THE INTERPLAY BETWEEN MILITARY EXPENDITURES AND ECONOMIC GROWTH: THE CASE OF EAST AFRICAN ECONOMIES

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A RESEARCH PROJECT SUBMITTED TO THE SCHOOL OF BUSINESS, ECONOMICS & TOURISM, DEPARTMENT OF ECONOMIC THEORY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF ECONOMICS (POLICY AND MANAGEMENT) OF KENYATTA UNIVERSITY.

June 2023

DECLARATION

This research project is my original work and has not been presented for any award in any University.

Signature: ……... Date: ……...

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K102/37540/2016

I confirm that this research project is the work of the candidate and was done under my supervision.

Signature: ……... Date: 14/06/2023……...

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DEDICATION

I dedicate this work to my parents and family for financial and moral support.

ACKNOWLEDGEMENTS

I acknowledge and appreciate the great input from my supervisor, Dr. Mdoe Idi Jackson, Dr. Gachanja Paul M., and Dr. Kinyanjui George K., for the valuable guidance and suggestions that have led to the development of this Research project.

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ACRONYMS AND ABBREVIATIONS

ADF: Allied Democratic Forces

ARDL: Autoregressive Distributed Lag

CS-DL: Cross-Sectionally Augmented Distributed Lag

DRC: Democratic Republic of Congo

EAC: East African Community

GDP: Gross Domestic Product

IPS: Im, Pasaran and Shin

LDCs: Least developed countries

LLC: Levin-lin-Chu

MILEX: Military Expenditure

MoU: Memorandum of Understanding

NRA: National Resistance Army

OECD: The Organization for Economic Cooperation and Development

SIPRI: Stockholm International Peace Research Institute

WDI: World Development Indicators

OPERATIONAL DEFINITION OF TERMS

East African Community:	This is an economic federation comprised of seven (7) partner States that is Kenya, Uganda, Tanzania (Houses Headquarters in Arusha), Burundi, South Sudan, Rwanda, and the Democratic Republic of Congo (DRC).
Military Expenditure:	The amount of financial resources devoted by a country to raising and maintaining armed forces or different techniques of defense purposes.
Global Military Burden:	World Military expenditure as a share of the global gross domestic product (GDP)

ABSTRACT

Over the years, the East African Community (EAC) has experienced tremendous growth in defense spending in the advent of rising violent cross-border and domestic terrorism. The member states reported a cumulative rising share of their military expenditure in the total global military expenditure from 8.3% in the 1960s to 27.5%, in 2020. Concurrently, with a diminishing share of their global GDP from 30.7% to 21.5%. African share in the global military expenditure has revealed a 70% upsurge in the period 1970 - 2020. Irrefutably, peace and continued sustainable economic development are the prime agenda of all EAC countries. The continuous growth in military spending presents a new economic challenge as it competes against other public sector needs whose importance cannot be underscored. Using a mix of empirical strategies, this study sought to verify whether defense spending impacts economic growth in the case of the seven (7) EAC countries since their independence (1960 - 2020). This study aimed at complementing existing literature by further examining the effect of military expenditure on economic growth using the Engle and Granger (1987) two-step cointegration analysis to elucidate their long-run equilibrium relationship and the Granger tests to establish the direction of causality. The study relied on the Stockholm International Peace Research Institute (SIPRI) annual data between 1960 - 2020 to collate military expenditure estimates, World Development Indicators (WDI), and the EAC Information Repository to collate data on economic growth. Founded on the empirical findings and the analysis, the study concluded that the EAC is a diverse region with varying levels of economic development. The results from the statistical analysis indicate that the countries included in the study exhibit variations in their GDP and military expenditure. Further, there is a one-way causal relationship between GDP and military spending in Tanzania, Burundi, Rwanda, and Congo (COD), but a two-way causal relationship between GDP and spending on defense in Kenya and Uganda. This implies that rising military spending in these nations follows economic development, with Kenya and Uganda having a favorable effect on economic growth.

Keywords: Defense, Expenditure, Economic Growth, Causality.

CHAPTER 1

INTRODUCTION

1.1. Background of the Study

Global peace is perhaps the single most significant determinant of economic prosperity, but at what cost is peace tenable? Even more paradoxical, would peace-related expenditures stall economic growth and crowd-out other vital investment activities? In 2021, the world military expenditure reached its highest level of $1,981 billion. Subsequently, in 2020, global military expenditure rose to $2 trillion, marking an increase in global military burden by 2.4% in real terms from the previous year (SIPRI, 2021). The increase in global military burden, military spending, as a share of GDP, was primarily attributed to the severe economic downturns most countries were experiencing in 2021 due to the covid-19 pandemic while their overall military spending was increasing (Perlo-Freeman, Sköns, Solmirano & Wilandh, 2021). Africa as a region has also had a rising trend in military expenditure over time, primarily attributed to a recent global appetite to intensify defence budgeting.

1.2. Military Expenditure in the EAC

The East African Community (EAC) is an economic federation comprising seven (7) partner States, namely, Kenya, Uganda, Tanzania, Burundi, Rwanda, South Sudan, and the Democratic Republic of Congo (DRC). It is headquartered in Arusha, Tanzania, and boasts a population of 467 million people (Worldometers, 2022). Figure 1.1 below shows the geographical positioning of the region.

Figure 1.1 The New East African Community (EAC) Region.

Figure 1.1 shows that the EAC is to the East of Africa. It falls in the larger part of the continent known as Sub-Saharan Africa. With the inclusion of the Republic of Congo in the region covers the East and a key part of central Africa. The EAC has a combined GDP of USD240 billion; the EAC regional block aims at deepening the cooperation among its member states in the political, social, and economic spheres for mutual benefit. Among the region's top priorities are strengthening the peace, security, and governance in the region, developing multi-dimensional quality infrastructure, and institutional transformation of all the EAC organs. According to the security treaty signed by the member states, the respective State's armed forces are to cooperate in the regional defense affair emphasizing mutual training and joint operations.

The partner states have been working closely to ensure peace within the region per the treaty agreement. Kenya and DRC have cooperated under the quick reaction force (QRF) in security stabilization. The EAC partners have also been involved in Somalia's African Union (A.U.) mission (AMISOM), neutralizing insurgents in Mogadishu. Uganda and DRC have previously undertaken joint military operations in the eastern DRC to control the affiliated terror group in the region. EAC's widespread conflict and terror threats have seen the partner states increase their military expenditure over time. This could have resulted in a trade-off between military expenditure and other primordial realms such as health, education, and infrastructure. Thus, this study is based on the motivation of establishing the opportunity cost of military expenditure from the region's economic growth and development.

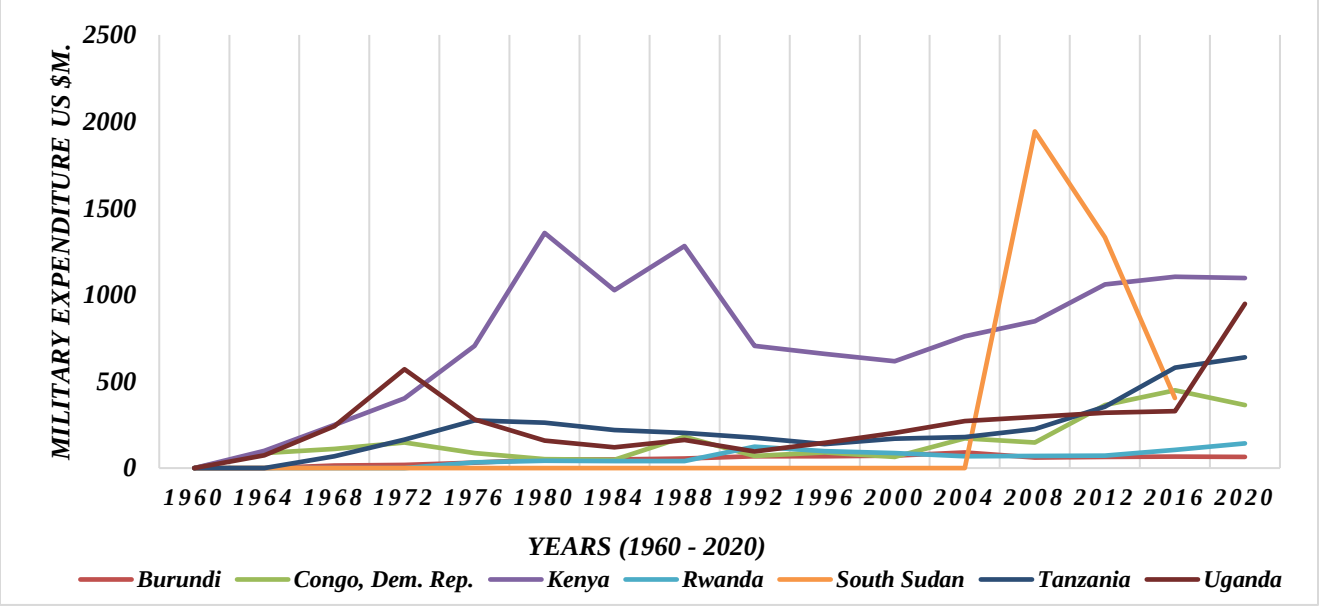

Figure 1.2: Military Expenditure by Country in constant (2019) US$ m. (1960 - 2020)

Figure 1.2 shows the trend analysis of EAC military expenditure in millions of US$. The trend analysis reveals that defense spending has grown since the respective countries' independence from 1960 to 2020. The increase in military expenditure could result from the region's surge of internal conflicts and terror attempts.

