar study is also done by Degar (1986). Degar critically evaluated the Benoit's findings and investigated the inter-relationships among defense; saving and economic growth for a sample of 50 less developed countries for the time period from 1965 to 1973. Using the three stage OLS estimation technique the results of the study show that defense expenditure significantly depresses the saving which leads to retard growth and development and therefore, the correlation between defense expenditure and economic development is negative which is the opposite of Benoit's result. However, the above studies are conducted for a group of countries; Chan (1988) investigated the relationship between defense burden and economic growth for a single country (Taiwan) for the time period 1961-1985. He discussed three models; modernization model, the capital formation model and the export-led growth model through which defense burden may affect economic growth. Using GLS method, the results of the study show that modernization effect did not play a significant role in raising the economic growth which is contradicted to Benoit's result. The results of capital formation model and export-led model show that capital formation is curtailed by defense spending and also defense spending has adverse impact on export competitiveness.

It is conventional wisdom that there is trade-off between military spending and non-military spending. However it does not tell us about the pattern of trade-off between these variables. Russett (1982) estimated a model for America to show the trade off pattern of military spending on one hand and education and health on the other for the time period 1941 to 1979. Applying OLS estimation technique, the findings of the study show that there is no systematic trade-off pattern between military spending and expenditure on education and health nor military spending significantly depress education and health.

All the above studies are conducted on the implicit assumption that defense expenditure is incurred prior to economic growth. However, these studies are silent regarding the causality that may exist between defense expenditure and economic growth. Chowdhury (1991) investigated the casual relationship between expenditure and economic development. In order to show the direction and presence of causality the Granger causality tests are used on annual time series data for 55 less developed countries. The results of the study show that the correlation between defense and economic growth is positive for some countries and is negative for other countries. So this correlation cannot be generalized across countries due to the difference in socio-economic structure and the type of government in each of these countries.

Different studies have conducted with different channels to analysis the impact of defense burden on economic development for different countries. Lindex (1992) derived a two sector growth model to analysis the effect of military burden and government expenditure on the growth of GNP in selected Middle East countries for the period 1974 to 1985. By using GLS, the findings of the paper show that the impact of military burden on the growth of GNP is negative whereas the government size is positive related to the growth of GNP.

Blomber and Brock (1996) studied the effect of defense spending and political instability on growth for a sample of 70 countries for the period from 1967 to 1982. Using OLS and GLS, the findings of the paper show that increase in political instability do decrease growth while increase in defense expenditure does decrease political instability. However the results explain that increase in defense expenditure has a direct negative effect on growth but not significantly.

Khilji and Mehmood (1997) analyzed the impact of military expenditure on economic growth and other major economic variables in Pakistan for the period from 1972 to 1995. By using annual data set of time series, they applied Granger causality test on the four equations model. The findings of the study show that there is bi-directional feedback between defense burden and GDP growth. Their results explain that defense burden is negatively related to GDP growth, growth of non-defense output, investment ratio and tax revenue. However, the findings of four equation model did not reflect the degree of interdependence that may exist between these variables. So results derived from such models may be misleading. Therefore, they specified three equations model which explains GDP growth, average propensity to save and defense ratio. In single equation estimation of saving ratio and defense burden, the results show that the saving ratio is positively affected by defense burden and negatively by the inflation rate and they also show that Pakistan defense burden is negatively affected by Indian defense burden and positively by government budget.

4 III.

5 Theoretical Discussion

There are many channels through which defense expenditure may affect growth. Researchers normally identify three main mechanisms through which defense burden influence economic growth which are: (a) spin-off effects (b) resources allocation and (c) creation of new resources.

First, if aggregated demand is initially inadequate as compared to potential supply, then the additional demand generated by defense sector may be productive by utilizing the capital stock and generating employment

opportunities for unemployed persons. This increased productive demand has not only short-run multiplier effect but also there is possibility of long run growth effect. In this way defense expenditure may have positive effect on growth. (Deger 1986). There is also modernization effect of military effect. The military personnel may engage in R & D, provide technical skills, educational training, and medical care and introduce to new technology ??Benoit 1973). Second, military expenditure may affect growth through resources allocation. Military expenditure has opportunity cost in term of forgone investment i.e. increase in military expenditure will reduce available funds for investment reduces investment and hence regard growth. The final way in which defense may influence growth is through the creation of new resources. Military expenditure is inflationary in aggregated supply constrained economies and this may lead to rise in profitability that induces higher investment and hence growth. However, the expectation of continuing inflation might cause consumption to increase and saving to decrease. This decreased in saving will lead to low investment and hence little chance of growth potential.

