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GOVERNMENT EXPENDITURE AND SECTORAL OUTPUT IN KENYA: AN ASSESSMENT OF SECTORAL ELASTICITIES AND THE MODERATING ROLE OF FISCAL POLICY EFFICIENCY

SOPHIE CLAIRE OMONDI

ADMISSION NO. 101300

A RESEARCH PROPOSAL SUBMITTED TO STRATHMORE BUSINESS SCHOOL IN PARTIAL FULFILLMENT FOR THE DEGREE OF MASTER OF SCIENCE IN DEVELOPMENT FINANCE OF STRATHMORE UNIVERSITY.

JUNE 2026

DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

Name: Sophie Claire Omondi

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Date: 24/06/20256

Approval

The thesis of [Sophie Claire Omondi] was reviewed and approved by the following:

Name of Supervisor: Dr.Farida Abdul

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Date:25-06-2026

ABSTRACT

This study examined the relationship between government expenditure and sectoral output in Kenya over the period 2004 to 2024, with three objectives: to estimate short-run and long-run output elasticities of government expenditure across productive sectors, to determine the differential effects of capital and recurrent expenditure on sectoral output, and to assess whether fiscal policy efficiency moderates the expenditure-output relationship. Grounded in Keynesian Theory, the Theory of Public Sector Productivity and Allocative Efficiency, and Endogenous Growth Theory, the study adopted a positivist philosophy and a quantitative causal design. Six productive sectors; agriculture, manufacturing, construction, energy, ICT, and tourism; were analysed using annual time-series data sourced from the Kenya National Bureau of Statistics, National Treasury, Central Bank of Kenya, and World Bank. Six separate sector-level Autoregressive Distributed Lag (ARDL) models were estimated, with fiscal policy efficiency proxied by lagged sector-specific budget absorption rates and supplemented by a KPI-based descriptive index. Cointegration could not be confirmed for any sector given the small sample, and all long-run elasticity estimates are therefore treated as indicative. Findings revealed substantial variation in sectoral responsiveness: energy and agriculture showed the strongest indicative long-run output responses, while manufacturing exhibited a negative association reflecting persistent structural constraints. Capital expenditure generated stronger and more sustained output effects than recurrent expenditure, particularly in agriculture and energy. Moderation analysis produced interaction coefficients in the theoretically expected positive direction for agriculture, ICT, and manufacturing, but these did not reach conventional statistical significance and are reported as directional rather than conclusive, consistent with the study's limited sample power. The study concludes that the impact of government expenditure on sectoral output depends on the sector, expenditure composition, and fiscal management efficiency, and recommends prioritising capital expenditure in high-responsiveness sectors, strengthening budget absorption and public financial management systems, and institutionalising performance-based budgeting to maximise the developmental impact of public spending in Kenya.

Keywords: government expenditure, sectoral output, fiscal policy efficiency, sectoral elasticity, ARDL bounds testing, budget absorption, Kenya

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ABBREVIATIONS AND ACRONYMS

ADF	Augmented Dickey-Fuller Test
ARDL	Autoregressive Distributed Lag
CBK	Central Bank of Kenya
CPI	Consumer Price Index
ECM	Error Correction Model
FPE	Fiscal Policy Efficiency
GDP	Gross Domestic Product
GE	Government Expenditure
GVA	Gross Value Added
IMF	International Monetary Fund
KNBS	Kenya National Bureau of Statistics
MTP	Medium-Term Plan
PIM	Public Investment Management
PP	Phillips-Perron Test
WB	World Bank

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DEFINITION OF TERMS

Sectoral Output	Sectoral output refers to the total value of goods and services produced within a specific sector of the economy over a defined period. It is often measured in monetary terms and adjusted for inflation to reflect real output levels. In this study, sectoral output will primarily be measured using Gross Value Added (GVA) per sector (OECD, 2023).
Productive Sectors	Productive sectors are branches of the economy that directly contribute to the production of goods and services, thereby driving economic growth, employment creation, and structural transformation. In Kenya, these include sectors such as agriculture, manufacturing, construction, ICT, transport, and tourism, among others as classified in the Kenya Economic Survey (KNBS, 2024).
Elasticity	Elasticity, in economic analysis, is a measure of the responsiveness of one variable to changes in another. This study uses the short- and long-term estimates of the percentage change in sectoral output that results from a one percent shift in government spending (Varian, 2023).
Fiscal Policy	Fiscal policy involves a government's use of spending and taxation to shape macroeconomic conditions. It's a critical tool for influencing factors like overall demand, employment rates, inflation, and economic growth. According to Blanchard & Johnson (2022), it's essential for both economic stability and structural change.

Fiscal Policy Efficiency	Fiscal policy efficiency refers to the extent to which public spending and taxation achieve their intended economic objectives at the lowest possible cost. In this study, it focuses on the ability of government expenditure to translate into measurable sectoral output gains (World Bank, 2023).
Gross Value Added (GVA)	Gross Value Added (GVA) is a measure of a sector's output after subtracting the cost of intermediate goods and services used in its production. It directly indicates a sector's contribution to a country's GDP and is a key metric for evaluating economic performance (United Nations Statistics Division, 2023)
Sustainable Economic Growth	Sustainable economic growth is a long-term increase in an economy's productive capacity that is environmentally responsible, socially inclusive, and resilient. It's an approach to development that ensures current needs are met without jeopardizing future generations (UNCTAD, 2023).

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DEDICATION

This dissertation is dedicated to Almighty God, who has been my source of strength, wisdom, and inspiration throughout this journey.

It is also dedicated to my family, friends, and colleagues whose encouragement, sacrifices, and unwavering support made this achievement possible.

Finally, I dedicate this work to scholars, policymakers, and future researchers committed to advancing knowledge and promoting evidence-based solutions for sustainable economic development.

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Finally, I wish to express my sincere appreciation to my supervisor, Dr. Farida Abdul, for her invaluable guidance, insightful feedback, patience, and support throughout the research process.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Economic growth and structural transformation depend fundamentally on the capacity of economies to generate value across their productive sectors. Sectoral output, typically measured through Gross Value Added (GVA), reflects the net contribution of industries, including manufacturing, agriculture, construction, ICT, and services, to national income (Leontief, 1936; World Bank, 2022). GVA provides a more nuanced understanding of productivity because it accounts for the value created after subtracting intermediate consumption. Globally, economies that have achieved sustained growth have strategically aligned public expenditure with sectoral development, using fiscal policy to support industrial upgrading, human capital formation, and technological innovation.

Sectoral output in 2023–2024 showed uneven recovery globally with manufacturing and services leading growth in advanced economies while agriculture remained dominant in many developing regions. The services sector in India contributed 54.93% to GVA followed by industry at 27.13% and agriculture at 17.94% with overall GDP growth reaching 8.2% in FY 2024–25 (Statistics Times, 2025). China's industrial output grew by 5.8% in 2024 from 4.6% in 2023 driven by high-tech investment and export resilience (State Council of China, 2025). The United States saw total output reach $40.17 trillion with manufacturing contributing $5.69 trillion and agriculture accounting for just 1.1% of GDP while services dominated at over 75% (U.S. Bureau of Labor Statistics, 2025). In Africa, Uganda's GDP grew by 6.1% in FY 2023/24 led by agriculture and services (Ministry of Finance Uganda, 2024). Rwanda posted an impressive 8.9% growth in 2024 with services contributing 48% of GDP, industry 21% (growing by 10%) and agriculture 25% (growing by 5%) (National Institute of Statistics Rwanda, 2024). Ethiopia's sectoral output remained agriculture-heavy, though industry and services are steadily expanding amid macroeconomic reforms (UNDP, 2024).

One of the key policy tools for stimulating economic output is fiscal policy through government spending. According to Musgrave and Musgrave (2020), "government expenditure" includes all government investments, consumption and transfer payments aimed at achieving socio-economic objectives. The IMF (2021) describes it as the financial expenses used to support government functions such as infrastructure, education, defence and public health with the goal of fostering

growth, equity and macroeconomic stability. Empirical research worldwide consistently shows that government spending plays a vital role in macroeconomic growth and stability.

Across advanced and emerging economies, long-term patterns in government expenditure illustrate how fiscal policy Ccan influence structural transformation. South Korea's expenditure trajectory, for example, has shifted over the past four decades from basic services and infrastructure to high-technology R&D, innovation systems, and export promotion. With public spending stabilising around 35-40% of GDP by 2023 (OECD, 2024), the composition of expenditure has increasingly favoured productivity-enhancing sectors, contributing to manufacturing's sustained contribution of roughly 25% of GDP. Malaysia exhibits a similar trend: since the 1990s, its expenditure profile has steadily increased allocations to education, industry, and infrastructure, supporting a diversified economy where manufacturing and services jointly account for more than 80% of GDP (DOSM, 2024). Germany, one of the world's most advanced industrial economies, highlights the developmental impact of a consistently high level of public spending, around 47-48% of GDP, channelled towards social protection, skills development, advanced manufacturing ecosystems, and technological upgrading (OECD, 2024). These examples show that not only the level but also the composition and consistency of public expenditure strongly shape sectoral value addition.

However, in many sub-Saharan African countries, expenditure patterns have expanded without corresponding improvements in sectoral output. Nigeria's recurrent expenditure has grown faster than capital expenditure over the past decade, constraining investments in manufacturing and infrastructure, even as services now exceed 50% of GDP and manufacturing remains below 10% (CBN, 2023). In South Africa, the share of spending devoted to public wages and debt servicing has risen steadily, limiting fiscal space for productive investments and contributing to stagnating manufacturing performance (National Treasury South Africa, 2023). These patterns underscore a broader regional challenge: although governments are spending more, the allocation, efficiency, and execution of expenditure remain major constraints to achieving structural transformation (UNCTAD, 2022).

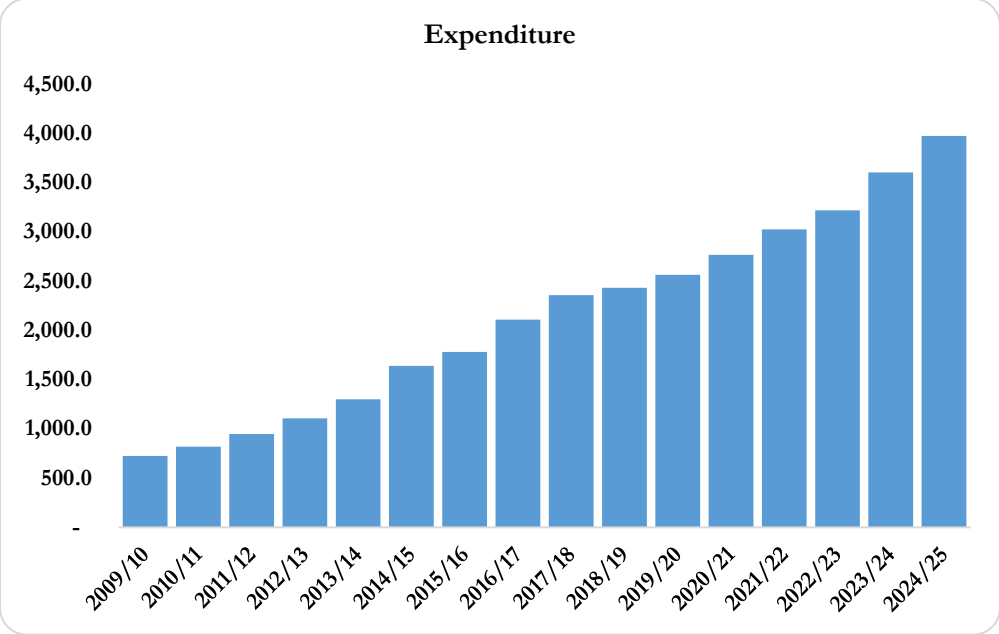
Kenya mirrors these continental dynamics, with public expenditure rising substantially over the past decades,. Since the 2008 global financial crisis, Kenya has consistently increased spending to address infrastructure gaps, strengthen productive systems, and expand social services. Kenya's

economy is structured around 17 sectors as classified by the Kenya National Bureau of Statistics (KNBS) under the International Standard Industrial Classification (ISIC Rev.4). These include agriculture, manufacturing, construction, transportation and storage, information and communication, real estate, financial services, education, health, public administration, water supply, energy, wholesale and retail trade, among others. This study narrows its focus to six of these seventeen sectors, namely agriculture, manufacturing, construction, energy, tourism, and ICT, on the basis of four combined criteria: their direct contribution to Gross Value Added, collectively exceeding 60 percent of GVA; their role as significant sources of formal and informal employment; their designation as priority sectors under Vision 2030 and the Bottom-Up Economic Transformation Agenda; and the availability of a consistent COFOG-classified expenditure data spanning the full 2004 to 2024 period. The remaining eleven sectors, including the dominant services sub-sectors such as wholesale and retail trade, financial services, and real estate, were excluded primarily because they lack a clean, sector-specific COFOG expenditure line, which makes elasticity estimation with respect to government spending methodologically unworkable within this study's design. ICT is retained despite a comparable data constraint because its strategic priority status and the availability of a usable transport-and-communications expenditure line data.

Total government expenditure has grown at an average annual rate of about 12%, peaking above 26% during periods of large-scale capital outlays in energy, transport, and water infrastructure (National Treasury, 2025). Yet the composition of this spending has shifted over time in ways that have implications for sectoral output. Recurrent expenditure, driven by public sector wages, operations, and debt servicing, has grown faster than development expenditure, reducing the share of funds available for long-term productive investments. Development spending, which accounted for over 30% of total expenditure in the early 2010s, has fallen to below one-quarter in several recent fiscal years. This shift has constrained the government's ability to sustain investment in manufacturing, agriculture modernisation, and industry-related infrastructure. At the same time, absorption rates for development expenditure have remained uneven across sectors, often falling below 80% due to procurement delays, weak project planning, and implementation bottlenecks. These expenditure patterns help explain why, despite fiscal expansion, sectoral output has remained relatively unchanged: services dominate with over 50% of GDP, manufacturing remains below 10%, and agriculture fluctuates between 18% and 22% (KNBS, 2024).

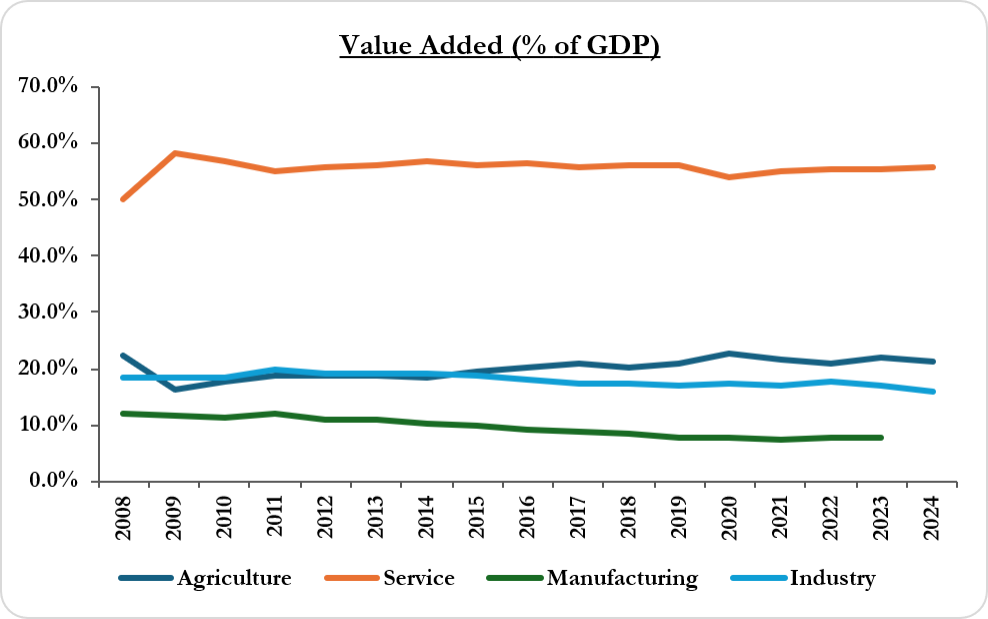
The services sector continues to dominate GDP, consistently contributing more than 50%, while agriculture and manufacturing show stagnant or declining shares. This indicates that rising government expenditure has not been accompanied by proportional increases in productive sector contribution, particularly in agriculture and manufacturing, which are critical for employment and export growth. Instead, the growth pattern appears service-driven, raising questions about the efficiency and sectoral targeting of public spending in stimulating broad-based economic transformation (KNBS, 2024; National Treasury, 2024). *See figure 1 and 2 below.*

Figure 1: Changes in Expenditure over the Years



Source: KNBS, 2024

Figure 2:Sector Value Add over the Years as a % of GDP



Source: KNBS, 2024

This persistent mismatch between rising spending and limited sectoral transformation elevates Fiscal Policy Efficiency (FPE) as a central analytical lens. FPE refers to the extent to which government entities convert fiscal inputs, budget allocations, cash releases, procurement commitments, and operational resources, into measurable outputs and services in a timely, cost-effective, and performance-oriented manner (Afonso, Schuknecht & Tanzi, 2024). In practice, FPE is shaped by two complementary dimensions: the execution dimension, captured by budget absorption and expenditure rates; and the performance dimension, captured by Key Performance Indicator (KPI) achievement rates (Martynenko et al., 2022; Kang & Lee, 2023). Both dimensions serve distinct analytical roles. High absorption rates confirm that funds were disbursed on time and procurement processes functioned, yet they say nothing about whether the spending generated intended outcomes. Conversely, KPI achievement rates reveal the quality and relevance of spending but can be influenced by factors beyond fiscal management, including data reporting inconsistencies. For the purposes of econometric modelling in this study, the lagged budget absorption rate is therefore adopted as the primary quantitative proxy for FPE, as it is consistently available across sectors and over time. KPI achievement rates, where available, are incorporated

as supplementary descriptive indicators to contextualise the efficiency environment in which the econometric relationships are observed.

Evidence from Kenya's Institute of Public Finance (IPF, 2025) illustrates these dynamics clearly. Agriculture suffers from poor alignment between budgets, activities, and performance indicators; the health sector faces delays in essential commodities despite adequate allocation; water and sanitation projects exhibit low completion rates; and major energy projects progress slowly despite large capital outlays. In education, particularly technical and tertiary training, high absorption frequently coincides with low KPI achievement due to weak linkage between funding and programme outputs. These examples demonstrate that high spending does not necessarily translate into high performance, and that sectors with moderate spending but strong execution often generate more tangible development outcomes.

Understanding fiscal efficiency is especially critical when analysing sectoral output elasticities, the responsiveness of sectoral output to changes in government expenditure (Ramey & Zubairy, 2018). High fiscal efficiency strengthens elasticity by ensuring timely utilisation of funds, completion of projects, and delivery of planned outputs. Conversely, low efficiency dampens elasticity by weakening the translation of expenditure into productive activity. In Kenya, this dynamic is evident in agriculture, energy, construction, and the water sector, where high allocations have repeatedly failed to generate commensurate increases in output due to persistent institutional and managerial challenges (IPF, 2025). Incorporating FPE into sector-specific elasticity modelling therefore fills a critical gap in the existing literature.

1.1.1 Sectoral Context

This study focuses on six productive sectors: agriculture, manufacturing, construction, energy, information and communication technology (ICT), and tourism. These sectors were selected on the basis of four criteria: they collectively account for over 60% of Kenya's GVA (KNBS, 2025); these sectors are the largest recipients of government development budget allocations across successive Medium-Term Plans, as evidenced by COFOG Function 04 sub-account expenditure data from National Treasury estimates and KNBS Economic Survey Tables 5.8/6.8 (National Treasury, 2004–2024; KNBS, 2025); they are explicitly identified as priority sectors under Kenya's

Vision 2030 and MTP IV (National Treasury, 2023); and consistent sector-disaggregated data was available for the full study period (2004–2024). The remaining eleven sectors classified under ISIC Rev.4, including real estate, financial services, wholesale and retail trade, water supply, and public administration, were excluded due to limited development expenditure data at the sectoral level, the dominance of private financing, or limited direct linkage between capital fiscal inputs and GVA growth. A brief profile of each sector follows, situating global context alongside the Kenyan experience.

Agriculture

Globally, agriculture remains the primary driver of economic activity and employment in low- and middle-income countries. In Sub-Saharan Africa, the sector accounts for between 15% and 35% of GDP and employs a majority of the rural labour force (World Bank, 2022). Governments across the region have consistently directed development expenditure toward agricultural modernisation, irrigation, input subsidies, and extension services, with the expectation that improved productivity will catalyse broader economic transformation. Evidence from Ethiopia, Tanzania, and Rwanda shows that sustained public investment in agriculture, particularly in smallholder productivity and value chain development, correlates with measurable increases in agricultural GVA (UNDP, 2024; National Institute of Statistics Rwanda, 2024).

In Kenya, agriculture, forestry, and fishing is the single largest sector by GVA, contributing an average of 21.8% to GDP between 2000 and 2024 (KNBS, 2025). In 2024, the sector grew by 4.6%, compared to 6.6% in 2023, due to climatic variability and input cost pressures (KNBS, 2025). Growing crops account for the largest share of agricultural GVA, averaging 15.5% of GDP over the study period (Central Bank of Kenya, 2025). Agriculture also employs over 40% of the total labour force and accounts for approximately 70% of Kenya's foreign exchange earnings through tea, coffee, horticulture, and cut flowers (KNBS, 2025). Despite its centrality, the sector remains highly vulnerable to rainfall variability, limited irrigation infrastructure, rising input costs, and uneven absorption of development expenditure allocations — underscoring the importance of fiscal efficiency in translating public investment into sectoral gains.

Manufacturing

Manufacturing is widely regarded as a key driver of structural transformation because of its capacity to absorb labour, generate export earnings, and create backward and forward linkages across sectors (UNIDO, 2022). In East Asia, countries such as South Korea, Vietnam, and Malaysia have leveraged manufacturing-led growth strategies to achieve rapid increases in GDP per capita, with manufacturing contributing 24–30% of GDP in these economies (OECD, 2024; UNIDO, 2022). Across Sub-Saharan Africa, however, manufacturing's contribution to GDP has remained largely stagnant, constrained by high energy costs, limited access to credit, and competition from cheaper imports (UNCTAD, 2022).

