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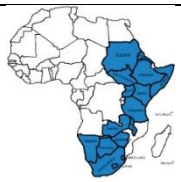


Government Spending Priorities and Their Impact on Economic Development in Tanzania

[1]Rustis Bernard*, [2]Beatrice Njau

[1]National Bureau of Statistics, P.O. Box 2683, Dodoma, Tanzania, [2]Eastern Africa Statistics Training Centre (EASTC), P.O. Box 35103, Dar es Salaam, Tanzania.

* Corresponding Author Email: rustis.silayo@nbs.go.tz

KEYWORDS

Government expenditure, Economic growth, ARDL model, Fiscal policy, Tanzania

ABSTRACT

This study analyses the impact of Tanzania's government spending priorities (1990–2023) on economic growth, focusing on four key sectors (public services, defence, health and education) constituting 89% of fiscal spending. Using an ARDL approach with diagnostic and cointegration tests, we examine short-run dynamics and long-run equilibrium relationships while controlling for trade openness and exchange rates. The findings reveal significant sectoral heterogeneity: health expenditures drive long-run growth, while education spending shows short-run benefits but long-run inefficiencies, likely due to skills mismatches. Defence and public services exhibit minimal growth impacts. Granger causality tests confirm unidirectional links, education fosters growth, while health and defence spending respond to GDP expansion. The study recommends reallocating budgets toward health and education, coupled with efficiency reforms in public services and defence, to achieve sustainable development. These findings offer a framework for fiscal policy optimization in resource-constrained economies

1. INTRODUCTION

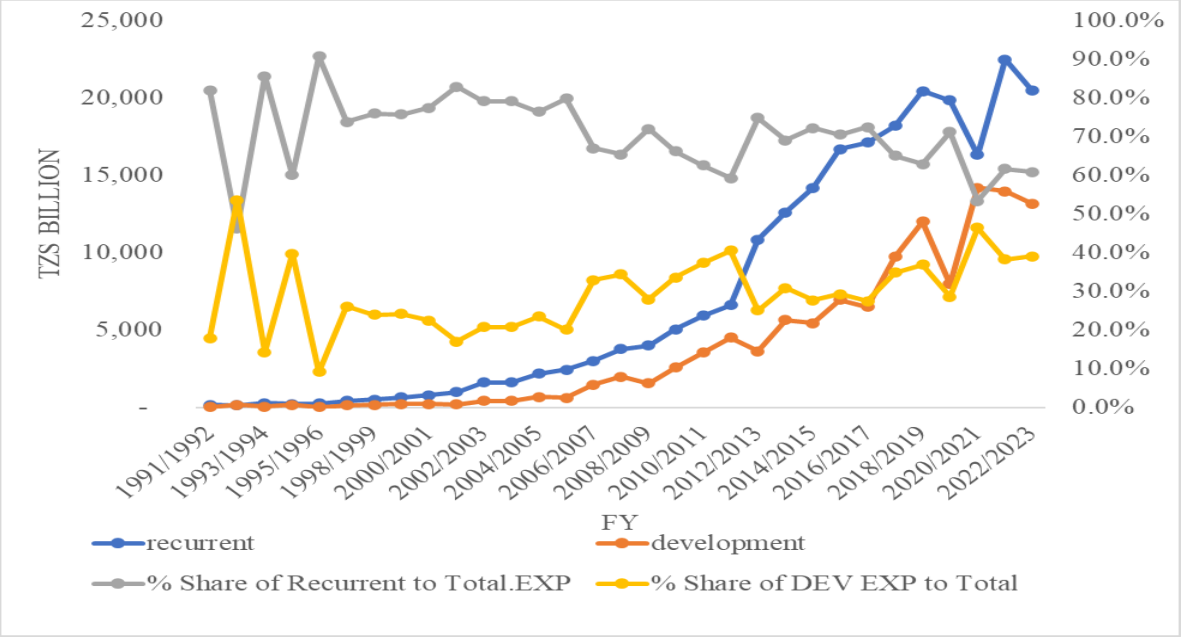
Economic development, as measured by the growth rate of Gross Domestic Product (GDP), serves as a fundamental indicator of a nation's economic performance and prosperity (Tanaka, 2024; Buthelezi, 2023). For decades, economists have debated whether government expenditures significantly impact economic growth, a question that remains unresolved (Rahman, Nath, Siddiqui, & Hossain, 2023).

Keynesian economists argue that government expenditure stimulates economic growth by boosting aggregate demand, a view supported by Wagner's Law, which posits that economic activity expands proportionally with government spending (Magai & Masele, 2023; Adam & O'Connell, 2019). Empirical studies confirm that productive government spending, particularly in infrastructure, social safety networks, and public services, positively correlates with economic development (Afonso & Furceri, 2008; Kyissima et al., 2017).

Conversely, Classical economists contend that excessive government spending crowds out private investment, increases inflation, and ultimately constrains economic growth (Kunwar, 2019). Evidence from Buthelezi (2023) and Tanaka (2024) supports this claim, showing that unproductive public expenditures hinder economic performance, especially in developing nations. Thus, strategic allocation of public funds is crucial for fiscal sustainability and long-run growth (Wahudi, 2020).

