

Research Article

Examining Government Spending and Its Impact on Economic Growth in Sierra Leone: Spotlight on Human Capital and Military Expenditure

Abu Bakarr Tarawalie^{1,*}, Emma Catherine Pokawa²

¹Department of Economic and Commerce, Fourah Bay College, University of Sierra Leone, Freetown, Sierra Leone

²Domestic Tax Department, National Revenue Authority, Freetown, Sierra Leone

Abstract

The discussion surrounding the government's role in fostering economic growth has been extensively explored in economic literature, yet it remains relatively unexplored within the context of Sierra Leone. Government expenditure continues to rise due partly to the high demand for public goods like roads, communication, power, education and health, as well as the increasing need to provide both internal and external security for the citizenry and the nation. However, despite significant increases in government spending on education, health and defense, economic growth has remained sluggish, leaving many Sierra Leoneans entrenched in poverty. Thus, this research investigates the relationship between various aspects of government spending and economic expansion in post-war Sierra Leone, focusing specifically on investment in human capital and military expenditures. Employing an ARDL estimation methodology with quarterly time series data for the period 2000Q1 to 2020Q4, the study reveals that military spending positively influence long-run economic growth. However, spending on human capital is identified as having a dampening effect on growth over the long run. In the short term, government expenditure on human capital and defense demonstrates a negative impact on economic growth while their lagged effect reveals a positive association with economic growth. These findings reveal the need for strategic policy interventions to optimize governmental expenditure in Sierra Leone. Policymakers are encouraged to prioritize targeted investments in education, healthcare, and skills enhancement to foster sustained economic growth.

Keywords

Economic Growth, Government Expenditure, Quarterly Data, ARDL Framework, Sierra Leone

1. Introduction

The relationship between government expenditure and economic growth, particularly in Least Developed Countries like Sierra Leone, has been a subject of debate among policy makers. The role of government in any economy remains critical, giving that it directs the process of achieving a coun-

try's macroeconomic objectives such as full employment, economic growth and development, price stability and poverty reduction. The literature suggests that government expenditure, notably on social and economic infrastructure, can enhance growth [1]. Studies have shown that the expansion of

*Corresponding author: tarawalieabu@yahoo.com (Abu Bakarr Tarawalie)

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government expenditure contributes positively to economic growth [2, 3]. They argue that increases in government expenditure on socio-economic and physical infrastructure encourage economic growth by enhancing labor productivity and boosting national output. Particularly, investment in infrastructure such as roads, communications, and power reduce production costs, which stimulates private sector investment and enhances firm profitability, thereby fostering economic growth. These findings provide strong support for the Keynesian theory and Wagner's theory which emphasized the importance of government expenditure in driving economic growth. On the other hand, studies have shown that, in an effort to finance escalating expenditure, the government may resort to raising taxes and/or borrowing. As a result, the elevated income taxes discourage individuals from working long hours or seeking employment, thereby reducing income and aggregate demand while dampening incentives to work, save, and invest. Consequently, the weakened economy may fail to generate sufficient tax revenue to sustain the growing expenditure, leading to increased public sector borrowing and debt service obligations. Ultimately, the higher government spending may hinder overall economic performance [4, 5]. Furthermore, in pursuit of gaining popular support and maintaining political power, politicians and government officials may sometimes allocate funds toward unproductive projects or goods that the private sector could produce more efficiently, which dampens growth. Consequently, government activities may result in the misallocation of resources, thereby impeding the growth of national output. This assertion is supported by the classical and neo-classical schools, which suggests an inverse relationship between government expenditure and economic growth.

In Sierra Leone, Government expenditure continues to rise due partly to the increased demand for public goods like roads, communication, power, education and health, as well as the increasing need to provide both internal and external security for the citizenry and the nation. Specifically, government expenditure towards education, health and defense continue to increase. The literature posits that increase in education and health will increase human productivity, improves workers' skills, efficiency and overall growth. Thus, the state of health and level of education of a country's population are major factors driving productivity because only a healthy and educated labor force can make meaningful contributions to production and growth of national output. Also, investment in defense helps to provide adequate security and stability, which are recipe for attracting investment and boasting growth. However, despite significant increases in government spending over the past three decades on education, health and defense, economic growth has remained sluggish, leaving many Sierra Leoneans entrenched in poverty. The disparity