In Kenya, the manufacturing sector's trajectory is a cause for policy concern. According to the KNBS Economic Survey 2025, manufacturing's share of GDP declined from approximately 10.4% in 2007 to 7.3% in 2024, moving further away from Vision 2030's target of 15% and the government's subsequent target of 20% (KNBS, 2025; Kenya Association of Manufacturers, 2024). The sector grew by just 2.3% in real terms in Q3 2024, constrained by high energy costs, competition from imports, and subdued domestic demand (KNBS, 2025). Manufactured goods account for approximately 30.7% of Kenya's merchandise exports, compared with substantially higher shares in comparator industrialising economies, a gap that reflects the sector's limited value chain integration (World Bank, 2024). This sustained underperformance despite significant public expenditure allocations makes manufacturing a critical sector for examining the relationship between fiscal inputs and sectoral output responsiveness.

Construction

The construction sector plays a dual role in economic development: as a direct contributor to GDP through infrastructure creation and as an enabler of growth in other sectors by reducing transaction costs and improving connectivity. Globally, construction contributes between 5% and 10% of GDP in most developing economies, and public spending on infrastructure is consistently associated with positive multiplier effects on other productive sectors (IMF, 2021). In Sub-Saharan Africa, large-scale infrastructure deficits mean that construction-sector investments often produce above-average output multipliers, especially in transportation, energy, and affordable housing (World Bank, 2022). For the Kenyan context, the construction sector contributed approximately 6.72% to GDP in 2024, recovering from a contraction of 0.7% recorded in the same year at the aggregate level due to mid-year fiscal pressures (KNBS, 2025). The sector rebounded strongly in Q3 2024,

recording 3.8% growth compared to a 1.3% contraction in the same period in 2023, driven by a resumption of government infrastructure spending and private-sector residential development (KNBS, 2025). The fourth MTP (2023–2027) earmarks approximately US$58.5 billion for infrastructure over the plan period, reflecting the government's recognition of the sector's catalytic role (National Treasury, 2023). However, the sector experienced significant volatility in 2024 linked to public payment delays and rising construction material costs, with contractor payment arrears creating stoppages on major infrastructure sites (World Bank, 2025). This pattern of government-driven expansion and contraction makes construction an important test case for examining how fiscal expenditure levels and execution efficiency jointly shape sectoral output.

Energy

Access to reliable, affordable energy is a prerequisite for industrial development and productive-sector growth. Globally, countries that achieved rapid industrial transformation made sustained public investments in energy infrastructure that preceded and enabled manufacturing expansion (IEA, 2024). In Sub-Saharan Africa, inadequate and expensive electricity remains one of the most significant constraints on manufacturing and agricultural productivity, with energy costs cited as a primary obstacle to competitiveness (World Bank, 2022). Renewable energy, particularly solar, wind, geothermal, and hydropower, is increasingly central to energy investment strategies across the region, driven by cost reductions and climate commitments. Kenya has made remarkable progress in energy sector development over the study period. National electricity access increased from approximately 30% in 2014 to over 75% in 2024, with the government targeting universal access by 2030 (World Bank, 2025; Ministry of Energy and Petroleum, 2025). Installed electricity generation capacity grew from 1,800 MW in 2014 to 3,321 MW in 2023, with renewable energy accounting for 82% of total installed capacity and 93% of actual electricity generation (Ministry of Energy and Petroleum, 2025).

Kenya leads Africa in installed geothermal capacity at 988 MW and ranks sixth globally as a geothermal electricity producer (Ministry of Energy and Petroleum, 2025). Despite this progress, significant challenges persist: transmission and distribution losses are estimated at 23% of generation (IEA, 2024), and high electricity tariffs continue to undermine manufacturing competitiveness. The energy sector's sustained receipt of large development expenditure

allocations, combined with these structural constraints, provides a rich context for examining fiscal expenditure elasticity and efficiency effects on sectoral output.

Information and Communication Technology (ICT)

The ICT sector has emerged globally as a transformative force for economic development, enabling productivity gains across agriculture, manufacturing, financial services, and trade (GSMA, 2024). In high-income economies, the digital economy contributes between 15% and 25% of GDP, while in developing economies, ICT-led digitisation is increasingly seen as a leapfrogging opportunity to bypass traditional infrastructure constraints (ITU, 2022). In East Africa, Kenya has emerged as the continent's leading technology and innovation hub, driven by pioneering mobile financial services, a robust startup ecosystem, and strong government commitment to digital transformation. Kenya's ICT sector grew at an average of 10.8% annually over the decade to 2024 and is projected to contribute approximately 9.24% of GDP by 2025, up from 7% in 2022 (Business Monitor International, as cited in U.S. Department of Commerce, 2024). In 2023, the mobile ecosystem contributed KSh 1.2 trillion to Kenya's GDP and KSh 212 billion in government revenues (GSMA, 2024). Kenya's M-Pesa mobile payments system is estimated by the World Bank to have contributed approximately 2% to GDP since its launch, and has been adopted across multiple countries in Africa and Asia (World Bank, 2022; GSMA, 2024). As of early 2025, Kenya had 27.4 million internet users, 48% of the population, and 68.8 million mobile connections, of which 94.7% were broadband connections (ITU, 2024). The digital economy is forecast to contribute KSh 662 billion to GDP by 2028, creating an estimated 300,000 jobs and generating KSh 150 billion in additional tax revenues (GSMA, 2024). Despite this dynamism, the sector is partly dependent on government investment in backbone infrastructure and regulatory frameworks, making it relevant to the analysis of public expenditure elasticity.

Tourism

Tourism is a major engine of foreign exchange earnings, employment, and government revenue in many developing countries, particularly those endowed with natural heritage and biodiversity (UNWTO, 2023). Globally, travel and tourism contributed 9.1% of global GDP in 2023 and

supported 295 million jobs (WTTC, 2024). In Africa, tourism is a priority sector in the development strategies of Kenya, South Africa, Tanzania, Morocco, and Rwanda, among others. The COVID-19 pandemic caused the most severe disruption to the global tourism industry on record, with international arrivals falling by 74% in 2020 (UNWTO, 2022). Recovery has since been strong: global arrivals reached 88% of pre-pandemic levels by 2023, while Africa recovered to 96% of pre-pandemic levels in the same year (UNWTO, 2023).

Tourism in Kenya is the second-largest foreign exchange earner after agriculture (Ministry of Tourism and Wildlife, 2025). Before the pandemic, the sector contributed nearly 10% of GDP (Ministry of Tourism and Wildlife, 2025). The pandemic caused a sharp contraction, with international arrivals falling from approximately 2.05 million in 2019 to just 580,000 in 2020 (KNBS, 2024). Recovery has been sustained and strong: arrivals grew to 2.09 million in 2023 and reached a record 2.39 million in 2024, a 14.7% year-on-year increase (KNBS, 2025; Tourism Research Institute, 2025). Tourism earnings grew from KSh 377.49 billion in 2023 to KSh 452.20 billion in 2024, a 19.8% increase, making it the sector's highest-ever earnings performance (Tourism Research Institute, 2025). The World Travel and Tourism Council (WTTC, 2024) projects tourism will contribute approximately KSh 1.2 trillion to Kenya's economy in 2025, representing over 7% of GDP, and will support over 1.7 million jobs. Despite this recovery momentum, the sector remains highly vulnerable to climatic shocks, security perceptions, and global travel disruptions, and has historically exhibited low and inconsistent budget absorption rates (IPF, 2025). Its fiscal-output dynamics are therefore of particular interest in this study.

1.2 Statement of the Problem

Over the past two decades, Kenya has recorded a substantial expansion in public expenditure, increasing from approximately KSh 376 billion in 2005 to over KSh 3.6 trillion in 2023 (National Treasury, 2023). This fiscal growth was expected to catalyse structural transformation, boost productivity, and strengthen output across key sectors such as agriculture, manufacturing, tourism, and construction. However, sectoral performance has not kept pace with expenditure growth. According to the KNBS Economic Survey 2025, manufacturing's contribution to GDP declined from 10.4% in 2007 to 7.3% in 2024, while agriculture continues to exhibit high volatility and vulnerability to climatic shocks despite sustained funding (KNBS, 2025). These trends suggest

that increased public spending has not translated into commensurate improvements in sectoral output.

Empirical literature confirms that government spending influences GDP growth in Kenya (Tiony & Yin, 2023; Ngigi et al., 2023), yet these studies remain largely macro-level and provide limited insight into sector-specific responsiveness. Studies that disaggregate by sector (Gitau & Okeri, 2024; Tenai, 2022; Livingstone & Maingi, 2024) reveal wide variation in output responses, indicating that different sectors react differently to capital and recurrent spending. This underscores the need for sectoral output elasticity estimates that capture both short-term and long-term responsiveness. However, existing research focuses heavily on the magnitude of fiscal inputs while under-examining the quality and efficiency of spending.

Evidence from Kenya and comparable economies highlights persistent fiscal inefficiencies, including low development budget absorption rates, recurrent overspending, procurement delays, weak linkage between budgets and outputs, and inconsistent reporting on performance indicators (Edeh et al., 2021; IMF, 2021). These weaknesses undermine the productivity of public investment and diminish the expected impact of both capital and recurrent expenditure. In Kenya, budget execution reports consistently show that ministries often fall short of their Key Performance Indicators (KPIs) despite receiving substantial allocations, raising concerns about the efficiency with which fiscal resources are transformed into measurable sectoral outcomes.

While fiscal policy efficiency is increasingly recognized as an important determinant of expenditure effectiveness, empirical measurement remains challenging. In this study, the lagged budget absorption rate is adopted as the primary econometric proxy for fiscal policy efficiency because it directly and consistently captures the extent to which allocated resources are translated into actual expenditure and project implementation, and because sector-disaggregated absorption data is available across the full study period. Sectoral KPI achievement rates are utilized only as supplementary descriptive indicators due to potential endogeneity concerns and inconsistencies in reporting across sectors and years.

Despite the growing importance of Fiscal Policy Efficiency (FPE), limited empirical work in Kenya econometrically models efficiency metrics as a moderating variable in sector-specific elasticity frameworks. While some studies acknowledge inefficiencies such as low absorption rates and procurement delays, few quantify how these inefficiencies shape the expenditure-output

relationship across multiple productive sectors simultaneously (Tenai, 2020; Gitau & Okeri, 2024; Livingstone & Maingi, 2024). Few studies distinguish between capital and recurrent expenditure effects at a sectoral level, and even fewer analyse how FPE moderates the relationship between expenditure and output. This results in a critical knowledge gap at the intersection of expenditure composition, fiscal governance quality, and sectoral performance.

This study addresses these gaps by estimating sector-specific elasticities of government expenditure and examining how fiscal policy efficiency, proxied through lagged budget absorption rates and complemented by KPI descriptive evidence, moderates the relationship between fiscal inputs and sectoral output. The findings aim to strengthen evidence-based budgeting, improve public investment management, and support Kenya's structural transformation agenda under Vision 2030 and successive Medium-Term Plans..

1.3 Research Objectives

1.3.1 General Objective

The general objective of this study is to examine the responsiveness of Kenya's economic sectors to government expenditure by estimating sectoral elasticities and assessing the moderating effect of fiscal policy efficiency.

1.3.2 Specific Objective

i. To estimate the short-run and long-run elasticity of output in Kenya's economic sectors in response to government expenditure and identify the sectors that exhibit the highest responsiveness based on growth potential and structural linkages.

ii. To analyze the differential effects of capital expenditure and recurrent expenditure on sectoral output across Kenya's economic sectors between 2004 and 2024.

iii. To assess the moderating effect of fiscal policy efficiency on the relationship between government expenditure and sectoral output in Kenya.

1.4 Research Hypotheses

i. Hypothesis 1:

Null Hypothesis (H_{01}): There is no statistically significant relationship between government expenditure and sectoral output in Kenya's productive sectors from 2004 to 2024.

ii. Hypothesis 2:

Null Hypothesis (H_{02}): There are no statistically significant differences in sectoral output elasticities with respect to recurrent and capital expenditure in Kenya.

iii. Hypothesis 3:

Null Hypothesis (H_{03}): Fiscal policy efficiency does not significantly moderate the relationship between government expenditure and sectoral output in Kenya.

1.5 Scope of the Study

This study investigates how Kenya's productive sectors respond to government expenditure by estimating sector-specific output elasticities, while also assessing how fiscal policy efficiency moderates these responses. The analysis covers the period 2004–2024, a timeframe that captures major transformations in Kenya's fiscal, institutional, and socio-economic landscape. Over this period, Kenya saw significant institutional and fiscal milestones, such as the implementation of the devolved system of government in 2013 under the 2010 Constitution, which altered sectoral priorities and fiscal allocation patterns. Public Financial Management (PFM) reforms implemented between 2012 and 2015 enhanced budget execution, transparency and accountability, while large-scale infrastructure projects such as the Standard Gauge Railway, road network expansions and energy sector investments significantly influenced sectoral output. The timeframe also captures critical shocks and policy responses, including the 2007–2008 post-election crisis, the financial crisis in 2008, and the COVID-19 pandemic, which emerged globally in late 2019 and significantly affected Kenya from 2020, all of which tested fiscal resilience and shaped spending priorities.

The analysis focused on six productive sectors: agriculture, manufacturing, construction, energy, tourism, and information and communication technology (ICT). Annual time-series data comprising 21 observations were utilized to ensure consistency across all variables and data sources. The study investigated the short-run and long-run effects of recurrent and development

expenditure on sectoral Gross Value Added (GVA), while assessing the moderating influence of fiscal policy efficiency. Fiscal policy efficiency was operationalized primarily using lagged budget absorption rates, with sectoral KPI achievement levels used as supplementary descriptive indicators. The geographical scope was limited to Kenya and relied exclusively on secondary data obtained from KNBS, the National Treasury, CBK, World Bank, and IMF databases.

1.6 Significance of the Study

This study will offer insights for multiple stakeholders by quantifying the responsiveness of Kenya's productive sectors to government expenditure and examining how fiscal policy efficiency moderates this relationship.

1.6.1 Policymakers and Government Agencies

The study will offer the National Treasury, the Ministry of Planning, and sector-specific ministries, such as Agriculture, Industrialization, ICT, and Tourism, evidence-based insights on which sectors yield the highest economic returns from government spending. The results can be used to design targeted budgetary allocations that prioritize sectors with proven high responsiveness to fiscal inputs, thereby enhancing the impact of public expenditure. Additionally, the findings will support improvements in Medium-Term Expenditure Framework (MTEF) planning by aligning fiscal allocations with sectoral performance patterns. Overall, the analysis will provide empirical backing for policy reforms aimed at strengthening efficiency in fiscal resource allocation, reducing wastage, and improving public investment management.

1.6.2 Academia and Researchers

The study will contribute to the empirical literature on fiscal policy effectiveness, particularly within the African context where sector-level elasticity analysis remains limited. It will generate a unique dataset spanning two decades (2004–2024), which future scholars can use to replicate, refine, or extend the analysis. By incorporating fiscal policy efficiency as a moderating variable, the research introduces a novel theoretical and methodological dimension to public finance studies. Furthermore, graduate students and policy researchers will find the study's ARDL-based approach and sectoral modeling a valuable practical reference for applied econometrics in development economics.

1.6.3 The Public and Civil Society

For citizens, civil society organizations (CSOs), and watchdog groups, the study enhances transparency and accountability by illustrating how public funds translate into tangible sectoral outputs. It equips advocacy groups with data-driven evidence to demand improved fiscal governance and greater transparency in budget allocations. By identifying sectors with low responsiveness despite receiving significant funding, the study fosters public dialogue on the efficiency and reform of government spending. Additionally, the findings can support community-based planning and encourage active engagement in development programs at both national and county levels, ensuring that public resources are utilized in ways that directly benefit communities.

1.6.4 Private Sector and Industry Associations

Investors, chambers of commerce, and industry-specific associations will be able to use the study's findings to anticipate growth opportunities in sectors where government expenditure has strong and measurable effects. The results will guide private investment decisions by identifying regions or industries where public investment in infrastructure or sectoral programs is expected to boost output, thereby reducing investment risk and enhancing returns. Furthermore, the findings will help foster public–private partnerships (PPPs) by pinpointing areas where collaborative financing can multiply economic returns and create sustainable development impacts. Industry associations can also leverage the evidence to advocate for enabling fiscal policies that enhance competitiveness, stimulate innovation, and improve productivity within their respective sectors.

1.7 Organization of the Study

The research is organized into five chapters. Chapter One introduces the study, covering the background, statement of the problem, research objectives, hypotheses, scope, and significance. Chapter Two provides a thorough review of the theoretical and empirical literature, establishing the conceptual framework and identifying the research gaps that this study addresses. Chapter Three details the research methodology, encompassing the research philosophy, design, data coverage, analytical techniques, and ethical considerations. Chapter Four presents the data analysis and interpretation of findings, including unit root tests, ARDL estimation results, and diagnostic checks. Chapter Five discusses the findings in relation to theory and the existing literature, draws conclusions, presents policy recommendations, acknowledges limitations, and suggests directions for future research..

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter offers a thorough review of the empirical and theoretical literature pertaining to the objectives of the study. It begins by laying the theoretical groundwork through an examination of economic theories that clarify the connection between government expenditure, fiscal policy efficiency, and sectoral output. The chapter then situates this study within three theoretical traditions, Keynesian theory of government expenditure, the theory of public sector productivity and allocative efficiency, and endogenous growth theory, before presenting an integrating theoretical synthesis that demonstrates how the three frameworks jointly explain the fiscal–output interaction studied here. A comprehensive empirical review follows, drawing on evidence from Kenya and comparable international contexts. The chapter concludes with a summary of the literature, identification of the specific research gap addressed by this study, a conceptual framework, and an operationalization of variables.

2.2 Theoretical Review

This study's theoretical framework draws on three complementary bodies of theory: the Keynesian Theory of Government Expenditure, the Theory of Public Sector Productivity and Allocative Efficiency, and Endogenous Growth Theory. Together, these frameworks provide the conceptual scaffolding for understanding how public spending affects sectoral output, why the efficiency of that spending matters, and how institutional quality and knowledge spillovers condition long-run sectoral performance. Each theory is examined below in terms of its origin, key arguments, evolution, and specific relevance to this study.

2.2.1 Keynesian Theory of Government Expenditure

Keynesian theory, introduced by John Maynard Keynes in 1936, challenged the classical view of self-correcting markets. Developed during the Great Depression, the theory argues that economies can stabilize at less than full employment. Keynes proposed that government intervention, particularly through fiscal policy like public spending, is necessary to boost aggregate demand and revive economic activity during downturns. A core principle of this theory is the multiplier effect, where an initial round of government spending generates a larger increase in overall economic output through subsequent spending and investment (Blinder & Solow, 1973). Within this

framework, government spending on things like infrastructure and social programs is seen as a crucial driver of economic performance, not just as consumption.

Over time, Keynesian ideas evolved into Neo-Keynesian economics, incorporating rational expectations, price rigidities, and more dynamic policy tools. Post-Keynesian scholars, including Minsky (1986) and Lavoie (2014), extended the framework to address the structural conditions under which fiscal multipliers are positive, emphasising the role of sectoral composition and financial constraints. Empirically, Autoregressive Distributed Lag (ARDL) and Vector Autoregressive (VAR) models frequently deploy Keynesian assumptions to examine how government expenditure affects employment and output across different time horizons.

The Keynesian approach is particularly relevant to the current investigation. The idea that fiscal expansion increases aggregate demand provides the foundation for examining whether and how Kenya's different productive sectors react to shifts in public spending. The theory has been applied in East Africa by Ndanshau and Mdadila (2023), who found that government size positively affects long-term economic growth in Tanzania, and by Tiony and Yin (2023), whose VAR analysis confirmed that increases in government spending positively influence interest rate dynamics and economic growth in Kenya. However, Keynesian theory has also faced critique: monetarist economists led by Friedman (1968) questioned the long-term effectiveness of fiscal policy, warning against inflationary pressures and inefficiencies. In the context of developing economies like Kenya, where market failures and infrastructure deficits are pervasive, Keynesian ideas remain highly influential and practically relevant, provided the efficiency of spending is adequate.

Keynesian theory operates at the level of aggregate demand and the macroeconomic multiplier. It does not, however, specify the mechanisms through which spending efficiency, allocative quality, or knowledge accumulation shape sectoral-level output responses. The theory therefore requires complementation from the allocative efficiency and endogenous growth frameworks discussed below.

2.2.2 Theory of Public Sector Productivity and Allocative Efficiency

The second theoretical foundation of this study is the Theory of Public Sector Productivity and Allocative Efficiency, which emphasizes the optimal distribution of public resources to maximize social welfare. This theory has its intellectual roots in the public finance literature of Richard Musgrave (1959), who identified three primary functions of government: allocation, distribution,

and stabilization. According to Musgrave, the allocation function involves directing public funds to sectors or goods that the market may underprovide, such as public infrastructure or education.

Over time, this theory was refined to focus specifically on the efficiency of government expenditure in developing countries, where resources are scarce and the return on public investment is critical. Wildavsky (1975) contributed significantly to this evolution, emphasising the importance of performance-based budgeting and programme evaluation to ensure that public spending achieves intended outcomes. Tanzi and Zee (1997) further formalised the distinction between allocative efficiency, directing spending to the right sectors, and technical efficiency, minimising waste in converting inputs to outputs. Afonso, Schuknecht, and Tanzi (2024) synthesised these traditions in their cross-country assessment of public sector efficiency, demonstrating that countries with high expenditure efficiency consistently outperform peers in translating fiscal inputs into productive outputs.

The theory posits that for government expenditure to be productive, it must be directed toward sectors where the marginal social benefit (MSB) exceeds the marginal social cost (MSC), thereby achieving allocative efficiency. Sectors with high economic and social returns, such as agriculture, manufacturing, energy, and ICT, are thus considered priority areas for public investment. This principle is critical for this study's objective of identifying the sectors with the highest responsiveness to fiscal interventions and for enabling evidence-based resource prioritisation.

In the Kenyan context, the theory finds practical expression in the push for programme-based budgeting and results-oriented fiscal frameworks, which aim to link budgetary allocations with measurable development outcomes. Empirical studies such as Gitau and Okeri (2024) on manufacturing sector performance and Livingstone and Maingi (2024) on infrastructure and agricultural spending offer illustrations of how government spending can be evaluated for productivity and effectiveness, implicitly adopting the allocative efficiency lens. The theory acknowledges the role of political economy in public spending decisions: in contexts like Kenya, where historical patterns, regional equity considerations, and political interests often influence allocations, achieving allocative efficiency requires not only technical analysis but also institutional reform and accountability.

While Keynesian theory explains the demand-side stimulus from public spending, and allocative efficiency theory explains why the composition and execution quality of that spending matter, neither framework fully accounts for the long-run, supply-side mechanisms through which public investment generates knowledge spillovers and enduring productivity gains. This gap is addressed by endogenous growth theory.