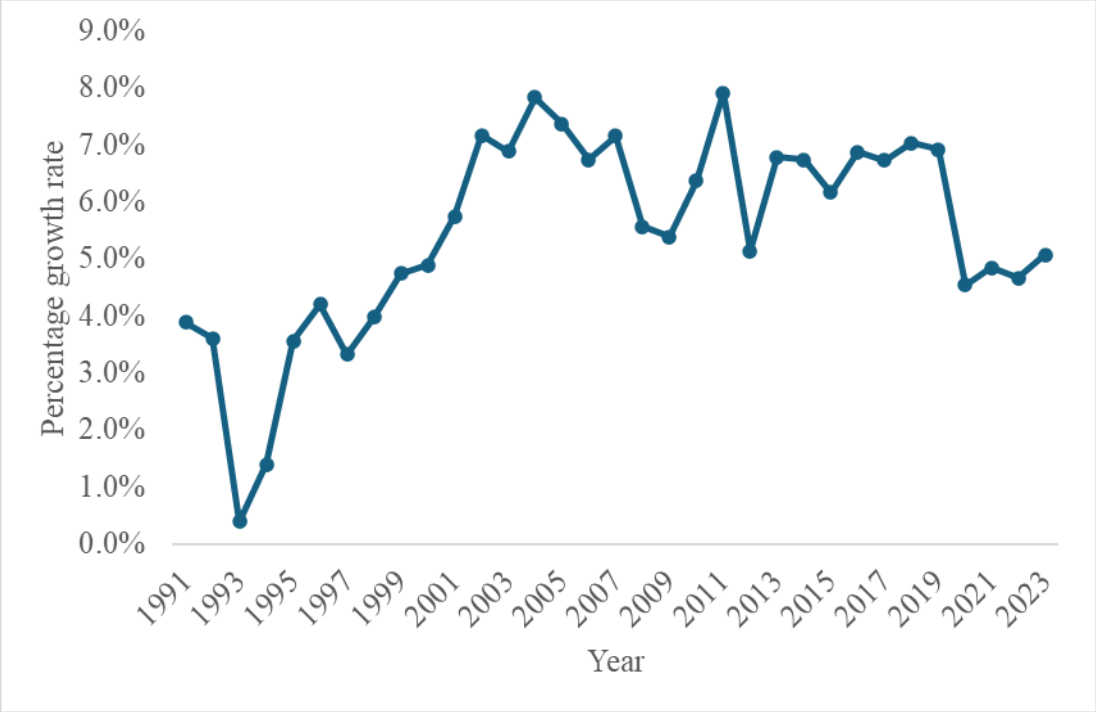
In Tanzania, government spending has risen significantly, from TZS 93.367 billion in 1989/1990 to TZS 33,684.361 billion in 2022/2023 (Economic Survey, 1992 & 2023). However, recurrent expenditures dominated by wage bills and operational costs have consistently exceeded 50% of the total budget, while development spending fluctuates between 25% and 46.5% (Chart No. 1).

Chart No. 1: Government Expenditure Current and Development



Despite increased investments in infrastructure (e.g., the Julius Nyerere Hydro Project and Standard Gauge Railway), Tanzania's GDP growth has declined from 6.7% in 2014 to 5.1% in 2023 (Chart No. 2), raising concerns about spending efficiency.

Chart No. 2: Trend of Gross Domestic Product Growth Rate from 1991-2023



Despite government rising budget allocations with 89.1% directed to priority sectors (public services, defence, health, and education) in 2022/23, economic growth has stagnated below the 8% target set in Vision 2025. The GDP growth decline suggests potential inefficiencies in expenditure allocation.

Existing literature on Tanzania's government spending and economic growth remains inconclusive, with mixed findings (Magai & Masele, 2023; Salim, 2017). There is also limited research on sector-specific impacts, particularly in developing economies. This study addresses these gaps by examining: Causal relationships between government spending and economic performance; Short-run vs. long-run effects of expenditure priorities and which sectors (e.g., education, health, defence and General Public Services) most influence growth.

To resolve these contradictions and address growth paradox, this study aims to assess the impact of government spending priorities on economic development through three specific objectives and hypothesis below:

i. To examine the causal relationship between government spending priorities and economic performance in Tanzania.
ii. To analyse the short-run and long-run relationships between government spending priorities and economic performance.
iii. To determine whether specific sectors of government spending influence economic development.

Hypothesis of the Study

H_1 *H_0* There is no causal relationship between government spending priorities and economic performance.

H_1 There is a causal relationship between government spending priorities and economic performance.

H_2: *H_1* There is no short-run and long-run relationship between government spending priorities and economic performance.

H_1 There is a short-run and long-run relationship between government spending priorities and economic performance.

H_3: *H_0* There is no specific sector spending that influences economic development in Tanzania.

H_1 Specific sector spending influences economic development in Tanzania.

2. METHODOLOGY

This study employs a quantitative research design using secondary time-series data from 1990 to 2023. Data was collected from three authoritative sources: (1) National Bureau of Statistics (NBS) Tanzania, (2) Bank of Tanzania, and (3) World Bank Development Indicators. The analysis focuses specifically on Tanzania Mainland, which accounts for approximately 95% of national GDP, and examines four priority expenditure sectors that constitute 89% of total government spending: general public services, defence, education, and health. Real GDP growth serves as the dependent variable, while trade openness and exchange rates are included as control variables. All variables were transformed to natural logarithms to stabilize variance and normalize distributions (Gujarati, 2004).

This study employed a multistage econometric approach to analyse the relationship between government spending and economic development in Tanzania. The analysis began with stationarity tests using both the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) methods to determine the time series properties of the data. Based on these preliminary tests, the Autoregressive Distributed Lag (ARDL) model was selected due to its superior performance with small samples and ability to

handle variables with different orders of integration (Pesaran et al., 2001). The study further applied Granger causality tests to examine directional relationships between sectoral government expenditures and GDP growth. Comprehensive diagnostic tests, including the Breusch-Godfrey test for serial correlation, Breusch-Pagan test for heteroskedasticity, and Jarque-Bera test for normality, were conducted to ensure model reliability. All analyses were performed using Stata 17.0, with Microsoft Excel used for preliminary data organization.

Unit Root Test

The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests were applied to all variables to assess stationarity, a prerequisite for ARDL modelling. The test's null hypothesis (non-stationarity) was rejected if $p < 0.05$. Variables found non-stationary at level I(0) were differenced to I(1) per standard practice (Pesaran et al., 2001). Before conducting these tests, all variables were transformed into their natural logarithmic form to stabilise the variance and improve normality. This approach is commonly adopted in empirical research to avoid spurious regressions. Studies such as Kyissima et al. (2017) and Kimea and Kiangi (2018) have employed both ADF and PP tests to ensure robustness.

Equation for ADF testing:

$$\Delta Y_t = \alpha + \beta t + \gamma Y_{\{t-1\}} + \sum_{\{i=1\}}^{p} \delta_i \Delta Y_{\{t-i\}} + \epsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots. (1)$$

Where:

ΔY_t represents the first difference of the time series at time t $\{\Delta Y_t = \mathrm{Y_t} - Y_{\{t-1\}}\}$

α represents constant or intercept.

β**:** The coefficient of the time trend (**t**)

βt represents the time trend component.

γ is the coefficient of the lagged value of the series, which tests for the presence of a unit root in the series.