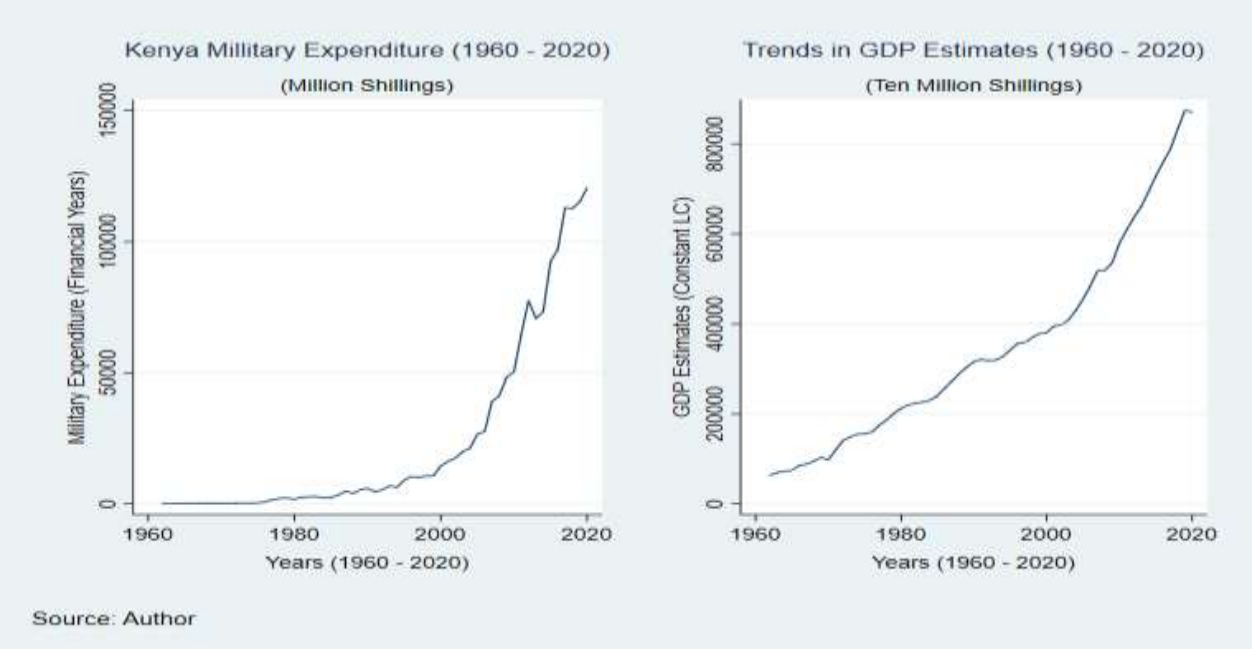

Figure 1.3: Kenya Military Expenditure trend versus GDP (1960 - 2020)

In the efforts to streamline national defense and ensure the safety of Kenya's territorial boundaries, adequate budgetary allocation was inevitable. The SIPRI data indicate that defense spending has been on the rise since independence in 1963 in absolute terms. Conversely, Kenya's GDP indicates a similar trend along with the time series, growing faster in the 1990s (Figure 1.3). By the late 1990s, Kenya had hit the global headlines with rising cases of terrorist attacks that were threatening key sectors of the economy. The need for Kenya to reconsider its defense operations became evident after the bombing of the United States Embassy in Nairobi in 1998. The bombing was characterized by insurmountable destruction of property, loss of lives, physical impairment, psychological effects on families, and permanent distortion of the welfare of hundreds of families (Helling, 2004; Macintyre et al., 1999; Pfefferbaum et al., 2003, 2006).

Despite the magnitude of this bombing, it was not the first of its kind. There had been all sorts of violent instabilities through which Kenya reaffirmed its need to strengthen its military order.

A spotlight example would be the failed military *coup d'état* of 1982 that attempted to overthrow the government of then-President Daniel Moi. Though the reasons for the attempted coup are scanty, pundits of political warfare and military involvement point to poor and unequal remuneration of military officers, rent-seeking, and low budgetary allocations as some of the reasons that triggered the military involvement in domestic political affairs (Zimmermann, 1979; Johnson et al., 1983; Kimenyi and Mbaku, 1996; Lofchie, 1972; Powell, 2012).

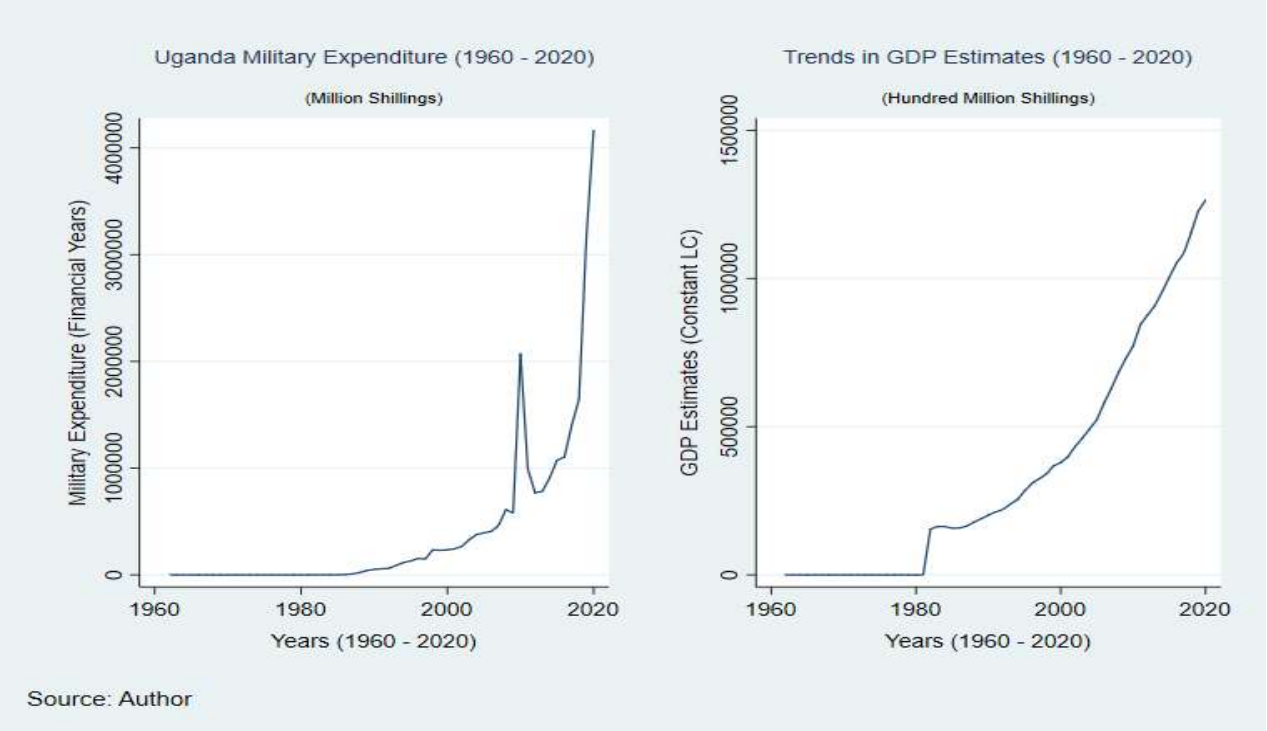

Figure 1.4: Uganda Military Expenditure trend versus GDP (1960 - 2020)

Uganda had strings of internal attacks since its independence in 1962, the most recent being the Kampala Central District perpetrated by the Allied Democratic Forces (ADF) (Michelle, 2021). While budget allocation to defense spending has been on the rise in Uganda since 1962, there has been a notable drastic rise from the early 1980s (Figure 1.*4*) following the Uganda Bush Wars against the rebel groups of the National Resistance Army (NRA).

There was a significant increase in defense spending in the 1970s, 1980s, and early 2000s, corresponding to Uganda's political unrest and civil war. In his study examining the impact of military expenditure in Uganda (1970 - 2019), Wokadala (2021) found that the political turmoil in Uganda resulted in increased defense spending and negatively affected GDP growth. The results from Figure 1.*4* above support the changes in military expenditure. According to the 3rd National Development plan (2020), Uganda registered significant economic growth in the last three decades after the return of normalcy following the insecure periods of the 1980s and 90s (National Planning Authority, 2020). In 2019 the economic growth was $34.9B reflecting a 4.93% growth from 2018.

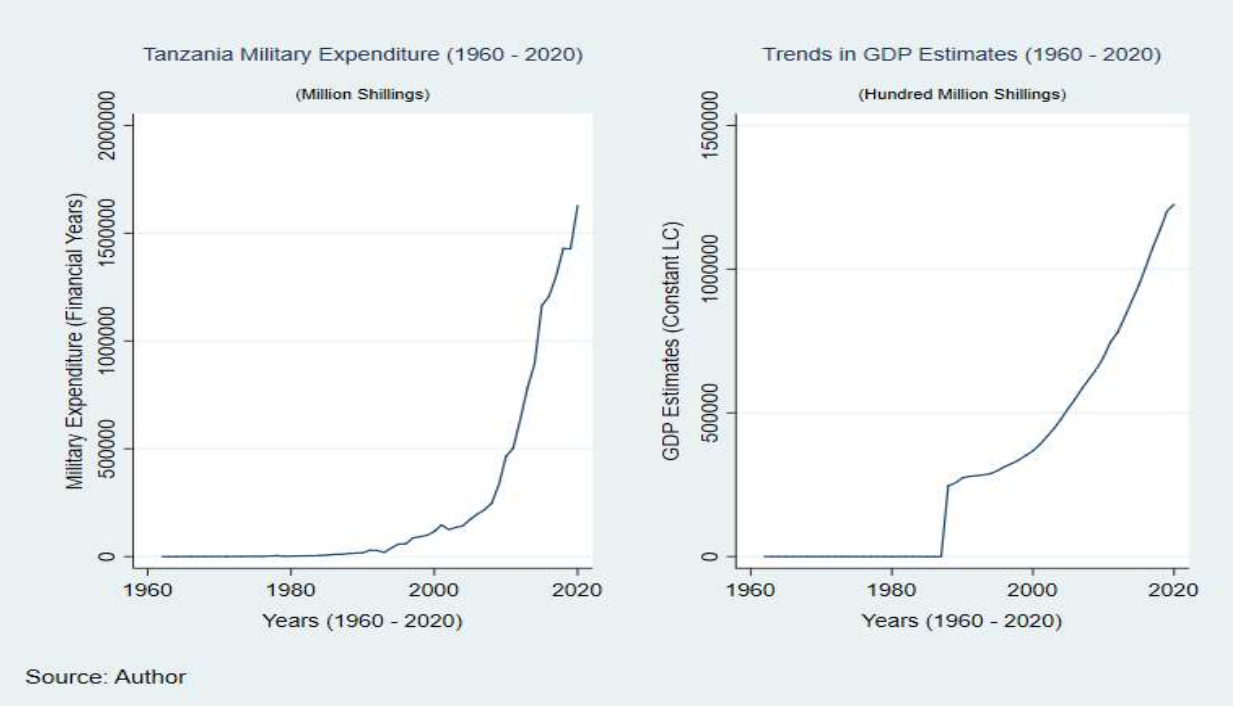

Figure 1.5: Tanzania Military Expenditure trend versus GDP (1960 - 2020)

Available data indicates that Tanzania's Military expenditure has continued to increase steadily since its independence in 1964 (Perlo-Freeman et al., 2021). According to Rebecca (2018), post-colonial conflicts such as the Tanzania-Uganda conflict of the 1970s escalated the growth in military expenditure. Over the same period of the 1970s, the Tanzania government scaled down other government spending sectors to respond to the increased domestic dissent (See Figure 1.5).

