

## Defense Expenditure and Economic Growth in Sub-Saharan African Countries

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### 1. Introduction

The relationship between defense expenditure and economic growth is a debatable issue. Benoit (1973, 1978) was the first to initiate the debate who found that military spending and development are positively related. Subsequently, considerable research works have been made using improved econometric methods and analysis to test the validity of Benoit (1973/ 1978)'s findings. Studies miserably failed to reach any consensus on the issue. Similar is the case with economic growth. Numerous studies have been undertaken to find the determinants of economic growth. But no final word can yet be said about the exact number of determinants of economic growth. Both the number and nature of determinants of economic growth vary from country to country. Solow (1956) conducted empirical survey on the determinants of economic growth based on the Neoclassical theory. According to Solow (1956) model, in steady-state equilibrium the level of GDP per capita will be determined by the prevailing technology, the exogenous rates of saving, population growth and technical progress. Similar conclusion was also reached by Swan (1956). In other words, other things being equal, countries that have higher saving rates tend to have higher levels of per capita income, and vice versa. This conclusion was supported by the economists for the past four decades since 1956. However, recent growth theories no longer support the Solow-Swan model and are very much critical of the same.

The critics are of the opinion that the observed difference in per capita income across countries cannot be explained by the standard neoclassical model. The

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recent growth theories opine that the endogenous growth model which assumes both constant and increasing returns to capital may be more relevant to adequately explain the factors or determinants responsible for economic growth of countries. More recently renewed empirical works have been undertaken to resolve the crises arising out of the different implications of both the exogenous and endogenous growth models (Khan and Yim, 2000; Mehanna, 2001).

The issue of convergence has now become one of the major concerns of the researchers. That is, a poor economy should grow at a higher rate per capita than a rich economy so as to reduce the gap between the two economies. The recent studies emphasize the fact that a microeconomic policy framework conducive to growth is a must. A broad consensus is found to exist among the economists regarding the fact that there is an inverse relationship between long-term growth and inflation while the relationship between long-term growth and good fiscal performance as well as undistorted foreign exchange markets is positive (Fischer, 1993). The empirical works have also established the fact, that the quantitative implications of different saving and population growth rates are biased upward if human capital is not accounted for in the model (Knight, Loayza, and Villanueva, 1993). Needless to say, human capital development is positively related with both savings and population growth.

In fact, macroeconomic policies may affect growth in many different ways. Some of the policies may promote growth while others may be totally detrimental for the same. Again, there may be some policies or determinants whose effects on growth may be quite ambiguous. One of such policies is the policy relating to defense expenditure. Though the growth pattern of a country is linked to characteristics of countries like economic base, population growth, unemployment rate, investment in physical and human capital, flow of foreign investment, industrial growth, inflation, development of financial institutions, and the level of integration with the global economy, the recent literature includes military expenditure as well as foreign aid in the context of developing countries as the important determinants of economic growth (Benoit, 1973,1978; Ball, 1983; Joerding, 1986; Chowdhury, 1991; Looney,1991; Madden and Haslehurst, 1995; Kollias and Makrydakis, 1997). Sufficient theoretical framework and empirical evidence that crystallize the relationship between military spending and economic growth are not available.

Some of the commonly agreed upon theoretical explanations regarding military expenditure and economic growth have been synthesized by recognized literature on the subject which may be summarized as follows;

- (a) Defense spending may exert positive or favorable influence upon economic development either through an expansion of aggregate demand or through increased security of a country. There are four arguments in favor of this positive relationship. These are;
1. The defense expenditure can have an expansionary impact on the economy through the operation of Keynesian multiplier effect. This stimulative impact is likely to be stronger in developing countries.
  2. The adoption of the state-of-the art technologies to produce civilian goods may be encouraged by military spending which is likely to generate externalities congenial for development.
  3. Since a major portion of the total defense budget is usually spent for building or developing infrastructure like roads and highways, airports, information technology, etc., the military expenditure is likely to promote growth.
  4. Last but not the least, since military expenditure strengthens internal and external, security, a congenial atmosphere for trade and investment is created for the local and foreign investors and as a result, economic growth takes place.
- (b) Defense spending through a crowding out of investment can exert negative influence upon economic development of a country. There are also arguments in support of this negative relationship between defense spending and economic growth which may be summed up in the following ways:
1. More growth-oriented and need-based public and private investment may be crowded out by higher expenditure on defense. As a result, long-run economic growth may be adversely affected. Since military spending may crowd out private sector R & D activities, it may seriously affect technological innovations due to R & D activities of this sector which are likely to spill over faster to civilian sector than those of defense sector. As the evidence shows, a number of innovations in the defense sector may not be useful for the civilian sector.
  2. Defense expenditure can cause balance of payment problems if hard-earned foreign exchanges are used to purchase arms and defense hardware.
  3. Export is regarded as an engine of growth and this export sector is likely to be adversely affected due to the diversion of resources from the export sector to the defense sector

4. Above all, military expenditure inhibits growth through bureaucratic inefficiency and excess burdens created by taxes required to finance military spending.