P is the number of lagged differences of the dependent variable selected by (AIC)

ϵ_t represent error term

Equation For Phillip Perron (P-P)

$$\Delta Y_t = \alpha + \beta t + \gamma\, y_{\{t-1\}} + \epsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots. (2)$$

Where:

ΔY_t represents the first difference of the time series at time t $\{\Delta Y_t = \mathrm{Y_t} - Y_{\{t-1\}}\}$

α represents constant or intercept.

βt represents the time trend component.

ϵ_t represent error term

γ is the coefficient of the lagged value of the series, which tests for the presence of a unit root in the series.

The PP test has a similar structure but adjusts for serial correlation and heteroskedasticity differently using nonparametric statistical methods. The unit root result indicated that some variables (Real GDP, Health Expenditure, Education Expenditure, General Public Services Expenditure, trade openness) were nonstationary at level 1(0] but became stationary after first differencing I (1). Others like Exchange Rate were stationary at level I (0).

Model Specification

The combination of I(0) and I(1) integration levels led to the selection of the ARDL model, which is suitable for such datasets. The model can examine both the short-run dynamics and long-run equilibrium relationship simultaneously. This methodological approach aligns with studies such as Kunwar (2019), Onifade et al. (2020), and Mosha et al. (2021), which applied ARDL to assess the effects of various government expenditures on economic growth. The model incorporates a comprehensive set of variables reflecting government spending priorities according to COFOG classification.

General Functional Form:

$$\Delta \mathrm{lnRGDP}_{\mathrm{t}} = \gamma_0 + \gamma_1\, lnRGDP_{\{t-1\}} + \gamma_2\, lnEE_{\{t-1\}} + \gamma_3 lnHE_{\{t-1\}} + \gamma_4 lnGPSE_{\{t-1\}} + \gamma_5 lnDE_{\{t-1\}} + \gamma_6\, lnER_{\{t-1\}} + \gamma_7 lnTO_{\{t-1\}} + \sum_{\{i=1\}}^{\{p\}} \alpha_1\, \Delta lnRGDP_{\{t-i\}} + \sum_{\{i=0\}}^{\{q\}} \alpha_2\, \Delta lnEE_{\{t-i\}} + \sum_{\{i=0\}}^{\{q\}} \alpha_3\, \Delta lnHE_{\{t-i\}} + \sum_{\{i=0\}}^{\{q\}} \alpha_4\, \Delta lnGPSE_{\{t-i\}} + \sum_{\{i=0\}}^{\{q\}} \alpha_5\, \Delta lnDE_{\{t-i\}} + \sum_{\{i=0\}}^{\{q\}} \alpha_6\, \Delta lnER_{\{t-i\}} + \sum_{\{i=0\}}^{\{q\}} \alpha_7\, \Delta lnTO_{\{t-i\}} + \lambda ECMt - 1 + \epsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots .. (3)$$

Where:

$\mathbf{\Delta RGDP_t}$**=** represents the first difference of GDP

$\boldsymbol{\gamma_0}$= Intercept term

$lnRGDP_{t-1}$, EE_{t-1}, HE_{t-1}, ... TO_{t-1} represent lagged levels of the dependent and independent variables, while γ_1 to γ_7 are the parameters that capture the long-run equilibrium relationships.

$\sum\alpha_1\Delta lnRGDP_{t-i}$ to $\sum\alpha_7\Delta lnTO_{t-i}$ capture the short-run changes in GDP due to changes in each explanatory variable

q is the optimum lag length of the independent variable (EE, HE, GPSE …)

ε_t = Error term captures all other unobserved GDP influences

$\boldsymbol{\lambda}$**=** Speed of adjustment must be negative

ARDL Bound Test for Cointegration.

Given that the variables were integrated at different orders, I(0) and I(1), the ARDL bound test was used to test for the presence of a long run cointegrating relationship between the dependent and independent variables. The ARDL approach is particularly useful in correcting for endogeneity and preventing spurious results (Mosha et al., 2021). Once the cointegrating relationship was confirmed, the error correction model (ECM) component of ARDL was used to analyse the short-run dynamics. This approach is widely supported in empirical literature, including by Mosha et al. (2021) and Ndanshau and Mdadila (2023), who investigated the economic effects of government expenditure in Tanzania.

Lag Length Selection

Selecting the appropriate lag length is crucial for modelling the dynamic relationship between government spending priorities and economic development in Tanzania. The number of lagged terms in a time-series model directly affects the accuracy and reliability of results, particularly in tests for causality and cointegration. For instance, Johansen's cointegration approach relies on correct lag selection to avoid biased estimations and spurious relationships (Mwamkonko, 2021). To determine the optimal lag length, this study used standard selection criteria, including the Akaike Information Criterion (AIC), Schwarz Criterion (SC), and Hannan-Quinn Criterion (HQC). These criteria help balance model complexity and goodness-of-fit. AIC tends to allow more lags to improve model fit; SC is more conservative and penalises additional lags more heavily to prevent overfitting, while HQC provides a middle ground between the two. By comparing these criteria, the study ensures that the chosen lag structure optimally captures the underlying dynamics.

Previous studies, such as Paul and Furahisha (2017), Kimea and Kiangi (2018), Mwamkonko (2021), Buthelezi (2023), and Mosha et al. (2021), have successfully applied these criteria to establish suitable lag structures. Following this approach ensures that the model effectively captures the temporal effects of government spending on economic growth, leading to more robust and reliable econometric analysis.

Granger Causality Test

The study employs the Granger causality framework to empirically examine the directional relationships between government expenditure allocations and economic development, directly addressing the first specific objective regarding causal relationships. The test investigates three potential scenarios: whether sectoral government spending (General Public Service, Defence, Education and Health) Granger causes GDP growth; whether GDP growth Granger causes changes in expenditure patterns; or whether a bidirectional relationship exists between these variables.

Previous studies such as Kimea & Kiangi (2018), Kyissima et al. (2017) and Paul & Furahisha (2017), have successfully applied the Granger Causality test to analyse similar economic relationships. To validate this relationship, two core equations are estimated.

Equation (4.0): Testing Whether Lagged Government Spending Priorities Cause GDP Growth.