The spike in military spending thus crowded out the nation's development and recurrent expenditures. Kelvin (2017), using findings from panel data for 1995-2010, argues that the spike in defense spending in Tanzania negatively affected national economic growth. The growing defense spending takes up a significant amount of resources for developmental purposes hence crowing out the more productive sectors of the economy.

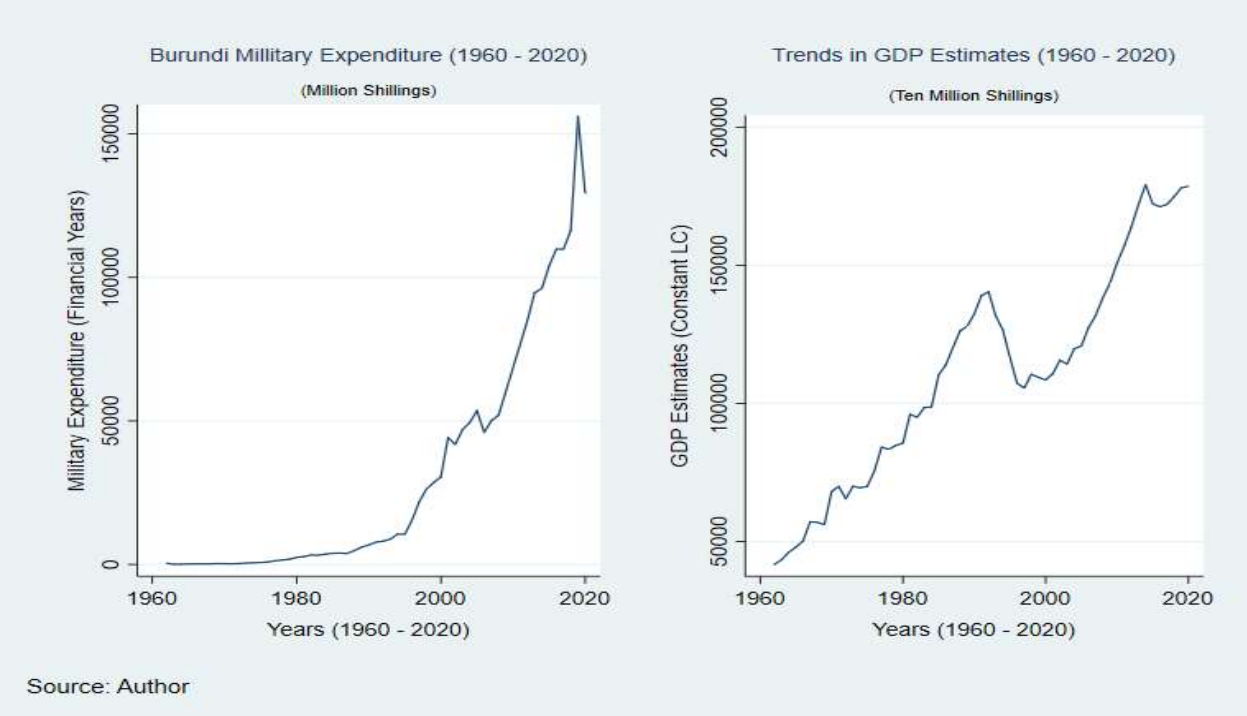

Figure 1.6: Burundi Military Expenditure trend versus GDP (1960 - 2020)

Figure 1.*6* demonstrates the trend in military expenditure for Burundi and the trend in GDP estimates. Data on military spending between 2009 - 2011 is missing from SIPRI even though an evident rising trend is visible from 1996. The country has also been experiencing economic growth over time. However, during the period 1990s to 2006, there was a sharp decline in economic growth. Page (2006) suggests that a civil war occasioned this decline following a failed coup d'état.

The assassination of the country's first democratically elected president in 1993 triggered the civil war and had catastrophic economic implications. The country went under an economic embargo from the neighboring countries and the international community (Nkurunziza & Ngaruko, 2004). The government concentrated on military expansion, destabilizing other economic agents. According to Mercier et al. (2020), the over-allocation of defense spending reduced the resources for the agricultural sector hence resulting in food insecurity in 1.77M households. During the 1990s and 2000, the poverty rate increased from 33% to 67%, and Burundi recorded the highest poverty levels.

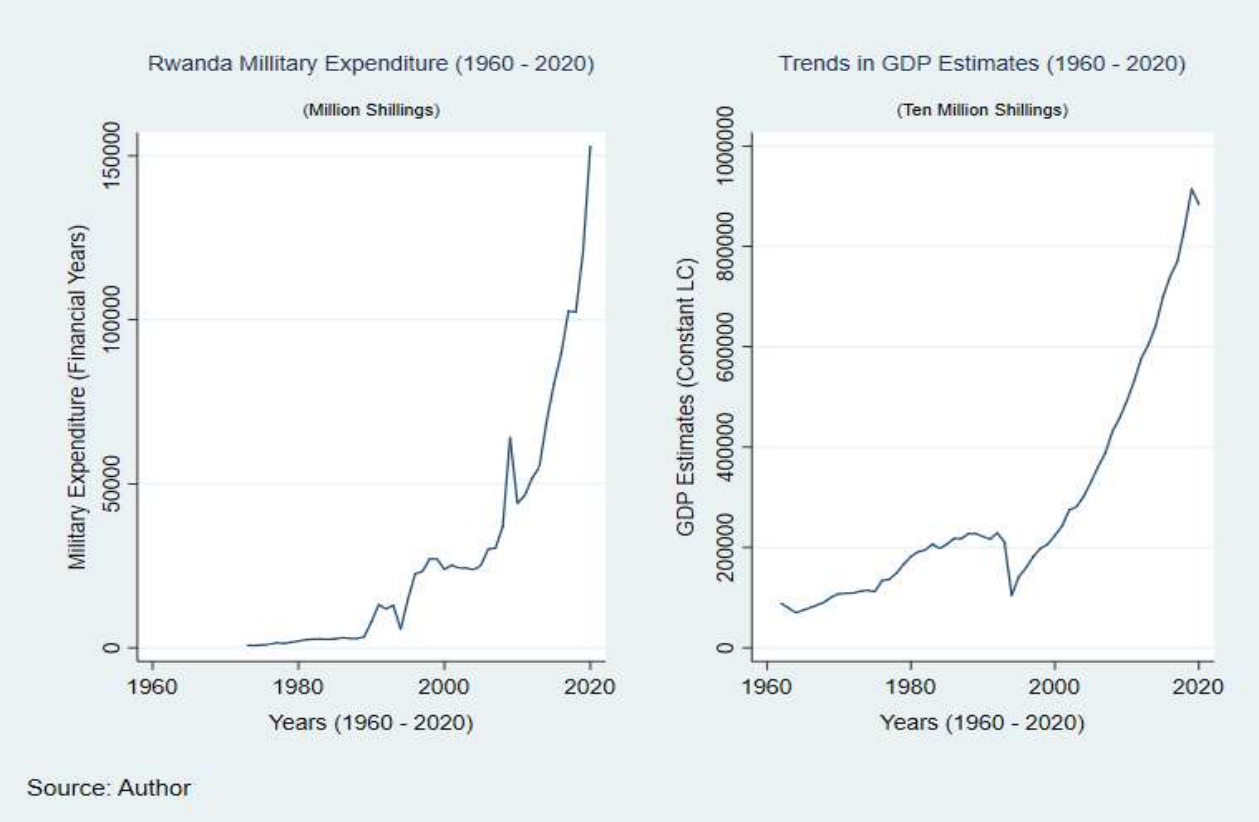

Figure 1.7: Rwanda Military Expenditure trend versus GDP (1960 - 2020)

As evident from Figure 1.7, the Rwanda genocide of 1990 had a negative impact on the country's economic growth (Chossudovsky & Galand, 2016). There is an increase in military expenditure during the same period.

Military spending took up the most significant proportion of all countries' income and foreign aid. The high expenditures significantly reduced expenditures for health, education, and infrastructure, thus resulting in the collapse of public service, instability of the social climate, and high unemployment rates. Military expenditure increased from 14% to 38 % within a span of three years, taking up 51% of the total state earnings, thus rendering administrative operations difficult (Ndikumana, 2001). The importation of military materials also increased, resulting in a negative payment balance.