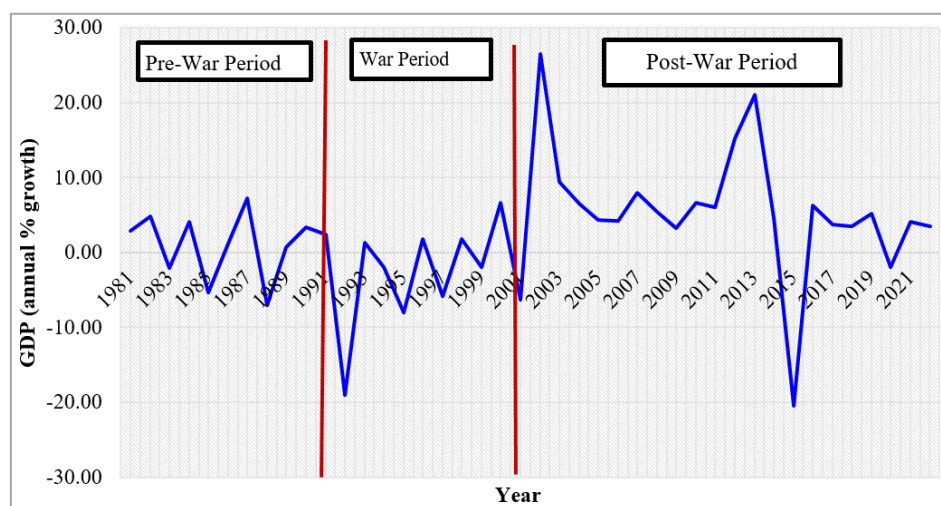
between escalating government expenditure and lackluster economic growth raises critical questions regarding the true impact of government spending on Sierra Leone's economic landscape. This lack of harmony necessitates a thorough investigation into the relationship between government expenditure and economic growth in Sierra Leone.

Furthermore, the existing literature presents conflicting views into the relationship between government spending and economic growth. This lack of clarity, coupled with the absence of a specific study on the Sierra Leonean context, underscores the necessity of further exploring the nexus between government expenditure and economic growth in Sierra Leone. This is particularly crucial due to Sierra Leone's status as a small open economy characterized by significant government spending (especially on education, health and defense) and moderate economic growth. As such, this study aims to fill this gap by investigating the relationship between various aspects of government spending and economic expansion in post-war Sierra Leone, focusing specifically on the impact of investment in human capital (which is the sum of government expenditure on education and healthcare) and military expenditure on economic growth. The study utilizes the auto-regressive distributed lag (ARDL) framework with quarterly time series data for the period 2000Q1 to 2020Q4. The study is divided into six sections. Following the introduction, section two presents a stylized fact on economic growth and government expenditures. In section three, a review of both theoretical and empirical literature is undertaken. The fourth section provides an analysis of the study's methodology including model specification and estimation technique. Section five presents the results and discussion of key finding, while section six provides the conclusion and policy recommendations.

2. Stylized Fact

Economic Growth in Sierra Leone

The Sierra Leone economy endured a significant setback caused by an 11-year civil war spanning from 1991 to 2001. This conflict brought the country's productive sectors to a halt, inflicted severe damage on infrastructure, and resulted in a substantial depletion of human resources. As illustrated in Figure 1, prior to the war, Sierra Leone experienced minimal economic growth, averaging approximately 1% between 1981 and 1990. Subsequently, from 1991-2000, the average growth rate plummeted to -2.16%, largely attributable to the effects of the civil war. In the aftermath of the war, the primary focus was on rebuilding the economy, establishing institutions, and the restoration of depleted infrastructure.



Source: World Bank Database (2024)

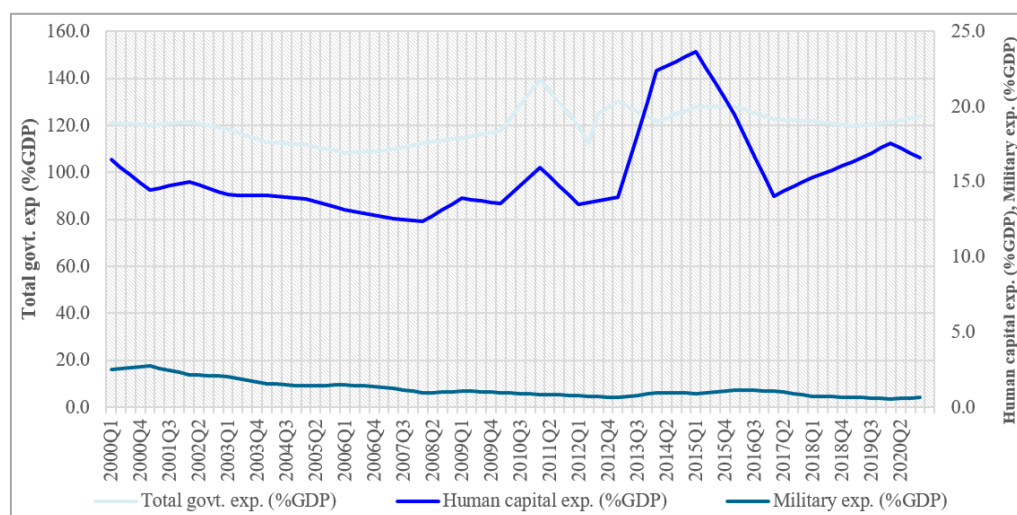
Figure 1. Trend in GDP in Sierra Leone (1981-2022).