The foregoing discussion points out to the fact that military spending may affect growth both positively and negatively. The net effect, however, will depend upon the strength of the two opposing forces; A group of economists are of the opinion that like military spending, foreign direct investment (FDI) has also considerable influence upon economic growth of a country. Since the 1980s country barriers to foreign investment have given way to countries actively seeking FDI in stead of discouraging it. Governments now compete with each other to win more investment from foreign companies. FDI is necessary to develop a country's production capacity in all sectors of the economy, and it links a country with the global economy and ensures competitiveness. A group of economists regard FDI as an engine of growth since it facilitates the use and exploitation of local raw materials, introduces modern techniques of management that allows financing current account deficits, increases the stock of human capital via on the job training, and stimulates the investment in R&D. In the perspective of the new theory of economic growth, FDI may affect not only the level of output per capita but also its rate of growth. It is commonly believed that military spending exerts considerable influence upon FDI, a vital factor for economic growth.

### **1.1. Objectives of the Study**

In this paper we have made an attempt to examine the relation between military spending and economic growth in the context of multivariate economic growth framework in the seventeen countries of sub-Saharan African region over the period from 1980 to 1999. The main focus of the paper is to determine if military expenditure has any impact on economic growth and FDI. Researchers have tried to ascertain the relation between military spending and economic growth through the estimation of single-equation and simultaneous equation models and more recently, through the applications of time-series techniques that investigate causal links;

### **1.2 Rationale for the Study**

The researchers have made both extensive cross-country analysis and detailed case studies of individual countries to ascertain the causal relation between the two; but none of the former could arrive at any consensus regarding the matter. In this context, Dunne (1996) has made an extensive survey which may be cited here

as a reference. Our present study is expected to make additional contribution to the issue in the following ways;

(a) It provides a further case study of seventeen countries of Sub-Saharan Africa region.

(b) The present study goes beyond the standard “Granger Causality” econometric techniques used in previous econometric works, and uses a panel data approach within the framework of economic growth model. So, our approach is more comprehensive than the earlier ones.

### **1.3 Organisation of the Study**

The remaining sections of the paper are organized as follows: Section 2 gives a brief review of literature on military expenditure and economic growth. Section 3 describes the hypothesis, the conceptual framework of the model or the research methodology, and the nature and source of data used in the study. Section 4 gives an analysis of empirical results. Section 5 narrates the political economy of military expenditure in the countries of Sub-Saharan Africa. Section 6 gives the conclusion and analyses the policy implications of the findings of the study.

## **2. A Brief Review of Literature**

There is a good deal of research on the issue of economic growth and military spending. Most of the studies used cross-country or panel data approach to investigate the issue. While most of these studies utilized the standard Neo-classical growth model or its extended version which includes human capital, more recent studies focus on endogenous growth models. The key assumption of the neoclassical growth theory is that technical change is exogenous and the same technological opportunities are available across countries. The implication of the study is that steady state growth entirely depends upon exogenous population growth and exogenous technical progress. In other words, the model predicts that poor countries should gradually converge towards richer countries. However, studies undertaken by Romer (1986) and Lucas (1988) have totally discarded this central assumption. Recent literature based on endogenous growth models (Romer, 1986; Lucas; 1988) are of the view that the convergence hypothesis is “conditional” because it depends upon various factors like the rate of savings, the growth rate of population, the marginal productivity of labor, etc. The lower the level of income, the greater is the opportunity of catching up through higher rates of capital accumulation and diffusion of technology.

There are some studies which have attempted to explain cross-country differences in total factors of production. Most of these studies with the exception of Hall and Jiahes (1998) have focused on cross-country differences in growth rates. The growth rates are important since they have considerable influence upon growth levels. The cross-country differences in growth rates may be temporary since technological transfers across countries imply convergence in growth rates as technological transfers bring countries closer to each other within a definite period of time. The main conclusion of these studies taken together may be summed up as follows: A country's growth over a long period is basically determined by three factors. These are: 1. the efficient utilization of the existing stock of resources, 2. the accumulation of productive resources such as human capital, and 3; technological progress. Of course, these factors can be further broken down into various determinants of economic growth (Dewan and Hussain, 2001).

A survey of the large body of empirical evidence reveals little consensus on either the existence of a relationship between military spending and economic growth or when it exists, the nature and direction of such a relationship. So far our knowledge goes, Benoit (1973,1978) was the first to initiate the debate on the relationship between military spending and economic growth who suggested that there was a positive correlation between defense expenditure and economic growth. Subsequently, after comprehensive critique provided by Ball (1983), considerable research works with improved approach using rigorous econometric analysis have been undertaken to test the validity of Benoit (1973,1978)'s finding and to overcome the analytical deficiencies in his study. There have been studies using single-equation analysis, simultaneous equation systems, and large macroeconomic models all developed from a variety of theoretical perspectives. Studies have been applied to different cross-sectional samples of countries, time series for individual countries, and pooled time series and cross-sectional data. None of these studies, however, can arrive at any consensus on the issue. Of course, most of the studies have one common finding that defense expenditure has no significant impact or a negative impact on economic growth (Dunne, 1996).