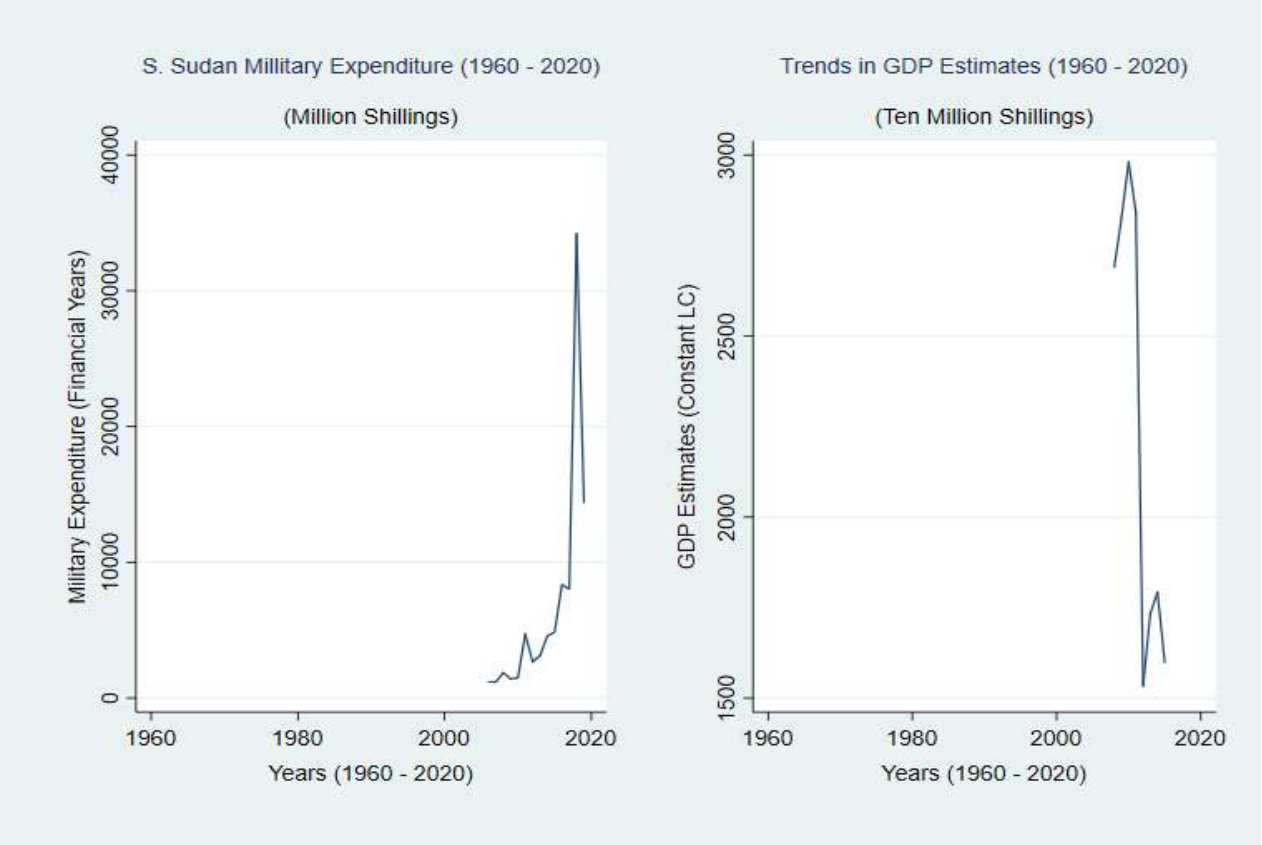

Figure 1.8: South Sudan Military Expenditure trend versus GDP (1960 - 2020)

Figure 1.*8* shows a sharp increase in military expenditure around 2013 - 2014, coupled with a drastic fall in economic growth around the same period. According to Verjee (2021), violence broke out in the country in late 2013 due to intensified political tensions. These saw scores of lives lost, mass destruction of property, and destruction of livelihoods.

The economic cost was the decline in the country's GDP due to destruction, disruption, and diversion of economic resources. The government had to switch spending to the defense and security of the nation at the expense of other sectors such as education, health, and infrastructure (Frontier Economics, 2015). In his study Nyadera (2018) indicates that depending on the intensity of such conflicts within a government in a region will have substantial costs to other member states within the same region linking to security needs.

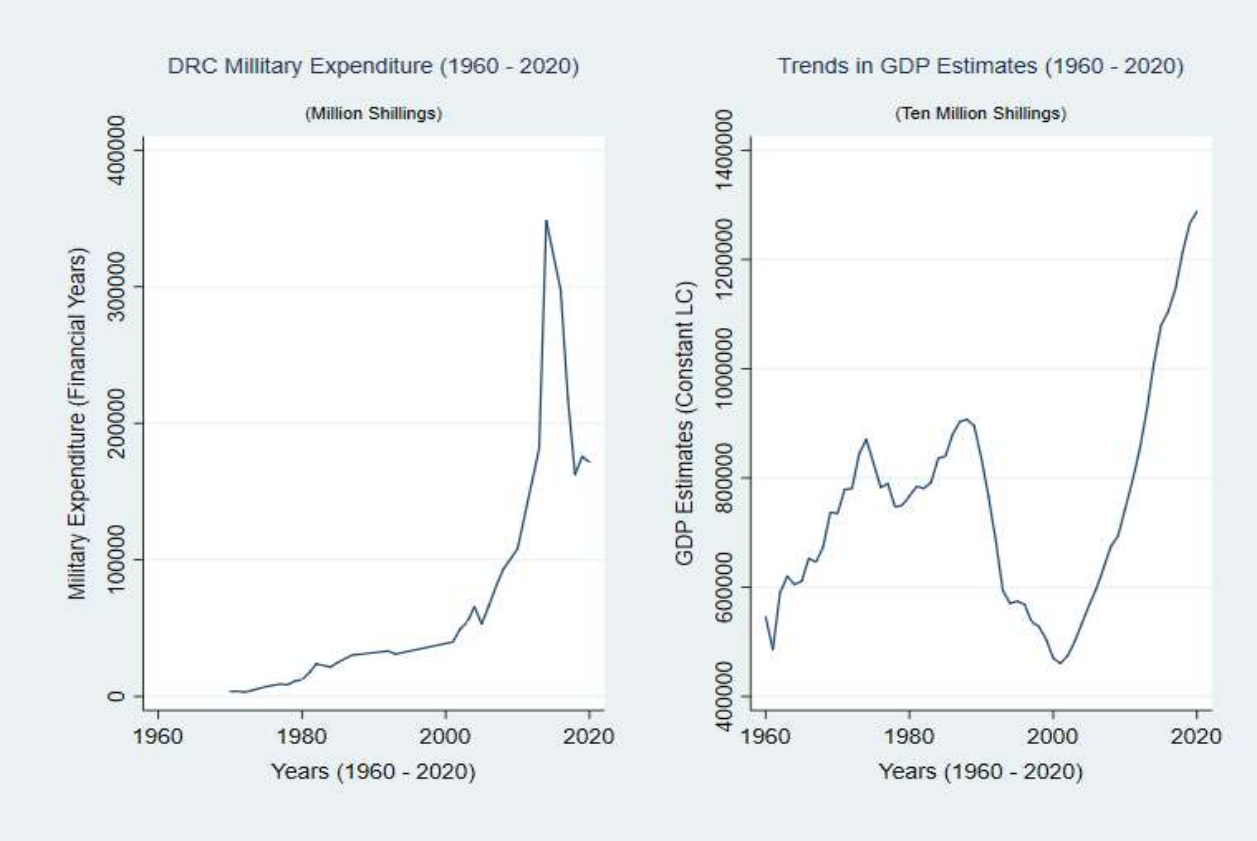

Figure 1.9: DRC Military Expenditure trend versus GDP (1960 - 2020)

In April 2020, the Democratic Republic of Congo (DRC) joined the EAC formally after making a request to join the community in 2019. Kinne (2018) argues that the depth of militarization of any conflict area is measured in terms of access to weapons and its corresponding acquisition of defense-related materials. The military budget for DRC has increased over time, largely attributed to the constant internal security issues (See Figure 1.9). Such an increase in military spending

would therefore suppose a diversion of the country's scarce resources towards factors that reinforce the conflict (Rufanges & Aspa, 2016). Even with the evidential need for security and regional stability, one would want to know how spending on defense relates to economic growth and whether there is a causal effect from one of the two-time series variables to the other. Of interest, too, would be to know how these two variables relate in the long run. The answers to these empirical questions are valuable for decision-makers and policy analysts in making decisions on spending scarce national resources and actual wealth creation. It is also primarily fundamental for further causal empirical analysis by academics and researchers. This study sought to establish the direction of causality between military expenditure and economic growth and to investigate the long-run relationship between the two variables.

1.3. Statement of the Problem

Peace is a fundamental determinant of any regional economic growth. It has a significant impact on economic development through the effective enhancement of factors of production such as capital and labor, good governance, and efficiency of respective institutions. One of the prerequisites to any regional economic and social development is fostering and maintaining a conducive environment for cooperation.

Literature on military spending in the EAC is vastly scant. Despite the vital role of EAC's defense systems in the horn of Africa, researchers have not been apprehensive about the need to understand the effects of the increasing defense spending on the region's economic performance. Whereas Omitoogun (2004) documents the veracity of military expenditure data given by the EAC countries and other selected African states to SIPRI, there is still low use of the data for research and policy advice owing to a lack of publicity by stakeholders.

This inadequacy is happening in a region where the importance of establishing the effects of defense spending on the region's economic performance is paramount. Defense spending competes for resources with key macroeconomic policy objectives outlined in the economic blueprints of the member states.

In addition, from a global perspective, the EAC falls within Sub-Saharan Africa (SSA), whose immediate economic priorities are growth and equitable redistribution of resources. The importance of understanding the connection between defense expenditures and economic growth in the EAC is compounded by the opaqueness in military expenditures. Unlike other sectors of the economy, such as infrastructure, where sub-sectorial budget breakdowns are readily available for public review, the particulars of the military expenditure are not in the public domain. A review of the general military expenditure visa vies the economic growth and the share of government spending can result in regional economic efficiency and budget transparency. Thus, this study formed a basis to contribute to further discussion on the relationship between military expenditure and economic growth and inform policy.

1.4. Research Questions

The study sought to provide answers to the following questions:

i. What is the causal relationship between military expenditure and economic growth in EAC?
ii. What is the long-run relationship between military expenditure and economic growth?

1.4. Objectives of the Study

The study's main objective was to determine the relationship between military expenditure and economic growth in the EAC region.

The specific objectives were**:**

i. To establish the direction of causality between military expenditure and economic growth in EAC.

ii. To establish the long-run relationship between the two variables between military expenditure and economic growth.

1.5. Significance of the Study

This study intended to contribute to the current debate on the relationship between defense spending and economic growth in East African countries by analyzing the causality between defense spending and economic growth and their potential long-run equilibrium. The study's significance is in its surveillance of military expenditure, which is a significant concern in many nations, particularly those attempting to preserve security in the face of threats. It will additionally scrutinize the disputed connection between military spending and economic growth, analyzing both favorable and negative impacts on economic growth. However, countries must develop economically and meet society's economic and social needs.

1.6. Scope of the Study

This study sought to complement existing literature by further examining whether financing defense impacts growth and their long-run relationship using data (1962 - 2020) from SIPRI on different measures of military expenditure for the East Africa Countries. GDP data (1962 – 2020) for the East Africa countries is available from the World Development Indicators (WDI) and the EAC Information Repository data sets.

1.7. Organization of the Study

The study is divided into five sections. The first section provides a framework of the study's background and goals, while the second section critiques related research. The third section explains the research design and methods used. The fourth section displays and analyzes the findings. Finally, the fifth section summarizes the conclusions and their impact on policy.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

This chapter reviews the theoretical and empirical literature on the relationship between a country's military expenditure and economic growth over time.

2.2. Theoretical Literature

This section discusses the competing theories that explain the connection between a country's military expenditure and economic growth over time.