The first equation examines whether past government spending predicts future GDP growth. It includes expenditures on education, health, and public services and defence along with control variables for trade openness and exchange rates.

$$lnGDP_t = \alpha_0 + \sum_{j=1}^{p} \alpha_1 lnGDP_{t_1} + \sum_{j=1}^{p} \alpha_2 lnEE_{t-j} + \sum_{j=1}^{p} \alpha_3 lnHE_{t-j} + \sum_{j=1}^{p} \alpha_4 lnGPSE_{t-j} + \cdots$$

$$+ \sum_{j=1}^{p} \alpha_7 lnTO_{t-j} + \sum_{j=1}^{p} \alpha_8 lnER_{t-j}$$

$$+ \epsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (4.0)$$

Where,

$_{ln}GDP_t$ = Real GDP at time t

lnEE = Government Expenditure on Education

lnHE = Government Expenditure on Health

lnGPSE = Government Expenditure on public services

lnTO = Trade Openness

lnER = Exchange Rate

ϵt = Error term capturing unobserved influences on GDP

Equation (5.0): Testing Whether GDP Growth Granger Causes Changes in Sectoral Spending

The second equation assesses reverse causality by testing whether GDP growth drives changes in sectoral expenditures for (general public services, education, health and defence). Similar equations are estimated for all other variables, including trade openness and exchange rate.

$$lnEE_t = \beta_0 + \sum_{j=1}^{p} \beta_1 lnEE_{t-j} + \sum_{j=1}^{p} \beta_2 lnGDPr_{t-j} + \sum_{j=1}^{p} \beta_3 lnGPSE_{t-j} + \sum_{j=1}^{p} \beta_4 lnDE_{t-j} + \sum_{j=1}^{p} \beta_5 lnHE_{t-j} + \sum_{j=1}^{p} \beta_6 lnER_{t-j} + \sum_{j=1}^{p} \beta_7 lnTO_{t-j} + \epsilon_t \quad (5.0)$$

Equation 5.0 tests if past spending on Education (EE), Government on public services +…. + Government Expenditure on Health (HE) predict future economic growth, which supports the hypothesis that causality exists. The study determines the optimal number of lags (p) using the Akaike Information Criterion (AIC) to ensure a reliable result.

Diagnostic Tests

The study implemented a comprehensive diagnostic testing protocol to ensure the econometric model's validity by examining key statistical assumptions. Four main tests were conducted: the Breusch-Godfrey test for serial correlation in residuals, the Breusch-Pagan test for heteroskedasticity, the Jarque-Bera test for normality of residuals, and recursive CUSUM/CUSUMSQ tests for parameter stability. These methods, commonly used in Tanzanian econometric research (Mosha et al., 2021; Mwamkonko, 2021), help confirm that the model meets essential regression assumptions, including independent errors, constant variance, and normally distributed residuals.

3.0 RESULTS

This section presents the study's findings on government spending priorities and their impact on economic development in Tanzania. The results provide a comprehensive understanding of how different spending categories influence economic performance. The analysis is presented in three subsections: descriptive statistics of fiscal and macroeconomic variables, long-run determinants of economic growth, and short-run dynamics and adjustment mechanisms.

3.1 Descriptive Statistics (1990–2023)

Descriptive statistics provide an insightful summary of the behaviour and variability of key macroeconomic variables from 1990 to 2023. All variables were log-transformed to stabilize variance

and normalize distributions. Seven variables were analysed, including Gross Domestic Product (GDP) growth rate, Exchange Rate (ER), Trade Openness (TO), and government expenditure components (General Government Public Service, Defence, Education, and Health). Below is a summary of structured findings from Stata/MP 17.0

Table 1: Summary of Descriptive Statistics Findings of the Variables after Transformation

Variable	Mean	Std. Dev.	Minimum	Maximum	N
lnGDPr (GDP growth)	1.52	0.58	-0.54	2.04	33
lnER (Exchange rate)	6.97	0.69	5.27	7.78	33
lnTO (Trade openness)	3.60	0.23	3.18	4.03	33
lnGPSE_GDP (Public services)	2.31	0.61	0.37	2.84	33
lnDE_GDP (Defence)	0.16	0.29	-0.36	0.78	33
lnEE_GDP(Education)	0.99	0.45	0.34	1.53	33
lnHE_GDP (Health)	1.38	0.33	0.71	2.03	33

Source: Author's computations (2025)

Table 1 shows logarithmic transformation of macroeconomic variables (1990-2023) reveals distinct patterns: GDP growth averaged 1.52 log points (5.16% actual) with notable volatility (SD=0.58), reflecting economic sensitivity to shocks. The exchange rate showed persistent depreciation (6.97-7.78 log points) with high volatility (SD=0.69), while trade openness remained remarkably stable with mean 3.60 and SD of 0.23. Sectoral expenditures varied significantly, with public services demonstrating the highest mean (2.31) and defence the lowest (0.16). Health expenditures showed steady growth with mean 1.38 and SD of 0.33, while education spending indicates mean of 0.9 and SD of 0.45 exhibited greater fluctuation. Negative log values for defence spending represent values below 1% of GDP. These transformed metrics provide a normalized foundation for subsequent econometric analysis of expenditure impacts.

3.2 Unit Root Test

The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests were applied to all variables to assess stationarity, a prerequisite for ARDL modelling. The test's null hypothesis (non-stationarity) was rejected if $p < 0.05$. Variables found non-stationary at level I(0) were differenced to I(1) per standard practice (Pesaran et al., 2001).

Table 2: Unit Root Test (ADF & PP)

	At level, I (0)			At level, I (1)		
Variables	ADF Statistics	PP Statistics	Stationary at level	ADF Statistics	PP Statistics	Stationary after first difference
lnGDPr	-2.482	-2.705	No	-6.16	-6.788	Yes
lnER	-5.237	-4.898	Yes	-5.237	-4.898	Yes
lnTO	-1.496	-1.915	No	-3.724	-3.822	Yes
lnGPSE_GDP	-2.992	-3.044	No	-2.992	-3.044	Yes
lnDE_GDP	-1.99	-1.995	No	-4.514	-4.510	Yes
lnEE_GDP	-1.478	-1.404	No	-6.914	-6.955	Yes
lnHE_GDP	-1.986	-2.176	No	-3.657	-3.512	Yes

Source: Author's computations (2025)

Table 2 provide findings for Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests which revealed mixed orders of integration among the variables. At level I(0), only the exchange rate (lnER) demonstrated stationarity in both tests (ADF=-5.237, PP=-4.898). All other variables became stationary after first differencing I(1), with particularly strong results for GDP growth (ADF=-6.16, PP=-6.788) and education expenditure (ADF=-6.914, PP=-6.955). This pattern of mixed integration orders - with variables stationary at either I(0) or I(1) - satisfies the key assumption for employing the ARDL modelling approach, justifying its use for subsequent cointegration and causality analysis.