The recent application of causality tests to the data to examine whether there is any effect of military expenditure on growth and vice versa may be regarded as an important piece of single-equation work. This causality test is better known as Granger causality test since the technique was first developed by Granger (1969). However, several methods are available for testing Granger causality. Joerding (1986), Manage and Marlow (1986), Kinsella (1990), Ghowdhury (1991), Lopney (1991), Chen (1993), Kusi (1994), Hasan (1994), Madden and, Haslehurst (1995),

Kollias. and Makrydakis (1997) used Granger-causality tests in their studies to ascertain the impact of military spending on economic growth. Joerding (1986); Used two measures of military spending and growth for 57 less-developed countries (LDCs) for the period from 1962 to 1977 found no evidence that military spending causes growth. Kinsella (1990) studied the causal relationship between military spending and various economic variables including output of the United States and concluded that there was no significant relationship between defense spending and output. Chowdhury (1991) used a Granger-causality test to analyze the presence and; direction of causality between defense spending and economic growth in less developed countries (LDCs) and his test results showed a lack of consistency across different countries. Looney (1991) analyzed the case of Pakistan and India and found a positive effect of military spending on growth for Pakistan but a negative one for India.

Chen (1993) analyzed the case of China and found no significant relationship between military spending and economic growth. However, Hasan (1994) found a positive effect of military spending on growth when he reworked Chen's data with VAR methods. Maddan and Haselhurst (1995) found no causal link between military spending and economic growth. Kollias and Makrydakis (1997) analyzed Greek data and found no causal link between defense expenditure and economic growth. Hassan et al. (2002) examines the relation between military spending and economic growth in the context of a multivariate economic growth framework in the seven SAARC countries over the period from 1980 through 1999 using a panel data approach and finds that the SAARC region, mostly composed of developing countries, gain more from defense spending vis-a-vis the developed countries as benefits are more widespread across the economy in these countries. The study also finds that the ultimate impact of defense on growth is positive as it brings overall stability in the economy by providing security against all external threats and aggression, though the immediate objective of military spending may not be directly related to growth. Hassan (2003) examines the impact of military spending upon economic growth using a panel data of 95 countries and 8 MENA (Middle-East and North African) countries. The central focus of the study is to examine the important factors that contribute to FDI and economic growth in the world and to compare them with those of MENA countries. The study finds significant negative impact of military spending upon economic growth while its impact upon FDI is positive which implies that military spending encourages FDI since it may bring desired stability in the country by providing security against all external threats and aggression. However, the ultimate impact of military spending on GDP growth turns out to be negative; Of course, no clear-cut conclusion can be drawn from this analysis.

We must carefully assess various supply-side (spin-offs from technology or infrastructure) and demand-side (resource diversion) factors before we make any generalization. In fact, economic growth is influenced by a host of macroeconomic variables like globalization index, IGT (Information and Communication Technology) configuration, human capital, population growth, gross domestic investment, government expenditure, foreign direct investment (FDI), inflation rate, exchange rate, military expenditure and per capita income. Globalization or the degree of openness to the global economy (Gallup et al., 1998), ICT, human capital (Barro, 1991; Benhabib and Spiegel, 1994; Becker et al., 1990; Sach and Warner, 1997; Barro, 1997), ICT, population (Hassan, 2003), and military spending (Hassan et al., 2002) are found to have positive influence upon economic growth while the impacts of government expenditure (Levine and Zervos, 1993; Barro, 1991; Hassan et al., 2002), inflation (Grimes, 1990; Barro, 1995; Mankiw, Romer and Weil, 1992; Barro, 1997; Fischer and Modigliani, 1978) on economic growth are found to be negative. However, this result contradicts the findings by Clark (1993) and Hassan et al. (2002). Of course, the result obtained by Hassan et al. (2002) is not statistically significant. Domestic and foreign investment, FDI are found to have positive influence upon growth while per capita income affects growth negatively (though not significantly) (Hassan et al. 2002). The pattern of relationship between FDI and economic growth is not clear-cut. Schneider and Frey (1995), Tsai (1994), Lipsey (1999), Hassan (2003) found positive relationship while Edwards (1990) found that the relationship between economic growth and FDI is quite inverse. Asiedu (2002) finds the unambiguous positive effect of both the quality of infrastructure (Wheeler and Mody, 1992; Kumar, 1994; Loree and Guisingar, 1995) and openness to international trade (Edward, 1990; Gastanga et al, 1998) on FDI. However, Asiedu (2002) finds that the impact of infrastructure development (measured by telephone per 1000 people) on FDI in Africa is not significant, but the impact of the same on FDI in other countries is quite significant. Hassan (2003) finds none of the economic factors significant in explaining FDI in MENA countries. But in another study Hassan et. al (2002) finds positive influence of globalization and information technology and negative influence of human capital, population growth, exchange rate, per capita income and military expenditure on FDI in the SAARC countries.