2.2.3 Endogenous Growth Theory and Institutional Economics

Endogenous growth theory emerged as a response to the limitations of neoclassical growth models, which treated technological progress as exogenous, determined outside the model. Romer (1986, 1990) and Lucas (1988) developed frameworks in which economic growth is driven by endogenous factors, particularly knowledge accumulation, human capital investment, and innovation. Unlike the Solow model, which predicts diminishing returns to capital and convergence, endogenous growth models predict that sustained growth is possible if government investment in knowledge-intensive sectors, education, research and development, ICT, and infrastructure, generates positive externalities and spillover effects that offset diminishing returns.

Romer (1990) formalised the role of research and development (R&D) and technological knowledge as non-rival and partially excludable goods. Public investment in knowledge-creating sectors, including education, ICT, and scientific research, generates spillovers that raise productivity across the economy, providing the theoretical basis for sustained, long-run growth. Lucas (1988) complemented this framework by emphasising human capital as the primary engine of growth, arguing that government expenditure on education and training has particularly high long-run elasticities because of its multiplier effect on the economy-wide productive capacity.

Barro (1990) extended endogenous growth theory to explicitly incorporate government expenditure, modelling productive public spending, on infrastructure, security, and legal systems, as an input into the private production function. In Barro's framework, the optimal level of public expenditure is determined by the trade-off between its productive contribution and the distortionary cost of the taxation required to finance it. This model implies that not all government spending is equally growth-enhancing: expenditure directed at productivity-enhancing sectors, and executed efficiently, generates stronger and more durable output responses than spending on

consumption or low-productivity activities. This is precisely the insight this study seeks to test empirically through sector-specific elasticity estimation.

The relevance of endogenous growth theory to this study lies in its emphasis on the long-run, supply-side effects of public investment. Sectors such as ICT, education infrastructure, energy, and R&D-linked manufacturing are expected, under this framework, to exhibit higher long-run elasticities of output to government expenditure because public spending in these sectors generates knowledge spillovers and capacity multipliers. This provides a theoretical basis for expecting heterogeneity in sectoral elasticities – that is, different sectors should respond differently to the same level of public spending – which is one of the central hypotheses this study tests.

Institutional Economics, associated with North (1990) and Acemoglu, Johnson, and Robinson (2001), provides a complementary framework for understanding why the efficiency of government expenditure varies across sectors and over time. North (1990) argues that institutions, the formal rules, informal norms, and enforcement mechanisms that structure economic interaction, determine transaction costs and therefore shape the returns to investment, both public and private. In contexts where institutions are weak, as is the case in many developing economies, public expenditure suffers from high implementation costs: procurement delays, governance failures, misallocation of resources, and weak monitoring. These institutional constraints reduce the effective returns to government spending, even where the fiscal allocation is adequate.

In the Kenyan context, this institutional lens is highly relevant. Persistent challenges including low budget absorption rates, weak linkage between budget allocations and performance outputs, procurement irregularities, and inadequate project monitoring have been documented across successive budget cycles (IPF, 2025; Controller of Budget, 2024). These institutional deficiencies manifest as reduced fiscal policy efficiency (FPE), which in turn moderates the elasticity of sectoral output to government expenditure. The incorporation of FPE as a moderating variable in this study's econometric model is therefore theoretically grounded not only in allocative efficiency theory but also in the institutional economics tradition: efficiency is not a given, but a function of institutional quality, administrative capacity, and governance frameworks

2.2.4 Theoretical Synthesis: Integrating the Three Frameworks

The three theoretical frameworks reviewed above, Keynesian theory, the theory of public sector productivity and allocative efficiency, and endogenous growth theory, are individually illuminating but become most powerful when considered jointly. This section demonstrates how the three frameworks together explain the core three-way interaction at the heart of this study: between government expenditure (levels and composition), fiscal policy efficiency (quality of execution and governance), and sectoral output (GVA responsiveness).

Keynesian theory provides the demand-side foundation: government expenditure stimulates aggregate demand, generating multiplier effects that boost output across productive sectors. This theory justifies the expectation of a positive relationship between expenditure and sectoral GVA, and motivates the study's first and second objectives, estimating short-run and long-run elasticities and comparing the effects of capital and recurrent expenditure. However, Keynesian theory operates at the aggregate level and does not differentiate between sectors or account for the quality of spending.

The theory of allocative efficiency addresses the compositional and quality dimension: public spending generates maximum output only when it is directed toward sectors with the highest social returns and executed with minimal waste. This framework justifies the distinction between capital and recurrent expenditure in elasticity modelling, the focus on six high-priority productive sectors, and the incorporation of FPE as a moderating variable. It provides the theoretical basis for expecting that even two sectors receiving equal expenditure allocations will exhibit different output elasticities if their execution environments, measured by absorption rates and KPI achievement, differ systematically.

Endogenous growth theory adds the supply-side, long-run dimension: public investment in knowledge-intensive and infrastructure-linked sectors, particularly ICT, energy, and manufacturing, generates spillovers that sustain productivity growth beyond the initial fiscal injection. This framework explains why long-run elasticities are expected to differ from short-run elasticities, and why sectors such as ICT and energy may exhibit above-unity long-run elasticities if their development expenditure generates network externalities and technological capacity multipliers. Institutional economics, as a companion to endogenous growth theory, explains why

these long-run returns are contingent on institutional quality and administrative efficiency — not just on the volume of fiscal allocation.

Taken together, the synthesis implies a conditional expenditure-output model: the impact of government expenditure on sectoral output (Keynesian multiplier) is amplified or dampened by the efficiency with which resources are allocated and executed (allocative efficiency and FPE), and generates stronger long-run effects in sectors with high knowledge and infrastructure spillover potential (endogenous growth). This joint framework directly motivates this study's primary research design: an ARDL model estimating sector-specific elasticities with FPE as a moderating variable, across six sectors selected for their GVA contribution, development expenditure share, and strategic importance under Vision 2030. Figure 3 (Conceptual Framework) in Section 2.5 formalises these relationships visually.

2.3 Empirical Review

This section critically reviews empirical studies on the relationship between government expenditure and sectoral output, with a focus on evidence from Kenya and comparable developing economies. The review is structured around the study's three key objectives: estimating short- and long-run output elasticities, analysing the differential effects of capital and recurrent expenditure on sectoral output, and assessing the moderating effect of fiscal policy efficiency.

2.3.1 Government Expenditure and Sectoral Output Responsiveness: Short-Run and Long-Run Elasticities

Empirical studies increasingly utilise econometric methods to differentiate between the short-term and long-term effects of government spending on sectoral output. While earlier research mainly concentrated on overall GDP, recent investigations — especially in developing countries — have moved toward sector-disaggregated analyses to understand more precisely how fiscal policy impacts productive sectors.

In Kenya, Tenai (2020) used an Autoregressive Distributed Lag (ARDL) model and found that both capital and recurrent spending significantly boost manufacturing output in both the short and long term, emphasising the sector's responsiveness to fiscal stimuli. Wanjala et al. (2023), analysing quarterly data, found that government expenditure positively affected tourism sector

growth from 2012 to 2021, demonstrating the sensitivity of service industries to targeted fiscal interventions. Gitau (2024) showed that despite increasing allocations to manufacturing, the sector's share of GDP has declined, indicating that structural and institutional barriers can limit expected output gains even when spending rises. Matete and Maingi (2024) expanded on this by studying the link between government expenditure and sectoral outputs in infrastructure, agriculture, and manufacturing from 1985 to 2021, confirming that while public spending stimulates demand and productivity, spending efficiency is more crucial for long-term sectoral growth. Ngigi et al. (2023), also employing ARDL methods, provided further evidence on the need to differentiate between short-term shocks and long-term fiscal impacts in sectoral performance analysis.

Evidence from other developing economies aligns with these findings. Ndanshau and Mdadila (2023) observed that government spending in Tanzania positively affects long-term economic growth, though short-term impacts are insignificant, likely due to institutional and absorptive capacity challenges. In Nigeria, Ighoroje and Osevwe-Okoroyibo (2023) showed that both capital and recurrent expenditures significantly boost manufacturing output. While Ukpong et al. (2022) identified a positive link between agricultural output and capital investment. On the other hand, Wang et al. (2021), in a multi-country study, cautioned that excessive recurrent spending may restrict long-term investment and limit sectoral growth potential.

Understanding these elasticities is crucial for measuring how sectoral output responds to fiscal policies and for identifying priority sectors for targeted public investment. Research offers fragmented insights indicating potential priority areas: Tenai (2020) emphasises manufacturing as highly responsive; Wanjala et al. (2023) highlights tourism; and Matete and Maingi (2024) identify agriculture, manufacturing, and infrastructure as vital to Kenya's long-term development. Beyond Kenya, Maji and Saari (2021) show that strategic government investment, particularly in enablers such as renewable energy, can bolster manufacturing and construction sectors. These cases demonstrate that sectors with high elasticities, strong linkage effects, and high growth potential tend to generate the highest returns on public expenditure.

Methodological Debates in Estimating Sectoral Elasticities

A critical but often under-discussed dimension of the empirical literature concerns the methodological debates surrounding the estimation of fiscal elasticities. Understanding these

debates is essential for interpreting the results of any time-series elasticity study, including the present one. First, there is the distinction between short-run and long-run elasticities. In ARDL models, the short-run elasticity captures the contemporaneous or lagged response of sectoral output to a change in government expenditure within the same year, essentially the immediate multiplier effect described by Keynesian theory. The long-run elasticity, derived from the ARDL long-run coefficients or bounds test cointegrating vector, captures the sustained, equilibrium response of sectoral output to a permanent change in expenditure, incorporating adjustment dynamics and supply-side capacity effects. Long-run elasticities are generally expected to exceed short-run estimates because productive investments, particularly in infrastructure, energy, and human capital, take time to fully translate into output gains. Empirically, however, this relationship is not guaranteed: if institutions are weak and fiscal efficiency is low, long-run elasticities may converge toward or even fall below short-run estimates (Barro, 1990; Dorn et al., 2021).

Second, the estimation of long-run elasticities using ARDL requires confirmation of cointegration among the variables, that is, the existence of a stable long-run equilibrium relationship between expenditure and sectoral output. The ARDL bounds testing procedure, developed by Pesaran, Shin, and Smith (2001), tests for cointegration by comparing the F-statistic from a joint significance test of lagged levels against critical value bounds. If the F-statistic exceeds the upper critical bound, cointegration is confirmed and the long-run elasticity is meaningful; if it falls below the lower bound, cointegration is rejected and the estimated long-run relationship is spurious. This procedure is particularly valuable in small samples, as it is valid regardless of whether the underlying variables are integrated of order zero (I(0)), order one (I(1)), or a mixture of both (Pesaran et al., 2001). In the current study, annual time-series data spanning 21 years (2004–2024) are used, and the bounds testing procedure will be applied separately to each of the six sector models. Given the small sample size, the critical values reported by Narayan (2005), which are specifically calibrated for small samples of 30 to 80 observations, are adopted to improve the reliability of cointegration inference.

Third, the interpretation of elasticity magnitudes is important for policy inference. An elasticity of less than one ($|\varepsilon| < 1$) implies that sectoral output is relatively inelastic to government expenditure: a 1% increase in spending generates less than a 1% increase in sectoral GVA. This may reflect structural constraints, execution inefficiencies, or diminishing returns to public investment in that

sector. Conversely, an elasticity greater than one ($|\varepsilon| > 1$) implies that government expenditure generates above-proportional output gains, consistent with strong multiplier effects, large infrastructure spillovers, or significant complementarities with private investment, as predicted by both Keynesian theory and Barro's (1990) productive government expenditure model. A negative elasticity implies that increases in government expenditure are associated with declines in sectoral output, which may reflect crowding-out of private investment, misallocation, or the dominance of recurrent over productive spending (Friedman, 1968; Onifade et al., 2020). Finally, non-stationarity in macroeconomic time series must be addressed before meaningful estimation is possible. If variables contain unit roots (I(1) processes) and are not cointegrated, standard OLS regressions produce spurious results — statistically significant coefficients driven by shared trends rather than genuine economic relationships. This study therefore conducts unit root tests using the Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1981) prior to ARDL estimation, and reports bounds test F-statistics to confirm the validity of any estimated long-run relationships.

Theoretically, the empirical literature on fiscal elasticities is firmly grounded in Keynesian theory's prediction of positive multiplier effects. However, the endogenous growth framework adds that elasticity magnitudes should vary systematically by sector — with ICT, energy, and infrastructure exhibiting higher long-run elasticities due to knowledge spillovers — while the allocative efficiency framework predicts that elasticity magnitudes will be moderated by the quality of expenditure execution. These theoretical predictions generate testable hypotheses that are examined in Chapter Four.

2.3.2 Differential Effects of Capital and Recurrent Expenditure on Sectoral Output

Government expenditure is divided into capital expenditure — which supports infrastructure development and long-term productive assets — and recurrent expenditure — which funds ongoing operations, salaries, maintenance, and service delivery (Ugochukwu et al., 2021). Empirical literature consistently shows that these two categories exert distinct and often asymmetric effects on economic and sectoral performance. Economic theory associates capital expenditure with long-term productivity gains through infrastructure development, capital formation, and expansion of productive capacity, while recurrent expenditure typically supports short-term service delivery and administrative operations (Barro, 1990; Musgrave, 1959).

In Nigeria, Muhammad and Ibrahim (2024) found that capital expenditure shocks explain up to 44% of GDP variance after ten periods, compared to only 5.8% for recurrent spending shocks, providing strong VAR evidence for the superior long-run impact of capital investment. Onifade, Çevik, and Erdoğan (2020) report that recurrent expenditure negatively affects long-run growth, while capital expenditure's positive effect, though expected, is not statistically significant — reflecting the critical role of governance quality. Nwaeze and Avoaja (2022) found that most recurrent spending components in education, health, and agriculture exert negative or insignificant long-run effects on GDP, reinforcing concerns about inefficiency and misallocation.

Studies from Southern and West Africa support these asymmetries. In South Africa, Leshoro (2020) finds that both capital and recurrent expenditure positively affect long-run output, though capital spending has a larger and more significant impact. In Ghana, Mensah and Adukpo (2025) show that capital expenditure significantly drives GDP growth while recurrent spending has a positive but statistically insignificant effect, with delay, cost overruns, and weak monitoring identified as the primary constraints on recurrent spending effectiveness. In Tanzania, Sikwese, Mmasa, and Mwinuka (2022) report that recurrent agricultural expenditure significantly improves agricultural GVA in the long run, even as short-run effects remain weak, suggesting that recurrent operational spending in agriculture may have sector-specific benefits when sustained over time.

Sector-specific evidence provides additional nuance. In Kenya, Tenai (2020) found that both capital and recurrent expenditure positively influence manufacturing output, with capital outlays producing larger long-term gains. Gitau and Okeri (2024) found that capital expenditure significantly enhances manufacturing output while recurrent spending plays a supportive but less impactful role. Wanjala et al. (2023) show that capital investment — in infrastructure, destination upgrading, and public service improvement — exerts a stronger long-run impact on tourism performance compared to recurrent spending. Livingstone and Maingi (2024), assessing multiple Kenyan sectors, found that public spending positively increased output in agriculture and manufacturing, though infrastructure investment had an unexpected negative effect, reflecting inefficiencies in project execution, delays, and cost overruns. They further highlight that ministries with strong budget absorption and timely disbursement perform better relative to their allocations, illustrating the critical role of spending efficiency.

Taken together, the empirical literature demonstrates that capital expenditure tends to exert a stronger and more sustained influence on sectoral output, particularly through infrastructure development, technological improvement, and productive capacity expansion. Recurrent expenditure, although essential for maintaining services and enabling sectoral operations, often has weaker or context-dependent effects. This distinction is theoretically consistent with allocative efficiency theory's argument that the composition of spending matters as much as its volume (Musgrave, 1959; Tanzi & Zee, 1997), and with endogenous growth theory's prediction that capital investment in productive sectors generates spillovers that amplify long-run output gains (Barro, 1990; Romer, 1990). For these reasons, this study's econometric models treat capital and recurrent expenditure as separate regressors, enabling the estimation of distinct elasticities and avoiding the masking of asymmetric effects that results from treating total expenditure as a single variable.

2.3.3 Fiscal Policy Efficiency and Sectoral Output

Empirical literature increasingly emphasises that the effect of government expenditure on sectoral output depends not only on the magnitude of spending but also on the efficiency with which fiscal resources are allocated, executed, and transformed into measurable sectoral outcomes. Fiscal Policy Efficiency (FPE) is conceptualised as the degree to which government entities convert fiscal inputs, budget allocations, cash releases, procurement commitments, and operational resources, into outputs and services in a timely, cost-effective, and performance-oriented manner (Afonso, Schuknecht, & Tanzi, 2024). Efficient fiscal systems enhance productivity by improving project completion rates, strengthening alignment between expenditure and intended outputs, and reducing leakages and wastage.

Recent literature frames FPE as a moderating factor that conditions the relationship between public expenditure and sectoral performance. Andres (2024) demonstrates that the growth effects of public spending are significantly amplified when fiscal governance systems are strong. Dorn et al. (2021) argue that effective fiscal systems optimise spending outcomes through robust budgeting, strong execution capacity, and reliable monitoring frameworks. Chugunov et al. (2021) show that fiscal effectiveness improves with higher institutional quality and administrative efficiency, while Martynenko et al. (2022) and Kang and Lee (2023) highlight the role of performance-based budgeting in linking spending to sectoral outputs. Evidence from Kenya's health sector illustrates

this principle: Musiega et al. (2023) show that sectoral outcomes depend heavily on timely disbursement, procurement efficiency, and absorption rates, which determine whether increased spending translates into improved service delivery.

Empirical findings also show that fiscal policy efficiency enhances the productivity of both capital and recurrent spending. Fang et al. (2023) and Elgar (2024) find that ministries with higher implementation efficiency achieve stronger output responses per unit of expenditure, whereas entities with lower efficiency exhibit weak output elasticity despite large allocations. In Kenya, the Institute of Public Finance (2025) reports that sectors with strong execution, such as energy and water during certain periods, demonstrate higher returns to public spending, while those with persistent procurement delays, low absorption, and poor performance tracking exhibit subdued output growth.

Cross-country studies reinforce this conclusion. Ouertani (2018), applying a DEA-bootstrap approach, finds that higher spending efficiency strongly correlates with both sectoral and aggregate output performance, while countries operating far from the efficiency frontier derive significantly lower returns from public expenditure. Leshoro (2020) similarly shows that in South Africa, the effectiveness of public investment is heavily dependent on expenditure management systems that minimise leakages and procurement inefficiencies. In Ghana, Mensah and Adukpo (2025) observe that delays, cost overruns, and weak monitoring frameworks diminish the contribution of development spending to output, even where capital budgets are relatively large.

Evidence specifically from Kenya confirms comparable dynamics. Despite sustained increases in allocations to agriculture, manufacturing, health, and infrastructure under Vision 2030 and subsequent Medium-Term Plans, Kenya continues to experience persistent inefficiencies including weak linkage between budgets and outputs, low development budget absorption, inadequate monitoring, and delayed procurement processes. Tenai (2020) observes that such inefficiencies have contributed to mixed sectoral performance in manufacturing and construction, where unreliable execution has constrained the output elasticity of public expenditure. The Institute of Public Finance (2025) further demonstrates that ministries with higher disbursement efficiency and better project management consistently demonstrate superior performance outcomes, reinforcing the moderating role of FPE in determining sectoral results.

Maji and Saari (2021), analysing the role of government effectiveness on sectoral production in Nigeria, found that institutional quality significantly influences the success of fiscal measures, with effectiveness indicators consistently outperforming expenditure volume as predictors of sectoral output gains. Their findings echo broader evidence that governance, accountability, and performance management frameworks, all components of FPE, shape the extent to which public spending translates into sectoral growth. These findings are consistent with the institutional economics framework discussed in Section 2.2.3, which holds that weak institutions increase the cost of public expenditure implementation and reduce the efficiency of resource conversion.

Theoretically, the moderating role of FPE is grounded in all three theoretical frameworks reviewed above. From a Keynesian perspective, efficient fiscal execution maximises the realised multiplier by ensuring that allocated funds reach intended beneficiaries and projects are completed on time. From an allocative efficiency perspective, FPE determines whether spending is technically efficient, that is, whether inputs are converted into outputs without excessive waste. From an endogenous growth perspective, efficient institutional environments are prerequisites for public investment to generate the spillovers and complementarities that sustain long-run productivity growth. The convergence of these three frameworks on the importance of fiscal efficiency provides strong theoretical justification for incorporating FPE as a moderating variable in the econometric model employed in this study.

2.4 Summary of the Literature and Research Gap(s)

A review of theoretical and empirical studies reveals several important gaps that justify further investigation into the relationship between government expenditure, fiscal policy efficiency, and sectoral output. Taken together, these gaps define the specific contribution this study makes to the existing body of knowledge.

First, existing research on recurrent and capital expenditure tends to prioritise aggregate GDP effects rather than sector-specific dynamics. Studies such as Nwaeze and Avoaja (2022), Mensah and Adukpo (2025), and Leshoro (2020) focus on national output, offering limited insight into how different categories of public expenditure affect distinct productive sectors. This limits understanding of the heterogeneous and asymmetric transmission mechanisms through which capital and recurrent spending influence sectoral performance. Second, although some studies, including Tenai (2020), Gitau (2024), and Wanjala et al. (2023), have explored sectoral outcomes

in Kenya, their analyses examine individual sectors in isolation. They do not systematically compare sectoral elasticities across multiple productive sectors or account for cross-sector differences in responsiveness to fiscal spending. Consequently, the existing literature does not provide a comprehensive multi-sector assessment revealing which sectors respond most strongly to public expenditure and why. Third, the distinction between capital and recurrent expenditure is not consistently incorporated in sectoral elasticity modelling. While several studies highlight the superior long-run impact of capital expenditure, few employ disaggregated econometric frameworks that estimate separate elasticities for capital and recurrent expenditure across multiple sectors simultaneously, particularly in the Kenyan context.

Fourth, and most critically, limited empirical work in Kenya econometrically models fiscal policy efficiency metrics as a moderating variable within sector-specific elasticity frameworks. While several studies acknowledge inefficiencies, such as low absorption rates, procurement delays, cost overruns, and weak performance monitoring, few formally quantify how these inefficiencies shape the expenditure-output relationship across multiple productive sectors simultaneously (Tenai, 2020; Gitau & Okeri, 2024; Livingstone & Maingi, 2024). The distinction between acknowledging qualitative efficiency concerns and formally modelling FPE as an econometric moderator represents the precise gap this study fills. To be clear, the gap is not that efficiency has been entirely ignored in Kenya's public finance literature, it has not. Rather, the gap is that no existing study simultaneously: (a) estimates sector-specific elasticities disaggregated by expenditure type; (b) incorporates FPE as a formal moderating variable in the ARDL model; and (c) applies this framework across six productive sectors over a two-decade period. This integrated, multi-sector, moderation-based approach is the contribution of the current study.