As a result, the Sierra Leone economy experienced an increase in government expenditure and a resurgence in investment, particularly in the mineral resource sector and telecommunications. This resulted to a surge in growth as the country experienced an increase in Real GDP growth from 3.8 percent in 2000 to 21.6 in 2003 [6]. This growth momentum was due to an increase in economic activities in all sectors of the economy. However, growth moderated as real GDP growth declined gradually from 9.6 percent in 2004 to 5.0 percent in 2010. The country experienced a surge in economic activity as real GDP growth increased significantly from 15.2 percent of GDP in 2012 to 20.7 percent in 2013, due largely to iron ore mining and related activities. However, due to the fall in iron ore prices and the Ebola Virus Disease (EVD) outbreak, real GDP declined to 4.6 percent in 2014 and further contracted to negative 20.1 percent in 2015. Five years later, the country also suffered from the COVID-19 global pandemic affecting global supply chain, food scarcity and halt in productive activities. While Sierra Leone has made strides in post-war reconstruction and attracting investment, entrenched issues such as poverty, weak infrastructure, and fiscal mismanagement remain significant obstacles to sustained economic development.

Government Expenditure

Government spending in Sierra Leone has been steadily increasing, primarily due to growing demands for essential public services such as infrastructure for transportation, communication, power supply, and improvements in education and healthcare. Additionally, there has been a rising need to procure goods and services, including compensating government employees. This surge in expenditure is evident in

the available statistics, which show a continuous rise in total government spending. In furtherance of the analysis, a decomposition of total government expenditure into Human capital expenditure and Military expenditure is presented in Figure 2. Represented by the green line, total government expenditure has been relatively stable since 2000Q1 until 2011Q2 when it peaked at 134.2% GDP., due largely to increased economic activities in the mining sector (especially iron ore mining) and a surge in revenue generation associated with mining activities. However, total expenditure witnessed minor fluctuations and slight decline between 2015 and 2016, due to the impact of the twin shock associated with a fall in iron ore prices in the world market and the Ebola outbreak. Also, total expenditure remained modest in 2019 due to the Covid pandemic. Further analysis of the graph shows that, Military expenditure (depicted by orange line) as a share of GDP remains comparatively low throughout the period under consideration. While it appears relatively unchanged, a slight, but consistent decline persists until 2014 before increasing in 2015. The increase could be explained by the state of emergency that was in effect around the Ebola pandemic, requiring huge military personnel to ensure adherence to government directives. In sharp contrast, human capital expenditure (depicted by blue line) is comparatively high, averaging 16% as a share of GDP. From the graph, human capital expenditure shows a steady increase over time, peaking around 2015 before gradually declining through 2020. Evidently, investment in human capital appears to be a major driver of total government expenditure, as its trend aligns closely with the overall spending pattern.



Source: World Bank Database (2024)

Figure 2. Decomposition of government expenditure (2000Q1-2020Q4).

3. Literature Review

The theoretical literature on the nexus between government expenditure and economic growth is largely dominated by the Classical, Keynesian, Wagner and the endogenous schools of thought. The Classical paradigm largely drawing from Adam Smith and David Ricardo, advocate for minimal government intervention. They argue that excessive government spending distorts market mechanisms, leading to inefficiencies like deadweight loss and resource misallocation. Additionally, they contend that taxation to fund government spending reduces resources available for private investment and consumption, disrupting the natural flow of capital within the economy and potentially hindering growth. However, the Keynesian theory support active government intervention, especially during economic downturns, to stimulate demand and promote growth. They argue that government spending can create jobs, boost consumer spending, and restore confidence, thereby driving economic expansion. Keynesians also emphasize deficit spending as a countercyclical measure to stabilize the economy during recessions. Furthermore, Wagner's theory suggests a positive relationship between economic growth and government spending expansion over time. Wagner argued that as societies become wealthier, there is increased demand for public goods and services, driving higher government spending. Proponents believed that government expenditure on infrastructure, education, and healthcare enhances productivity and contributes to long-term growth. Critics, however, question the causation between economic growth and government spending, citing potential negative consequences like crowding out private investment. Endogenous growth theory shifts the focus to technological progress and knowledge accumulation as drivers of long-term growth. It argues that government intervention can foster

innovation and address market failures to promote efficient resource allocation and sustained economic development.

The empirical review in this study collectively underscore the complex interplay of factors such as corruption, efficiency, and sector-specific spending that shapes the impact of government expenditure on economic growth. Understanding these dynamics is crucial for policymakers aiming to leverage government expenditure to stimulate economic growth effectively. Notably, Sierra Leone's context is absent in this review. Thus, its inclusion would likely enrich and augment the understanding of the relationship between government expenditure and economic growth in the context of Sierra Leone.