Masanjala and Papageorgiou (2003) analyzed the three current debates on economic growth, namely, geography/endowment hypothesis, institutions hypothesis and policy /integration hypothesis. The essence of the geography/endowment hypothesis is that geographical and ecological variables foster

economic development by influencing directly the quality of land, labor productivity and production technologies. The institutions hypothesis holds that the role of geography in explaining cross-country growth variations operates predominantly through the choice of institutions, with little direct effect from geography. The policy/integration hypothesis emphasizes the role of macro-economic policy and the degree of integration in international trade and de-emphasizes the role of initial conditions in economic growth. (Diamond, 1997; Easterly and Levine, 2003; Sachs and Warner, 1997; Bloom and Sachs, 1998, Gallup, Sachs and Mellinger, 1998, Landes; 1998, Sachs, 2001,2003; Engerman and Sokoloff, 1997; Acemoglu, Johnson and Robinson, 2001,2002; Rodrik, Subramanian and Trebbis, 2002; Acemoglu and Johnson, 2003; Frankel and Romer, 1999; Alcalá and Giccone, 2002). Using Bayesian Model Averaging Methodology, Masanjala and Papageorgiou (2003) finds institutional variables are important in explaining economic growth in Africa. In fact, there are different channels through which positive externalities associated with FDI can occur. In a competition channel, increased competition leads to increased productivity, efficiency and investment in human and/or physical capital. It may also lead to changes in the industrial structure towards more competitiveness and more export-oriented activities. Second, in a training channel, increased training of labor and management can enhance growth. Third, in linkage channel, foreign investment is often accompanied by technology transfer, and such transfers may take place through transactions with foreign firms. Finally, in demonstration channel, domestic firms replicate the more advanced technologies used by foreign firms.

### **3. Formulation of Hypotheses, Data and Research Methodology**

#### **3.1. Formulation of Hypotheses**

Based on the above review of literature on economic growth, military spending and FDI, we have developed and tested the following hypotheses:

- HI: The impact of military spending on both economic growth and FDI is ambiguous.
- H2: Globalization has positive impact on both economic growth and FDI.
- H3: IGT infrastructure has positive impact on both economic growth and FDI.
- H4: Human capital has positive impact on both economic growth and FDI.
- H5: The impact of population growth on economic growth and FDI is ambiguous.

- H6: Gross domestic investment has positive impact on both economic growth and FDI.
- H7: Government expenditure has negative impact on economic growth, but its impact on FDI is ambiguous.
- H8: FDI has positive impact on economic growth,
- H9: GDP growth has positive impact on FDI.
- H10: The impact of inflation on both economic growth and FDI is ambiguous.
- H11: The impact of exchange rate fluctuation on both economic growth and FDI is negative.
- H12: The impact of per capita income on economic growth and FDI is positive.

### 3.2. Sources and Nature of Data Used in this Study

Data for this analysis are derived from World Development Indicators, International Financial Statistics, the World Telecommunication Development Report, and the UNESCO database. The analysis is based on data from a cross section of seventeen sub-Saharan African Gpuntries (Angola, Botswana, Cameroon, Cote D'Ivoire, Gabon, Ghana, Kenya, Malawi, Mauritius, Namibia, Nigeria, Senegal, South Africa, Tanzania, Uganda, Zambia and Zimbabwe) overtime from 1980 to 1999. Data description and their nominal statistics are provided in table 1.

### 3.3. Methodology of the Study: Specification of the Model.

Our hypothesis stated above explaining economic growth and military expenditure, based on a review of the theoretical and empirical literature and on the ideas presented above in section 2 are represented by the following equations:

$$(BDPGRWH)_{it} = \beta_0 + \beta_1(YO)_{it} + \beta_2(GI)_{it} + \beta_3(ICT)_{it} + \beta_4(HC)_{it} + \beta_5(PG)_{it} + \beta_6 + (GDI)_{it} + \beta_7(GE)_{it} + \beta_8(FDI)_{it} + \beta_9(ER)_{it} + \beta_{10}(IR)_{it} + \beta_{11}(ME)_{it} + \varepsilon_1$$

$$(FDI)_{it} = \beta_0 + \beta_1(YO)_{it} + \beta_2(GI)_{it} + \beta_3(ICT)_{it} + \beta_4(HC)_{it} + \beta_5(PG)_{it} + \beta_6(GDI)_{it} + \beta_7(GE)_{it} + \beta_8(GDPGROWTH)_{it} + \beta_9(ER)_{it} + \beta_{10}(IR)_{it} + \beta_{11}(ME)_{it} + \varepsilon_1$$

Where:

- Y0 = initial GDP per capita (denoted by GC in the tables);  
 GI = globalization index (an indicator of market opeririess);  
 ICT = information and communication technology infrastructure;  
 HC = human capital;

- PG = population growth;  
GDI = gross domestic investment;  
GE = government expenditure;  
FDI = net foreign direct investment inflows;  
ER = exchange rate;  
IR = inflation rate;  
ME = military spending;  
E = error term;  
i = represents each sampled country;  
t = represents each year.