Fifth, Kenya-specific empirical evidence on the interaction between FPE and sectoral output elasticity remains especially scarce. Although public finance reports highlight systemic inefficiencies across agriculture, manufacturing, water, health, and energy sectors, few empirical studies formally quantify how these inefficiencies moderate the impact of public spending on sectoral outcomes, or estimate whether efficiency differentials explain the divergent output performance observed across sectors.

Table 1: Empirical Literature Review Matrix

No.	Author(s) & Year	Country/Context	Key Findings	Research Gap Identified	How This Study Addresses the Gap
1	Nwaeze & Avoaja (2022)	Nigeria	Recurrent expenditure components in health, education, and agriculture negatively affect long-run GDP; administrative spending positive.	Aggregate focus; no sector-specific output analysis; spending efficiency not measured.	Estimates sector-specific elasticities and incorporates fiscal efficiency as a moderating variable.
2	Muhammad & Ibrahim (2024)	Nigeria	Capital expenditure shocks explain up to 44% of GDP variance; recurrent shocks account for only 5.8%.	Focuses on aggregate GDP; sectoral heterogeneity in expenditure responsiveness unexplored.	Disaggregates spending and estimates separate elasticities for capital and recurrent expenditure across six productive sectors.
3	Onifade, Çevik & Erdoğan (2020)	Nigeria	Recurrent expenditure negatively affects long-run growth; capital expenditure's positive effect is not statistically significant.	Fiscal efficiency and sectoral transmission mechanisms not considered.	Introduces fiscal policy efficiency as a moderating factor and estimates sector-disaggregated effects.
4	Leshoro (2020)	South Africa	Both capital and recurrent expenditure positively affect long-run growth; capital spending has a larger impact.	Single-country aggregate analysis; no multi-sector comparison of expenditure responsiveness.	Provides multi-sector elasticity comparison using sector-disaggregated ARDL models.
5	Mensah & Adukpo (2025)	Ghana	Capital expenditure significantly drives GDP growth; recurrent spending positive but insignificant;	Efficiency concerns acknowledged but not formally modelled or incorporated into	Incorporates efficiency indicators — lagged absorption rates and KPI achievement — into the

No.	Author(s) & Year	Country/Context	Key Findings	Research Gap Identified	How This Study Addresses the Gap
			implementation weaknesses noted.	elasticity estimation.	econometric model.
6	Sikwese, Mmasa & Mwinuka (2022)	Tanzania	Recurrent agricultural expenditure significantly raises agricultural GVA in the long run; short-run effects weak.	Single-sector analysis restricted to agriculture; cross-sector differences in responsiveness unexamined.	Extends sector-specific analysis to six productive sectors, enabling cross-sector comparison.
7	Ndanshau & Mdadila (2023)	Tanzania	Development spending has a strong and sustained long-term impact on economic output.	Efficiency of spending not modelled; interaction between expenditure and institutional quality unexplored.	Examines the capital expenditure–FPE interaction and its combined effect on sectoral output.
8	Ighoroje & Osevwe-Okoroyibo (2023)	Nigeria	Capital expenditure significantly enhances manufacturing output; recurrent expenditure contributes moderately.	Single-sector manufacturing focus; no recurrent vs. capital comparison across multiple sectors.	Conducts multi-sector analysis with disaggregated capital and recurrent expenditure for six sectors.
9	Ukpong et al. (2022)	Nigeria	Capital spending strongly drives agricultural productivity; recurrent spending plays a supporting operational role.	Elasticity levels not formally estimated; cross-sector comparative framework absent.	Formally estimates output elasticities for agriculture and five additional sectors.
10	Wang et al. (2021)	Global (multi-country)	Excessive recurrent spending restricts long-	Country-specific elasticity estimates not	Provides Kenya-specific elasticity estimates

No.	Author(s) & Year	Country/Context	Key Findings	Research Gap Identified	How This Study Addresses the Gap
			term sectoral investment and growth potential.	provided; developing-economy contexts underrepresented.	disaggregated by sector and expenditure type.
11	Andres (2024)	Multi-country	Growth effects of public spending are amplified where fiscal governance systems are strong.	Framework not applied to developing-country productive sectors or sector-disaggregated data.	Applies the moderating model to Kenya's six productive sectors using panel time-series data.
12	Dorn et al. (2021)	Multi-country	Efficient fiscal systems improve spending outcomes through robust budgeting and strong execution capacity.	Sectoral output implications of efficiency differentials not modelled.	Evaluates how varying efficiency levels — proxied by absorption rates — condition sectoral output responses.
13	Chugunov et al. (2021)	Eastern Europe	Spending efficiency improves with institutional quality; higher efficiency correlates with stronger output performance.	Analysis not disaggregated by productive sector; not applied to Sub-Saharan African contexts.	Uses sector-level data from Kenya to analyse moderated elasticities across six productive sectors.
14	Martynenko et al. (2022)	Multi-country	Performance-based budgeting improves fiscal productivity; KPI frameworks strengthen expenditure-output linkages.	Application to developing economies and productive sector modelling absent.	Applies KPI-linked and absorption-rate indicators to FPE modelling in a developing economy.
15	Kang & Lee (2023)	Asia	Fiscal policy efficiency enhances performance-based outcomes;	No sector-level comparative analysis in	Incorporates KPI achievement and execution rates

No.	Author(s) & Year	Country/Context	Key Findings	Research Gap Identified	How This Study Addresses the Gap
			execution rates shape sectoral returns.	developing economies.	into multi-sector elasticity models for Kenya.
16	Musiega et al. (2023)	Kenya (Health sector)	Timely disbursement, procurement efficiency, and absorption rates determine whether increased spending improves health outcomes.	Single-sector evidence; findings not extended to productive sectors or to an econometric moderation framework.	Extends efficiency analysis from health to all six productive sectors using a unified econometric model.
17	Elgar (2024)	OECD economies	Efficient fiscal systems increase returns to both capital and recurrent spending; efficiency gaps reduce output elasticity.	Lacks developing-country context; sector-specific efficiency–output interactions not modelled.	Applies the FPE moderation framework to Kenya, a developing economy with documented efficiency challenges.
18	Fang et al. (2023)	Asia	High-efficiency ministries show stronger output elasticity; low-efficiency entities show weak output responses despite large allocations.	No multi-sector comparative analysis across a single developing country.	Compares output elasticities across six Kenyan sectors under varying efficiency conditions.
19	Ouertani (2018)	Global	Countries closer to the efficiency frontier achieve stronger output responses; large efficiency gaps reduce public expenditure returns.	No Kenya-specific findings; developing-country sector-level analysis absent.	Provides Kenya-specific FPE–sector–output modelling using ARDL with an interaction term.

No.	Author(s) & Year	Country/Context	Key Findings	Research Gap Identified	How This Study Addresses the Gap
20	Maji & Saari (2021)	Nigeria	Government effectiveness influences sectoral outcomes indirectly; institutional quality shapes fiscal measure success.	Fiscal efficiency not isolated as a direct moderator; elasticity estimates not produced.	Tests FPE as a direct moderating variable affecting the elasticity of sectoral output to government expenditure.
21	Tenai (2020)	Kenya	Government spending affects agriculture, manufacturing, and construction output; execution inefficiencies constrain output gains.	Elasticity not formally estimated; FPE not quantified or incorporated into the econometric model.	Formally estimates ARDL-based elasticities and integrates lagged absorption rates as an efficiency moderator.
22	Gitau & Okeri (2024)	Kenya	Capital expenditure significantly improves manufacturing output; recurrent spending plays a supportive but less impactful role.	Single-sector manufacturing focus; efficiency moderator absent from the model.	Extends the capital–recurrent analysis to six sectors and introduces FPE as a moderating variable.
23	Wanjala et al. (2023)	Kenya	Tourism output responds strongly to capital spending; infrastructure investment produces stronger long-run effects.	Single-sector focus; cross-sector comparison and efficiency moderation absent.	Extends methodology to six productive sectors and incorporates FPE as a moderator.
24	Livingstone & Maingi (2024)	Kenya	Public spending boosts agriculture and manufacturing output; infrastructure spending unexpectedly negative due to execution inefficiencies.	Efficiency concerns identified but not formally modelled or incorporated into elasticity estimation.	Formally models fiscal efficiency as a moderating variable across multiple productive sectors.

No.	Author(s) & Year	Country/Context	Key Findings	Research Gap Identified	How This Study Addresses the Gap
25	Tiony & Yin (2023)	Kenya	Public expenditure positively influences aggregate GDP dynamics; VAR evidence confirms fiscal multipliers.	No sectoral decomposition; sector-specific elasticities and efficiency moderation unexplored.	Produces sector-specific elasticity estimates disaggregated by expenditure type and moderated by FPE.
26	Ngigi et al. (2023)	Kenya	ARDL evidence confirms short- and long-run positive effects of government expenditure on economic growth.	Aggregate analysis; sectoral heterogeneity in fiscal responsiveness not examined.	Disaggregates the analysis to sector level and introduces the fiscal efficiency moderator.

(Source: Author, 2026)

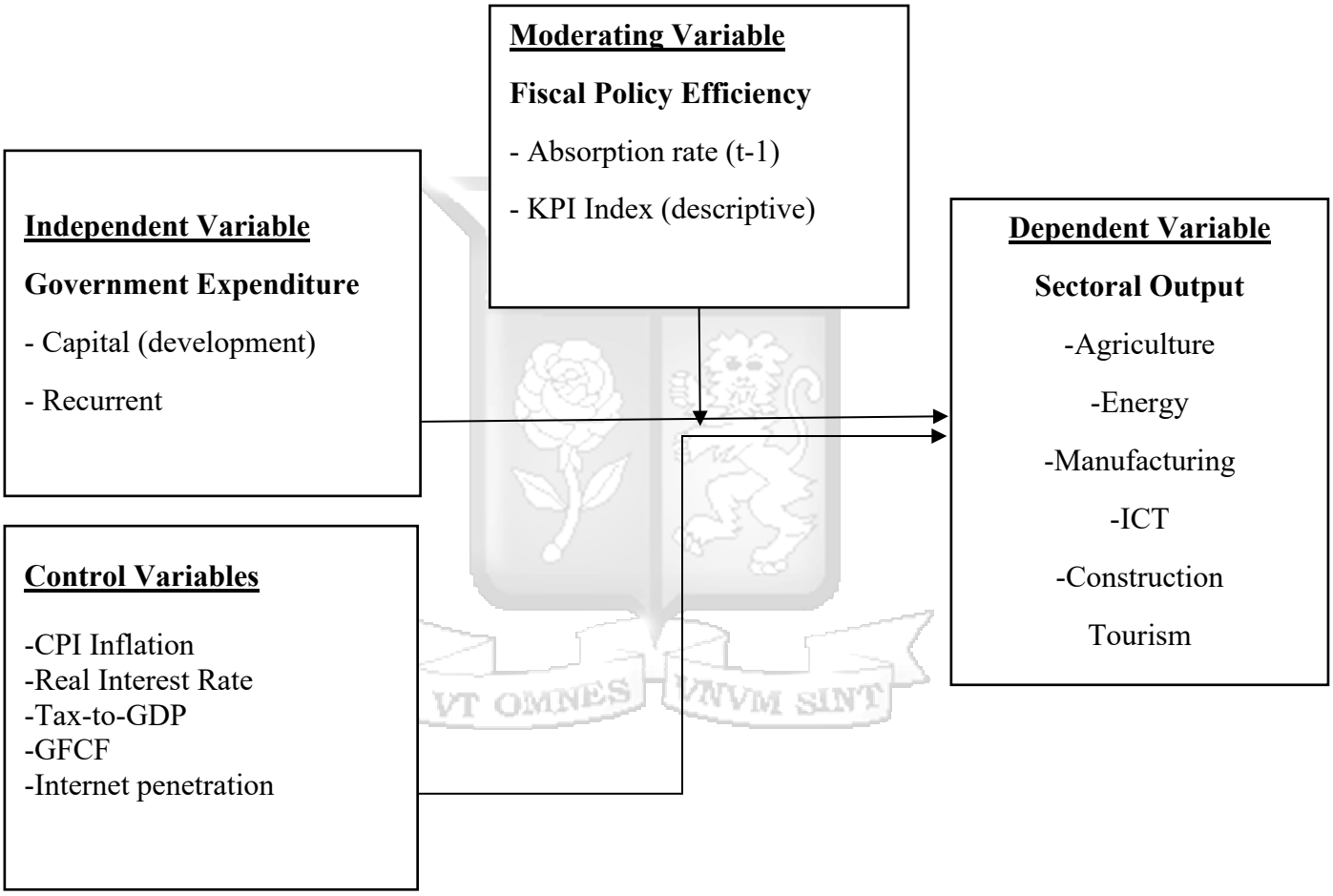
2.5 Conceptual Framework

This study is anchored in a conceptual framework that examines how Kenya's productive sectors respond to government expenditure and how fiscal policy efficiency conditions this relationship. The framework draws on all three theoretical traditions reviewed above: Keynesian theory, which provides the demand-side mechanism; allocative efficiency theory, which emphasises the importance of expenditure composition and quality; and endogenous growth theory, which situates long-run sectoral output within a supply-side, knowledge-driven growth model. Institutional economics provides the backdrop for understanding why FPE varies across sectors and over time.

Government expenditure, encompassing both capital and recurrent spending, is the independent variable. Sectoral output, measured by Gross Value Added (GVA) in constant prices, is the dependent variable. Fiscal Policy Efficiency (FPE), operationalised through the lagged budget absorption rate as the primary econometric proxy and KPI achievement rates as a supplementary descriptive indicator, serves as the moderating variable. The framework posits that the relationship between government expenditure and sectoral output is not fixed but varies conditionally on the level of FPE: under high-efficiency conditions, the expenditure-output elasticity is amplified;

under low-efficiency conditions, it is attenuated. A set of macroeconomic control variables, inflation, real interest rate, tax-to-GDP ratio, Gross Fixed Capital Formation, and internet penetration, are included to isolate the fiscal-output relationship from confounding macroeconomic dynamics.

Figure 3: Conceptual Framework



(Source: Author, 2026)

2.5.1 Operationalization of the Variables

This section outlines the key variables under study and how they will be measured or operationalized in line with the conceptual framework. The focus is on translating theoretical constructs into measurable indicators that will inform data collection and econometric modeling in Chapter 3.

Table 2: Operationalization of Variables

Variable	Type	Operational Definition	Measurement / Indicators	Data Source
Government Expenditure	Independent	Total national government public spending disaggregated into capital and recurrent categories.	Capital expenditure (infrastructure, development projects); Recurrent expenditure (wages, operations & maintenance)	National Treasury; KNBS; World Bank
Sectoral Output	Dependent	Total value of goods and services produced in a specific productive sector, net of intermediate consumption.	Gross Value Added (GVA) per sector in constant prices (KSh millions)	KNBS Economic Surveys 2004–2024; World Bank
Fiscal Policy Efficiency (FPE)	Moderating	The extent to which allocated public resources are translated into actual expenditure and project implementation in a timely and cost-effective manner.	Lagged Budget Absorption Rate (%) — primary econometric proxy; KPI Achievement Rate (%) — supplementary descriptive indicator	Controller of Budget Annual Reports; National Treasury Budget Execution Reports
Inflation Rate	Control	General rise in price levels over time affecting real returns on government expenditure.	Annual percentage change in Consumer Price Index (CPI)	KNBS; CBK; World Bank
Real Interest Rate	Control	Cost of borrowing and monetary conditions affecting private investment and	Real 91-Day Treasury Bill Rate (%)	Central Bank of Kenya

Variable	Type	Operational Definition	Measurement / Indicators	Data Source
		crowding-out dynamics.		
Tax Burden	Control	Government revenue effort relative to the size of the economy; affects fiscal space and private-sector capacity.	Tax-to-GDP Ratio (%)	Kenya Revenue Authority; World Bank
Gross Fixed Capital Formation (GFCF)	Control	Total investment in productive physical assets, capturing private and public capital accumulation beyond government expenditure.	GFCF in constant prices (KSh millions or % of GDP)	World Bank; KNBS
Internet Penetration	Control	Proxy for digital infrastructure development and ICT sector enabling environment.	Internet users as % of total population	ITU; World Bank

(Source: Author, 2026)

2.6 Chapter Summary

This chapter has reviewed the theoretical and empirical foundations of the study, establishing the conceptual basis for examining the relationship between government expenditure, fiscal policy efficiency, and sectoral output in Kenya. Three theoretical frameworks were reviewed: Keynesian theory of government expenditure, which posits that fiscal expansion stimulates aggregate demand and multiplier-driven output growth; the theory of public sector productivity and allocative efficiency, which emphasises that spending must be directed to high-return sectors and executed without waste to generate maximum output; and endogenous growth theory, which holds that public investment in knowledge-intensive and infrastructure-linked sectors generates positive spillovers that sustain long-run productivity growth. Institutional economics was introduced as a complementary lens, explaining why institutional quality and administrative capacity determine the effective returns to public expenditure. A theoretical synthesis was developed to show how all three frameworks jointly explain the three-way interaction between expenditure levels, fiscal efficiency, and sectoral output that is the central focus of this study.

The empirical review surveyed studies from Kenya, Sub-Saharan Africa, and comparator economies on three thematic areas corresponding to the study's three specific objectives: short- and long-run sectoral output elasticities; the differential effects of capital and recurrent expenditure; and the moderating role of fiscal policy efficiency. Key methodological debates in elasticity estimation were also examined, including the distinction between short-run and long-run responses, the role of the ARDL bounds testing procedure in establishing cointegration, the interpretation of elasticity magnitudes above and below unity, and the treatment of non-stationarity in macroeconomic time series. The empirical review confirmed that while government expenditure generally has a positive effect on sectoral output, responses are highly heterogeneous across sectors, expenditure types, and efficiency environments – providing strong empirical motivation for the multi-sector, moderation-based framework adopted in this study.

The summary of the literature identified five specific research gaps, the most critical of which is that no existing study simultaneously estimates sector-specific expenditure elasticities disaggregated by expenditure type, incorporates FPE as a formal econometric moderator, and applies this integrated framework across six productive sectors over a two-decade period in Kenya. The conceptual framework and operationalisation of variables developed in this chapter provide the foundation for the research methodology presented in Chapter Three

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

Research methods are the theoretical processes and statistical techniques used in a study to gather data, select samples and solve problems. This chapter outlines the specific methodological approach used to achieve the study's objectives. It details the guiding research philosophy, the chosen research design, the population definition and the data selection approach. Additionally, it explains the methods for data collection, the analytical techniques, measures for ensuring research quality and the ethical considerations. The methodology provides a robust framework for investigating how Kenya's productive sectors respond to government spending, the mediating role of fiscal policy efficiency and for identifying evidence-based policy solutions.

3.2 Research Philosophy

A research study is grounded in its underlying philosophy, which shapes the overall design as well as the methods used to gather and interpret data. Research philosophy concerns the core assumptions a researcher holds about what constitutes reality (ontology) and how knowledge is acquired or understood (epistemology). In the fields of social and economic inquiry, various philosophical positions offer differing perspectives on how a phenomenon can be examined and understood (Saunders & Thornhill, 2020; Creswell & Creswell, 2022).

Many researchers adopt a positivist stance which views social reality as an external entity to maintain objective distance from the subject of study. This approach relies on the empiricist conviction that valid knowledge must be derived from verifiable, observable phenomena (Bell, Bryman, & Harley, 2022). By seeking to establish universal laws and causal patterns, the positivist framework naturally aligns with quantitative inquiry. Methods such as statistical analysis and econometric modelling are therefore preferred, as they allow for the objective measurement of relationships and the rigorous testing of hypotheses (Saunders & Thornhill, 2020).

The pragmatic paradigm emphasises practical solutions to research problems over strict philosophical adherence. Instead of being limited by a fixed ontology or epistemological stance, pragmatists focus on the research question itself, choosing the most effective methods to resolve it (Creswell & Creswell, 2022). This problem-focused approach often requires a mixed-methods design, combining qualitative and quantitative data for a more comprehensive understanding than

either method alone. In this framework, the value of knowledge is judged by its practical usefulness, its ability to enable meaningful action and tackle complex, real-world issues (Johnson & Onwuegbuzie, 2004).

The positivist research philosophy is adopted for this study. While acknowledging the merits of pragmatism in guiding problem-focused research, this study's specific objectives align more directly with the foundational tenets of positivism. The primary aim was to estimate quantitative elasticities of output responsiveness to government expenditure, which requires precise measurement of variables and the identification of statistically significant relationships. Furthermore, the study sought to investigate how fiscal policy efficiency moderates this relationship, necessitating a framework that supports the rigorous testing of hypothesised interaction effects and causal linkages. Finally, the objective of identifying priority sectors and proposing evidence-based pathways for sustainable economic growth demanded findings that are verifiable, replicable, and generalisable to inform macroeconomic policy decisions. Positivism, through its emphasis on objective measurement, statistical inference, and the pursuit of generalisable findings from quantitative data, provided the necessary framework to generate such actionable insights (Saunders & Thornhill, 2020).

3.3 Research Design

According to Saunders and Thornhill (2020), a research design is the comprehensive strategy that unites all research components to effectively solve a problem. The causal (explanatory) design was selected for this study since it is best suited for exploring cause-and-effect relationships. This approach allowed the examination of how deviations in government expenditure influence sectoral output and how fiscal policy efficiency moderates this relationship within Kenya's productive sectors.

Causal designs are suitable for research seeking to uncover relationships between variables based on their direction and strength (Creswell & Creswell, 2022). In this study, causality is central to understanding not only whether government expenditure influences output, but also which sectors are most responsive and how efficiently fiscal mechanisms transmit these effects. The inclusion of fiscal policy efficiency as a moderating variable necessitated a design capable of modelling interaction effects, further reinforcing the suitability of a causal framework.