The study by Buthelezi [4] challenges traditional Keynesian views by studying the long-run impact of government expenditure on economic growth in South Africa [4]. Using Vector-error correction (VEC) and Markov-switching dynamic regression, the study finds that increased government spending doesn't always lead to economic growth, especially in lower economic states, where it can reduce growth by 0.009% to 0.30%. Conversely, Iliyasu & Muhammed [2], and Nguyen & Bui [5] investigates the role of corruption in this relationship. The findings from [2] show that augmenting government spending and reducing corruption significantly enhances both short-run and long-run growth, while Nguyen & Bui [5] suggests that controlling corruption and government spending interact in complex ways, impacting economic growth differently across Emerging Markets and Developing Economies (EMDEs) in Asia. Furthermore, evidence from the empirical findings by Ehekoba & Amakor [7] posits that expenditure on education, health and general administration boost growth, while expenditure on defense retard growth.

Studies by Nurudeen & Usman [8], Dereje [9], Better [10], and Nguyen [11] highlight the varied effects of different government expenditure components on growth. While ex-

penditures on transport, communication, and health may boost growth, total capital expenditure could have negative consequences, as seen in Nigeria by Better [10]. The study by Dereje [9] in the case of Ethiopia indicates that real government spending on human capital fosters growth in the long term, while real government consumption hampers it. Research by Kimaro, et al [3] underscores the importance of government expenditure efficiency, suggesting that while increased spending may accelerate growth in low-income countries in Sub-Saharan Africa, efficiency doesn't necessarily amplify this effect.

Other studies, such as Loizides, & Vamvoukas [12], Odhiambo [13], and Wu et al [14], present different perspectives on the relationship between government size, spending, and economic growth, with bidirectional causality observed in different country contexts. While Wu et al [14] support Wagner's law, showing a positive relationship between government spending and growth, Diyoke et al [15] present contrasting findings in Sub-Saharan Africa. Also, Emeru [16] examination of Ethiopia's case underscores the importance of sector-specific expenditure, particularly in education, for fostering economic growth. These findings collectively highlight the nuanced nature of the relationship between government expenditure and economic growth, influenced by corruption, efficiency, and expenditure composition, essential for policymakers aiming to stimulate sustainable growth.

4. Methodology

Theoretical framework

The theoretical framework explores the relationship between government expenditure and economic growth through the Keynesian Model. Unlike organic theories like Wagner's and the Peacock-Wiseman hypothesis, Keynes regarded government expenditure as an exogenous variable explaining economic growth. This model emphasizes how government spending directly impacts aggregate demand, influencing overall economic growth. The theory posits that through expansionary fiscal policy, increased government spending can lead to economic expansion. As government spending rises, production increases, stimulating aggregate demand and consequently boosting economic growth.

Expanding the basic equation of aggregate demand to include both private and government contributions, the framework provides a more comprehensive understanding of the factors driving economic activity. It highlights the significance of government expenditure as a tool for stimulating demand. Utilizing the assumption of a small open economy, the basic equation representing aggregate demand is specified to encompass both private and government contributions:

$$AD = C + I + (X - M) \quad (1)$$

In equation 1, the components of aggregate demand (AD) are broken down into consumption (C), investment (I), and

net exports (X-M). However, consumption and investment are not solely influenced by private individuals and firms; government actions also play a significant role. Thus, to reflect the sources of consumption and investment more accurately, equation 1 is expanded into equation 2.

$$AD = C^p + I^p + C^g + I^g + (X - M) \quad (2)$$

In equation 2, the components of aggregate demand are further delineated to capture both private and government contributions. This expansion acknowledges that total consumption (C) includes both private consumption (C^p) and government consumption (C^g), while total investment (I) comprises both private investment (I^p) and government investment (I^g). This refined equation offers a more comprehensive view of the factors driving aggregate demand. By explicitly incorporating government expenditure ($C^g + I^g$) into the model, it recognizes the direct influence of government actions on economic activity. In the context of the Keynesian model, where government intervention is often used to stimulate demand during periods of economic downturn, this expanded equation underscores the importance of government expenditure as a tool for influencing economic growth.

Empirical Model

Based on the theoretical foundation, the empirical model for assessing the relationship between government expenditure and economic growth is stipulated as follows:

$$EG_t = \beta_0 + \beta_1 GE_t + \beta_2 PC_t + \beta_3 PI_t + \beta_4 OPN_t + \beta_5 INF_t + \epsilon_t \quad (3)$$

In equation 3, EG is economic growth, GE is government expenditure, PC is private consumption, PI is private fixed capital investment, OPN is trade openness, and INF is inflation. The error term, ϵ_t , in the model is assumed to be random with zero mean and constant variance.

Economic growth (EG) signifies the sustained increase in an economy's production of goods and services over time, often measured by the rise in real gross domestic product (GDP). This expansion indicates prosperity, leading to improved living standards and increased job opportunities. Government Expenditure (GE) refers to the amount a government spends on goods, services, investments, and transfer payments within a specific period. In this study, Government Expenditure is decomposed into Human Capital (HC)¹ and Military expenditure (MIL) as shown in Equation 4. Private sector expenditure comprises private consumption and capital expenditure by households and businesses, respectively, impacting short-term demand and long-term growth. Achieving a balanced mix between consumption and investment is crucial for sustainable growth. Trade openness (OPN) denotes a country's engagement in international trade, providing op-

¹ This is measured as the sum of education and healthcare as a percentage share of GDP.

opportunities for businesses to expand their market base and stimulate economic growth. Meanwhile, inflation (INF) refers to the general increase in prices, reducing the purchasing power of money and causing macroeconomic instability. Unpredictable inflation may hinder investment and consumption, leading to an economic slowdown.