2.2.1. The Augmented Solow Model

The theory was developed by Mankiw, Romer, and Weil in 1992 as a modified version of the Solow (1956) model (Hamilton & Monteagudo, 1998). The theory is an approach to measuring the effect of military expenditure on a nation's economic growth. This theory assumes that the share of military expenditure $m := M/Y$ influences factor productivity through a level effect on the efficiency variable, which controls for any labor and technological changes. The theory accounts for interactions between the nation and the factor productivity and examines the impact on the national growth rate. The aggregate production function featuring this labor and technological changes is as follows:

$$\boldsymbol{Y(t) = K(t^{\propto})[A(t)\, L(t)]^{1-\propto}} \qquad \textbf{(2.1)}$$

Where Y is the real income, K is the real capital stock, L is Labor, and A the technology variable.

This theory fits in the study as it helps in the estimation of the panel data by treating military expenditure and economic growth as varying variables across the EAC partner states and time.

In addition, the theory is clear on testable restrictions on the coefficients to be estimated and provides a distinction between respective variables and parameters.

2.2.2. The Barro Model

This theory was developed by Robert Barro as a revision of the Ricardo-effect model by David Ricardo in the 19th century. According to the Barro Model, demand would remain constant if the government intends to stimulate economic growth through increased debt spending (Barro, 1990). This is as a result of the increased savings by the general public to cater to anticipated future tax increases for debt payments. If further means that the government cannot stimulate consumer spending since its citizens believe that what is gained will be used to offset taxes later in the future.

The Barro model assumes that the government purchases a constant share of private output $g(t) = \tau y(t)$ and uses it to offer free public services to private producers. Further, the model considers all public disbursements that produce externalities generalized to the firms' system, such as the national defense (Yakovlev, 2007). Thus, public spending affects the constant returns to the scale production function in two productive factors, k(*t*) and g(*t*).

The Barro Model stipulates that government expenditure has a non-linear effect towards the growth triggered by the relation between productivity-enhancing and the tax-distorting effects of increased government expenditure (Barro, 1990). This theory fits the present study as it allows for forms of government expenditure, such as military expenditure, which affects the output through a production function.

Further, the model points out that government expenditure has a non-linear effect on growth resulting from the interaction between tax-distorting and productivity-enhancing effects of increasing the respective government expenditure. The production function at constant returns to scale in private capital *k(t)* only can be presented as follows:

$$\boldsymbol{y(t) = ak(t)^{1-\alpha} g(t)^{\alpha} = ak(t)^{1-\alpha}(\tau y(t))^{\alpha} = A(\tau)k(t)} \qquad \textbf{(2.2)}$$

Though the Barro model is complex for explicit estimation, it is useful in suggesting the appropriate variables for this study. Like the augmented Solow model, the Barro model is also suitable for analyzing the relationship between defense and growth.

2.2.3. The Feder-Ram Model

Feder's model was developed by Ram Rat in 1986 as a two-sector growth model. The theory was to examine the relationship between economic growth and government spending (Ram, 1986). The theory assumes a distinction between the effects of military spending and non-military government spending on economic growth. Ram (1989) further notes that non-military public spending could result in positive externalities to the other sectors since non-military spending provides public inputs that improve economic infrastructure, unlike the military sector.

The Feder's model provides a justification for the inclusion of military expenditure as an explanatory variable in the growth equation. This model provides a distinction between the military output (M) and the civilian output (C). However, labor (L) and capital (K), and military production all have external impacts on civilian production, as shown below:

$$\boldsymbol{(M = M(L_m, K_m),\ C = C(L_m, K_m, M) = M^{\circ}c(L_c, K_c)} \qquad \textbf{(2.3)}$$

The domestic income is represented by:

$$\boldsymbol{Y = C + M} \qquad \textbf{(2.4)}$$

Equation 2.3 above is only admissible if C and M represent the monetary output levels other than the output qualities. With price normalization, the equation can be re-written as follows:

$$(\boldsymbol{Y = P_c Cr(L_c, K_c M) + P_m Mr(L_m, K_m)}) \qquad \textbf{(2.5)}$$

where P_m and P_c denote the (constant unitary) money prices associated with the actual output quantities M_r and C_r. The model allows the values of the marginal products of both labor (M_L, C_L) and capital ($M_{.K.}$, $C_{.K.}$) to differ across sectors by a constant uniform proportion (Cuaresma & Reitschuler, 2004).

Although the Feder-Ram model has the limitations of being static in nature and having multi-collinearity issues, some developments have been formulated to ensure a provision for the non-linear impact of military expenditure.

2.2. Empirical Literature

Benoit (1978) studied the relationship between military expenditure and economic growth has been a debatable issue since the 1970s. In the study, Benoit argues that the less developed countries positively correlated their military spending and the nation's economic growth. A subsequent similar study by Selvarathinam (2014) argued that economic and social reforms were more critical toward economic growth than increased military expenditure. The main concern for this study has been on understanding the consequences of an increase or reduction in military spending at the expense of other economic sectors. Different studies have arrived at opposing conclusions citing the peculiarities of each country's economic strength and nature of active threats to peace. The opposing arguments on the relationship between military spending and economic growth are addressed in different perspectives by the various economic schools.

The Keynesian school argues that military expenditure forms an essential component of government spending as it injects into the economy. According to this school of thought, military expenditure promotes economic growth by creating employment and investment opportunities through enhanced technological advancement. Musayev (2016) further supports this school by arguing that externalities, such as developing road infrastructure for military operations, can result from defense spending, leading to economic growth.

Contrary to the hypothesis that military expenditure positively correlates with economic growth, Deger & Smith (1983) highlights the classical school of thought, which argues that an increase in military expenditure is probable to impede economic growth. While examining the interaction between military spending, growth, and savings from cross-sectional data for fifty Least developed countries (LDCs), Deger argues that military expenditure has a small influence on growth through modernization and a more negative influence through savings. He found out that the adverse effects of defense spending outweighed the positive impact. The findings further argue that a greater military expenditure could indicate lower private investments and savings levels due to low aggregate demand. The increase in defense spending could essentially cause an increase in the prevailing interest rates, subsequently inundating private investments.

On aggregate demand, the Keynesian School of thought argued that an increase in defense spending triggers demand and increases purchasing power, thus creating positive externalities to the economy. Similarly, Dunne & Tian (2016) argued in line with Keynesian thought, suggesting that a rise in military spending in an open economy resultantly increases income and investments, thus stimulating economic growth.

Using the multivariate regression model, Azam (2020) tried to evaluate the effects of military expenditure on the economic growth of thirty-five non-OECD countries. The study found that military spending had a negative effect on economic growth. Further, the causality tests revealed a bi-directional causality between military spending and economic growth. The study had policy recommendations that there was a need to redesign the military expenditure budget to stimulate economic growth while improving social welfare.

Similar research has demonstrated a contrasting argument on the chain of causation and the ultimate long-run equilibrium. Gokmenoglu et al., (2015), while examining the long-run relationship and the causality between military expenditure and economic growth in Turkey's case, found a uni-directional relationship between the two variables. The military spending did not contribute to the economic growth of Turkey. The study recommended that governments direct scarce resources towards more productive investments such as infrastructure and education.

Dunne and Mohammed (1995) use a relatively homogeneous Sub Sahara African countries sample. When a time series analysis is employed, the study establishes a negative relationship between defense spending and economic growth. However, using a cross-sectional analysis of the same countries, these results are not immediately established, adding to the inconsistency of this evidence. Mylonidis (2008) controls country-level institutional variations in a panel study for economic growth. The study concludes that military spending has an overall negative effect on economic growth on average. The intensity of the product seemed to increase with time across the panel of European countries, pointing to the fact that increasing defense spending derails economic growth.

In contrast, Wang et al. (2012) established that defense spending has a more prominent loading factor in the productivity Malmquist Index and thus significantly bolsters economic growth in OECD countries. Using the autoregressive distributed lag (ARDL), an estimation technique Odusola (2021) found that there was a positive relationship between military expenditure and economic growth in Nigeria (1981-2017) in the long run and inverse in the short run. This indicates that defense spending did not have immediate positive economic gains. The negative relationship in the short run could be that Nigeria is a developing country with limited resources for defense spending constrained by the low-income levels and growth rate. Therefore, only in economic growth would the government increase the military expenditure; otherwise, an additional defense allocation would result in unfavorable economic impacts, such as the crowding-out effect of other productive sectors.

A similar study of military expenditure and economic growth has been done by Saba & Ngepah (2019) with evidence from select African countries. While considering a balanced panel of thirty-five African countries, the findings show that, generally, military expenditure negatively affected the economic growth in Africa. The defense sector plays a vital role in African economic growth. Thus, per this study's policy recommendations, countries should not use military expenditure to attain growth but rather channel these resources to more productive sectors such as healthcare and education. The military expenditure should not be completely ruled out but, most importantly, maintained at an optimal level that ensures a relative level of security to support economic activities.

Khalid (2014) suggests that a considerable number of developing countries spend a disproportionate percentage of their budgets on military expenditure at the expense of other sectors of the economy, such as infrastructure.

The definitive objectives of any developing country are to realize sustainable economic growth and strive to add more economical and social value concurrently in the long run while optimizing the allocation of available resources. Security and economic growth form the vital pressing concerns of developing countries. Understanding the relationship between a nation's expenditure on the Military and its economic growth is vital for three main reasons. First, military expenditure budgeting, especially individual budget activities, is often not a public process. Thus, public budget transparency requirements are largely not met, and therefore difficult to assess the excesses and balance of allocation. Secondly, disproportionate budgeting may challenge other vital sectors that help accelerate economic transactions. Hence, the lack of understanding of optimal sector allocations may lead to some sectors being crowded with less than necessary allocation. Lastly, military expenditure versus economic growth literature is inconclusive and specific to country-level data. Therefore, available evidence may provide direction at a policy level but significantly lack country-level analysis and data specifics.

Dunne & Tian (2016) groups the influence of military expenditure into three macroeconomic channels: demand, supply, and security effects. The mechanisms operate according to the Keynesian multiplier, in which a boost in military spending would lead to a surge in demand for products and services, which, in turn, would result in an increased use of resource factors. In this way, defense spending positively impacts economic growth. However, this result is not straightforward due to national account dynamics. Considering a budget deficit in most developed and developing countries, increasing defense spending further dampens the exchange rate, thus considerably crowding out private investments in addition to a larger debt burden. In this scenario, defense spending negatively affects economic growth.