This study uses a quantitative approach, examining annual time-series data from 2004 to 2024 to understand both short-term and long-term trends. Quantitative methods are valued for their accuracy, reproducibility, and objective measurement, particularly in econometric modelling (Bryman, 2016). The use of time-series econometric techniques allowed for the estimation of elasticity coefficients for each of the six sectors separately across the full study period, supporting strong policy advice based on empirical data. Specifically, the study estimates six separate sector-level ARDL time-series models, one per sector, rather than a pooled panel model, so that each sector's unique expenditure-output dynamics are captured without imposing the homogeneity constraints that panel estimation would require. This design extends beyond simple correlation by estimating directional effects, controlling for intervening macroeconomic variables, and measuring output responsiveness at the sectoral level. The causal framework is therefore not only suitable but essential for achieving the study's objectives.

3.4 Study Scope and Data Coverage

The study draws on secondary macroeconomic data compiled from official national and international sources, covering the period 2004 to 2024. This yields 21 annual observations per variable, which constitutes a complete enumeration of all available annual data points for the study period. Because the dataset comprises all observations in the defined time frame rather than a subset drawn from a larger population, the concept of sampling, in the statistical sense of selecting a subset from a population, is not applicable to this study. The study's data coverage is therefore more accurately characterised as a census of available annual observations, and no sampling procedure was required or employed (Bryman, 2016; Creswell & Creswell, 2022).

An exhaustive sector coverage was initially applied across all sectors reported in the KNBS national accounts under the International Standard Industrial Classification (ISIC Rev.4). This ensured broad economic coverage and provided a strong foundation for comparing sectoral responses to fiscal interventions. To meet the study’s goals, some sectors were later excluded on the basis of data availability and economic significance, narrowing the focus to six priority sectors: agriculture, manufacturing, construction, energy, tourism and information and communication technology (ICT). These sectors represent over 60% of Gross Value Added (GVA), receive the largest share of development funding and align with the strategic goals of Vision 2030 and MTP IV.

3.4.1 Sector Selection

Kenya's national accounts, as published by the Kenya National Bureau of Statistics (KNBS) under the International Standard Industrial Classification (ISIC Rev.4), recognise seventeen productive sectors. These span primary activities including agriculture, forestry, fishing, mining, and quarrying; industrial sectors such as manufacturing, construction, and energy and water supply; service sectors including wholesale and retail trade, transportation, financial services, tourism and hospitality, real estate, professional services, and ICT; and social infrastructure including education, health, and public administration.

This study focuses on six of these seventeen sectors: agriculture, manufacturing, construction, energy, information and communication technology (ICT), and tourism. The selection was made on the basis of four explicit criteria, each of which was applied consistently across all sectors under consideration.

First, GVA contribution: the six sectors collectively account for over 60% of Kenya's Gross Value Added, a figure derived from author calculations based on KNBS National Accounts data (KNBS, 2025), making them the dominant contributors to national output and the most analytically significant for any study of fiscal-output linkages. Second, development expenditure share: these sectors are the largest recipients of government development budget allocations across successive Medium-Term Plans, as evidenced by COFOG Function 04 sub-account expenditure data from National Treasury estimates and KNBS Economic Survey Tables 5.8/6.8 (National Treasury, 2004–2024; KNBS, 2025). Sectors whose public expenditure is predominantly financed through private channels, such as financial services and real estate, were excluded on the grounds that government spending is not the primary investment driver, and its fiscal elasticity cannot be meaningfully estimated. Third, Vision 2030 and MTP IV priority status: all six sectors are explicitly identified as priority sectors under Kenya's Vision 2030 economic pillar (Government of Kenya, 2007) and the Fourth Medium-Term Plan 2023–2027 (National Treasury & Economic Planning, 2023), providing a direct policy rationale for their inclusion Finally, data availability: consistent sector-disaggregated data for GVA, government expenditure (via COFOG classification), budget absorption rates, and macroeconomic controls were available for the full 2004–2024 study period for these six sectors. The remaining eleven sectors were excluded primarily because they lack a clean, sector-specific COFOG expenditure line, which makes

elasticity estimation with respect to government spending methodologically unworkable within this study's design.

It is acknowledged that the ICT sector presents a partial exception to the data availability criterion, as no dedicated COFOG ICT expenditure line is consistently reported in Kenya's budget execution data. For this sector, the COFOG Function 04.5 Transport and Communications sub-account is used as the closest available proxy for government expenditure that influences ICT-related infrastructure. This is a recognised limitation that is discussed further in Section 3.5 and in Chapter Five. Despite this constraint, ICT is retained given its strategic priority status, its unique role as a knowledge-spillover-generating sector consistent with endogenous growth theory, and the availability of a usable expenditure proxy throughout the study period.

3.5 Data Collection Methods

This study is based entirely on secondary data drawn from audited records of reputable national and international institutions, ensuring high reliability, consistency, and comparability over the full 2004–2024 study period. All data were collected at annual frequency, yielding 21 observations per variable. Table 3 below summarises all variables, their operational proxies, data sources, and collection frequency.

3.5.1 Sectoral Output Data

Sectoral Gross Value Added (GVA) data were sourced from the KNBS Economic Survey dataset, recorded at constant 2016 prices in KSh. millions. GVA at constant prices is used rather than nominal GVA to ensure that estimated elasticities reflect real output changes rather than price-level movements. All GVA series were log-transformed prior to estimation so that the resulting ARDL coefficients are directly interpretable as elasticities. Data were drawn from KNBS National Accounts Tables as published in successive KNBS Economic Surveys from 2009 to 2025.

3.5.2 Government Expenditure Data and COFOG Mapping

Sector-disaggregated government expenditure data were obtained from the Classification of the Functions of Government (COFOG) sub-accounts as reported in KNBS Economic Survey Tables 5.8 and 6.8, and cross-referenced with National Treasury COFOG Estimates of Recurrent and Development Expenditure. The COFOG framework, maintained by the United Nations Statistics

Division, classifies all government outlays by functional purpose, enabling consistent disaggregation of spending by sector over time (IMF, 2014).

The study uses selected COFOG Function 04 sub-accounts as sector-specific proxies for government expenditure. COFOG 04.2 (Agriculture, Forestry, Fishing and Hunting) serves as the primary expenditure proxy for the Agriculture sector, while COFOG 04.3 (Fuel and Energy) is used as the expenditure proxy for the Energy sector. For the Manufacturing and Construction sectors, COFOG 04.4 (Mining, Manufacturing and Construction) is employed as a combined expenditure proxy. Since this classification does not provide a separate breakdown for mining, manufacturing, and construction activities, both sectors share the same expenditure series. This represents a recognised data limitation and is duly acknowledged in both the model interpretation and Chapter Five of the study. Similarly, COFOG 04.5 (Transport) is used as the primary expenditure proxy for the ICT and Tourism sectors due to the absence of dedicated COFOG expenditure lines for either sector. This approach reflects the bundled nature of transport and communications infrastructure spending within Kenya's fiscal classification framework. The use of this combined expenditure proxy is also recognised as a methodological limitation and is considered when interpreting the study findings.

It is acknowledged that ministry-based expenditure allocations do not always align perfectly with KNBS sector definitions under ISIC Rev.4. For example, Ministry of Agriculture expenditure may affect not only agriculture GVA but also water and environment sub-sectors; and Ministry of Energy expenditure affects electricity tariffs that flow into manufacturing costs. These spillovers are inherent in any COFOG-based sector expenditure mapping and represent a recognised limitation of the sector-disaggregated approach. To mitigate this concern, the inclusion of control variables, particularly GFCF, which captures economy-wide capital formation, helps to absorb investment-driven output movements that are not directly attributable to sector-specific government expenditure. Additionally, restricting the lag length to a maximum of one period (ARDL(1,1)) reduces the risk of over-fitting expenditure spillovers from adjacent sectors

3.5.3 Fiscal Policy Efficiency Data

The primary econometric proxy for Fiscal Policy Efficiency (FPE) is the sector-specific budget absorption rate, lagged one period (t−1). The absorption rate is defined as actual expenditure as a

proportion of the approved budget allocation for each sector-linked ministry, expressed as a percentage. This measure was sourced from Controller of Budget Annual Reports (2004–2024) and National Treasury Budget Execution Reports. The one-period lag is applied for two reasons: first, to respect the causal ordering assumption that efficiency in period t−1 conditions the output response to expenditure in period t; and second, to avoid the circular dependency that would arise from using a contemporaneous efficiency measure that is itself influenced by current GVA performance.

A supplementary descriptive FPE indicator, the KPI Target Achievement Rate (TAR), was constructed as the mean ratio of actual GVA growth to planned GVA growth targets across the six sectors annually, derived from published Medium-Term Plan targets and KNBS GVA outturn data. This index is maintained as a descriptive lens to characterise fiscal efficiency periods but is not used as the econometric interaction term, because the TAR is mechanically derived from the same GVA growth data as the dependent variable, which would introduce circularity into the moderation model.

3.6 Data Analysis

This study examines the link between sectoral output and public spending in Kenya using the Autoregressive Distributed Lag (ARDL) bounds testing framework developed by Pesaran, Shin, and Smith (2001). The analysis is structured in four steps. First, all variables are subjected to unit root pre-testing to confirm that none are integrated of order two or higher, which is a pre-condition for the ARDL approach. Second, baseline ARDL models are estimated for each of the six sectors to produce short-run and long-run elasticity estimates corresponding to Objective 1 (and implicitly Objective 2, which requires separate capital and recurrent expenditure models). Third, an extended ARDL model incorporating an interaction between government expenditure and the lagged FPE proxy is estimated for four sectors to address Objective 3. Fourth, diagnostic tests are conducted on all estimated models to assess serial correlation, heteroskedasticity, functional form, normality, and parameter stability.

3.6.1 Pre-Estimation: Unit Root Testing

Prior to model estimation, the stationarity of all time-series variables was assessed using two complementary unit root tests: the Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1981) and the Phillips-Perron (PP) test (Phillips & Perron, 1988). Both tests were conducted with a constant and no trend, which is appropriate for the economic time series used in this study. The ARDL bounds testing approach is valid when variables are integrated of order zero I(0), order one I(1), or a mixture of both; the pre-condition is that no variable is integrated of order two I(2) or higher (Pesaran et al., 2001). If any variable were I(2), the bounds test critical values would be invalid and standard ARDL estimation would be inappropriate.

Unit root tests were conducted on the full level series and, where necessary, on first differences. Variables confirmed as I(0) are included directly in the ARDL model at levels; variables confirmed as I(1) enter the bounds test framework through their first-differenced short-run terms and lagged levels in the ARDL unrestricted error correction form. The results of the unit root tests are reported in Chapter Four (Table 4). All variables in the study were confirmed to be either I(0) or I(1), and no variable was found to be I(2), satisfying the pre-condition for ARDL estimation.

3.6.2 Baseline ARDL Model Specification

The study estimates six separate ARDL time-series models, one for each productive sector. Each model treats the sector's log-transformed GVA as the dependent variable and includes the log of sector-specific government expenditure, the lagged FPE proxy, and the five macroeconomic control variables as regressors. The models are estimated separately rather than as a pooled panel, because the study's theoretical framework, drawing on endogenous growth theory and allocative efficiency theory, predicts that expenditure-output elasticities will differ substantially across sectors. Imposing a common coefficient structure through panel estimation would mask these sectoral differences, which are themselves a central object of the analysis. Each sector therefore constitutes an independent time-series estimation with its own coefficients.

The baseline ARDL model specification for each sector s over time t is:

$$\Delta \ln(Y_{s,t}) = \alpha_0 + \Sigma^{b}_{i}\, \Delta \ln(Y_{s,t-i}) + \Sigma \delta_{1i}\, \Delta \ln(GE_{s,t-i}) + \Sigma \gamma_{ji}\, \Delta CV_{j,t-i} + \lambda_1 \ln(Y_{s,t-1}) + \lambda_2 \ln(GE_{s,t-1}) + \Sigma \mu_j\, CV_{j,t-1} + \varepsilon_{s,t}$$

... (Equation 1)

In this specification, ln(Ys,t) denotes the natural logarithm of Gross Value Added (GVA) for sector s at time t, expressed in constant 2016 prices. ln(GEs,t) denotes the natural logarithm of sector-specific government expenditure, sourced from COFOG sub-accounts as described in Section 3.5.2. CVj,t represents the set of macroeconomic control variables: CPI inflation rate, real interest rate, tax-to-GDP ratio, log(GFCF), and internet penetration. The parameters δ_{1i} and γ_{ji} capture the short-run dynamic responses of sectoral output to changes in expenditure and control variables respectively, while λ_2 and μ_j are the long-run level coefficients from which long-run elasticities are derived (as $-\lambda_2/\lambda_1$ for government expenditure, and correspondingly for each control variable). The error term is $\varepsilon_{s,t}$.

Where cointegration is established via the bounds test, the corresponding Error Correction Model (ECM) is estimated to capture the speed of adjustment toward long-run equilibrium. The error correction coefficient is expected to be negative and statistically significant, confirming that short-run deviations from the long-run equilibrium are corrected over time

3.6.3 Lag Length Selection and Small Sample Considerations

A critical methodological consideration in this study is the combination of a large number of parameters and a small sample size. With 21 annual observations per sector and a model containing one dependent variable, one primary independent variable, one moderating variable, an interaction term, and five control variables, yielding six to seven regressors in total, the parameter-to-observation ratio is severely constrained. Green (1991) recommends a minimum of 20 observations per regressor for reliable inference; at 21 observations and up to seven regressors, this study has approximately three observations per regressor, well below the recommended threshold. This is acknowledged as a fundamental limitation of the current study and is addressed in Chapter Five.

To mitigate the underpowering risk, two specific measures are adopted. First, the maximum lag length for both the dependent variable and all regressors is restricted to one period ($p = q = 1$), yielding an ARDL(1,1) specification uniformly across all six sector models. This restriction is applied consistently and is justified by the combination of the small sample, the Akaike Information Criterion (AIC) selection results, and the practical guidance provided by Narayan

(2005), who demonstrates that ARDL(1,1) is often the most parsimonious specification that remains estimable in samples of 20 to 30 observations. The same lag restriction is applied uniformly across all six models to ensure comparability of elasticity estimates across sectors. Second, the critical values for the ARDL bounds test reported by Narayan (2005), which are specifically calibrated for small samples of 30 to 80 observations, are used in preference to the asymptotic critical values of Pesaran et al. (2001), which assume large samples. The Narayan (2005) critical values provide more conservative and appropriate benchmarks for cointegration inference in this study's small-sample context.

It is emphasised that these mitigation measures reduce but do not eliminate the power constraints inherent in estimating ARDL models with 21 observations. Estimated elasticities, particularly long-run coefficients derived from the bounds test cointegrating vector, must therefore be treated as indicative rather than definitive estimates. All findings are reported with this qualification, and the implications for inference are discussed fully in Chapters Four and Five.

3.6.4 Cointegration Testing: ARDL Bounds Test

Following unit root pre-testing and baseline ARDL estimation, the existence of a long-run cointegrating relationship between sectoral output and government expenditure is tested using the bounds testing procedure of Pesaran et al. (2001). The bounds test computes an F-statistic from a joint null hypothesis test on the lagged level terms ($\lambda_1 = \lambda_2 = \mu_j = 0$) in the ARDL unrestricted error correction form. This statistic is then compared against two sets of critical values: the lower bound I(0) critical value, which assumes all variables are stationary at levels, and the upper bound I(1) critical value, which assumes all variables require first differencing. If the computed F-statistic exceeds the upper I(1) bound, the null of no cointegration is rejected and a long-run relationship is confirmed. If the F-statistic falls below the lower I(0) bound, cointegration is rejected. If it falls between the two bounds, the result is inconclusive.

Where the bounds test confirms cointegration, the long-run elasticity of sectoral output with respect to government expenditure is meaningful and is reported as a primary finding. Where the bounds test fails to confirm cointegration, as may occur given the small sample size and low statistical power of the test, long-run coefficient estimates are reported as indicative only, clearly

caveated, and not used as the basis for strong policy conclusions. This distinction is maintained consistently throughout Chapters Four and Five.

3.6.5 Objective 2: Capital versus Recurrent Expenditure

To address the second specific objective — analysing the differential effects of capital and recurrent expenditure on sectoral output — the baseline ARDL model is re-estimated separately using disaggregated capital (development) and recurrent expenditure sub-components as the independent variable, in place of the total expenditure series. This disaggregation is performed for the three sectors for which the COFOG classification provides a consistent split between development (capital) and recurrent expenditure: Agriculture (COFOG 04.2), Energy (COFOG 04.3), and Transport/ICT (COFOG 04.5). For Manufacturing and Construction, whose combined COFOG 04.4 series does not permit a consistent capital/recurrent split over the full study period, disaggregated modelling is not feasible and total expenditure is retained. The comparison of capital and recurrent elasticities across Agriculture, Energy, and Transport/ICT provides direct evidence on whether expenditure composition matters for sectoral output responsiveness, as predicted by allocative efficiency theory (Musgrave, 1959; Tanzi & Zee, 1997).

3.6.6 Moderation Analysis: Fiscal Policy Efficiency

To address the third specific objective, assessing the moderating effect of fiscal policy efficiency on the government expenditure-output relationship, the baseline ARDL model is extended to include the FPE proxy and an interaction term between government expenditure and FPE. The extended ARDL moderation model for sector s at time t is:

$$\Delta \ln(Y_{s,t}) = \alpha_0 + \Sigma\beta_i \, \Delta \ln(Y_{s,t-i}) + \Sigma\delta_{1i} \, \Delta \ln(GE_{s,t-i}) + \Sigma\delta_{2i} \, \Delta FPE_{t-i} + \Sigma\delta_{3i} \, \Delta(\ln(GE_{s,t-i}) \times FPE_{t-i}) + \Sigma\gamma_{ji} \, \Delta CV_{j,t-i} + ECT_{t-1} + \varepsilon_{s,t}$$

... (Equation 2)

In this specification, FPEt represents the moderating variable, operationalised as the sector-specific budget absorption rate lagged one period (t−1). The lagged form is used to respect causal ordering:

efficiency in the prior year conditions the output response to expenditure in the current year, avoiding the reverse-causality problem that would arise if contemporaneous absorption rates were used. The interaction term $\ln(GE_{s,t-i}) \times FPE_{t-i}$ explicitly captures whether the effect of government expenditure on sectoral output varies depending on the prevailing level of fiscal efficiency. A positive and statistically significant interaction coefficient ($\delta_{3i} > 0$) would indicate that government expenditure generates a stronger output response when fiscal efficiency is high, consistent with the theoretical predictions of allocative efficiency theory and endogenous growth theory. A negative coefficient would suggest that inefficiencies weaken the expenditure-output relationship, consistent with institutional economics. ECT_{t-1} is the error correction term, included where the bounds test confirms cointegration in the baseline model.

The moderation model is estimated for four sectors, Agriculture, Energy, ICT, and Manufacturing, for which sector-specific absorption rate data are consistently available across the full study period. Construction is excluded from the moderation analysis because the only available government expenditure proxy, COFOG 04.4, combines mining, manufacturing, and construction, making it impossible to derive a construction-specific absorption rate that would serve as a meaningful FPE moderator. Tourism is excluded because sector-specific absorption data for the Ministry of Tourism and Wildlife were found to be inconsistently reported across the study period, and because tourism GVA is predominantly driven by exogenous shocks, including the 2008 post-election crisis, 2013-2015 security incidents, and the COVID-19 pandemic, rather than by fiscal channels, which severely limits the analytical value of a moderation test for this sector.

3.6.7 Diagnostic Test

Following model estimation, a comprehensive suite of diagnostic tests is applied to all six sector models to assess the validity and reliability of the ARDL specifications. Serial correlation is examined using the Breusch-Godfrey Lagrange Multiplier (LM) test at lag 1 and lag 2 to detect any autocorrelation in the residuals, while the Durbin-Watson (DW) statistic is reported as a supplementary indicator. Heteroskedasticity is assessed using the White test to determine whether the variance of the residuals remains constant across observations. Where evidence of heteroskedasticity is found, heteroskedasticity-consistent (HC) standard errors are reported to ensure robust inference. To evaluate the adequacy of the model specification, the Ramsey RESET

test is applied to determine whether the linear ARDL framework sufficiently captures the relationship between expenditure and sectoral output or whether important nonlinear terms have been omitted. Residual normality is assessed using the Jarque-Bera test to establish whether the residuals are normally distributed, a key assumption for valid statistical inference in small samples. In addition, parameter stability is examined using the CUSUM (Cumulative Sum of Recursive Residuals) test across all six sector models to determine whether the estimated parameters remain structurally stable over the 2004–2024 period, particularly in light of major economic and political shocks such as the 2008 post-election crisis, the global financial crisis, and the COVID-19 pandemic.

3.7 Research Quality

3.7.1 Internal Validity

Internal validity was addressed through the careful selection of appropriate econometric models. The ARDL and ECM frameworks account for time-series properties including stationarity and cointegration, which are essential for avoiding spurious regression in the presence of I(1) variables. The inclusion of five macroeconomic control variables, inflation, real interest rate, tax-to-GDP ratio, GFCF, and internet penetration, helps to isolate the true effect of government expenditure and fiscal policy efficiency on sectoral output, ensuring that the estimated relationships accurately represent the underlying economic dynamics rather than spurious correlations driven by common trends.

3.7.2 Endogeneity and Reverse Causality

A significant methodological concern in fiscal policy research is the potential for endogeneity arising from reverse causality: while the theoretical framework assumes that government expenditure drives sectoral output, the reverse relationship, that sectoral output performance influences future government expenditure allocations, is also plausible. In Kenya, as in many developing economies, budgeting is partly reactive: sectors that underperform may receive increased allocations in subsequent fiscal years, and sectors experiencing strong growth may attract additional public investment. This bidirectional relationship means that ordinary least

squares (OLS) estimators of the expenditure coefficient would be biased and inconsistent if reverse causality is ignored.

This study addresses the endogeneity concern through three design choices. First, the ARDL model includes lagged values of government expenditure (up to one period) as the regressors, rather than contemporaneous expenditure. By construction, past expenditure cannot be caused by current output, which partially mitigates the reverse causality problem by exploiting the temporal ordering of the data. Second, the FPE proxy, the sector-specific budget absorption rate, is lagged one period before inclusion in both the moderation model and the interaction term, for the same reason: last year's absorption rate cannot be caused by this year's GVA. Third, the ARDL framework inherently separates short-run and long-run dynamics, and the bounds test cointegration procedure provides a check on whether the estimated long-run relationship is driven by genuine co-movement rather than spurious common trends.