In line with the above, equation (3) can be expanded and re-written as;

$$EG_t = \beta_0 + \beta_{1,2}HC_t + \beta_{1,2}MIL_t + \beta_2PC_t + \beta_3PI_t + \beta_4OPN_t + \beta_5INF_t + \epsilon_t \quad (4)$$

Estimation Procedure

This section outlines the systematic steps used to estimate the model parameters and analyze the results.

Unit Root Test

The estimation procedure involves several stages, starting with the Unit Root/Stationary Test. This test is crucial in time series analysis to ensure the appropriateness of the chosen model for the data, preventing spurious results, and enhancing the reliability of forecasts and parameter estimates. A time series dataset is considered stationary if its statistical properties, such as mean, variance, and autocovariance, remain constant over time. Many time series models assume stationarity. Unit root tests, typically the Augmented Dickey-Fuller (ADF) test and Phillip Perron (PP) test, help determine whether a series is stationary or exhibits a unit root, indicating non-stationarity. Depending on the series' characteristics, two versions of unit root tests are commonly conducted: one with both constant and trend, and another without trend but with a

constant.

The Autoregressive Distributed Lag (ARDL) Model

The study utilized the Autoregressive Distributed Lag (ARDL) model to analyze the impact of government expenditure on economic growth, a technique suitable for variables with mixed orders of integration. ARDL allows for the analysis of a wide range of phenomena without strict stationarity assumptions, mitigating spurious regression risks by incorporating lagged levels of variables. This enhances reliability, reduces erroneous conclusions, and accommodates small sample sizes, making it appropriate for empirical studies.

The ARDL estimation methodology follows a systematic approach, starting with lag selection, balancing dynamic behavior capture with overfitting avoidance. Information criteria like Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC) guide lag determination, supplemented by techniques such as sequential testing and HQ to identify the optimal lag length. Subsequently, the bounds test of cointegration is conducted to ascertain long-run relationships among variables, critical for understanding equilibrium relationships between non-stationary variables. If the F-statistic surpasses upper bound limits, indicating cointegration, the model establishes a long-run relationship; otherwise, no cointegration exists. Following cointegration confirmation, the ARDL framework facilitates simultaneous estimation of long-run and short-run relationships, enhancing the understanding of dynamic interactions between variables.

Transforming and specifying equation (4) in an ARDL form gives;

$$\begin{aligned} \Delta EG_t = & \delta_0 + \sum_{i=1}^p \beta_{1ti} \Delta EG_{t-1} + \sum_{i=0}^q \beta_{2,1ti} \Delta HC_{t-1} + \sum_{i=0}^q \beta_{2,2ti} \Delta MIL_{t-1} + \sum_{i=0}^q \beta_{3ti} \Delta PC_{t-1} + \\ & \sum_{i=0}^q \beta_{4ti} \Delta PI_{t-1} + \sum_{i=0}^q \beta_{5ti} \Delta OPN_{t-1} + \sum_{i=0}^q \beta_{6ti} \Delta INF_{t-1} + \alpha_1 EG_{t-1} + \alpha_2 HC_{t-1} + \alpha_3 MIL_{t-1} + \alpha_4 PC_{t-1} + \alpha_5 PI_{t-1} + \\ & \alpha_6 OPN_{t-1} + \alpha_7 INF_{t-1} + \epsilon_t \end{aligned} \quad (5)$$

Where: p and q denote the maximum lag for the dependent and independent variables respectively; Δ indicates the difference operator; δ_0 represents the drift component. In equation (5), the long-run coefficients in the model are represented by α_i 's ($i = 1, 2, \dots, 5$) while the dynamic components with the β 's reflect the short-run. To confirm the existence of cointegration, we test the long run coefficients by specifying the null hypothesis of no cointegration, against the alternative that there is cointegration. The hypotheses are shown below;

$H_0: \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = \alpha_7 = 0$. There is no cointegration

$H_1: \alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 \neq \alpha_6 \neq \alpha_7 \neq 0$) There is cointegration

Based on the above hypothesis, we compute the F-statistics which is compared with both the lower and upper critical bound (Pesaran 2001). If the computed F-statistics is greater than the upper critical value, we reject the null hypothesis of no cointegration and accept the alternative hypothesis that there is cointegration. However, if the computed F-statistics is lesser than the lower critical value, we accept the null hypothesis of no cointegration.