The supply effects tend to push optimal levels of factors of production from the frontier in the case of increased defense spending, thus negatively affecting economic growth. The factors of production, such as natural resources, labor, and human capital, can be crowded out by heightened defense spending. The security effects channel generally implies that with relative peace, the economy is able to operate in a more conducive environment, thus experiencing growth. Therefore, an increase in defence expenditure positively impacts economic growth in this channel. Regional economic blocks are often premised on common goals while leveraging comparative advantages in trade. They are also guided by their ability and intention to derive homogeneity in budget allocation. For this reason, empirical comparisons of economic behavior and investment priorities across member countries help shape the integration. Since the signing of the Treaty that led to the establishment of EAC in 1999, the predominant objective of EAC was to put in place policies that enhance the cooperation of the member states in economic, social, cultural, and defense fields, among others, for a mutual benefit (East Africa Community, 2017).

According to Article 125 of the EAC establishment Treaty, the respective member countries were to cooperate in defense affairs for the region (EAC, 1999). Establishing development and governance strategies is critical for the socio-economic transformation of the region. Subsequently, having a peaceful and democratic region that is secure advances the sustainability of the social-economic development of the respective member states. With a peaceful and stable region, more foreign and local investments would promote continued economic growth.

According to the African Economic Outlook (2021), EAC has aligned toward enhancing peace and security to create a business-friendly environment and supports the growing middle class that demands fairly Revitalised products. In 1917, the EAC responded to the need to intensify regional stability by enhancing planning, training, and joint operations among its member states.

In 1977, the joint task force achieved a major goal in signing the mediation agreement after the dissolution of the former EAC, and by 1999 the EAC was fully revived through the ratification of the establishment Treaty. Another achievement of the EAC was the ratification of the MoU on the cooperation of member states in defense affairs in 2001 (EAC, 1999).

Cooperation in defense and security has been the cornerstone of the EAC regional integration, emphasizing fostering peaceful relations among the member states. According to Bainomugisha and Rwengabo (2016), adopting the MoU on defense pact has seen the EAC member states undertake several security cooperation activities, exchange programs, joint training, and shared infrastructure. These collaborative initiatives have resulted in greater counterterrorism cooperation, piracy management, and control of small arms and weapons proliferation through border controls.

A vast majority of papers on this subject assume a priori that defense spending impacts economic growth. However, the endogeneity of defense spending in the size of the economy has continued to raise concerns among researchers (Gokmenoglu et al., 2015).

In other studies, it has been established that either defense spending has a sufficiently weak impact on economic growth or has no correlation.

2.1. Overview of Literature

The reviewed theories suggest a number of approaches that can evaluate the effects of an increase or decrease in defense spending on economic growth and understand the long-run effects of the two variables. However, the augmented Solow model addresses this study's objectives and overcomes the shortcomings of the Feder-Ram model. The Augmented Solow model is advantageous in the study. It is dynamic as it incorporates the lag of military expenditure and thus can help test the lagged relationship between military expenditure and economic growth.

Therefore, this study intends to employ the augmented Solow models to test the military expenditure - economic growth nexus in the EAC for 1960 through 2020.

The review of empirical literature reveals that much empirical work focused either on the empirical relationship between military expenditure and economic growth or the causal relationship between two variables. This study adopts this strand of literature but improves it by first incorporating an economic block, which is not fully explored in previous works. Second, when the study period is short, it may result in inconclusive results. This study takes into consideration of a long-time frame of over 50 years.

CHAPTER THREE

METHODOLOGY

3.1. Introduction

The chapter focuses on the approach used in conducting the study, including the methodology, research design, theoretical foundations, and model specifications. The chapter also defines and measures the variables involved, outlines the sources and types of data used, and describes the techniques used for data analysis. Additionally, the chapter explains the diagnostic tests that will be carried out to assess the validity of the results.

3.2. Research Design

The study will analyze defense spending and its effect on economic growth and its long-run relationship. The study will adopt a macro panel research design in which panel data on military expenditure and the GDP of EAC countries will be used. The study will cover the period 1960-2020.

3.3. Theoretical Framework

This study is anchored on the Augmented Solow Model as it guides in measuring the effect of military expenditure on a nation's economic growth. This theory assumes that the share of military expenditure $m := M/Y$ influences factor productivity through a level effect on the efficiency variable, which controls for any labor and technological changes. The Augmented Solow Model excludes the non-military public expenditures as well as the externality effect terms of Military and non-military public expenditures.

This exclusion reduces the possibility of multi-collinearity that would otherwise make it impossible to test the externality effects of public expenditures and the impact of non-military government spending on economic growth. Further, the Augmented Solow Model allows for the inclusion of both current and lagged military expenditure in the model. It makes the model dynamic, allowing it to test for delayed effects as military expenditure trends. A standard form of the Augmented Solow Model equation is as follows:

$$\boldsymbol{Y(t) = K(t^{\propto})[A(t)\, L(t)]^{1-\propto}} \qquad \textbf{(3.1)}$$

Where $\propto$, $1-\propto$ represents shares of capital and labor in the production process, respectively, and *t* represents time. The output is represented by Y, and A.L. denotes the productivity-Augmented labor.

3.4. Empirical Framework

The study's objective is to determine the relationship between military expenditure and economic growth, explicitly exploring whether changes in military expenditure cause changes in economic growth or vice versa. The study employed the widely used Granger causality test for this objective owing to Granger (1969). Considering two-time series variables, X Granger causes Y; if Y is better predicted by both X and Y values, then it can be explained using the past values of Y alone. There are several approaches to obtaining the test statistic, although statistical packages have made it sufficiently straightforward. The study followed the (Toda & Yamamoto, 1995) vector autoregressive (VAR) procedure due to its comprehensive pre-test treatment of panel data. Furthermore, the Granger causality test is primarily data-driven and therefore does not require any theory a priori.

Building upon Equation 3.1, which represents the relationship between output (Y) and capital (K), labor (L), and total factor productivity (A), Equation 3.2 introduces an econometric model that examines the relationship between Milex and various explanatory variables, including lagged values of military expenditure (lnMilex) and GDP (lnGDP). By incorporating Equation 3.2, we aim to analyze the determinants of military expenditure and their impact on economic growth. To test the causality running from Milex to GDP:

$$\boldsymbol{lnMilex_{i,t} = \tau_{i,t} + \sum_{j=1}^{p} \beta_i^{(j)} \, lnMilex_{i,t-i} + \sum_{j=1}^{p} \lambda_i^{(j)} \, lnGDP_{i,t-i} + \mu_{1i,t}}$$

(3.2)

To test the causality running from economic growth (GDP) to military expenditure (Milex):

$$\boldsymbol{lnGDP_{i,t} = \varphi_{i,t} + \sum_{j=1}^{p} \beta_i^{(j)} \, lnGDP_{i,t-i} + \sum_{j=1}^{p} \lambda_i^{(j)} \, lnMilex_{i,t-i} + \mu_{2i,t}}$$

(3.3)

Where β and λ are the slope coefficients, *i* represents the respective EAC partner states under study ($i = 1, \dots, N$); *t* represents the time period ($t = 1, \dots, T$); p is the lag length, τ, and φ are the intercepts the error terms are represented by μ (1i, t) and μ (2i, t).

To estimate the long-run relationship between military expenditure and economic growth in the EAC, the study utilized the following model.

$$\boldsymbol{GDP_{i,t} = \beta_0 + \beta_1 GDP_{i,t-1} + Milex_{i,t} + \varepsilon_{i,t}}$$

(3.4)

Where $\boldsymbol{\beta_0} \dots \boldsymbol{\beta_3}$ are coefficient parameters and $\boldsymbol{\varepsilon_{i,t}}$ is the error term. ($i = 1, \dots, N$); ($t = 1, \dots, T$).

3.5. Definition and Measurement of Variables

Principally, two variables were used in this analysis for the EAC countries. The study utilized the metric of GDP growth as a measure of economic growth, while the percentage of GDP spent on the military was used to gauge military expenditure. To ensure the robustness of the studies, the study included possible maximum number of observations for each country.

Table 3.1: Definition and Measurement of Variables

Variables	Indicator / Description	Measurement
GDP	It refers to the monetary value of all final goods and services produced in a given country in a given period of time, usually one year.	*Data is in GDP (constant LCU)*
Military Expenditure	It refers to government expenditures on the Military.	Military Expenditures in constant Financial Years, 1960 - 2020
The two variables have been dollarized for uniformity in analysis using the Official exchange rate (LCU per US$, period average). The exchange rate is calculated as an annual average based on monthly averages (local currency units relative to the U.S. dollar) (TWB, 2022).		

3.6. Diagnostic Test

Panel data analysis is essential in determining the economic impact of defense spending in EAC and their long-term relationship. A test for the stationarity of the data series was performed to ensure that the series has a constant mean and variance. Unit root tests were conducted to test for stationarity.

3.6.1. The Panel Unit Root Tests

There are several approaches to conduct unit root tests for panel data. This study was guided by (Baltagi, 2021) to identify the most relevant approaches.

To test the order of integration among the variables in this study, the Levin-lin-Chu (LLC) (2002) and the Im, Pasaran, and Shin (IPS) (2003) were employed, and then the results were presented in a table. The LLC null hypothesis is that for each of the individual variables in the panel data, a unit root exists against the alternative and, thus, stationarity (Levin et al., 2002).

3.6.2. Testing for Panel Cointegration.

Macroeconomic variables are vastly dynamic, and their paths over time, stochastic. Even more importantly, these variables elicit intrinsic relationships. Cointegration, unlike correlation, provides the determination of the long-run equilibrium relationship between two-time series variables. These relationships are instrumental for policy as analysts get to understand the responses of a set of cointegrating variables in a given time series. This study, therefore, tested for cointegration between defense spending and GDP in the case of EAC.

The study used the Engle and Granger (1987) two-step approach, primarily a residual-based test for this exercise. In this test, the panel data variables of interest were integrated in order 1 to be stationary at first difference. These variables were cointegrated if their linear combination is fundamentally I(0). The linear combination can be represented mathematically as;

$$\boldsymbol{\beta}[\boldsymbol{y_t}, \boldsymbol{x_t}]' = \boldsymbol{\epsilon_t} \qquad \textbf{(3.5)}$$

Where β is the vector of cointegration and ϵ_t is the stationary equilibrium error. One of the advantages of the Engle and Granger (1987) test is that it assumes a single cointegrating vector irrespective of the number of variables being modeled.

Relative to this current study, this test typically employs the OLS estimator, for which a theory specifying the empirical relationship between the two variables is fundamental. A normalizing assumption such as $\beta = (1 - \beta)$ is made to identify the cointegrating vector using OLS uniquely.