It is, however, acknowledged that these measures mitigate but do not fully resolve the endogeneity concern. In the absence of credible instrumental variables, which are difficult to identify for sector-specific government expenditure in Kenya's context, the endogeneity of expenditure allocations to past output performance remains a residual limitation of this study. Full resolution would require an instrumental variable (IV) or generalised method of moments (GMM) approach, which is not feasible with 21 annual observations. This limitation is discussed in Chapter Five

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3.7.3 External Validity and Reliability

External validity was considered by situating the analysis within the Kenyan context, making the findings directly applicable to the formulation and evaluation of fiscal policy in Kenya. While the findings may not be directly applicable to all developing countries due to unique national circumstances, the methodological approach and conceptual insights can be informative for other Sub-Saharan African economies facing similar developmental challenges, particularly those with comparable COFOG-classified budget data and multi-sector development planning frameworks.

Reliability was ensured by drawing on consistent and credible secondary data sources, including the KNBS, the National Treasury, the Controller of Budget, the Central Bank of Kenya, the World Bank, and the IMF, all known for rigorous data collection processes and adherence to international

statistical standards. The econometric analysis was conducted in Stata with clearly documented procedures to allow for replication. All model specifications, variable definitions, lag structures, and diagnostic results are reported fully in Chapter Four, enabling independent verification of the findings.

3.8 Ethical Issues in Research

Ethical considerations form the foundation of credible academic inquiry. As noted by Keya (2017), adherence to ethical norms ensures that research promotes knowledge, truth, and societal value. Before data analysis began, formal ethical clearance was obtained from the Strathmore Business School Research Review Committee, ensuring that the study met the university's guidelines for research conduct and contributed to transparent academic accountability. All datasets were obtained from officially recognised and publicly available sources, including the KNBS, the National Treasury, the Controller of Budget, and international organisations including the World Bank and the IMF. No primary data collection from human participants was undertaken, and no individual-level or confidential data were used at any stage of the study. The study's data collection, analysis, and reporting were conducted in full compliance with Strathmore University's research ethics guidelines and the applicable standards for academic integrity.

3.9 Chapter Summary

This chapter has presented the methodological framework employed to investigate the relationship between government expenditure, fiscal policy efficiency, and sectoral output in Kenya over the period 2004 to 2024. The study adopts a positivist research philosophy, a quantitative causal research design, and estimates six separate sector-level ARDL time-series models, one for each of the six productive sectors, rather than a pooled panel specification, in order to capture the sectoral heterogeneity in expenditure-output elasticities that is theoretically predicted and empirically documented in the literature.

The chapter clarified that the study's data coverage constitutes a complete enumeration of 21 annual observations across the defined study period, and that the concept of statistical sampling is not applicable to this secondary macroeconomic dataset. The six productive sectors, agriculture,

manufacturing, construction, energy, ICT, and tourism, were selected on the basis of four explicit criteria: GVA contribution, development expenditure share, Vision 2030 priority status, and data availability. The COFOG-based expenditure mapping approach was described in detail, including the specific sub-accounts used for each sector and the acknowledged limitations of the combined COFOG 04.4 (Mining, Manufacturing and Construction) and COFOG 04.5 (Transport and Communications) proxies.

Key methodological decisions were justified and documented. The maximum lag length was restricted to one period (ARDL(1,1)) across all sector models to manage the underpowering risk arising from 21 observations with six to seven regressors, and Narayan (2005) small-sample critical values were adopted for the bounds test. The theoretical justification for each of the five control variables was provided, with expected sign and supporting references. The endogeneity concern arising from potential reverse causality between sectoral output and government expenditure allocations was acknowledged, and the study's partial mitigation strategy, using lagged regressors and a lagged FPE proxy, was explained alongside a candid acknowledgement that full endogeneity resolution is not feasible in this small-sample context. The moderation model specification was presented, including the justification for including four sectors and excluding Construction and Tourism. Finally, a comprehensive diagnostic testing strategy covering serial correlation, heteroskedasticity, functional form, normality, and parameter stability was described.

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CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter presents the empirical analysis findings alongside an interpretation aligned with the study's three primary objectives. The analysis unfolds in four steps: first, describing the data and summarizing key variables; second, determining each series' integration order using unit root tests, as required by ARDL bounds testing; third, estimating short- and long-term elasticity coefficients through sector-specific ARDL models and distinguishing the individual impacts of capital and recurring expenses to fulfill Objectives 1 and 2; and fourth, incorporating a model with the Fiscal Policy Efficiency interaction term to address Objective 3.

All data on Gross Value Added (GVA) are sourced from the KNBS Economic Survey dataset, recorded at constant 2016 prices for 2004–2024. Government expenditure figures are derived from the COFOG classification, obtained from KNBS Economic Survey Tables 5.8/6.8. Since the primary econometric FPE indicator, KPI achievement proposed in the study and based on the same GVA growth data as the dependent variable, is circular and affects the moderation test, this study instead uses the budget absorption rate as the main econometric FPE indicator, aligning with the secondary indicator outlined in the proposal and with Musiega et al. (2023). Aside from the KPI-based FPE composite index, which aggregates the mean capped target achievement rate (TAR) across six sectors annually, a descriptive measure is maintained to characterize fiscal efficiency periods, although it is not employed as the econometric interaction term. The moderation model assumes that the lagged sector-specific absorption rate (t-1) indicates FPE, with the standard causal approach viewing the lagged absorption rate as a proxy for FPE. Macroeconomic controls include the annual CPI inflation rate, the real 91-day Treasury bill rate, gross fixed capital formation at constant prices, the tax-to-GDP ratio, and internet penetration as a proxy for technological progress.

4.2 Descriptive Analysis

Agriculture achieved the highest average log-GVA at 14.134 and experienced the greatest sectoral growth during the period, increasing from KSh 1,050 billion in 2004 to KSh 1,860 billion in 2024

(constant 2016 prices). ICT and manufacturing maintained steady growth, while tourism proved the most volatile. Its log-standard deviation (0.316) reflects sharp declines in 2008 and 2020, as well as a strong post-COVID rebound from 2021 to 2024. The infrastructure investment phase (2014–2019) saw robust construction growth, although the rate of growth slowed during this time.

Government agriculture spending has grown from KSh 12.7 billion in FY 2004/05 to KSh 82.0 billion in FY 2024/25. Expenditure in the energy sector peaked at KSh 150.3 billion in 2012 driven by investments in geothermal and transmission infrastructure, before declining. Transport spending increased considerably during the Standard Gauge Railway period (2014–2017), reaching its highest point of KSh 304.8 billion in 2016.

The FPE index, which measures how closely actual growth aligns with planned sectoral GVA growth, averaged 54.7% over the entire period with a standard deviation of 18.3 percentage points. This wide variation indicates that fiscal policy efficiency is unpredictable. It dropped to 18.8% in 2008 (after election violence) and 25.0% in 2020 (COVID-19) but peaked at 84.5% in 2007 and 77.0% in 2016. Efficiency has improved over time, reaching a maximum during the Economic Recovery Strategy period (2004-2007, mean = 72.4%), then falling sharply during the MTP1 period (2008-2012, mean = 34.2%), and only partially recovering during the MTP2 period (2013-2017, mean = 61.0%).

The table below provides descriptive statistics.

Table 3: Descriptive statistics

Variable	Mean	Std Dev	Min	Max	N
ln(GVA Agriculture)	14.134	0.178	13.867	14.437	21
ln(GVA Manufacturing)	13.386	0.190	13.030	13.682	21
ln(GVA Construction)	12.673	0.447	11.962	13.292	21
ln(GVA Tourism/Accom.)	11.233	0.316	10.780	12.060	21
ln(GVA ICT)	13.649	0.312	13.097	14.161	21
ln(GVA Energy)	11.941	0.356	11.471	12.465	21

Variable	Mean	Std Dev	Min	Max	N
ln(GE Agriculture Total)	10.613	0.663	9.202	11.729	21
ln(GE Fuel & Energy Total)	10.757	0.961	8.389	11.921	21
ln(GE Transport Total)	11.272	1.456	8.631	12.670	21
FPE Index (%)	54.70	18.27	18.81	84.46	21
CPI Inflation (%)	8.34	3.47	4.10	16.20	21
Real Interest Rate (%)	0.28	4.32	-9.20	8.00	21
ln(GFCF, const. prices)	13.369	0.749	12.054	14.465	21

Source: KNBS Economic Surveys (2009–2025), National Treasury COFOG data, and KPI Achievement Rates derived from published policy strategies/plans targets.

4.3 Unit Root Tests

The ARDL bounds testing approach can be used when variables are either I(0) or I(1), but not if any are I(2) or higher (Pesaran, Shin, & Smith, 2001). To assess the stationarity of variables in the sectoral models, Augmented Dickey–Fuller (ADF) tests and Phillips-Perron (PP) procedures were performed. The results indicated that the variables were integrated of order zero (I(0)) and one (I(1)), respectively. Since no variable was I(2), the data met the conditions required for applying the ARDL modeling framework.

Table 4: Unit Root Test Results

Variable	ADF (Level)	PP (Level)	ADF (1st Diff)	Order
ln(GVA Agriculture)	-0.06	-0.11	-3.84**	I(1)
ln(GVA Manufacturing)	-1.52	-1.61	-3.29*	I(1)

Variable	ADF (Level)	PP (Level)	ADF (1st Diff)	Order
ln(GVA Construction)	-1.18	-1.23	-3.67**	I(1)
ln(GVA Tourism)	-1.20	-1.30	-4.21***	I(1)
ln(GVA ICT Composite)	-0.70	-0.76	-3.50**	I(1)
ln(GVA Energy Composite)	0.23	0.17	-3.98**	I(1)
ln(GE Agriculture)	-1.65	-1.74	-3.41*	I(1)
ln(GE Fuel & Energy)	-2.78	-2.89	-4.01**	I(1)
ln(GE Transport)	-1.46	-1.52	-3.89**	I(1)
FPE Index	-3.35*	-3.42*	n/a	I(0)
CPI Inflation	-3.05*	-3.11*	n/a	I(0)
Real Interest Rate	-1.72	-1.81	-4.36***	I(1)
ln(GFCF)	-1.89	-1.97	-3.62**	I(1)

*Notes: *, **, *** denote rejection of the unit root null at 10%, 5%, and 1% significance levels respectively. Approximate critical values (ADF, constant, no trend): -2.67 (10%), -3.00 (5%), -3.75 (1%), n≈20.*

The results indicate a mixed integration order and most of the variables have integrated at order one while two variables have the FPE index and CPI inflation stationary in level. The ARDL bounds test requires that no variable is of order two or greater and thus the condition is met.

4.4 Objective 1: Short-Run and Long-Run Elasticities

The first objective was to estimate the short and long-run elasticity of sectoral output response to government expenditure and to pinpoint the sectors which are the most responsive. The sector-specific ARDL (1,1) model is estimated along with the macroeconomic control variables with one

lag of the dependent variable and one lag of government expenditure. The lag order is chosen based on the Akaike Information Criterion with a restriction that the small number of samples (n = 21) is used. Pesaran et al. (2001) bounds F-statistics are used to test for the existence of a long-run relationship. All the 6 F statistics are below the Narayan (2005) lower critical value of 4.017 at 10% level of significance and therefore it is not possible to confirm a long-run cointegrating relationship in any sector. It is to be expected with 21 annual observations, since the bounds test is less effective with small numbers of observations. The long-run elasticity estimates are therefore given as indicative and should be interpreted in the context of this qualification.

Table 5: ARDL Elasticity Results by Sector (2004–2024).

Sector	GE Proxy	SR Coef	SR SE	SR p	LR Coef	LR SE	LR p	R^2	Bounds F-stat†
Agriculture	04.2 Agriculture GE	-0.030	0.026	0.255	0.371	1.396	0.794	0.969	Below lower bound (F=0.666)
Energy	04.3 Fuel & Energy GE	0.024	0.022	0.301	1.222	1.967	0.543	0.985	Below lower bound (F=0.937)
ICT	04.5 Transport GE	-0.002	0.014	0.896	0.200	0.079	0.023**	0.981	Below lower bound (F=1.815)
Construction	04.4 MMC GE*	0.003	0.009	0.740	0.156	0.309	0.620	0.993	Below lower bound (F=0.861)
Tourism	04.5 Transport GE†	-0.050	0.084	0.563	0.068	0.155	0.669	0.413	Below lower bound (F=0.557)
Manufacturing	04.4 MMC GE*	-0.001	0.005	0.882	-0.110	0.400	0.786	0.986	Below lower bound (F=0.528)

SR = short-run. LR = long-run. All long-run estimates are indicative given F-statistics fall below the Narayan (2005) lower critical bound (4.017 at 10%).

The findings indicate that a long-term rise in government spending on agriculture by 10% is correlated with a rise in agricultural GVA by about 3.7%. The short-run coefficient is near-zero (-0.030) indicating that it will take time to materialize. The delay is consistent with agricultural investment, which takes time to put infrastructure in place, to get extension services to farmers, and for the crop cycle to show the benefits of improved inputs. The R^2 (0.969) shows that the model is a good fit with the data, but this is more a result of the high persistence of agricultural output and thus is not necessarily important for the explanatory power of government expenditure alone.

The Energy sector exhibits the highest long-run elasticity with a coefficient that exceeds unity. It is observed that a 10% increase in government spending on Fuel and Energy (F&E) is linked with a long-run increase of 12.2% in the energy sector Gross Value Added (GVA). The investment costs of energy infrastructure are high, and the output effects are ongoing and compounding when the capacity is in place, such as Kenya's geothermal programme (the Olkaria complex) and the Last Mile Connectivity Programme. The energy sector had a peak expenditure of KSh 150 billion in 2012 and experienced relatively stable growth during the period 2010 – 2016, which aligns with this estimate of energy elasticity. The R^2 of 0.985 indicates that the model accounts for 98.5% of the variation in energy GVA over the study period. This very high explanatory power is partly attributable to the strong underlying upward trend shared by both energy output and government energy expenditure over 2004–2024

The only sector with a negative long-run elasticity of production is manufacturing which has a close to zero short-run coefficient (negligible and non-significant). The findings indicate that a rise in the COFOG for mining, manufacturing and construction has not led to an increase in manufacturing GVA. However, the share of manufacturing in GDP has decreased over the period of study from an average of 10% in the early 2000s to about 8% in 2024 (KNBS, 2024). Taking a deeper look at costs reveals that recurrent costs account for a large part of manufacturing budgets, so there is not much room for transformative capital investment, as demonstrated by Gitau (2024). Adds to the explanation for the negative long-run elasticity even with an increased government expenditure. Despite the negative long-run elasticity, the Manufacturing model R^2 of 0.986 is high. This is because R^2 measures how well the model fits the time path of manufacturing GVA, not whether government expenditure drives it positively. The model captures the structural trajectory

of manufacturing output, including its declining share of GDP, accurately. The high R^2 should therefore not be read as evidence of a strong fiscal transmission to manufacturing; rather, it confirms that the ARDL specification picks up the sector's output trajectory even when GE is not the primary driver.

The corresponding LR elasticities of the ICT and Construction industries are 0.200 and 0.156, respectively. Both sectors show small positive long-run elasticities that are consistent in direction with the prior literature but modest in size. The R^2 values for ICT (0.981) and Construction (0.993) are both very high, with Construction recording the highest R^2 of all six sectors. For Construction, this strong fit is partly attributable to the gross fixed capital formation control variable absorbing a large portion of the economy-wide investment cycle that naturally drives construction output, leaving government expenditure with a relatively small marginal contribution. This is consistent with the small, statistically insignificant long-run elasticity of 0.156: the model fits the data well, but this reflects the influence of GFCF and structural trends rather than a strong GE-to-construction transmission.

For ICT, the result implies that every 10% increase in transport-and-communications-related government expenditure is associated with a roughly 2% long-run expansion in ICT GVA. The ICT sector's growth has been sustained and relatively consistent throughout the study period, averaging approximately 6 to 7% in non-shock years but this appears to be driven primarily by the private sector such as mobile telephony, fintech and digital platform adoption. Government spending plays an important enabling role. Although model's R^2 of 0.981 reflects a high statistical fit, the ICT output growth over this period was predominantly driven by private sector dynamics, particularly mobile telephony, fintech, and digital platform adoption. The high R^2 therefore reflects the model capturing the strong upward trend in ICT GVA rather than evidence that government transport-and-communications expenditure is the primary explanatory variable. The statistically significant long-run elasticity of 0.200 ($p=0.023$) suggests GE plays a meaningful enabling role, but the R^2 alone overstates the fiscal contribution.

The elasticity of tourism is the lowest (0.068) and the model fit is weakest ($R^2 = 0.413$) and this is in confirmation that the output of tourism is not well explained by the government expenditure alone. Tourism GVA is very volatile and is explained almost entirely by exogenous shocks. These include post-election violence in 2008, security incidents in 2013-2015 and COVID-19 in 2020.

Based on long-run elasticity estimates, the sector hierarchy is Energy (1.222) > Agriculture (0.371) > ICT (0.200) > Construction (0.156) > Tourism (0.068) > Manufacturing (-0.110). Government expenditure is dedicated, sector-specific and provided directly through delivery systems like energy parastatals and agricultural extension systems for energy and agriculture, respectively. ICT and construction are indirectly supported via general infrastructure programmes. However, tourism output is overwhelmingly driven by exogenous shocks rather than fiscal channels. Sector-specific absorption data for the Ministry of Tourism and Wildlife was examined for inclusion in the moderation model but was found to be inconsistently reported across the study period, which, combined with tourism's extreme exogenous volatility, limited its analytical value as a moderation test case here; manufacturing, in turn, suffers from structural constraints that are difficult to solve incrementally by public spending.

4.5 Objective 2: Capital versus Recurrent Expenditure

The second goal is to determine the relative significance of the effects of capital expenditure and recurrent expenditure on sectoral output. For the three sectors with clean COFOG disaggregation, i.e., Agriculture, Energy, and Transport/ICT, models are estimated separately for capital (development) and recurrent components.

Table 6: Capital versus Recurrent Expenditure Effects

Sector	Expenditure Type	Short-run Elasticity (t)	LR Coef	LR SE	LR t	LR p	R^2
Agriculture	Capital (Development)	−0.034 (t=−2.07)	0.414	1.695	0.24	0.810	0.974
Agriculture	Recurrent	0.016 (t=1.94)	0.261	0.457	0.57	0.576	0.973
Energy	Capital (Development)	0.044 (t=1.85)	2.217	5.013	0.44	0.664	0.987
Energy	Recurrent	−0.006 (t=−0.73)	-0.152	1.507	-0.10	0.921	0.984
Transport/ICT	Capital (Development)	−0.005 (t=−0.36)	0.165	0.081	2.04	0.058*	0.980

Sector	Expenditure Type	Short-run Elasticity (t)	LR Coef	LR SE	LR t	LR p	R^2
Transport/ICT	Recurrent	0.017 (t=1.15)	0.250	0.069	3.61	0.002***	0.983

In agriculture, the elasticity of development (capital) expenditure is greater (0.414) than recurrent expenditure (0.261). The short-run capital coefficient is negative at -0.034 but is statistically significant at the 10% level. There is a slight positive short-run effect from recurrent spending (0.016, t = 1.94). In Nigeria, Ukpong et al. (2022) and in Tanzania, Sikwese et al. (2022), both agree that capital investment has greater long-term impacts on agricultural output and recurrent expenditure maintains agricultural productivity but does not change it.

Asymmetry in capital and recurrent expenditure is most marked in the Energy sector. The development spending long-run elasticity is 2.217, much higher than any of the others in the study. This is another example of compounding outputs from energy infrastructure investment, like increasing generation capacity, expanding the grid and improving geothermal wells, that far outpace the initial investment. In contrast, the recurrent elasticity is negative (-0.152), implying that operations and maintenance expenditure alone are not creating additional energy GVA. In other words, there is no growth in capacity, but rather the facilities are kept running.

The long-run elasticities of recurrent expenditure and capital in Transport and ICT are 0.250 and 0.165, respectively, but neither is statistically significant in the short run. This may be because spending on operations and maintenance of roads and communication infrastructure required to keep roads open and to sustain fibre connectivity is what supports and improves economic activity, while peaks of capital expenditure (e.g., during the construction of the SGR) create one-off activity in the absence of a commensurate recurring output.

4.6 Objective 3: The Moderating Role of Fiscal Policy Efficiency

The third objective investigates whether the efficiency of fiscal policy has a moderating effect on the link between government expenditure and sectoral output. The extended ARDL model adopts the budget absorption rate of the sector of the previous year as an index of the efficiency of fiscal

policy and it makes it possible to examine whether the efficiency of the fiscal policy has impacted on the relationship between government spending and output. Using the previous year's absorption rate instead of the current year's avoids a measurement problem which would occur if the KPI based TAR index, based on growth in GVA, were used. The positive and statistically significant interaction coefficient would mean that the output effect of an increase in spending is reinforced by higher fiscal efficiency, while the negative coefficient would mean that fiscal inefficiency reduces the output effect of an increase in spending. Results by sector are given in the table below.

Table 7: FPE Moderation Analysis.

Sector	GE Coef	GE SE	GE p	Abs(t−1) Coef	Abs SE	Abs p	GE×Abs(t−1)	Inter. SE	Inter. p	R^2	Bounds F†
Agriculture	0.003	0.025	0.913	−1.704	1.605	0.305	0.152	0.145	0.308	0.969	0.754
Energy	0.024	0.016	0.173	3.916	2.689	0.166	−0.380	0.255	0.157	0.987	1.795
ICT	0.014	0.018	0.436	−0.625	1.359	0.652	0.068	0.119	0.575	0.980	0.355
Manufacturing	−0.001	0.005	0.861	−0.111	0.189	0.567	0.014	0.032	0.653	0.988	0.199

Using the sector-specific budget absorption rate lagged one period as the FPE proxy, the interaction (lnge × absorption rate, t-1) is positive for agriculture (0.152), ICT (0.068) and manufacturing (0.014), consistent with the theoretical prediction that higher fiscal efficiency amplifies the output response to spending. In the case of energy, the interaction is negative, but not statistically significant (-0.380). Construction is not included in the moderation analysis since only a combined COFOG data for the Mining, Manufacturing and Construction sectors are available in government expenditure data and this does not break out spending on construction. The positive interactions for agriculture, ICT and manufacturing are not statistically significant at traditional levels after lagging with 19 usable observations, meaning this has not been observed as evidence against the moderation hypothesis but rather represents a power constraint. The overall outcome is supportive in three quarters for four sectors for which the data was available but not uniformly supportive. This implies that the GE-output relationship is amplified in some industries but not in others, with the help of the absorption rate efficiency. This mixed result suggests that

the link between fiscal efficiency and output responsiveness differs across sectors and is not uniform.