3.3 Lag-order Selection Criteria

This study established the optimal lag structure for the ARDL model through rigorous evaluation of information criteria, balancing short-run dynamics with long-run equilibrium relationships. While key variables (GDP growth, public service and education expenditures) showed optimal performance at lag 2, the comprehensive model achieved superior fit at lag 4, as evidenced by minimized AIC (-474.073), supported by Hannan-Quinn (-470.487) and Schwarz Bayesian (-462.863) criteria, and confirmed by a significant likelihood ratio test (LR = 10,558, $p < 0.05$). The selection of lag 4, prioritizing AIC's balance between fit and parsimony despite some variables favoring shorter lags, aligns with established econometric practice and previous research (Paul & Furahisha, 2017; Kimea & Kiangi, 2018). The ARDL framework's distinct advantage in accommodating asymmetric lag structures ($p \neq q$) enabled more refined analysis of fiscal policy impacts, with diagnostic tests confirming the model's robustness showing no serial correlation, heteroskedasticity, or non-normal residuals, thus validating its use for subsequent cointegration and error correction analysis.

Table 3: Lag Length Selection Criteria

Lag	LL	LR	df	P	FPE	AIC	HQIC	SBIC
0	48.0119		64	0	9.60E-12	-2.66746	-2.54792	-2.29381
1	243.888	391.75	64	0	1.70E-15	-11.4592	-10.3834	-8.09629
2	360.895	234.02	64	0	1.40E-16	-14.993	-12.9609	-8.64092
3	2072.24	3422.7	64	0	3.0e-62*	-124.816	-121.827	-115.474
4	7351.09	10558*	64	0		-474.073*	-470.487*	-462.863*

Source: Author's computations (2025)

3.4 Residual Diagnostic Test

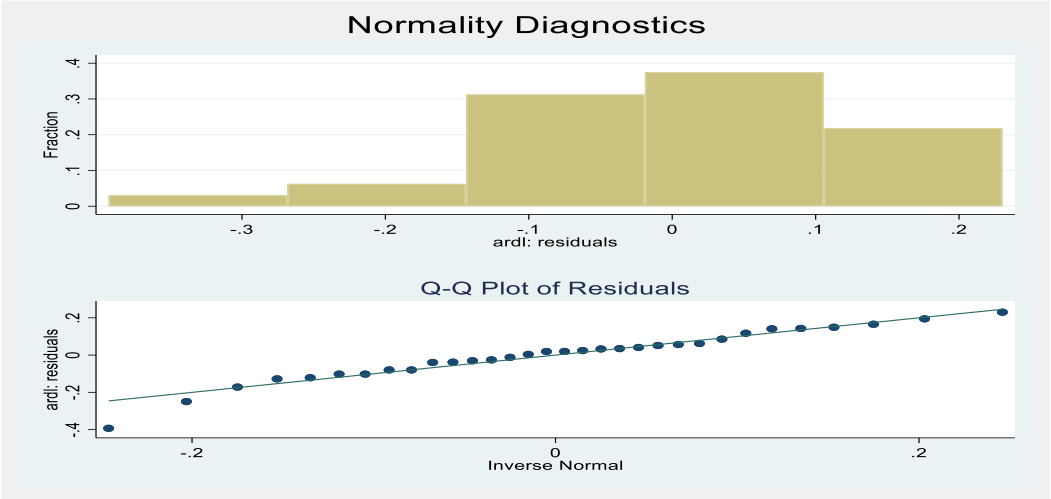
The ARDL model's validity was rigorously assessed through comprehensive diagnostic testing following established econometric protocols (Mosha et al., 2021). Initial tests for serial correlation using the Breusch-Godfrey LM test ($\chi^2 = 2.223$, $p = 0.136$) and heteroskedasticity via the Breusch-Pagan test ($\chi^2 = 0.00$, $p = 0.976$) confirmed the absence of autocorrelation and constant variance in residuals, respectively (Table 4). Normality assessment through the Jarque-Bera test ($\chi^2 = 4.041$, $p = 0.133$) and visual inspection of the Q-Q plot (Figure 1) validated the normal distribution of residuals, with only minor deviations observed. Model stability was further verified through recursive estimation techniques, with both CUSUM and CUSUMSQ test statistics (0.448) remaining well within the 5% critical bounds throughout the sample period (Figure 2, Table 5), indicating no structural breaks in parameters. These diagnostic results collectively confirm that the ARDL model satisfies all necessary assumptions for reliable inference, consistent with methodological standards in recent literature (Ndanshau & Mdadila, 2023; Onifade et al., 2020).

Table 4: Diagnostic Tests

Test	Statistic	p-value	Decision 5%	Conclusion
Serial Correlation Tests				
Breusch-Godfrey LM Test	$\chi^2 = 2.223$	0.136	Fail to reject H_0	No serial correlation
Heteroskedasticity Tests				
Breusch-Pagan Test	$\chi^2 = 0.00$	0.9763	Fail to reject H_0	No Heteroskedasticity
Normality Test				
Jarque-Bera Test	$\chi^2 = 4.041$	0.1326	Fail to reject H_0	Residuals are normally distributed

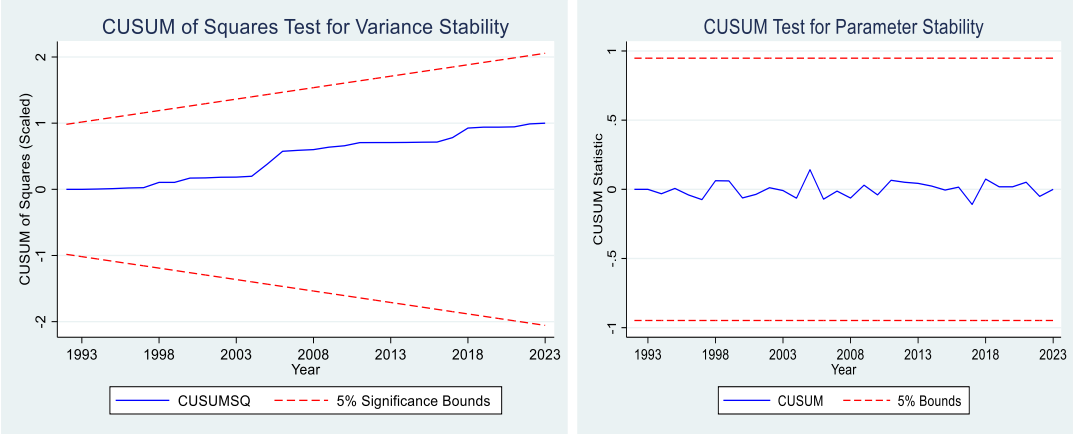
Source: Author's computations (2025)

Figure 1: Normality Diagnostic (Q-Q Plot)



Author's computations (2025)

Figure 2: CUSUM and CUSUMSQ Tests for Model Stability



Author's computations (2025).