The above mentioned channels show that military expenditure has direct as well as indirect effect on growth. The direct impact of defense spending on growth through the spin-off and reallocation of resources and the indirect impact of defense on growth is through the creation of new resources. The direct impact of military expenditure can be captured by the co-efficient of military expenditure in growth equation and the resources creation effect of military expenditure can be captured by the co-efficient of military expenditure in saving equation on the assumption that the national saving ratio can be taken to be reliable indicator of resources available to the economy.

IV.

6 The Model

The above mentioned mechanisms show that in order to capture the impact of military on economic growth there should be at least three equations for growth, saving and military expenditure. The proposed growth equation is:

The growth equation, the output growth (g) is made to depend on the military expenditure (m), per capita GDP (y) and population growth rate (n). The coefficient of military expenditure is ambiguous, depending on the relative size of spin-off and reallocation of resources effects of defense. The coefficient of per capita income (y) is expected to affect output growth positively or negatively. The growth rate of population (n) is expected to be positively affecting growth as it can be used as a proxy for labor forces increase and saving is also expected to have positive impact on economic growth.

The proposed saving equation is:

In the above equation the military expenditure (m) is meant to capture the role of military in creating of new resources. Due to the possibility of inflationary consequence of military expenditure on the creation of new resources, the coefficient of the military expenditure can be positive or negative. The impact of growth on saving is also taken into account and expected to have a positive sign of its coefficient.

The proposed military expenditure equation is:

As just to reverse of growth equation where the impact of military expenditure on growth is measured, in this equation the impact of growth (g) on military expenditure is measure and the expected sign of coefficient of growth can be positive or negative. The effect non-military government expenditure (nge) on defense spending is are also shown in the equation in order to show their correlation. So, the complete model is given by the following three equations:

Where $\alpha_1, \alpha_2, \alpha_3$ and α_4 are the coefficients of the mentioned variables and $\epsilon_1, \epsilon_2, \epsilon_3$ are error terms of the models.

V.

7 Empirical Results

The above model consists of three equations in order to analysis the interrelationship between economic growth, saving and military expenditure. Using time series data of Pakistan for the period The first equation shows that how military expenditure, population growth rate, per capita income and saving affect growth in Pakistan. The co-efficient of military expenditure (m) indicates that the net value of the spin-off and reallocation of resources effects of military expenditure is negative. This means defense burden absorb resources which could otherwise have been available for productive sector like education, health, and investment hence defense burden direct retard economic growth. The growth rate of population (n) which is used as a proxy for labor force shows the expected positive sign which means increase in labor force will increase growth in Pakistan. The results also show that per capita GDP and saving have positively correlated with economic growth.

In the second equation, the impact of military expenditure (m) and output growth (g) on saving is measured. The negative coefficient of military burden indicates the indirect impact of defense burden on economic growth i.e. defense expenditure retard saving in Pakistan which means increase in military expenditure has opportunity cost in term of forgone saving and hence increase in military burden will depress saving which leads to low

investment and hence low development in the economy. Thus military expenditure has indirect negative impact on growth. The positive coefficient of growth (g) shows that growth supports saving in Pakistan.

In the final equation the impact of output growth and non-military government expenditure on defense expenditure is measured. The results show that nonmilitary government expenditures are negatively related to defense spending as increase in non-military government expenditure reduces funds which might be available for defense sector. The positive coefficient of output growth shows that increase in economic growth has positive effect on military expenditure.

8 b) Second Stage

The above single equation estimates do not reflect the interdependence that exists between growth, saving and military burden, therefore, in this stage the whole model is estimated using simultaneous equations method (used two-stage least square i.e. TSLS) to account for simultaneity and high covariance between the equations and the results are: The above results show that the signs of the coefficients of the variables do not change but the significance of some of them changed.

9 VI.

10 Conclusion

The purpose of this paper has been to investigate the empirical relation between defense burden and economic growth in Pakistan over the period 1980-2013. The paper shows that military burden has direct as well as indirect negative effect on economic growth. The direct negative impact is measured through reallocation of resources and the indirect negative impact is measured through creation of new resources. Therefore, the overall effect of military expenditure on the growth is significantly negative i.e. increase in military expenditure retards economic growth in Pakistan. Policy implication can be inferred from this study that increased military spending cannot be used to increase economic growth in Pakistan. Any positive effect of military expenditure through modernization channel would be swamped by the negative effect on growth through low investment. ¹

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