### 3.4. Definition and Measurement of the Variables used in the Study

**GDP growth (GG):** is annual percentage change in GDP, as it is defined and measured in conventional macroeconomics.

**Foreign direct investment (FDI):** FDI inflows are net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than the home country of the investor. The measure is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments.

**Globalization index (GI):** It provides a measure of the degree of economic Openness. It is calculated as the sum of exports and imports divided by GDP.

**Information and communication technology infrastructure (ICT):** It is a composite variable composed of indicators such as the density of Internet hosts and the number of computers, telephone main lines, fax machines, TV sets, radios, users of mobile phones, and subscribers to newspapers. All the sub-factors are standardized and then combined to make the ICT-infrastructure variable.

**Human capital (HC):** It means percentage of relevant group participating in secondary education. Secondary education completes the provision of basic education that begins at the primary level, and aims at laying the foundation for lifelong learning and human development, by offering more subject or skill-oriented instruction using more specialized teacher.

**Population growth (PG):** It refers to the rate of population growth which is the exponential change of population each year.

**Gross domestic investment (GDI):** It consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. It is coded as

percentage of GDP. **Government expenditure (GE):** It denotes central government's total expenditure including non-repayable current and capital expenditure and it is indicated by percentage of GDP.

**Inflation rate (IR):** It indicates GDP implicit deflator measuring the average annual rate of price change in the economy.

**Exchange rate (ER):** It is a measure of each country's currency stability. Larger number indicates a weaker currency.

**Military expenditure (ME):** It refers to the expenditure made by the government in the defense sector. The expenditure includes both current and capital expenditure and it is indicated by percentage of GDP.

### 3.5. Econometric Technique

Generalized least squares (GLS) regression analysis has been used for estimation of the model. We have used both the pooled cross-section regression and fixed-effect panel regression to estimate the parameters of the two equations stated above: one for GDP growth and other for FDI. The generalized least square (GLS) regression analysis has been used to avoid possible cross-sectional Heteroskedasticity and contemporaneous correlations since the method uses cross-sectional weights of residuals to calculate the variance of the residuals. In this pool regression model, the intercept terms are restricted to be identical, that is, there is no country-specific variations so that  $\alpha_{it} = \alpha$

In this study fixed-effects panel regression has also been used since this is an efficient technique when there is a large number of cross-sectional units with diverse qualitative variations. In our study we have 17 countries, some of which are less developed or less underdeveloped relative to others. In such situation, an unrestricted intercept term is more plausible. The fixed-effects estimator allows  $\alpha_{it}$  to vary across-section units so that we get different constants for different countries. In other words,  $\alpha_{it} = \alpha$  and  $E(\alpha_1 E_1) \neq 0$ . In this case also we have used the GLS method to estimate the parameters. All estimates are adjusted for White Heteroskedasticity -consistent standard errors and covariance.

## 4. Analysis of Empirical Results

In the pooled cross-section regression of GDP growth we find the effects of military spending (ME), globalization (GI), gross domestic investment (GDI), inflation rate (IR), exchange rate (ER), foreign direct investment (FDI) and population growth (PG) on economic growth statistically significant in Sub-

Saharan African countries. Military spending, exchange rate, gross domestic investment and inflation rate and FDI inflows negatively affect the GDP growth. Therefore, gross domestic investment, globalization are found as expected while the impact of FDI on GDP growth is found negative and the impact of exchange rate is found positive contrary to our belief. The effects of ICT infrastructure, government expenditure and per capita income on GDP growth are negative and the impact of human capital on GDP growth is positive, but none of them are statistically significant. However, when country-specific variations are allowed in fixed-effect model, the significant positive effects of globalization, exchange rate and military expenditure becomes insignificant. The significant negative effect of ICT infrastructure becomes positive, but still remains insignificant. The impact of per capita income on the GDP growth remains negative and marginally significant in both the cases. In the pooled cross-section regression, the significant positive impact of military spending on GDP growth in the Sub-Saharan African countries is consistent with the findings of Hassan et al. (2002) in the SAARC countries, but contradicts with the study of Hassan (2003) in the 95 countries as a group. The significant positive impact of gross domestic investment (GDI) conforms to the study by Hassan et al. (2002) in the SAARC countries while the significant negative impact of FDI on economic growth contradicts the findings by Hassan et al. (2002) in the SAARC countries and Hassan (2003) in 95 countries as a group. The impact of globalization on economic growth is positive and significant in the Sub-Saharan African countries while the same is insignificant though positive in the SAARC countries (Hassan et al., 2003).

However, the effect of globalization in the 95 countries as a group is significantly negative (Hassan, 2003). The impact of ICT infrastructure is negative but insignificant in both SAARC (Hassan et al., 2002) and Sub-Saharan African regions, but significant in 95 countries as a group (Hassan, 2003). The significant negative impact of inflation rate is found both in Sub-Saharan African and 95 countries as a group, while the impact of population growth is negative in Sub-Saharan Africa and positive in the group of 95 countries (Hassan, 2003). It should be pointed out here that the GDP growth rate in MENA countries is poorly explained with the above explanatory variables. Only exchange rate is found significant in pooled regression. While the impact of this variable is still negative, the same is not statistically significant in the fixed-effect model (Hassan, 2003). Overall, when the country specific variations are allowed, the fixed-effect model cannot explain the variations better than the pooled cross-section model as reflected in the adjusted R<sup>2</sup> value, which is 55 percent in the former, a jump from 77 percent in pooled model. The F-value is also very low in the fixed-effect model.