Table 5: Cumulative Sum (CUSUM) Test for Parameter Stability

		Critical Value			
Type	**Test Statistic**	**1% e**	**5%**	**10%**	**Decision (5%)**
Recursive	0.448	1.143	0.9479	0.8499	No structural break

Source: Author's computations (2025)

3.5 **Causal Relationship Between Government Spending Priorities and Economic Performance in Tanzania**

This study employed Granger causality tests to analyse the directional relationships between four key government expenditure categories (general public services, defence, education, and health) and GDP

growth in Tanzania from 1990 to 2023. The analysis was preceded by confirmation of cointegration through ARDL bounds testing (F-statistic = 6.497, $p < 0.05$), with optimal lag selection determined using the Akaike Information Criterion (AIC). The results revealed distinct causal patterns across sectors. Education expenditure demonstrated a unidirectional causal effect on GDP growth ($F = 5.326$, $p = 0.021$), supporting Keynesian theory that public investment in human capital stimulates economic performance and prior findings (Lawal et al., 2015). Conversely, GDP growth was found to Granger-cause both health ($F = 18.452$, $p = 0.000$) and defence spending ($F = 20.681$, $p = 0.000$), aligning with Wagner's Law that economic expansion drives increased public expenditures. No significant causal relationship was detected for general public services in either direction ($p > 0.05$), suggesting potential inefficiencies in this spending category indicating inefficiencies (Ahuja & Pandit, 2020). The detail result is presented in table 6 below.

Table 6: Pairwise Granger Causality Test Between Government Spending and Economic Performance

Null Hypothesis	N	F-Statistic	Prob.
GDP growth does not Granger-cause public service expenditure (lnGPSE_GDP)	30	3.051	0.081
Public service expenditure does not Granger-cause GDP growth (lnGDPr)	30	0.399	0.528
GDP growth does not Granger-cause defence expenditure (lnDE_GDP)	30	20.68	0.000
Defence expenditure does not Granger-cause GDP growth (lnGDPr)	30	2.828	0.093
GDP growth does not Granger-cause education expenditure (lnEE_GDP)	30	0.187	0.665
Education expenditure does not Granger-cause GDP growth (lnGDPr)	30	5.326	0.021
GDP growth does not Granger-cause health expenditure (lnHE_GDP)	30	18.452	0.000
Health expenditure does not Granger-cause GDP growth (lnGDPr)	30	0.523	0.470

Table 7: Conclusion Hypothesis (HI)-Causal Relationship

Hypothesis	Relationship	p-value	F-statistic	Direction	Conclusion
H_0	**No causal relationship exists**				
	Public services → GDP growth	0.528	0.399	No relationship	Not Supported (no causality)
	GDP growth → Public services	0.081	3.051	No relationship	Not Supported (no causality)
	Defence → GDP growth	0.093	2.828	No relationship	Not Supported (no causality)
	Health → GDP growth	0.470	0.523	No relationship	Not Supported (no causality)
	Education → GDP growth	0.665	0.187	No relationship	Not Supported (no causality)
H_1	**Significant causal relationship exists**				
	GDP growth → Defence spending	0.000***	20.681	GDP → Defence	Supported (Wagner's L)
	GDP growth → Health spending	0.000***	18.452	GDP → Health	Supported (Wagner's Law)
	Education spending → GDP growth	0.021**	5.326	Education → GDP	Supported (Keynesian Law)

3.6 To Analyse the Short-Run and Long-Run Relationships Between Government Spending Priorities and Economic Performance in Tanzania

This study employed the Autoregressive Distributed Lag (ARDL) model to analyse both short-run dynamics and long-run equilibrium relationships between government expenditures and economic growth in Tanzania from 1990-2023. The ARDL bounds test (Pesaran et al., 2001) with optimal lag structure (1,2,2,2,2,2,0) selected via Akaike Information Criterion revealed strong evidence of cointegration, with an F-statistic of 6.497 exceeding the 5% critical value (3.61) and a significant t-statistic (-4.428). These results confirm a stable long-run relationship between government spending categories and GDP growth, consistent with findings from Alrasheedy & Alrazyeg (2020) and Mosha et al. (2021) Table 8.

Table 8: ARDL Bound Test for Cointegration

		5% significance level		
Statistics	Value	I (0)	I (1)	Conclusion
F-statistics	6.497	2.45	3.61	Cointegration**
t-statistics	-4.428	-2.86	-4.38	Cointegration**
**p < 0.05				

**p<0.05. Decision rules: Reject H_0 if F > I (1) or t < I(1) critical values.

Source: Author's computations (2025)

The long-run estimates (R^2 = 0.9047) demonstrate that health expenditure significantly enhances economic growth (coefficient = 3.132, p = 0.006), supporting the health-led growth hypothesis (Atilgan et al., 2024). A 1% increase in health spending corresponds to a 3.1% GDP growth boost, attributed to improved labor productivity and reduced disease burdens. Conversely, education spending shows a paradoxical negative effect (-4.058, p = 0.012), potentially reflecting inefficiencies in fund allocation (Bexheti & Mustafi, 2015) or skills mismatches (Siafu, 2024). Trade openness (3.093, p = 0.017) and exchange rate depreciation (1.901, p = 0.013) emerge as additional growth drivers, aligning with Sanjo et al.'s (2022) findings on Tanzania's trade liberalization benefits. Public services and defence expenditures show statistically insignificant long-run impacts, suggesting limited productive returns from these allocations. Detail result presented in table 9 below

Table 9: ARDL Long Run Coefficient Estimates

Regressor	Coefficient	Standard Error	t-Statistic	P-value	Significance
lnER (Exchange Rate)	1.901193	0.672661	2.83	0.013	**
lnTO (Trade Openness)	3.093055	1.147256	2.70	0.017	**
lnGPSE_GDP (Public Services)	0.960176	1.038084	0.92	0.371	
lnDE_GDP (Defence Exp.)	1.712712	1.397811	1.23	0.241	
lnEE_GDP (Education Exp.)	-4.057818	1.409533	-2.88	0.012	**
lnHE_GDP (Health Exp.)	3.132168	0.97081	3.23	0.006	***

Source: Author's computations (2025)

Notes: ***p<0.01, **p<0.05, *p<0.1.