At this point, we cannot fully submit to a functional specification of whether defense spending impacts economic growth or vice versa. Nonetheless, for cointegrating variables, the normalization choice is typically asymptotically irrelevant (Granger, 1969).

This study used two residual cointegration tests, Pedroni (2004) and Kao (1999), to analyze the long-run relationship between the variables.

3.7. Data Type and Source

This project used annual data between 1960 and 2020 on military expenditure in East African Community (EAC) countries from the Stockholm International Peace Research Institute (SIPRI). The data was measured in financial years and expressed in constant 2010 prices. The project also utilized Gross Domestic Product (GDP) data from World Development Indicators data sets, which were also expressed in constant 2010 prices. The decision to use these data sources and measures was based on the availability and reliability of the data.

3.8. Data Analysis

This research aimed to investigate the relationship between military expenditure and economic growth in the EAC. It collected annual panel data from 1960 to 2020 and conducted diagnostic tests. To determine if there is a causal relationship, the study estimated the model using equations 3.2 and 3.3. The analysis results will reveal whether the association between the two variables is bi-directional or uni-directional. Secondly, to investigate the long-term relationship between military expenditure and economic growth, equation 3.4 was used to estimate the long-run effects with a cross-sectionally augmented distributed lag (CS-DL) approach.

CHAPTER FOUR

EMPIRICAL FINDINGS

4.1. Introduction

This chapter outlines the results of the analysis of the relationship between military expenditure and economic growth in the East African region. It provides a comprehensive description of the descriptive statistics and the findings of our estimation of the relevant variables.

4.2. Descriptive Statistics (D.S.) all of East Africa Countries

A statistical outlook of the two variables over time is captured in the summary statistics table 4.2.

Table 4.2: Summary Statistics

Variable	Country Code	Obs.	Mean	Std. Dev.	Min	Max
Year		61	1990.500	18.042	1960	2020
Kenya GDP	1	61	1.18e+11	6.21e+10	5.00e+10	2.86e+11
Kenya Milex	1	59	3.43e+08	3.45e+08	3247999	1.15e+09
Uganda GDP	2	40	9.17e+11	3.11e+12	1.94e+10	1.64e+13
Uganda Milex	2	60	2.20e+08	2.35e+08	1399972	1.12e+09
Tanzania GDP	3	34	6.58e+10	4.41e+10	4.29e+10	2.48e+11
Tanzania Milex	3	56	2.48e+08	2.01e+08	1.20e+07	7.83e+08
Burundi GDP	4	61	5.30e+09	3.59e+09	9.20e+08	1.07e+10
Burundi Milex	4	56	3.54e+07	2.25e+07	1012000	8.46e+07
Rwanda GDP	5	61	1.28e+10	6.46e+09	5.20e+09	2.98e+10
Rwanda Milex	5	49	6.41e+07	4.08e+07	7843838	1.72e+08
S. Sudan GDP	6	5	6.22e+09	1.95e+09	4.44e+09	9.51e+09
S. Sudan Milex	6	11	6.56e+08	6.35e+08	7.06e+07	1.58e+09
Congo (COD) GDP	7	61	3.25e+24	7.19e+24	6.84e+09	3.21e+25
Congo (COD) Milex	7	27	2.27e+08	1.32e+08	2.66e+07	4.91e+08

Expenditure values measured in dollars.

Source: Author's calculations (2022)

Table 4.2 provides summary statistics for various variables for different countries. The sample for this study covers a period of 61 years, from 1960 to 2020, based on the availability of military expenditure data from SIPRI. The data was chosen for its reliable rating and its perceived value for empirical research.

The choice of the sample was made possible due to the presence of reliable military expenditure data from SIPRI. Kenya has an average GDP of 1.18e+11, while the average military expenditure (Milex) is 3.43e+08. Uganda has the highest GDP among the countries in the sample. On the other hand, South Sudan has the lowest GDP. The Democratic Republic of the Congo has the highest GDP but has a significant standard deviation of 7.19e+24.

Regarding military expenditure, the Democratic Republic of the Congo has the lowest average. It's crucial to note that not all countries in the sample have the same number of observations for all variables. For instance, Kenya has 61 observations for GDP and Milex, but Uganda has only 40 observations for GDP, implying that data might not be available for some years.

4.3. Testing for Unit Root

Table 4.3: Levin-Lin-Chu (LLC) unit-root test for GDP & Milex

	At Level		First, differences	
	Adjusted t*	p-value	Adjusted t*	p-value
Kenya GDP	-0.7981	0.2124	-2.4336	0.0075
Kenya Milex	1.4506	0.9266		
Uganda GDP	-97.0696	0.0000	-99.2843	0.0000
Uganda Milex	2.7342	0.9969		
Tanzania GDP	0.8054	0.7897	-1.1535	0.1244
Tanzania Milex	1.2615	0.8964		
Burundi GDP	0.2983	0.6173	-4.0584	0.0000
Burundi Milex	0.2038	0.5807		
Rwanda GDP	0.3124	0.6226	-1.9866	0.0235
Rwanda Milex	0.7677	0.7787		
S. Sudan GDP	3.8e+14	1.0000		
S. Sudan Milex	-4.6420	0.0000		
Congo (COD) GDP	-3.3238	0.0004	-5.4286	0.0000
Congo (COD) Milex	2.5714	0.9949		

Source: Author's calculations (2022)

Table 4.4:Im-Pesaran-Shin (IPS) unit-root test for GDP & Milex

	At Level		First, differences	
	Z-t-tilde-bar*	p-value	Z-t-tilde-bar*	p-value
Kenya GDP	-0.2816	0.3891		
Kenya Milex	1.3355	0.9091		
Uganda GDP	-4.5192	0.0000		
Uganda Milex	-1.3681	0.0856		
Tanzania GDP	-3.2669	0.0005		
Tanzania Milex	-0.2824	0.3888		
Burundi GDP	-0.0341	0.4864		
Burundi Milex	-1.7556	0.0396		
Rwanda GDP	0.1548	0.5615		
Rwanda Milex	-0.5897	0.2777		
S. Sudan GDP	-0.5619	*		
S. Sudan Milex	-0.6972	0.2429		
Congo (COD) GDP	-2.8158	0.0024		
Congo (COD) Milex	0.9880	0.8384		

**Normality of the Z-t-tilde-bar requires at least seven observations per panel with balanced data and a time trend.*

Source: Author's calculations (2022)

This part of the study aimed to perform two crucial assessments. The first was to determine the long-term connection between military expenditure and economic growth, and the second was to determine the direction of causality between the two variables. This analysis is crucial for East Africa's future approach to military expenditure in light of increasing security threats and the need to maintain regional peace and stability.

This section aimed to perform unit root tests for seven EAC countries' GDP and military expenditure (Milex) data. The unit root tests were used to determine if the time series data was stationary or non-stationary. The results were evaluated by comparing the computed t-statistics with the asymptotic critical values. If the computed t-statistics were more significant than the critical values in absolute terms, the null hypothesis that the series contained a unit root was rejected and the series was concluded to be stationary. The study conducted unit root tests on the

GDP and military expenditure (Milex) time series using the Levin-Lin-Chu (LLC) test and Im-Pesaran-Shin (IPS) test.

The goal was to determine if the time series were non-stationary or stationary. The null hypothesis was that the series contained a unit root, while the alternative hypothesis was that the series was stationary. If the computed t-statistics were larger than the asymptotic critical values, it was concluded that the series was stationary. The LLC test results showed that the GDP time series for Uganda, Burundi, and Congo (COD) were stationary, while the military expenditure time series were non-stationary. The IPS test results showed that the GDP time series for Uganda, Tanzania, Burundi, and Congo (COD) were stationary, while the military expenditure time series were non-stationary. This indicates that the relationship between military expenditure and economic growth should be examined using stationary time series.

4.4. Testing for Cointegration

Table 4.5: Kao Test for Cointegration

	Statistic	p-value
Modified Dickey-Fuller t	.	.
Dickey-Fuller t	.	.
Augmented Dickey-Fuller t	.	.
Unadjusted modified Dickey-Fuller t	-23.9811	0.0000
Unadjusted Dickey-Fuller t	-76.0898	0.0000

Source: Author's calculations (2022)

As mentioned earlier, the project used the Engle and Granger (1987) approach for cointegration because it imposes fewer assumptions on the data's distribution, making it more straightforward for a knowledgeable audience to understand. Unlike the Johansen test, Engel-Granger does not allow identifying the number of cointegrating vectors.

Table 4.5 presents the results of the Kao test for cointegration between the GDP and military expenditure (Milex) time series in the countries studied. The study tested the null hypothesis that there was no cointegration between GDP and military expenditure in the countries studied. The test results showed that the null hypothesis was rejected for all the statistics, with p-values equal to 0.0000. This indicates that there is a cointegration relationship between GDP and military expenditure in the countries studied.

The five test statistics reported in the table provide strong evidence that all panels in the data are cointegrated. The cointegration test is required to examine whether the residuals of our fitted regression are stationary based on the Engle and Granger (1987) residual-based approach.

4.5. Granger Causality Tests

The study examined the relationship and causality between defense spending and Gross Domestic Product (GDP). The evidence suggests that defense spending and GDP are cointegrated and have a long-run equilibrium relationship. The study's primary objectives were to determine the existence of a long-run equilibrium relationship and to establish the direction of causality between the two variables. This information will serve as a foundation for further macroeconomic analysis.