Thus, if there is cointegration, a reparametrized ARDL short run ECM of equation 5 is presented as:

$$\begin{aligned} \Delta EG_t = & \delta_0 + \sum_{i=1}^p \beta_{1ti} \Delta EG_{t-1} + \sum_{i=0}^q \beta_{2,1ti} \Delta HC_{t-1} + \sum_{i=0}^q \beta_{2,2ti} \Delta MIL_{t-1} + \sum_{i=0}^q \beta_{3ti} \Delta PC_{t-1} + \\ & \sum_{i=0}^q \beta_{4ti} \Delta PI_{t-1} + \sum_{i=0}^q \beta_{5ti} \Delta OPN_{t-1} + \sum_{i=0}^q \beta_{6ti} \Delta INF_{t-1} + \sigma ECT_{t-1} + \epsilon_t \end{aligned} \quad (6)$$

Where equation (6) shows a model in first difference that includes an error correction term (ECT). The ECT reflects the

model's speed of adjustment for any short-run disequilibrium to the long-run.

Finally, secondary quarterly time series data spanning from 2000Q1 to 2020Q4 were utilized. It is noteworthy that the original annual data were transformed into quarterly intervals using the frequency conversion feature within the EViews statistical software, employing the linear low-to-high frequency method. Primarily, data were sourced from the World Bank Economic Output website.

5. Result and Discussion

5.1. Unit Root Test Result

The Augmented Dickey-Fuller (ADF) unit root test,

commonly used to determine the stationarity of time series data, is utilized in this study. In Table 1, the ADF test results are presented for variables EG, HC, MIL, PC, PI, OPN, and INF. The test statistics are reported for both the level and first difference of each variable (where necessary), along with the corresponding significance levels, version (intercept and trend, intercept only or none) and order of integration. The result shows that, EG, PC, HC and PI, are stationary in levels, and they are characterised as I(0) variables, that is, they are integrated of order zero. However, MIL, OPN and INF are stationary at their first difference, denoting that they are I(1) variable, that is, they are integrated of order one.

Table 1. Augmented Dickey-Fuller (ADF) Unit Root Test.

Variable	Level	First difference	Version	Order
EG	-5.112***		Intercept and Trend	I (0)
HC	-3.653***		Intercept and Trend	I (0)
MIL	-2.509	-3.764***	Intercept	I (1)
PC	-5.046***		Intercept and Trend	I (0)
PI	-3.291**		Intercept	I (0)
OPN	-2.255	-3.160**	Intercept	I (1)
INF	-2.563	-3.492**	Intercept	I (1)

* & ** indicate significance at the 5% and 1% levels respectively

Source: Author's computation

5.2. ARDL Estimation Procedure

Having established that the variables are stationary of mixed order, an ARDL estimation approach is used for the purpose of regression analysis. Aiming for model accuracy and validity, several pre-estimation and post-estimation tests are conducted. Among the pre-estimation tests is the selection of optimal lags to be introduced in the model for automatic selection during the regression process. Additionally, a bounds test of cointegration is performed to ascertain the presence of a long-run relationship among the variables. Subsequently, depending on the bounds test outcome, the ARDL model is estimated for either the short-run or both the short-run and long-run dynamics.

5.3. Optimal Lag Selection

Table 2 outlines the outcomes of the optimal lag selection process for the model employing diverse criteria including Log Likelihood (LogL), Sequential Modified Likelihood Ratio (LR) test statistic, Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC), and Hannan-Quinn Criterion (HQ). Initially, with zero lags, the model exhibits poor fit. However, with the inclusion of two lag, substantial enhancements emerged across all metrics, with the Log Likelihood rising and the LR statistic notably increasing. Notably, the FPE significantly decreases to 0.003, indicating heightened prediction accuracy. The AIC, SIC, and HQ criteria also demonstrate improvements at lag length two, suggesting a favorable balance between model fit. Ultimately, the results advocate for a model with two lags as the most suitable choice.

Table 2. Optimal Lag Selection.

	Lags	LogL	LR	FPE	AIC	SIC	HQ
Model 1	0	-1463.6	NA	91651675	38.2	38.4	38.3
	1	-621.1	1510.1	0.103	17.6	19.3	18.3
	2	-435.3	299.1*	0.003*	14.0*	17.2*	15.3*
	3	-410.7	35.2	0.006	14.7	19.4	16.5
	4	-377.5	41.4	0.011	15.1	21.3	17.5

Source: Author's computation

5.4. Cointegration Test

The bounds test of cointegration, as depicted in Table 3, evaluates whether a long-run relationship exists among the variables under scrutiny. In this test, the F-statistic and the critical values are compared to assess the significance of cointegration. The F-statistic is compared against critical values of the upper bound, I (1), at the 10%, 5%, and 1% levels. The F-statistic of 8.885 exceeds all three critical values, indicating statistical significance at all levels. This suggests that there is strong evidence to reject the null hypothesis of no cointegration, indicating the presence of a long-run relationship among the variables.

Table 3. Bounds Test of Cointegration.