Note : ln represents natural logarithm.

Short-run dynamics, captured through the Error Correction Model (ECT = -0.632, p = 0.001), reveal immediate positive effects from education spending (2.485, p = 0.000) and lagged defence expenditure (2.104, p = 0.026), though current defence spending shows negative coefficients (-1.596). Public service spending consistently hampers growth (-1.370, p = 0.002), indicating administrative inefficiencies (Sosvilla-Rivero et al., 2025). The robust ECT coefficient confirms rapid annual adjustment (63.2%) to equilibrium after shocks, validating the model's stability (Pesaran et al., 2001). These findings underscore temporal variations in expenditure impacts: while health investments yield sustained growth, education provides short-term stimulus but long-term drag. The results support Nyasha & Odhiambo's (2019) contention that fiscal impacts are sector- and timeframe-dependent. Policy implications emphasize reallocating resources from low-implact sectors (public services) toward health and education, while addressing structural inefficiencies in education spending through vocational training reforms (George, 2020) and improved governance.

Table 10. Short-Run ARDL Estimates

Variable	Coefficient	Std. Error	t-Statistic	P-value	Significance
D1.lnER	0.684443	0.862287	0.79	0.441	
LD.lnER	-2.191235	0.923011	-2.37	0.032	**
D1.lnTO	-1.627227	0.806568	-2.02	0.063	*
LD.lnTO	-2.688865	0.561417	-4.79	0.000	***
D1.lnGPSE_GDP	-1.370368	0.370208	-3.7	0.002	***
LD.lnGPSE_GDP	-0.486302	0.265964	-1.83	0.089	*
D1.lnDE_GDP	-1.595809	0.905418	-1.76	0.100	*
LD.lnDE_GDP	2.104256	0.847340	2.48	0.026	**
D1.lnEE_GDP	2.485373	0.461939	5.38	0.000	***
LD.lnEE_GDP	0.906515	0.325279	2.79	0.015	**
Constant	-16.10993	3.710344	-4.34	0.001	***
ECT (-1)	-0.632010	0.142744	-4.43	0.001	***

Source: Author's computations (2025)

Notes: ***p<0.01, **p<0.05, *p<0.1.

D1. represents first-differenced variables and LD. represents lagged variables.

Table 10: Conclusion Hypothesis (H_2) - Short-Run (SR) and Long-Run (LR) Relationships

Hypothesis	Variable	p-value >0.05 or <0.05	Coefficient	Conclusion
H_0	Public services (LR)	0.371	0.960	Not Supported (insignificant)
	Defence (immediate SR)	0.100	-1.596	Not Supported (insignificant)
H_1	Health (LR)	0.006***	3.132	Supported: Positive LR effect
	Education (SR)	0.000***	2.485	Supported: Positive SR effect
	Education (LR)	0.012**	-4.058	Supported: Negative LR effect
	Public services (SR)	0.002***	-1.370	Supported: Negative SR effect
	Trade (SR)	0.000***	-2.689	Supported: Negative SR effect
	Trade (LR)	0.017**	3.093	Supported: Positive LR effect
	Defence (lagged SR)	0.026**	2.104	Supported: Positive SR effect

Note*:* SR = short-run, LR = long-run. *, **, *** denote significance at 1%/5%/10% levels, H_0 denotes the null hypothesis; H_1 denotes the alternative hypothesis

3.7 Specific Sectors Of Government Spending Influence Economic Development in Tanzania

The findings reveal that specific sectors of government spending have varying impacts on economic development in Tanzania. In the long run, health expenditure (lnHE_GDP) exhibits a statistically significant positive effect on GDP growth, with a coefficient of 3.132 (p = 0.006), indicating that a 1% increase in health spending boosts economic growth by 3.1%. This supports the health-led growth hypothesis, suggesting that improved healthcare enhances workforce productivity and economic performance. Conversely, education expenditure (lnEE_GDP) has a negative long-run effect (coefficient = -4.058, p = 0.012), implying inefficiencies in resource allocation or a mismatch between education outputs and labor market demands. Meanwhile, public services (lnGPSE_GDP) and defence spending (lnDE_GDP) show no significant long-run impact, suggesting that their contributions to growth may be constrained by inefficiencies or non-productive allocations.

In the short run, education expenditure (lnEE_GDP) demonstrates a strong positive effect (coefficient = 2.485, p = 0.000), reinforcing its immediate role in human capital development. However, public service spending (lnGPSE_GDP) negatively affects growth (coefficient = -1.370, p = 0.002), likely due to bureaucratic inefficiencies. Defence spending (lnDE_GDP) shows mixed effects, lagged defence expenditure has a positive impact (coefficient = 2.104, p = 0.026), while immediate spending is insignificant. These results highlight that sector-specific spending influences economic development differently, with health and education being critical but requiring strategic reforms for optimal outcomes.

The null hypothesis (H_0), which states that no specific sector spending influences economic development, is rejected based on the empirical findings. The alternative hypothesis (H_1), which posits that specific sector spending affects economic development, is supported. Key evidence includes Health expenditure significantly boosts long-run growth ($p = 0.006$), validating its developmental role. Education spending has short-run growth benefits ($p = 0.000$) but long-run inefficiencies ($p = 0.012$), indicating sectoral importance but requiring policy adjustments and Defence and public service spending show context-dependent effects, with defence exhibiting short-run benefits and public services lagging.