When we regress foreign direct investment against a set of explanatory variables, in pooled cross-section model we find the effects of globalization, population growth and military expenditure significantly positive while the effects of gross domestic investment, government expenditure, GDP growth, inflation rate and per capita income are significantly negative. In the fixed-effect model, positive effects of globalization and military spending, negative effects of GDP growth and inflation rate still remain significant while significant positive effect of population growth becomes negative but insignificant, significant negative effect of government expenditure remains negative but insignificant; insignificant positive effect of IGT infrastructure becomes negative but significant; and finally, significant negative impact of per capita income becomes positive but still significant. However, these results both in pooled cross-section and fixed effect regression model do not conform to the results in case of all explanatory variables found by Hassan (2003) in all the 95 countries as a group, the MENA countries and by Hassan et al. (2002) in the SAARC countries. Of course, the military spending positively influences the FDI both in Sub-Saharan African and in all the 95 countries as a group, though its effect on FDI in the latter countries is insignificant (Hassan, 2003). Overall, the fixed-effect model explains the variations better than the pooled cross-section model as reflected in the adjusted R<sup>2</sup> value, which is 98 percent in the former, a jump from 69 percent in pooled model.

##### **5. Political Economy of the Military Expenditure in the Sub-Saharan African Countries**

Statistically we have been able to show some positive relationship between economic growth and military spending in the above analysis. But this may not always hold true. Sometimes the comparisons between military spending and GDP growth may be misleading. Usually the growth concepts are not kept in mind while making expenses for military purposes particularly in the poor countries like the countries of Sub-Saharan Africa.

In most cases, the military expenditure is incurred for security considerations with little or no consideration for economic growth and human welfare. The military expenditure imposes burden on a country's economy since it crowds out resources for other sectors of the economy, especially health and education. The economic burden imposed by the military expenditure may be measured in terms of the GDP it takes. The greater the share, the higher is the burden. A higher burden implies less resources for other sectors of the economy since the economy's resources are limited. In a resource poor country the crowding out of the social sector is not

beneficial for its people since the people are deprived of certain basic needs, which may motivate negative reactions against the government. In fact, it is very difficult to make any judgment, prediction or interpretation about the relationship we have found between military expenditure and economic growth in Sub-Saharan African countries on the basis of available data, since only limited and incomprehensive data are available on military expenditure which are also not reliable in most cases due to deficient accounting system in many countries, deliberate manipulation of military expenditure reporting organizations without adequate resources of their own to check the accuracy of the states' reports. Besides, the absences of the concept of military expenditure and the problem of conversion of a national data into a common currency in many African countries have made the task still difficult. Military expenditure in Africa declined over the period 1990-96 due to poor economic condition, budget constraints and the demilitarization process in southern Africa in general and South Africa in particular, the continent's major military spender. Military expenditure in Africa, however, began to increase since 1997. The change in trend in military spending in South African countries since 1997 was due to (a) the persistence of many of the continent's conflicts and the involvement of several states in them and (b) the steady increase over the years in the military spending of some of Africa's major spenders, notably Nigeria, Algeria and Ethiopia. The involvement of Zimbabwe, Namibia, Rwanda and Uganda in the war with the Democratic Republic of Congo (DRC) also led to significant increase in their officially reported military expenditure. Of course, the officially reported data do not fully represent the total resources committed to military expenditure in Africa because of the concealed cost of armed conflict that is pervasive in the region. Three categories of countries have to bear the costs in armed conflict guided by both regional security and economic reasons on the African continent. These are: (a) countries on whose territories conflict is taking place (the DRC, Sudan, Angola, Algeria, Ethiopia, Eritrea); (b) countries siding with fractions in a conflict (Zimbabwe, Namibia, Rwanda, Uganda, Senegal); (c) countries involved in regional peace-keeping missions (Guinea, Nigeria, South Africa and Botswana's involvement in Liberia, Sierra Leone, and Lesotho). The diversion of vital resources to military purposes took place in far more countries in different parts of Africa in 1999. However, it is very difficult to estimate the magnitude of expenditure and costs related to armed conflict partly because they are not reflected in official budget, and partly because of the emerging pattern or different extraordinary forms of financing many of the wars on the continent. In conditions of war and armed conflict, the valuable natural resources like diamonds, emeralds, oil, and copper etc. of the developing countries involved in war are exploited by groups like different