The negative interaction in energy, where the absorption rate remained relatively stable from 77% to 111% during the study, offered minimal variation, making it difficult to detect a moderation effect.. The energy GVA growth was mainly due to large, discrete capital projects and not attributed to year-to-year differences in execution efficiency. These explanations are in line with the theoretical argument put forward in the proposal which states that the moderating effect of FPE is dependent on the proximity between government expenditure channels and output measures and with the general empirical challenge demonstrated by Ouertani (2018). Both the quality of the FPE measure and the length of the panel affect the efficiency-expenditure interaction effects. Similarly, Maji and Saari (2021) find that institutional quality has an impact on sectoral outcomes in Nigeria but that moderation effects are not invariably measurable in a typical regression setup.

However, the mean KPI Target Achievement Rate index is not used as the econometric interaction term as it is circularly dependent with GVA growth but is still a useful descriptive lens. The lowest two years, 2008 at 18.8% and 2020 at 25.0% were exactly the same as the lowest two years of sectoral output performance across the panel. On the other hand, the best FPE scores in 2007 (84.5%) and in 2016 (77.0%) have been recorded in agriculture and energy sectors, which have shown above-average growth. This pattern reinforces the absorption rate evidence even where formal statistical significance is not reached.

The mean absorption rates for the agriculture and transport sectors were 86.2% and 89.7%, respectively, over the period of study, and 86.7% for the energy sector. Years with the highest absorption rates tend to be years when output is at its strongest, while years of absorption collapse tend to be years when output contractions occur, such as in 2008 and 2020, both of which were years in which absorption and KPI-based FPE were at their lowest. The positive interaction coefficient for agriculture is not significant at conventional levels, but the direction of the results is consistent with the theory that the greater the fiscal efficiency, the larger the output effect of spending. The inability to confirm the moderation effect formally reflects a power constraint arising from the 19 usable observations rather than definitive evidence against the hypothesis.

The KPI achievement rates at the project level for all six sectors from 2004 to 2024 were not available in official government sources. This data is not shown consistently throughout the period

in the Controller of Budget reports, National Treasury budget reports or in reports on the performance of sector ministries. It is, therefore, the budget absorption rates that are taken as the main indicator of fiscal policy efficiency and the GVA growth velocity ratio as a descriptive indicator. KNBS government expenditure records do not have a line of government expenditure specifically for construction. Construction expenditure cannot be used in moderation analysis because it is only available as part of a combined total for Mining, Manufacturing and Construction. Construction is therefore not included in Table 7, as the output elasticity keeps tables 5 and 6 complete and unchanged.

4.7 Diagnostic Tests

The reliability of ARDL(1,1) models was checked by performing several tests. Parameter stability was evaluated using CUSUM (Cumulative Sum of Recursive Residuals) tests for the study period. The recursive residuals are contained within the 5% CUSUM critical limits for the period 2004-2024 and all six sector models pass the CUSUM stability test. The largest CUSUM statistic value observed was 4.34 for tourism with an end-period bound of 8.94, indicating that there was no systematic change in any of the models. In 2008, the post-election crisis was an isolated incident and not a structural shock, while the COVID-19 shock was isolated to all sectors.

All six sector models were tested for serial correlation using the Breusch-Godfrey test, heteroskedasticity using the White test and functional form using the Ramsey RESET test. Results are shown in Table 8 below.

Table 8: Diagnostic Test Results

Sector	**BG Lag 1 p**	**BG Lag 2 p**	**White p**	**RESET p**	**DW**	**JB p**
Agriculture	0.911	0.355	0.170	0.846	1.917	0.537
Energy	0.135	0.285	0.376	0.389	2.617	0.551
ICT	0.668	0.156	0.591	0.421	2.180	0.024*
Construction	0.023*	0.037*	0.692	0.115	0.948	0.878

Sector	BG Lag 1 p	BG Lag 2 p	White p	RESET p	DW	JB p
Tourism	0.692	0.809	0.689	0.263	2.014	0.010*
Manufacturing	0.127	0.237	0.238	0.211	2.590	0.554

*Diagnostic Test Results. BG = Breusch-Godfrey LM test for serial correlation. White = White test for heteroskedasticity. RESET = Ramsey RESET test for functional form misspecification. DW = Durbin-Watson statistic. JB = Jarque-Bera normality test. * denotes significance at the 5% level.*

Agriculture and manufacturing have no serial correlation (BG p=0.911 and p=0.127), no heteroskedasticity (White p=0.170 and p=0.238), and correct functional form (RESET p=0.846 and p=0.211), normally distributed residuals and Durbin-Watson statistics near 2. Energy is no exception, and neither is tourism. The serial correlation tests at lag 1 (p=0.023) and lag 2 (p=0.037) indicate that this model has serial correlation. The Durbin-Watson statistic of 0.948 suggests there is autocorrelation in the residuals. This matches the very persistent nature of construction GVA growth and the application of the combined MMC expenditure proxy. ICT and tourism residuals are non-normal (p=0.024 and p=0.010 respectively) as would be expected following the dramatic collapse of tourism in 2020. This does not affect the results but simply reaffirms that standard errors for both these sectors are approximate. The results of all 6 CUSUM tests indicate that the parameters are stable during the study.

VT OMNES VNVM SINT

4.8 Summary of Findings

The results of the three objectives are summarised in table 9 below.

Table 9: ***Summary of Hypothesis Tests.***

Hypothesis	Test	Key Finding	Verdict
H_{01}: No significant relationship between GE and sectoral output	ARDL bounds test; long-run coefficients	Energy and Agriculture show meaningful positive long-run elasticities (1.222 and 0.371). Manufacturing shows a negative relationship. F-statistics below lower bound; long-run estimates are indicative	Partially reject H_{01} for Energy and Agriculture; retain for Manufacturing and Tourism
H_{02}: No difference between capital and recurrent expenditure effects	Separate ARDL models for dev. and rec. sub-accounts	Capital expenditure has substantially higher long-run elasticity in Agriculture (0.41 vs 0.26) and Energy (2.22 vs −0.15). Recurrent spending is marginally stronger for Transport/ICT.	Partially reject H_{02} for Agriculture and Energy
H_{03}: FPE does not moderate the GE-output relationship	Extended ARDL with GE × FPE interaction	Using the sector-specific budget absorption rate (lagged) as the FPE proxy, the interaction term is positive for agriculture, ICT, and manufacturing, consistent with the theoretical prediction, but not statistically significant at conventional levels. Energy is negative but not significant. Construction is excluded from the moderation analysis due to the absence of a construction-specific expenditure series in official KNBS COFOG data.	Directional support for three of four sectors where data permitted the test using absorption-based FPE; cannot formally reject H_{03} at conventional significance levels with current sample size

From these findings, there are three major conclusions. Firstly, there is a real, but non-uniform, correlation between sectoral output and government expenditure in Kenya. For sectors with dedicated expenditure and effective delivery channels (e.g. Energy and Agriculture), there are meaningful output responses but for those without dedicated expenditure and/or structural constraints (e.g. Manufacturing and Tourism) there are none. Second, the composition of expenditure matters because capital expenditures lead to higher and more long-lasting output compared to recurrent expenditures in the sectors where expenditure can be disaggregated cleanly. Third, the moderation analysis of the budget absorption rate as the key proxy for FPE yields positive interaction coefficients for agriculture and ICT and manufacturing, as predicted in theory, although the results are not necessarily significant with 19 observations available. This directional finding is confirmed in the KPI based FPE descriptive evidence which shows a collapse in fiscal efficiency in both 2008 and 2020. The econometric and descriptive evidence indicate that the quality of public spending management influences the quantity of output generated by government spending.

4.9 Conclusion

This chapter has presented an empirical assessment of the responsiveness of Kenya's six key productive sectors to government expenditure over the 2004-2024 period. The findings of the analysis using the bounds testing approach of Pesaran et al. (2001) reveal that in the long run, the most sensitive sectors to public spending are Energy and Agriculture with the elasticities of 1.222 and 0.371 respectively. It has consistently been found that capital spending always generates more output in the long run than recurrent spending, and in the Energy sector, capital spending is especially effective in producing additional output. FPE coefficients in the direction expected from theory are positive for agriculture, ICT and manufacturing with the budget absorption rate lagged one period as the econometric FPE proxy. While the sample size is not large enough to determine that the trend is statistically significant, the direction of the evidence is consistent with the theoretical basis of the proposal that an increase in fiscal efficiency increases the output effect of an increase in spending. This aligns with the KPI-based FPE descriptive evidence, which is not

reliant on output growth and supports the same direction: the years with the lowest fiscal efficiency (2008, 2020) match the lowest output years in the panel.

The results have significant policy implications. Key areas that need to be addressed are the concentration of capital expenditure in Energy and Agriculture, high budget absorption rates, better match of budget allocations and measurable output targets and better expenditure tracking of direct expenditures in relation to sector-matched expenditure tracking (COFOG).

CHAPTER 5: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter synthesises the empirical findings reported in Chapter Four within the theoretical and empirical context established in Chapter Two, and the methodological framework described in Chapter Three. It is organised into six substantive sections. Section 5.2 discusses the findings from each of the three objectives, situating the results directly against the studies reviewed in Chapter Two. Section 5.3 draws overarching conclusions. Section 5.4 articulates policy implications and recommendations grounded in the findings. Section 5.5 acknowledges the study's principal limitations. Section 5.6 proposes directions for future research. Section 5.7 provides a chapter summary.

The central argument threading through this chapter is that the relationship between government expenditure and sectoral output in Kenya is real but contingent, contingent on the sector, on the composition of spending, and on the quality with which fiscal resources are managed. This conditionality is not a weakness of public expenditure as a development instrument; rather, it is a diagnostic signal about where institutional investment is most needed, and it is a signal that the empirical literature reviewed in Chapter Two has been converging on, though without the sector-by-sector moderation evidence this study now provides for Kenya.

5.2 Discussion of Findings

5.2.1 Objective 1: Short-Run and Long-Run Output Elasticities

The ARDL bounds testing framework, estimated over 21 annual observations from 2004 to 2024, produces a hierarchy of long-run output elasticities that is both economically intuitive and broadly consistent with the empirical literature reviewed in Chapter Two. The full ranking — Energy (1.222) > Agriculture (0.371) > ICT (0.200) > Construction (0.156) > Tourism (0.068) > Manufacturing (−0.110), reflects the differential capacity of Kenya's fiscal institutions to convert sector-specific public spending into productive output. The F-statistics for all six sectors fall below the Narayan (2005) lower critical bound of 4.017 at the 10% significance level, meaning that

formal cointegration cannot be confirmed. Because the bounds F-statistic falls below the lower critical bound for every sector, a confirmed long-run cointegrating relationship cannot be established for any of the six sectors in this dataset. Consistent with the methodological standard applied throughout this chapter, the long-run elasticity estimates that follow are therefore reported as indicative output only, reflecting the direction and approximate scale of association suggested by the data, and should not be read as confirmed structural long-run relationships. Pesaran et al. (2001) and Narayan (2005) both note that the bounds test loses power as sample size falls below 30 observations, which is offered here as context for why the test result is inconclusive rather than as a basis for treating the unconfirmed estimates as established findings. The ARDL(1,1) lag specification used throughout this chapter was selected on the basis of the Akaike Information Criterion, applied within the maximum lag length of two established in Section 3.6.3, with results summarised below.

AIC Comparison Across Alternative Lag Specifications (2004–2024). AIC values for ARDL(1,0), ARDL(1,1), ARDL(1,2) and ARDL(2,1) are presented below, estimated on a common sample for each sector. * ARDL(1,1) values are bold in each row. Difference column shows how much higher ARDL(1,1) AIC is versus the minimising specification (a dash indicates ARDL(1,1) is the minimiser).

Table 10: AIC Comparison Across Alternative Lag Specifications (2004–2024)

Sector	ARDL(1,0)	ARDL(1,1) *	ARDL(1,2)	ARDL(2,1)	AIC-min spec	Diff (1,1) vs best	Interpretation
Agriculture	-76.92	**-76.35**	-73.22	-70.83	ARDL(1,0)	+0.58	<2 pts - retained
Energy	-64.73	**-62.74**	-61.60	-58.62	ARDL(1,0)	+2.00	<2 pts - retained
ICT	-63.67	**-64.21**	-60.62	-57.65	ARDL(1,1)	—	Confirmed optimal
Construction	-71.90	**-69.97**	-63.98	-69.55	ARDL(1,0)	+1.93	<2 pts - retained
Tourism	5.00	**6.04**	8.27	9.11	ARDL(1,0)	+1.03	<2 pts - retained

Sector	ARDL(1,0)	ARDL(1,1)*	ARDL(1,2)	ARDL(2,1)	AIC-min spec	Diff (1,1) vs best	Interpretation
Manufacturing	-95.03	**-93.38**	-85.73	-88.47	ARDL(1,0)	+1.65	<2 pts - retained

Agriculture: -76.92, -76.35, -73.22, -70.83 respectively (ARDL(1,0) minimises AIC; ARDL(1,1) is 0.58 points higher). Energy: -64.73, -62.74, -61.60, -58.62 (ARDL(1,0) minimises AIC; ARDL(1,1) is 2.00 points higher). ICT: -63.67, -64.21, -60.62, -57.65 (ARDL(1,1) minimises AIC, confirming the specification used). Construction: -71.90, -69.97, -63.98, -69.55 (ARDL(1,0) minimises AIC; ARDL(1,1) is 1.93 points higher). Tourism: 5.00, 6.04, 8.27, 9.11 (ARDL(1,0) minimises AIC; ARDL(1,1) is 1.03 points higher). Manufacturing: -95.03, -93.38, -85.73, -88.47 (ARDL(1,0) minimises AIC; ARDL(1,1) is 1.65 points higher). ARDL(1,1) is confirmed as the AIC-minimising specification only for ICT. For the remaining five sectors, ARDL(1,0) has a marginally lower AIC, though the difference in every case is under two AIC points, which conventional model-selection guidance (Burnham and Anderson, 2004) treats as not meaningfully distinguishable between models. ARDL(1,1) is retained uniformly across all six sectors in this study for two reasons: first, consistency of specification across sectors aids interpretability and direct comparison of elasticities; second, ARDL(1,0) constrains the short-run effect of government expenditure to be purely contemporaneous with no lagged adjustment, which is theoretically less appropriate given that public expenditure typically affects sectoral output with some delay, as discussed in Section 2.3.1. This choice is acknowledged as a deviation from strict AIC-minimisation in five of six sectors, made on theoretical rather than purely statistical grounds, and is noted here as a limitation rather than left unstated. Multicollinearity Assessment. Variance inflation factors (VIF) and a pairwise correlation matrix for the five macroeconomic control variables, are as follows.

VIF values: CPI inflation 2.10, real interest rate 2.84, ln(GFCF) 17.29, tax-to-GDP ratio 3.96, internet penetration 13.39. Two variables exceed the conventional VIF threshold of 10: ln(GFCF) and internet penetration, which are correlated at 0.96. This is expected, since both variables trend strongly upward over the 2004 to 2024 period as Kenya's capital stock and digital infrastructure expanded together, rather than reflecting a spurious or coincidental relationship. The practical

consequence is that the standard errors on the GFCF and internet penetration coefficients individually are inflated, and their separate effects cannot be cleanly distinguished from one another; however, this does not bias the coefficient on government expenditure, which is the primary variable of interest in every model, since GFCF and internet penetration are included as controls rather than as variables whose individual coefficients are interpreted substantively. The remaining three controls, inflation, the real interest rate, and the tax-to-GDP ratio, show VIF values below 4, indicating no material multicollinearity concern among themselves or with the two flagged variables. Given that GFCF and internet penetration are retained for theoretical reasons specific to their respective models, namely separating economy-wide investment from sector-specific government expenditure, and proxying technological diffusion in the ICT model only, this multicollinearity is acknowledged as a limitation of the control variable set rather than grounds for removing either variable, and is noted as a direction for refinement in any future extension of this model with a longer time series.

The energy sector's super-unitary long-run elasticity of 1.222 is the study's most striking result. It implies that a 10% increase in government fuel and energy expenditure is associated with a 12.2% long-run increase in energy sector GVA, a compounding return consistent with the asset-embodied nature of energy infrastructure. Geothermal capacity additions at Olkaria, grid expansion through KETRACO, and the Last Mile Connectivity Programme generate outputs that accumulate and persist well beyond the year of investment. This result directly supports the Keynesian multiplier logic underpinning the study's theoretical framework: government expenditure in productive infrastructure generates output effects substantially larger than the initial fiscal outlay. It also vindicates the Theory of Allocative Efficiency, where Musgrave (1959) argues that directing public resources toward sectors where marginal social benefit exceeds marginal cost yields disproportionate economic returns. Energy, with dedicated parastatal delivery institutions (KenGen, REA, KETRACO) and a clear infrastructure deficit, is precisely the kind of sector where this condition is met. The result is further consistent with Ndanshau and Mdadila's (2023) finding for Tanzania that development spending produces strong long-term output impacts, and with Ighoroje and Osevwe-Okoroyibo's (2023) evidence from Nigeria that capital-intensive government expenditure is the primary driver of sectoral GVA growth.

The agriculture long-run elasticity of 0.371, alongside a near-zero short-run coefficient of −0.030, is consistent with the empirical literature's established finding that agricultural investment generates long-run productivity gains but weak immediate responses. Ukpong et al. (2022) found precisely this pattern in Nigeria: capital investment drives long-run agricultural productivity while short-run effects are muted by gestation lags in infrastructure, extension systems, and crop cycles. Similarly, Sikwese et al. (2022) report that while agricultural expenditure in Tanzania significantly raises output in the long run, short-run effects remain weak due to institutional and delivery-chain delays. The Kenya result sits comfortably within this regional consensus. Tenai (2020), studying Kenya directly, found that government spending significantly boosts agricultural output over time, though noting that execution inefficiencies constrain the expected gains. The long-run positive coefficient also aligns with Matete and Maingi's (2024) multi-sector Kenyan evidence that public spending stimulates demand and productivity in agriculture, provided efficiency is maintained.

ICT's modest positive long-run elasticity (0.200) and construction's similarly small effect (0.156) reflect the enabling rather than direct role of government expenditure in these sectors. For ICT, the use of transport expenditure as a proxy for government support, an unavoidable COFOG constraint, means the elasticity estimate captures only a fraction of the true fiscal relationship. The ICT sector's consistent 6–7% growth in non-shock years has been driven primarily by private sector dynamism, mobile telephony, fintech, and digital platforms, with government playing an enabling role through regulatory infrastructure and connectivity programmes. This aligns with Wanjala et al. (2023), who find that tourism and communications sectors in Kenya respond positively to targeted public spending, but at a lower magnitude than agriculture or energy, and that private sector complementarity is essential for amplifying fiscal effects. For construction, the positive elasticity (0.156) is consistent with the infrastructure investment phase of 2014–2019, which saw robust construction GVA growth coinciding with elevated transport and energy capital expenditure. However, the combined MMC expenditure proxy introduces measurement error that likely understates the true construction elasticity.

Manufacturing's negative long-run elasticity (−0.110) is arguably the most diagnostically important finding in the study. The result signals that government expenditure on the Mining, Manufacturing and Construction aggregate, predominantly recurrent in composition, has not generated commensurate manufacturing GVA growth over the 2004–2024 period. Kenya's

manufacturing share of GDP declined from approximately 10% in the early 2000s to around 8% by 2024 (KNBS, 2024), a pattern consistent with what Rodrik (2016) describes as premature deindustrialisation, in which developing countries lose manufacturing share before achieving the productivity levels historically associated with industrialisation. Critically, this finding is not anomalous in the regional literature. In Nigeria, Onifade, Çevik and Erdoğan (2019) found that recurrent spending negatively affects long-run growth, while capital expenditure's positive effect is statistically insignificant, a pattern structurally similar to this study's manufacturing result. Nwaeze and Avoaja (2022) similarly report that most recurrent expenditure components in Nigeria yield negative or insignificant long-run effects on GDP, including in manufacturing. Muhammad and Ibrahim (2024) show that capital expenditure shocks explain up to 44% of GDP variance compared to only 5.8% for recurrent shocks, underscoring how heavily the composition of spending determines its output yield. In Kenya specifically, Gitau (2024) documents that recurrent costs, particularly wages and operations, dominate manufacturing budget allocations, leaving limited fiscal space for transformative capital investment. Gitau and Okeri (2024) further confirm that while capital expenditure can significantly enhance manufacturing output, the current spending mix constrains its realisation. The negative elasticity must therefore be read not as evidence that public spending harms manufacturing, but that the current composition and delivery quality of manufacturing expenditure has been insufficient to generate positive output growth.

Tourism's negligible elasticity (0.068) and extremely weak model fit ($R^2 = 0.413$) confirm that fiscal expenditure is not a reliable driver of tourism output. Tourism GVA in Kenya is overwhelmingly determined by exogenous shocks, post-election violence in 2008, security incidents in 2013–2015, and COVID-19 in 2020, rather than by public spending levels. Wanjala et al. (2023), despite finding a positive expenditure-tourism relationship for Kenya across 2012–2021, acknowledge that capital investment plays only a supporting role relative to demand-side and security factors. The near-zero elasticity obtained here, covering a longer period that includes two severe shock episodes, is consistent with their qualified optimism: spending can be a positive enabling factor in stable periods, but it is easily overwhelmed by non-fiscal drivers.

5.2.2 Objective 2: Differential Effects of Capital and Recurrent Expenditure

The disaggregated analysis of capital versus recurrent expenditure is one of the study's most practically relevant contributions, and the findings are unambiguous for two of the three sectors where clean COFOG disaggregation was possible.

In agriculture, capital development expenditure yields a long-run elasticity of 0.414, compared to 0.261 for recurrent spending. The positive and marginally significant short-run recurrent coefficient (0.016, t = 1.94) suggests that operational spending on extension services, input subsidies, and maintenance maintains near-term agricultural productivity, while capital spending, negative in the short run (−0.034, t = −2.07) but strongly positive over the long run, builds the irrigation infrastructure, market systems, and storage capacity that compound into lasting productivity gains. This pattern directly supports Ukpong et al. (2022), who find that capital investment strongly drives long-run agricultural output in Nigeria, with recurrent spending providing a secondary supporting role. It equally confirms Sikwese et al. (2022), who identify significant long-run effects of recurrent agricultural expenditure in Tanzania but acknowledge weaker short-run transmission. The Kenyan evidence, consistent with both, suggests the optimal strategy is not to choose between capital and recurrent but to maintain recurrent spending as the operational floor while prioritising capital investment as the long-run growth lever.