Test Statistic	Value	Sig.	I (0)	I (1)
F-Statistic	8.885	10%	2.12	3.23
k	6	5%	2.45	3.61
		1%	3.15	4.43

Source: Author's computation

5.5. ARDL Estimation Result

The initial estimated ARDL model displayed bias standard errors due to the absence of homoskedasticity or a consistent variance. This raised concerns regarding the reliability of the results and heightened the risk of a type 1 error, inaccurately rejecting the null hypothesis. To rectify this issue, the ARDL model underwent re-estimation utilizing robust standard errors using the HAC-corrected covariance matrix. This method effectively addresses the heteroskedasticity problem within the model, ensuring more precise and dependable estimation outcomes. Through the implementation of robust standard errors, the model's efficiency is enhanced, thereby offering more dependable and insightful findings regarding the relationships among the variables under study.

Long Run

The robust standard errors for the long run ARDL estimation result is presented in Table 4. For the primary explanatory variables of interest, Military expenditure (MIL) exhibit a positive association with long-run economic growth, while expenditure on human capital (HC) shows the opposite trend. Meanwhile, Private Capital Investment (PI), unlike Private Consumption (PC), is found to have a negative impact on economic growth. Trade Openness (OPN) also displayed a positive long-run relationship with economic growth, aligning with expectations. Also, Inflation (INF) is found to share a negative association with economic growth. Overall, all variables exhibited a statistically significant relationship except for PC and INF.

Table 4. Long Run ARDL Estimation Result.

Variable	Coefficient	Std. Error Robust	t-Statistic	Prob.
HC	-1.755	0.280	-6.266	0.000
MIL	3.070	1.661	1.848	0.069
PC	0.061	0.050	1.222	0.226
PI	-0.525	0.122	-4.293	0.000
OPN	0.353	0.059	6.013	0.000

Variable	Coefficient	Std. Error Robust	t-Statistic	Prob.
INF	-0.166	0.146	-1.142	0.258

Source: Author's computation

From Table 4, it is observed that a one-percentage-point increase in government expenditure in human capital (HC) leads to a reduction in economic growth by 1.8%, with all other factors constant. This finding was in variant with Dereje (2012) [9] who found government expenditure on human capital to be growth enhancing. One possible reason for this negative association could be inefficiencies or mismanagement in the allocation of funds earmarked for human capital development. If government spending on human capital fails to translate into tangible improvements in education, healthcare, or workforce skills, it may hinder economic growth rather than fostering it. Additionally, the negative impact could stem from a lag between investment in human capital and its realization in terms of enhanced productivity and economic output.

In contrast, on average, it was observed that a one percentage point increase in Military expenditure (MIL) would increase economic growth by 3.1%, *ceteris paribus*. A strong and well-equipped military can contribute to peace and stability, boosting investor confidence and potentially attracting foreign investment and fostering regional cooperation.

Additionally, the analysis reveals that, on average, a one-percentage-point increase in Private Capital Investment (PI) corresponds to a 0.5% decrease in EG. This suggests that higher levels of private capital investment may exert a dampening effect on overall economic activity in Sierra Leone. The negative impact of Private Capital Investment (PI) on economic growth could be attributed to various factors, such as the possibility that private investment in Sierra Leone faces obstacles such as inadequate infrastructure, or regulatory hurdles, which may deter investors and lead to under-investment in productive sectors of the economy. Furthermore, the result shows that in the long term, a

one-percentage-point rise in Trade Openness (OPN) corresponds to a 0.4% increase in economic growth in Sierra Leone. This finding underscores the importance of adopting policies that promote free trade, such as reducing tariffs, removing trade barriers, and facilitating international trade agreements. By embracing liberal trade policies, Sierra Leone can enhance their economic openness, attract foreign investment, promote export-oriented industries, and stimulate economic growth in the long run.

Short Run

The short run ARDL estimation result, as presented in Table 5, unveils several notable insights into the short-term dynamics of the variables under consideration. With a high R-squared and adjusted R-squared value of 0.85 and 0.83 respectively, alongside with a statistically significant F-statistic, the result demonstrates a good fit and good overall performance in predicting the model. The Durbin-Watson statistic of 2.51 suggests no significant autocorrelation in the model residuals, enhancing confidence in the estimation results. Furthermore, the error correction term (ECT) is negative and statistically significant, indicating a rapid adjustment to restore equilibrium following short-term deviations and reinforcing the long-run relationship among the variables. The ECT result demonstrates that for any disequilibrium in the short-run is corrected at the 33.6% adjustment speed towards the long-run, annually.

Lagged economic growth (EG (-1)) displayed a significant positive coefficient, indicating a robust impact of previous periods' economic performance on current growth (growth inertia). The results reveal that a percentage point increase in previous periods' EG increases current EG by almost 0.64% on average in the short run.

Table 5. Short Run ARDL (2, 2, 2, 1, 0, 2, 0) Estimation Result.