Table 4.6: Granger Causality: Panel A - Vector Autoregression Test Results

		Model 1	Model 2
Country	**Dependent Variables**	**Ln Milex**	
Kenya	L.ln Milex	0.0428203 (0.30)	
	L.ln GDP	-.5233389 (-4.72)	
	Observations	56	
Uganda	L.ln Milex	0.2419237 (1.54)	
	L.ln GDP	0.1035316 (11.23)	

	Observations	57
	L.ln Milex	-0.0764925 (-0.65)
Tanzania	L.ln GDP	0.2976162 (2.15)
	Observations	53
	L.ln Milex	0.223543 (1.43)
Burundi	L.ln GDP	0.01176 (0.09)
	Observations	59
	L.ln Milex	021376 (0.13)
Rwanda	L.ln GDP	-0.3328441 (-2.71)
	Observations	59
	L.ln Milex	-0.1789267 (-0.55)
South Sudan	L.ln GDP	-0.8764683 (-1.5e+14)
	Observations	8
	L.ln Milex	-0.1119769 (-0.34)
Congo (COD)	L.ln GDP	0.0911658 (0.83)
	Observations	59

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 4.7: Granger Causality Panel B: Granger causality Wald Test Results

Country	Equation	Excluded	chi2	Prob > chi2
Kenya	Ln Milex	Ln GDP	1.2158	0.270
		ALL	1.2158	0.270
	Ln GDP	Ln Milex	0.47731	0.490
		ALL	0.47731	0.490
Uganda	Ln Milex	Ln GDP		
		ALL	67.907	0.000
	Ln GDP	Ln Milex		
		ALL	67.907	0.000
Tanzania	Ln Milex	Ln GDP		
		ALL	205.82	0.000
	Ln GDP	Ln Milex		
		ALL	205.82	0.000
Burundi	Ln Milex	Ln GDP		
		ALL	694.3	0.000

	Ln GDP	Ln Milex		
		ALL	694.3	0.000
	Ln Milex	Ln GDP		
Rwanda		ALL	588.6	0.000
	Ln GDP	Ln Milex		
		ALL	588.6	0.000
	Ln Milex	Ln GDP		
South Sudan		ALL		
	Ln GDP	Ln Milex		
		ALL		
	Ln Milex	Ln GDP		
Congo (COD)		ALL	596.49	0.000
	Ln GDP	Ln Milex		
		ALL	596.49	0.000

The optimal lag length supported by AIC was 1.

Table 4.6 and 4.7 above present the outcome of a Granger causality test which evaluates the directional relationship between two-time series variables. The test results are presented in Panel A and Panel B.

Panel A shows the results of a Vector Autoregression (VAR) analysis that models the relationship between the two variables. The coefficients of the lagged values of both Ln Milex and Ln GDP are estimated for each country. Asterisks indicate the significance of the coefficients, with a significance level of $p<0.1$, $p<0.05$, or $p<0.01$. If the coefficient of Ln Milex is positive, it indicates a positive relationship between Ln Milex and Ln GDP.

Panel B displays the results of a Granger Causality Test, which determines the direction of causality between the two variables. The test consists of two parts, one for each direction of causality. The chi-square value and the associated p-value are provided for each country. In instances where the p-value is less than 0.05, it indicates evidence of causality in the indicated

direction. For example, if the p-value for Ln Milex affecting Ln GDP is less than 0.05, it means that Ln Milex affects that country's Ln GDP.

The findings in Kenya indicate a -0.5233389 (p0.05) negative correlation between military spending and GDP. This is supported by the Granger causality Wald test, which has a p-value of 0.270. In Uganda, a significant t-statistic of 1.54 and a positive coefficient of 0.2419237 (p0.05) indicate a relationship between military spending and GDP. In Tanzania, military spending and GDP have a positive correlation, with a coefficient of 0.2976162 (p0.1) and a significant t-statistic of 2.15. In Burundi, a t-statistic of -2.71 and a coefficient of -0.3328441 (p0.1) indicate a negative but not statistically significant correlation between military spending and GDP.

In Rwanda, a t-statistic of -2.71 and a coefficient of -0.3328441 (p0.1) indicate a negative but not statistically significant correlation between military spending and GDP. In South Sudan, the association between spending on defense and GDP shows a coefficient of -0.8764683 (p=0.1) and a test statistic of -1.5e+14, meaning cannot be considered statistically significant.

With a coefficient of 0.0911658 (p>0.1) and a t-statistic of 0.83 in Congo (COD), the connection between military spending and GDP is positive but not statistically significant.

Based on the results, the study supports a causal relationship between military expenditure and GDP in Uganda, Tanzania, and Burundi. In contrast, the relationship is not statistically significant in Kenya, Rwanda, South Sudan, and Congo (COD).

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1. Introduction

The chapter summarizes the key outcomes of the research project, presents its conclusions and suggestions, and sheds light on the policy implications that stem from the study's results. It further identifies avenues for continued exploration and investigation.

5.2. Summary

The purpose of the study was to address two crucial objectives that are of interest to future research. The inspiration for the research was driven by the unequal allocation of the defense budget in the East African Community, which faced numerous economic challenges. The existing literature lacked a clear understanding of the relationship between defense spending and GDP, which led to the need for a country-specific examination to clarify this relationship and encourage further study.

5.3. Conclusions

Founded on the empirical findings and the analysis above, it can be concluded that the EAC is a diverse region with varying levels of economic development. The results from the statistical analysis indicate that the countries included in the study exhibit variations in their GDP and military expenditure. These disparities are revealed through each variable's mean, standard deviation, and range. This finding suggests that there is no uniform trend in the economic growth and military spending among the countries studied, highlighting the need for further analysis to understand the nuances of these relationships.

According to the Granger causality test findings, there is a one-way causal relationship between GDP and military spending in Tanzania, Burundi, Rwanda, and Congo (COD), but a two-way causal relationship between GDP and spending on defense in Kenya and Uganda. This implies that rising military spending in these nations follows economic development, with Kenya and Uganda having a favorable effect on economic growth. However, the findings are equivocal because of the limited sample size in South Sudan.

In this research, the link between military spending and GDP in EAC member nations was analyzed. The study also highlighted certain economic suggestions based on the results. Moreover, in Tanzania, Burundi, the Democratic Republic of the Congo (COD), and Uganda, this study discovered a positive correlation between military spending and GDP. This was a suggestion that initiatives to spur economic development would result in a proportional rise in military spending. However, the analysis discovered an inverse link between military spending and GDP in Kenya and Rwanda, suggesting that further investigation is required to determine the basis of this relationship. Further analysis in the study also indicated that economic development in Kenya and Rwanda does not translate into more military spending, which might have effects on national security. In addition to the analysis, there is no statistically meaningful correlation between South Sudan's military spending and its GDP.

The findings may be inconclusive due to the tiny sample size and the country's relatively recent creation. All EAC member states should prioritize reducing poverty and inequality, and achieving sustainable economic development depends on fostering a climate that is favorable to economic progress. Each of the EAC member nations has a distinct connection between military spending and GDP, and each requires a unique set of policy initiatives to support both economic development and national security.

For the EAC area to experience more stability and peace, attention must be paid to sustainable economic growth as well as eliminating poverty and inequality. The creation of an environment that is conducive to economic progress must also support the region's economic development.

5.4. Policy Implications

In view of the empirical findings for this study, it is essential to underscore that this paper reasonably serves as a starting point for a country-based debate on defense budgeting. This paper serves as a starting point for a country-based debate on defense budgeting. Further to the economic recommendations provided for the EAC, it is clear that the relationship between military expenditure and GDP is not only complex but also context specific. Therefore, the policy implications that arise from this conclusion are several and they involve a range of economic and political actions that the EAC member states must undertake to ensure sustainable economic growth, national security, as well as stability.

Firstly, the EAC member states need to prioritize economic growth, poverty reduction, and inequality reduction as the core foundations for promoting national security and stability. A peaceful, prosperous, and stable East Africa is essential for achieving the EAC's economic and political objectives, including regional integration, trade facilitation, and harmonization of policies. Therefore, the EAC should develop comprehensive and integrated economic policies that focus on enhancing the region's competitiveness, productivity, and innovation. This requires collaboration and coordination among the member states to ensure that each country contributes to the region's overall economic development.

Secondly, the EAC member states should create a conducive environment for economic growth, including investing in infrastructure, human capital, and relevant institutions. Improving the quality and quantity of infrastructure, including energy, transport, and ICT can significantly enhance the competitiveness of this region. Human capital development is also essential, as it ensures that the region has a skilled and educated workforce that can effectively participate in economic activities. Additionally, the EAC should prioritize strengthening institutions, including the legal and regulatory frameworks, to foster an enabling environment for business and investment.

Thirdly, the EAC member states must endeavor to develop and implement policies that will promote sustainable economic growth and military expenditure. In countries like Tanzania and Uganda, where there exists a positive relationship between military expenditure and GDP, the focus should be on promoting sustainable economic growth, as this will increase military expenditure and ultimately improve national security. In contrast, in countries like Kenya and Rwanda, where a negative but not statistically significant relationship exists between military expenditure and GDP, the focus should be on increasing GDP as this will increase military expenditure, improving national security.

Fourthly, the EAC member states should promote regional integration, harmonization of policies, and cooperation in areas of national security, including defence and military expenditure. The EAC should ensure full implementation and adherence to the standard defence policy and framework to ensure that member states work together to address shared security threats. This requires political will, commitment, and a willingness to cooperate and share information on security issues.

The policy implications arising from this study's conclusion involve a range of economic and political actions that the EAC member states must undertake to ensure sustainable economic growth, national security, and stability. Promoting economic growth, reducing poverty and inequality, creating a conducive environment for economic growth, and promoting regional integration and cooperation are all essential for achieving the EAC's economic and political objectives.

5.5. Areas for Further Research

The focus of the study was limited to military expenditure at large; whereas this would be a valuable empirical approach, most countries do not have publicly available military expenditure data at a disaggregated level. It is necessary that future research will undertake a multi-equation modeling in which broader effects can be estimated and, at the same time, issues around the endogeneity of defense spending addressed. Augmenting defense spending into dynamic growth models can also help inform optimal spending routines in the presence of competing economic needs.

In addition, further research can be explored to better understand the relationship between military expenditure and GDP in the following areas. First, factors influencing military expenditure: While this study has established a positive relationship between military expenditure and GDP in some EAC countries, further research is needed to identify other factors that influence military expenditure. For instance, research can be conducted to explore how political factors, such as the presence of external security threats or conflicts, affect military expenditure. This can help policymakers develop more effective strategies for allocating resources to the Military.

Secondly, the impact of military expenditure on other sectors: Military expenditure can potentially affect other sectors of the economy beyond its impact on GDP. For example, military spending can crowd out investment in other areas of the economy, such as health and education. Further research is needed to explore the extent to which military expenditure competes with other areas of government spending and the implications of this competition for long-term economic development.

In conclusion, the relationship between these two variables, military expenditure and GDP is multifaceted. While this study has shed some light on this relationship in the EAC countries, further research is needed to understand the implications of military spending for economic development fully. Such research will help policymakers make informed decisions about allocating resources to the Military while promoting long-term economic growth and stability.

The EAC countries need to consider the relationship between military expenditure and GDP to achieve sustainable economic growth. It is also crucial for the EAC countries to address political instability and effectively utilize foreign aid to support economic development. Furthermore, further research in areas such as the factors that drive economic growth, the impact of trade on economic growth, and the impact of foreign aid on economic growth will be essential to identify policy recommendations that could support sustainable economic growth in these countries.

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