Thus, the study confirms that sectoral allocation of government spending matters for economic development, but the impact varies by sector, efficiency, and time horizon. Policymakers should prioritize productive investments in health and education while addressing inefficiencies in public service delivery to maximize growth outcomes

Table 11: Conclusion Hypothesis (H_3) Testing on Sector-Specific Government Spending and Economic Development

Hypothesis	Variable	p-value	Coefficient	Effect Direction	Conclusion
H_0	Public services (LR)	p = 0.371	0.960	–	Not Supported (insignificant)
	Defence (immediate SR)	p = 0.100	-1.596	–	Not Supported (insignificant)
H_1	Health (LR)	p = 0.006***	3.132	+	Supported: Positive LR effect
	Education (SR)	p = 0.000***	2.485	+	Supported: Positive SR effect
	Education (LR)	p = 0.012**	-4.058	–	Supported: Negative LR effect
	Public services (SR)	p = 0.002***	-1.370	–	Supported: Negative SR effect
	Trade openness (SR)	p = 0.000***	-2.689	–	Supported: Negative SR effect
	Trade openness (LR)	p = 0.017**	3.093	+	Supported: Positive LR effect
	Defence (lagged SR)	p = 0.026**	2.104	+	Supported: Positive SR effect

Notes: LR = long-run; SR = short-run; Coefficients show % GDP growth change per 1% increase in spending/trade; and *,*,*** denote significance at 1%/5%/10% levels.

3. Discussion

The study found that health expenditure has a significant positive impact on long-term economic growth, with a 1% increase in health spending raising GDP growth by 3.1% (coefficient=3.132; p=0.006). This supports the health-led growth hypothesis and aligns with Atilgan et al. (2024), who demonstrated similar relationships in OECD countries. The results suggest that investments in healthcare infrastructure and preventive services yield substantial developmental returns, likely through improved workforce productivity and reduced disease burden.

Contrastingly, education expenditure showed a negative long-run effect (-4.058; p=0.012), indicating potential inefficiencies in education spending allocation. This finding corroborates George (2020) and Siafu's (2024) observations about skills mismatches and poor industry-academia linkages. However, the short-run results revealed education's positive impact (coefficient=2.485; p<0.001), suggesting its benefits manifest quicker than long-term returns, possibly through immediate human capital improvements. The Granger causality tests confirmed education's unique role as a growth driver (F=5.326; p=0.021), unlike health and defence spending which responded to economic growth rather than causing it.

Trade openness demonstrated strong positive long-run effects (coefficient=3.093; p=0.017), consistent with Sanjo et al.'s (2022) findings about Tanzania's trade liberalization benefits. However, the short-run negative coefficients (-1.627 to -2.689) indicate initial adjustment costs, supporting Samwel's (2016) observations about import competition pressures. The exchange rate's dual effects - positive long-run (1.901; p=0.013) but negative short-run (-2.191; p=0.032) impacts - reveal the complexity of currency dynamics in developing economies.

Defence and public service expenditures showed minimal growth contributions, with defence spending's positive but insignificant long-run coefficient (1.713; p=0.241) aligning with Sosvilla-Rivero et al.'s (2025) findings for stable economies. The negative short-run public service coefficients (-1.370 to -0.486) suggest bureaucratic inefficiencies, consistent with Ahuja & Pandit's (2020) observations about developing country expenditure ineffectiveness. The error correction term's significance (-0.632; p=0.001) confirms the model's stability, with 63.2% annual adjustment to equilibrium.

4. Conclusions

This study provides important insights into how different types of government spending affect economic growth. The findings reveal that not all government expenditures contribute equally to economic development. Health sector investments show the strongest positive impact on long-run

economic growth, suggesting that improving population health yields lasting benefits for the economy. Education spending, while valuable, appears to deliver more immediate, short-run growth effects rather than sustained long-run impacts. This may indicate that while education quickly boosts workforce skills and productivity, its effects may diminish over time without continuous investment and curriculum updates aligned with labour market needs.

The research uncovered concerning patterns in other spending areas. Expenditures on general public services and defence showed minimal positive effects on economic growth, revealing potential inefficiencies in how these funds are allocated and managed. The analysis of cause-and-effect relationships produced particularly interesting results. While increased education spending actively drives economic growth, the relationship works differently for health and defence spending - in these sectors, economic growth appears to lead to higher spending rather than the other way around. This signifies a need to prioritizes and manages different categories of public expenditure to maximize developmental impact.

Additional findings highlight the importance of external economic factors. Trade openness and exchange rate fluctuations significantly influence economic performance, sometimes more directly than certain types of government spending. The study also identified short-run negative effects from public service expenditures, which may reflect bureaucratic inefficiencies or misallocation of resources. The research makes an important theoretical contribution by demonstrating how both Keynesian and Wagner economic principles operate simultaneously in Tanzania's economy, with different types of spending following different economic mechanisms. This complexity underscores the need for carefully designed evidence-based fiscal policies that recognize these varied relationships between public spending and economic performance.

5. Recommendations

Policy Recommendations. The study's findings reveal critical insights for fiscal policy framework. Given the significant positive long-run impact of health expenditure on economic growth, the government should prioritize sustained investment in healthcare infrastructure and preventive services. However, the negative long-run effect of general public service expenditure calls for urgent reforms to improve transparency and efficiency in administrative spending. While education and defence expenditures showed no significant long-run impacts, targeted reforms could enhance their contributions to growth. A comprehensive review of expenditure allocation is needed to ensure resources are channelled toward the most productive sectors, supported by robust monitoring mechanisms to maximize developmental impacts.

Implementations Recommendations. To translate these findings into practice, several concrete measures should be adopted. First, the government should implement performance-based budgeting in the health sector to ensure efficient use of resources while expanding access to primary healthcare. Education spending, emphasis should be placed on vocational and technical training programs aligned with labour market needs to generate immediate employment and productivity gains. The negative short-run effects observed in health and defence spending suggest the need for stronger oversight mechanisms to prevent implementation delays and cost overruns. Complementary policies should include attracting foreign direct investment through regulatory reforms and enhancing trade openness while protecting strategic domestic industries.

Sector-Specific Recommendations. The study recommends differentiated approaches for each expenditure category. In healthcare, focus should be on preventive care programs and infrastructure development, coupled with measures to reduce wasteful spending. Education budgets should prioritize on technical and vocational training that matches labour market needs, potentially adopting IMF-style performance-based budgeting models. Defence spending requires streamlined procurement processes to improve efficiency without compromising national security. General public services, digital transformation through e-governance platforms can significantly enhance transparency and reduce operational costs. These sector-specific strategies should be implemented alongside macroeconomic policies that promote private sector investment and export competitiveness.

CONFLICT OF INTEREST

The author confirms that there are no potential conflicts of interest concerning the publication, public reception, or dissemination of this manuscript.

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