Variable	Coefficient	Std. Error Robust	t-Statistic	Prob.
EG (-1)	0.643	0.610	7.674	0.000
HC	-0.505	0.379	-1.330	0.188
HC (-1)	0.708	0.394	1.795	0.078
MIL	-18.501	4.059	-4.558	0.000
MIL (-1)	7.362	4.370	1.685	0.097
PC	-0.041	0.036	-1.126	0.264

Variable	Coefficient	Std. Error Robust	t-Statistic	Prob.
OPN	0.945	0.114	8.293	0.000
OPN (-1)	-0.386	0.124	7.247	0.000
ECT	-0.336	0.041	-8.253	0.003
_cons	4.685	0.610	7.674	0.000
R-squared	0.846			
Adj. R-squared	0.826			
F-statistic	42.247			
Prob (F-statistic)	0.000			
DW stats	2.513			

Source: Author's computation

Unlike the long run, Military expenditure shows a negative association with EG in the short run, with statistically significant coefficient at the conventional level. Heightened military spending can contribute to an environment of uncertainty and perceived risk, both domestically and internationally. In the short run, this uncertainty may deter private sector investment, consumer spending, and overall economic activity, as businesses and individuals adopt a more cautious approach in response to geopolitical tensions or the potential for conflict. The lagged effect, however, showed a positive effect on EG.

The lagged positive effects of human capital (HC) and military expenditure (MIL) on economic growth (EG) indicate that both HC and MIL have a delayed impact on economic growth. This suggests that investments in human capital, such as education and healthcare, as well as military spending, contribute to economic growth. However, the benefits of these investments are realized after a certain period, likely due to the time required for policies to take effect and other related factors.

Trade openness (OPN) affects EG positively while its lagged effect is negative. When a country adopts trade liberalization policies and becomes more open to international trade, there is often an initial period of adjustment during which domestic industries face increased competition from foreign firms. This likely explains the negative lagged effect since heightened competition can lead to short-term challenges such as job losses, decreased productivity, and industry restructuring, resulting in a temporary slowdown in economic growth.

5.6. Stability Test

The stability test was carried out using the CUSUM of squares test. The test result diagrams are depicted in Figure 3. Evaluation of the diagram indicates that the model exhibit stability, falling within the 5% significance bound level.

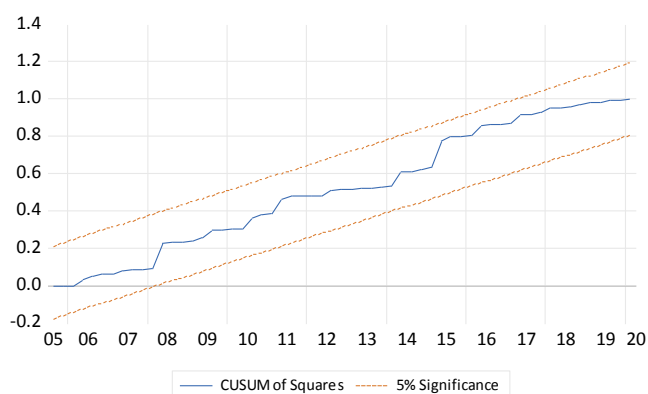


Figure 3. Stability Test.

6. Conclusion and Policy Recommendations

The debate surrounding the government's role in stimulating economic growth has persisted for decades. The literature presents conflicting evidence, leading to the relevance of the topic in understanding government spending's impact on economic growth. However, this relationship remains understudied in Sierra Leone, where government spending faces intense scrutiny. Thus, this study focused on investigating the relationship between government expenditure and economic growth in post-War Sierra Leone, specifically focusing on expenditure on human capital and military expenditure. In pursuit of this objective, the study utilized an ARDL estimation approach using a quarterly time series data. The long run regression result revealed that while military expenditure are growth enhancing in the long run, expenditure on human capital had a negative impact on growth. In the short run, the result further revealed that, government expenditure on hu-

man capital showed a negative effect, while its lagged value indicated a positive impact on growth. The findings of this study underscore the importance of carefully prioritizing government expenditure in post-war Sierra Leone to maximize its positive impact on economic growth. The findings from the study highlight the need for strategic policy interventions. As such, policymakers should prioritize investments in education, healthcare, and skills development to ensure that expenditure on human capital translates into long-run economic growth. Additionally, efforts should be made to optimize the allocation of resources towards defense purposes, ensuring that military expenditure does not crowd out investments in productive sectors of the economy. Furthermore, enhancing transparency, accountability, and efficiency in government spending is crucial for economic growth and development.

Abbreviations

ADF	Augmented Dickey-Fuller (ADF)
ARDL	Auto-regressive Distributed Lag
GDP	Gross Domestic Product
EMDEs	Emerging Markets and Developing Economies
AIC	Akaike Information Criterion
SIC	Schwarz Information Criterion
HQ	Hanna-Quinn Information Criterion

Author Contributions

Abu Bakarr Tarawalie: Conceptualization, Formal Analysis, Methodology, Software, Writing – original draft, Writing – review & editing

Emma Catherine Pokawa: Data curation, Resources, Validation, Visualization

Conflicts of Interest

The authors declare no conflicts of interest.

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