fighting units, public and private, state and non-state, including regular armed forces, remnants of paramilitary groups, self-defense units, foreign mercenaries and regular foreign troops, who can provide protection to them. Kaldor (1999) has categorized the sources of funding these new types of war into four kinds: (a) asset transfer to the fighting units in the form of looting, robbery, hostage-taking and deriving profits from control over market price; (b) war tax from the production of primary commodities and various forms of illegal trading, (c) external assistance in the form of remittances from abroad or assistance from foreign government; and (d) diversion of humanitarian assistance for government or warring factions. The current scenarios of armed conflict in Africa may be an example in point. Even more important is the set of social relationships for these systems for financing war - a factor that works strongly against ending war. The DRC has to spend a lot for hiring mercenaries from Russia and Ukraine, for importing arms from Zimbabwe, and to give up the control of her mineral mining centers to both the Rwandan-backed faction and the Ugandan-backed faction of the RDC (Congolese Rally for Democracy). Angola has to bear an external debt burden of about \$ 1 I billion and to take recourse to mortgaging her oil sales to pay for military equipment. Zimbabwe has to increase military spending at the cost of more pressing social issues such as health, especially the AIDS epidemic in the country. The government budgets of Uganda and Rwanda are seriously affected as a result of diamond export through illegal mining in the DRC. Senegal has to privatize her national telecommunication company to collect fund for suppressing internal rebellion and to intervene in Guinea-Bissau crisis. The military expenditure of Guinea, Nigeria, South Africa and Botswana has increased rapidly due to their involvement in peace-keeping missions in Liberia, Sierra Leone and Lesotho. Both Guinea and Nigeria have to bear the brunt of heavy influx of the refugees from Liberia and Sierra Leone. South Africa and Botswana have to spend about \$140 million within nine months. Therefore, data on military expenditure are irrelevant for measuring military expenditure involved in this type of war.

From the above discussion it is clear that a high level of military expenditure in any state, especially in African countries can be a valid reason to establish a direct causal linkage between military expenditure and economic growth. Since military expenditure is an input measure, it can by itself promote economic growth because economic growth not only depends on the input of resources, but also on cost effectiveness-what we buy with our money. Cost effectiveness in turn depends on factors such as the various components of defense budget and the percentages they take, the pattern of recruitment, the technological level, and the

methods of procurement (import or domestic production) as well as infrastructure is most useful and meaningful when it is disaggregated into its various component parts. Unfortunately this is not the case in developing countries like those of Africa. In many African countries salaries of army staff takes a disproportionate - share of military expenditure. In some countries this could be as high as 80% of the total defense budget. Thus it is difficult to generalize about the positive relationship between military expenditure and economic growth on the basis of available data. In fact, military expenditure constitutes a great economic burden in a number of African states;(Omitoogun, 2001); The result is huge public debt and wastage of funds which could have a higher value added if the same was invested in the social sector. Therefore, national priorities should be reassessed in the backdrop of social development and opportunity so as to gear up human resource development and alleviate mass poverty. Of course, military expenditure may have some positive impacts as trickling down effect in terms of employment and infrastructure development, if any; but their magnitude becomes less significant if compared with the potentials in the alternative uses.

## **6. Summary, Conclusion and Policy Implications**

Our results indicate that the set of variables that affect GDP growth and FDI are not always same: We find significant positive impact of gross domestic investment on GDP growth, but we do not find its any significant impact on FDI, Population growth affects GDP growth negatively while it affects FDI positively. We find significant negative impact of FDI on GDP growth and GDP growth on FDI. Inflation rate is found to affect both GDP growth and FDI negatively. Government expenditure affects both GDP and FDI negatively, but its negative impact on GDP is not significant. The exchange rate is found to have positive impact on GDP growth while it has no significant impact on FDI. Per capita income is found to affect FDI significantly, but its effect on GDP growth though negative is not at all significant. Human capital is found to have significant negative impact on FDI and no significant impact on GDP growth, Similar is the case with IGT-infrastructure. It has significant impact on FDI, but no significant impact on GDP growth. However, globalization has significant positive impact on both GDP growth and FDI.

Military spending is found to have significant positive influence upon both economic growth and FDI. It implies that military spending brings overall stability in the economy by providing security against all external threats and aggression and thus creates congenial atmosphere both for economic growth and FDI. It is usually believed that developing countries gain more from defense

spending vis-a-vis the developed countries, as benefits are more widespread across the economy in the these countries. However, the growth concepts are not usually kept in mind while making expenses for military purposes, more particularly in the Third World countries. The comparisons between military spending and GDP may be misleading sometimes. The proportion of national resources allocated to defense reflects the perceptions of national elite and decision making circle, which is largely founded on the security milieu in which a country finds itself. This is not expected to represent any comprehensive plan of sound investment where large-scale social and human welfare exist (Hassan et al., 2002). All the Sub-Saharan African countries in our study are not rich and developed and in these countries resources are transferred to defense at the cost of their socio-economic development and growth. In these countries the national security should be intrinsically linked up with human resource development. It would not be out of place to mention here that South Africa spent billions of dollars for defense to; fight communism and protect apartheid which could be fruitfully utilized for human resource development and GDP growth. Unless mass poverty is eradicated, no security plan would be sustainable one even if the size of military build-up is very big. Therefore, for sustainable development and everlasting security, priority should be given upon the development of human resource and not upon military build-up. To develop human resource like access to education and training, better sanitation and health care facilities should be ensured

Only military security is not enough to attain the long cherished goal of growth and development. So, it is imperative that we should carefully assess various supply-side (spin-offs from technology or infrastructure) and demand-side (resource diversion) factors to analyze the impact of military spending on growth (Hassan, 2003; Hassan et al., 2002). The reassessment of national priorities in the backdrop of social development and opportunity cost is necessary for human resource development and alleviation of mass poverty. Though military expenditure has some positive impacts as trickling down effect in terms of employment and infrastructure development, their magnitude becomes less attractive compared to the loss of benefits to be derived from the alternative use of resources spent for defense.

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**Appendices**

*Table -1: Summary Statistics of Variables: Sub-Saharan Countries*

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
GG	3.88	4.40	19.80	-6.20	3.52	0.73	7.92
IT	-1.45	-1.45	-1.03	-1.69	0.14	0.57	3.70
GE	27.72	28.00	39.40	12.70	6.49	-0.30	3.16
IV	19.53	19.00	32.00	11.00	4.58	0.33	2.65
IR	80.40	10.30	1103.20	4.60	235.14	3.57	14.20
HC	38.15	33.00	65.00	12.00	19.12	0.20	1.50
PG	2.75	2.90	3.60	1.00	0.54	-2.20	7.78
FI	220.01	72.00	2471.00	-100.00	396.29	3.55	17.54
GB	0.21	0.17	0.36	0.16	0.06	1.11	2.71
ER	10348.15	499.00	392824.00	1.00	52744.90	6.17	41.94

Table 2: Regression Estimates of Pooled Cross - Section and Panel Fixed - Effect Model (GLS), Africa. (Dependent Variable: GDP growth)

Explanatory Variables	Pooled Cross-Section GLS (N=17)	Fixed Effect GLS (N=17)
<b>Globalization</b>		
GI (Globalization Index)	0.064*** (3.879)	0.029 (1.306)
<b>Infrastructure</b>		
ICT (ICT Configuration)	-0.007 (-1.076)	0.006 (0.287)
HC (Human Capital)	0.050 (1.139)	0.146 ; (1.383) .
PG (Population Growth)	-0.733** ; (-2.135)	-1.349 (-1.309)
<b>National Investment</b>		
GDI (Gross Domestic Investment)	0.164*** (4.017)	0.271*** (3,438)
	-0.053	-0.469***
GE (Government Expenditure)	(-0.868)	(-3.708)
	-1.03E-10**	-2.17E-10***
FDI(FDI Inflows)	(2.395)	(-11.778)
<b>Economic Factors</b>		
IR (Inflation Rate)	-0.029*** (-4.551)	-0.047** (-2.097)
	0.008***	0.002
ER (Exchange Rate)	(5.279)	(0.876)
	0.698***	0.073
ME (Military Expenditure)	(4.360)	(0.106)
	-0.001*	-0.004*
GC (Per Capita Income)	(-1.731)	(-1.818)
<b>Constant</b>		
	-5.187*** (-2.993)	
R <sup>2</sup>	0.89	0.68
Adjusted R <sup>2</sup>	0.77	0.35
F-Value	27.55	2.33E+10

t-statistics in parentheses, \*p<0.05, \*\*p<0.01, \*\*\*p<0.0001

Table 3: Regression of Estimates of Pooled Cross-Section and Panel Fixed Effect Models (GLS), Africa

—(Dependent Variable; Foreign Direct Investment)

Explanatory Variables	Pooled Cross-Section GLS (N=17)	Fixed Effect ca5 (N=17)
<b>Globalization</b>		
GI (Globalization Index)	43751643*** (4.038)	13925075*** (4.515)
<b>Infrastructure</b>		
ICT (ICT Configuration)	2762%3 (0.829)	-15825457*** (-4.599)
HC (Human Capital)	21693925 (0.921)	-33469001*** (-4.141)
PG (Population Growth)	8.34E+08*** (6.648)	-334155 (-0.003)
<b>National Investment</b>		
GDI (Gross Domestic Investment)	-750438 ' (-0.026)	899279 (0.053)
GE (Government Expenditure)	-1.26E+08*** (-3.854)	-25520400 (-1.589)
FDI(FDI Inflows)	-90745455** (-2.396)	-43387948*** (-3.102)
<b>Economic Factors</b>		
IR (Inflation Rate)	-12699795** (-2.481)	-5513431*** (-3.492)
ER (Exchange Rate)	109920 - (0.194)	472387 (0.734)
ME (Military Expenditure)	4.66E+08*** (2.729)	1:49E-K)8*** (2.929)
GC (Per Capita Income)	-511063*** (-3.217)	1861688*** (4.681)
<b>Constant</b>	-4.10E+09*** (-7.924)	
R <sup>2</sup>	0.73 V	0.99
Adjusted R <sup>2</sup>	0.69	0.98
F-Value	18.39	3.96E+30
t-statistics. in parentheses		

\*p<.05, \*\*p<.01, \*\*\*p<.001