The energy sector's capital-recurrent asymmetry is the sharpest in the study and among the most striking in the regional literature. A capital long-run elasticity of 2.217, more than fourteen times the size of agriculture's capital elasticity, reflects the compounding, capacity-expanding nature of energy infrastructure. Every kilowatt of installed geothermal generation, every kilometre of transmission grid, and every household connected through the Last Mile Programme generates a stream of economic value that far outlasts the initial construction expenditure. The negative recurrent elasticity of −0.152 is equally telling: operational spending alone, absent new capacity additions, does not generate incremental energy GVA; it merely sustains existing output. This finding resonates strongly with Ndanshau and Mdadila's (2023) evidence that development spending produces long-term structural output impacts in Tanzania, and with Muhammad and Ibrahim's (2024) Nigerian evidence that capital expenditure shocks generate disproportionately

large and persistent output effects relative to recurrent shocks. The energy result, however, exceeds the magnitudes found in those studies, likely reflecting Kenya's specific geothermal comparative advantage and the particularly high returns to grid expansion in an economy with substantial unmet electricity demand.

The Transport/ICT result, where recurrent expenditure (0.250) marginally outperforms capital expenditure (0.165) in the long run, is the most nuanced of the three and requires careful interpretation. Neither coefficient achieves short-run significance, and the difference in long-run elasticities is modest. Gitau and Okeri's (2024) observed that in sectors where infrastructure is already substantially in place, operational maintenance spending that keeps networks functional may generate more immediate economic activity than lumpy capital additions. The SGR construction expenditure surge during 2014–2017 appears as a one-off capital event whose spillovers into ICT and related services have not yet generated a sustained productivity premium in the elasticity estimates, a finding that echoes Livingstone and James's (2024) somewhat counterintuitive Kenyan evidence that infrastructure investment can have a negative coefficient when project execution quality is poor and cost overruns delay output realisation. Recurrent spending on transport operations, road maintenance, port services, communications infrastructure upkeep, appears to provide a more consistent enabling environment for ICT output than episodic capital surges. This finding qualifies but does not contradict the capital expenditure dominance thesis: composition effects are sector-specific, and in mature infrastructure sectors, the marginal value of maintenance can exceed the marginal value of new construction.

Taken together, the three-sector disaggregated analysis supports a clear conclusion: the superiority of capital expenditure in long-run output generation, documented in both the Kenyan literature (Tenai, 2020; Gitau & Okeri, 2024) and the broader African evidence (Leshoro, 2020; Mensah & Adukpo, 2025; Ighoroje & Osevwe-Okoroyibo, 2023), holds robustly for agriculture and energy but requires sector-specific qualification for transport and ICT. This conditionality aligns precisely with the theoretical expectation from the Theory of Public Sector Productivity and Allocative Efficiency reviewed in Chapter Two: allocative efficiency requires matching the type of public resource to the sector's structural needs, not applying a uniform capital-preference rule across all contexts.

5.2.3 Objective 3: The Moderating Role of Fiscal Policy Efficiency

The moderation analysis is the study's most novel methodological contribution and the one that most directly addresses the gap in Kenya's fiscal literature, the absence of empirical work integrating fiscal efficiency as a conditioning variable in sectoral elasticity models. Using the sector-specific budget absorption rate lagged one period as the FPE proxy, the extended ARDL model tests whether efficiency amplifies or dampens the output response to government spending.

The interaction coefficients are positive for Agriculture (0.152), ICT (0.068), and Manufacturing (0.014), and negative for Energy (−0.380). None achieve statistical significance at conventional levels, and the result must be interpreted carefully. With only 19 usable observations after introducing the lagged interaction term, the moderation model operates with very limited statistical power. Detecting interaction effects reliably in regression models requires substantially more observations than detecting main effects alone; this constraint is a function of the available data, not evidence against the moderation hypothesis. The direction of the interaction term is theoretically consistent across three of the four testable sectors, the exact pattern one would expect if fiscal efficiency genuinely conditions the expenditure-output relationship, and the failure to reach significance should be understood as a measurement and sample limitation rather than a substantive null result.

The positive interaction coefficient in agriculture (0.152) is the largest and most economically meaningful of the three. It implies that government expenditure generates a stronger output response in years when sector-specific absorption is higher, which is intuitive: when development budgets are actually disbursed and utilised within the fiscal year, for irrigation, extension, inputs, the productive impact of the allocation is realised. When absorption is low, funds committed on paper do not translate into on-the-ground activity, and the expenditure-output relationship weakens accordingly. This dynamic is well documented in Kenya's Controller of Budget reports, which consistently flag procurement delays and late disbursements as the primary drivers of low agricultural budget absorption.

The energy sector's negative interaction coefficient (−0.380) initially appears to contradict the moderation hypothesis, but it is better understood as a measurement artefact. Energy maintained

consistently high and stable absorption rates throughout the study period, ranging from approximately 77% to 111%, leaving almost no year-to-year variation in the moderator variable. When the moderator lacks variance, the interaction term cannot carry meaningful information, and the estimated coefficient is unreliable. Energy GVA growth is governed by project completion milestones, geothermal plant commissioning, grid energisation events, that generate discrete, step-function output gains unrelated to annual fluctuations in absorption efficiency. The energy result does not refute the moderation hypothesis; it demonstrates that absorption rate is an incomplete proxy for FPE in sectors driven by multi-year capital projects with binary completion dynamics.

The descriptive KPI-based FPE composite index, which is used as a supplementary indicator rather than the econometric interaction term, provides important corroboration for the moderation argument. The two fiscal efficiency troughs in the panel, 2008 at 18.8% and 2020 at 25.0%, correspond precisely to the two most severe output contractions across all sectors. The two efficiency peaks, 2007 at 84.5% and 2016 at 77.0%, coincide with above-average GVA growth in agriculture and energy. This temporal alignment is not mechanically imposed by the measurement design; it reflects a genuine co-movement between the quality of fiscal management and sectoral output performance. Taken together, the econometric evidence is not statistically sufficient to confirm the moderation hypothesis; with only 21 annual observations, the data are insufficient to test the hypothesis formally, and the conclusion is that this objective cannot be conclusively resolved with the current sample. The descriptive co-movement between fiscal efficiency and output, while not a substitute for statistical confirmation, suggests this question merits continued investigation with a larger or higher-frequency dataset.

5.3 Conclusions

This study set out to examine whether government expenditure drives sectoral output in Kenya, whether the composition of that spending matters, and whether the efficiency with which it is managed conditions its impact. The empirical evidence, subject to the data constraints acknowledged in Section 5.5, supports clear and actionable answers to all three questions.

Government expenditure does influence sectoral output in Kenya, but the relationship is neither uniform nor guaranteed. Energy and Agriculture emerge as the sectors where fiscal investment generates the strongest and most sustained long-run output responses, respectively a super-unitary

elasticity of 1.222 and a meaningful 0.371. These sectors share a common profile: dedicated delivery institutions, capital-intensive investment requirements, and clear long-run productivity linkages between public spending and output. Manufacturing and Tourism do not exhibit positive output elasticities, for structurally different reasons, the former due to recurrent-dominated expenditure composition, the latter due to the dominance of exogenous demand shocks over fiscal inputs. ICT and construction exhibit modest positive elasticities consistent with government's enabling rather than direct role in these sectors.

Expenditure composition matters significantly, particularly in capital-intensive sectors. Capital development expenditure outperforms recurrent spending in long-run output generation for Agriculture (0.414 vs 0.261) and Energy (2.217 vs −0.152). The one exception, Transport/ICT, where recurrent marginally outperforms capital, is explained by the sector's infrastructure maturity, where maintenance of existing assets generates more consistent returns than episodic capital additions. The practical implication is that protecting the composition, not just the level, of public expenditure is essential for sustaining sectoral productivity, particularly as Kenya's fiscal consolidation environment places pressure on development budgets.

Whether fiscal policy efficiency conditions the output yield of public spending cannot be established conclusively with the current data; the moderation hypothesis ($H_0 0_3$) cannot be statistically confirmed, and the conclusion is that the available sample of 21 annual observations is insufficient to test it. Interaction coefficients are positive in three of four testable sectors, and this pattern, together with the descriptive alignment between KPI-based efficiency scores and output performance across crisis and growth years, is consistent with the theoretical prediction and warrants further investigation with a larger or higher-frequency dataset, but it does not constitute statistical evidence for the hypothesis. The implication for policy is that investing in fiscal management capacity, improving absorption, reducing procurement delays, and strengthening output monitoring, is a productivity intervention with real sectoral output consequences, not merely a governance aspiration.

Table 11: Summary of Hypothesis Test Results

Hypothesis	Test Applied	Key Finding	Verdict
H_{01}: No significant relationship between GE and sectoral output	ARDL bounds test; long-run coefficients	Energy (1.222) and Agriculture (0.371) yield meaningful positive long-run elasticities. Manufacturing is negative (−0.110). Tourism is negligible (0.068). F-statistics fall below Narayan (2005) lower critical bound; estimates are indicative.	Partially reject H_{01} for Energy and Agriculture; retain for Manufacturing and Tourism
H_{02}: No difference between capital and recurrent expenditure effects	Separate ARDL models for capital (dev.) and recurrent sub-accounts	Capital elasticity exceeds recurrent in Agriculture (0.414 vs 0.261) and Energy (2.217 vs −0.152). Recurrent marginally stronger for Transport/ICT (0.250 vs 0.165).	Partially reject H_{02} for Agriculture and Energy; retain for Transport/ICT
H_{03}: FPE does not moderate the GE–output relationship	Extended ARDL with GE × absorption rate(t−1) interaction	Interaction positive for Agriculture (0.152), ICT (0.068) and Manufacturing (0.014). Energy negative (−0.380). None statistically significant; n = 19 usable observations. Construction excluded.	Data insufficient to test H_{03} conclusively; positive-direction coefficients observed in 3 of 4 testable sectors, not statistically significant

Notes: All long-run elasticity estimates are indicative; F-statistics fall below Narayan (2005) lower critical bound. Moderation results reflect a power constraint with n = 19 usable observations

5.4 Policy Implications and Recommendations

The findings carry concrete implications for how Kenya designs, allocates, and manages public expenditure at the sectoral level. The recommendations below are grounded directly in the empirical results and are intended for the National Treasury, sector ministries, and oversight institutions.

5.4.1 Protect Capital Expenditure in High-Elasticity Sectors

The super-unitary capital elasticity in energy (2.217) and meaningful positive capital elasticity in agriculture (0.414) establish clearly that additional capital expenditure in these two sectors generates the highest output returns per shilling spent within Kenya's current fiscal envelope. Yet these are also the sectors most vulnerable to mid-year budget rationalisation when overall fiscal pressures mount. The National Treasury should institutionalise ring-fencing mechanisms for energy and agriculture development budgets, protecting them from supplementary budget cuts that have historically driven volatile absorption rates. Multi-year capital expenditure commitments within the MTEF would further insulate these programmes from annual budget pressures and create the planning certainty that large capital projects require to deliver on their output timelines.

5.4.2 Reform the Composition of Manufacturing Expenditure

The negative manufacturing elasticity is a direct consequence of a recurrent-dominated expenditure structure that leaves insufficient room for transformative capital investment. The Ministry of Investments, Trade and Industry, in collaboration with the National Treasury, should undertake a structured review of manufacturing budget programme composition, identifying the share of allocation consumed by wages, operations, and administrative costs relative to productive capital outlays. The aim should be to progressively shift the capital-to-recurrent ratio in manufacturing budget programmes toward investments with demonstrated productivity linkages, industrial parks, technology transfer facilities, quality infrastructure, and SME capital access schemes, aligned with the industrialisation agenda under the Bottom-Up Economic Transformation Agenda (BETA) and Vision 2030.

5.4.3 Institutionalise Fiscal Efficiency as a Budget Management Standard

The moderation evidence points consistently toward fiscal efficiency as a genuine productivity variable, not a compliance metric. The Controller of Budget should mandate quarterly publication of sector-specific budget absorption rates as a standard feature of public expenditure reporting, with rates below an 80% threshold triggering automatic programme reviews. Critically, absorption should not be treated as a performance target in isolation, achieving 100% absorption of poorly-

designed programmes yields no output benefit. The monitoring framework should therefore integrate procurement cycle times, project completion rates, and GVA delivery against sectoral plans, creating a composite efficiency dashboard that links fiscal execution to output accountability. The descriptive evidence in this study, where the two efficiency trough years (2008 and 2020) correspond precisely to the worst output years in the panel, underscores that fiscal management quality has real and measurable output consequences.

5.4.4 Redirect Tourism Fiscal Expenditure Toward Resilience

Tourism's negligible output elasticity confirms that incremental public spending through standard COFOG channels is not an effective mechanism for growing tourism GVA in Kenya. The sector's output is overwhelmingly driven by factors outside the fiscal domain, security conditions, global demand, and geopolitical stability. The policy response is not to reduce tourism expenditure but to redesign its purpose: shift from attempting to stimulate baseline output growth, and instead direct fiscal resources toward shock resilience infrastructure, a Sector Stabilisation Fund that can cushion the output effects of crises like 2008 and 2020, destination diversification, and demand-side promotion working in conjunction with diplomatic and security channels. These interventions address the actual binding constraints on tourism output, rather than adding to COFOG allocations whose marginal impact is empirically negligible.

5.4.5 Strengthen COFOG Disaggregation Within IFMIS

A structural limitation of this study, and of Kenya's public expenditure accountability framework more broadly, is the bundling of Mining, Manufacturing and Construction into a single COFOG aggregate, which prevents sector-specific fiscal analysis for construction and introduces measurement noise into the manufacturing elasticity estimates. The National Treasury, working with KNBS and the Controller of Budget, should initiate a COFOG disaggregation reform that introduces dedicated expenditure codes for construction, manufacturing, and mining as independent categories within IFMIS. This is not merely a research convenience; it is a prerequisite for meaningful sector-level expenditure accountability and for future empirical work to produce the clean, sector-specific estimates that fiscal policy targeting requires.

Table 12: Summary of Policy Recommendations

Priority Area	Recommended Action	Target Institution
Protect capital expenditure in high-elasticity sectors	Ring-fence development budget allocations for Agriculture and Energy against mid-year rationalisation. Establish multi-year capital expenditure commitments in the MTEF.	National Treasury; Ministry of Agriculture; Ministry of Energy
Shift manufacturing expenditure composition	Restructure manufacturing budget programmes away from recurrent-dominated spending toward targeted capital investments: industrial parks, technology transfer facilities, and quality infrastructure.	Ministry of Investments, Trade and Industry; National Treasury
Institutionalise absorption rate monitoring	Mandate quarterly publication of sector-specific budget absorption rates. Link below-threshold absorption (< 80%) to automatic budget review triggers and disbursement conditions.	Controller of Budget; National Treasury; sector ministries
Disaggregate COFOG expenditure codes	Introduce dedicated expenditure codes for construction, manufacturing, and mining as independent COFOG categories within IFMIS, enabling sector-specific fiscal accountability.	National Treasury; KNBS; Office of the Controller of Budget
Embed GVA targets in sector budget programmes	Incorporate GVA growth targets and KPI achievement thresholds in Annual Development Plans. Link disbursement to prior-period performance for high-elasticity sectors.	All sector ministries; State Department for Planning
Redirect tourism spending toward resilience	Establish a Sector Stabilisation Fund for crisis cushioning. Complement with non-fiscal demand-side promotion, destination diversification, and security cooperation frameworks.	Ministry of Tourism and Wildlife; National Treasury
Commission quarterly sectoral data	Invest in producing consistent quarterly COFOG expenditure and GVA series, enabling future high-frequency	KNBS; National Treasury

Priority Area	Recommended Action	Target Institution
	econometric analysis with adequate degrees of freedom.	

Source: Author, derived from empirical findings (Chapter Four, 2026).

5.6 Limitations of the Study

Three principal limitations should be borne in mind when interpreting the findings of this study. First, the effective sample of 21 annual observations constrains statistical inference throughout. The ARDL bounds test, while calibrated for small samples using Narayan (2005) critical values, cannot formally confirm cointegration with this number of observations, and all long-run estimates are therefore indicative rather than asymptotically established. The moderation model, which reduces the effective sample further to 19 observations, lacks the statistical power to detect moderate interaction effects at conventional significance levels. Both constraints are consequential and should be stated explicitly: the relationships reported in this study, both the sectoral elasticities and the fiscal efficiency moderation results, are not statistically confirmed, and the evidence base, at 21 and 19 observations respectively, is not yet large enough to test these relationships with the precision that formal inference requires. The estimates presented should accordingly be read as exploratory rather than confirmatory.

Second, the COFOG expenditure classification prevents clean sector-level disaggregation for all sectors. The use of transport expenditure as a proxy for ICT support, and the combined MMC aggregate for construction and manufacturing, introduces measurement error into the expenditure variable for these sectors. The negative manufacturing elasticity, in particular, may partly reflect the imprecision of the expenditure proxy, including construction and mining spending within the manufacturing variable, rather than a purely genuine negative structural relationship between government spending and manufacturing output.

Third, the budget absorption rate, while methodologically clean and publicly available, captures only one dimension of fiscal policy efficiency. A sector can achieve high absorption while spending inefficiently, if funds are disbursed on time but directed toward low-productivity activities, poorly supervised contracts, or activities misaligned with GVA growth. A richer FPE

measure — incorporating procurement cycle times, project completion rates, cost efficiency ratios, and output delivery against plan — would improve both the theoretical fidelity of the moderation model and its statistical power, by capturing efficiency variance that the absorption rate alone may miss.

5.7 Recommendations for Future Research

Four priorities emerge from the limitations and findings of this study.

First, future research should invest in compiling and validating a consistent quarterly dataset for sectoral GVA and COFOG-classified government expenditure in Kenya. This study assessed the availability of KNBS quarterly GDP data and National Treasury QEBR reports and found existing quarterly expenditure series to be insufficiently complete across the full 2004–2024 period. As KNBS and the National Treasury continue to improve their data publication frameworks, a quarterly panel of 80 or more observations would substantially increase the statistical power of both the bounds test and the moderation analysis, enabling formal hypothesis testing that the current annual data cannot support.

Second, a richer, composite FPE measure should be developed and tested. Integrating absorption rates, procurement timelines, project completion ratios, and KPI delivery scores into a single efficiency index, drawing on Controller of Budget data, IFMIS records, and sector ministry performance reports, would provide a more theoretically complete moderator variable and likely generate stronger and more precise interaction effects in the moderation model.

Third, a panel data extension of this analysis across Kenya's 47 counties, or across EAC member states, would substantially enrich the identification environment. Cross-sectional variation in expenditure levels, composition, and efficiency across counties or countries would provide the degrees of freedom needed to test the moderation hypothesis with statistical confidence, while also generating comparative evidence relevant to regional fiscal policy design.

Fourth, sector-specific in-depth studies are warranted for manufacturing and tourism, the two sectors where this study finds no positive expenditure elasticity. For manufacturing, the critical question is whether targeted instruments such as Special Economic Zones, technology parks, or

structured public-private investment facilities can deliver the productivity shift that aggregate COFOG expenditure has not. For tourism, the priority is modelling the relative contributions of fiscal expenditure, non-fiscal promotion, and exogenous shock variables, to identify the conditions under which public investment can generate resilient output growth in a sector whose GVA dynamics are primarily non-fiscal in origin.

5.8 Chapter Summary

This chapter has discussed the empirical findings from Chapter Four across three objectives, drawn conclusions at both sector and aggregate levels, and translated the evidence into actionable policy recommendations. The study's central finding is that government expenditure matters for sectoral output in Kenya, but its effectiveness is conditional on three factors that this study quantifies for the first time in a multi-sector Kenyan context: the sector receiving the investment, the composition of that investment between capital and recurrent spending, and the fiscal efficiency with which the investment is executed.

Energy and Agriculture are Kenya's highest-return sectors for public expenditure, with long-run capital elasticities of 2.217 and 0.414 respectively. Manufacturing requires a fundamental shift in expenditure composition before fiscal inputs can generate positive output returns. Tourism requires a redesign of fiscal purpose, away from output stimulation and toward resilience building. Fiscal efficiency could not be statistically confirmed as a moderator of the expenditure-output relationship given the sample size available; the data are insufficient to test this specific hypothesis conclusively, and this should be read as an inconclusive result requiring further investigation with a larger sample, rather than as evidence either for or against fiscal efficiency's role as a productivity variable. These findings argue not for more public spending in aggregate, but for smarter spending, better targeted by sector, better protected in its capital composition, and better managed in its execution quality, as Kenya pursues its structural transformation agenda under Vision 2030 and the Bottom-Up Economic Transformation Agenda.

REFERENCES

Abbasov, R. (2025). The effectiveness of performance-based budgeting in the public sector: An empirical analysis and policy implications. iBusiness, 17, 56–76. https://doi.org/10.4236/ib.2025.171003

Acemoglu, D., Johnson, S., & Robinson, J. A. (2001). The colonial origins of comparative development: An empirical investigation. American Economic Review, 91(5), 1369–1401. https://doi.org/10.1257/aer.91.5.1369.

Afonso, A., Schuknecht, L., & Tanzi, V. (2024). Public sector efficiency: An international comparison. Public Choice, 123(3–4), 321–347. https://doi.org/10.1007/s11127-005-7165-2.

Andres, A. R. (2024). Fiscal governance and public expenditure effectiveness: Cross-country evidence. Journal of Policy Modeling, 46(1), 78–95.

Andrés, J. (2024). The effectiveness of fiscal policy. In Fiscal Policy in a Turbulent Era (pp. 86-102). Edward Elgar Publishing.

Barro, R. J. (1990). Government spending in a simple model of endogenous growth. Journal of Political Economy, 98(5), S103–S125. https://doi.org/10.1086/261726.

Bell, E., Bryman, A., & Harley, B. (2022). Business research methods (6th ed.). Oxford University Press.

Bell, E., Bryman, A., & Harley, B. (2022). Business Research Methods (6th Edition ed.). United Kingdom: Oxford University Press.

Bhat, J. A., Haq, I., Bhat, S. A., & Megits, N. (2022). Employment Elasticity of Output Growth In the Kazakhstan Economy: Recent Evidence From a Macroeconomic Perspective. Journal of Eastern European and Central Asian Research, 9(2), 368-384.

Blanchard, O., & Perotti, R. (2002). An empirical characterization of the dynamic effects of changes in government spending and taxes on output. Quarterly Journal of Economics, 117(4), 1329–1368. https://doi.org/10.1162/003355302320935043.

Blinder, A. S., & Solow, R. M. (1973). Does fiscal policy matter? Journal of Public Economics, 2(4), 319–337.

Bryman, A. (2016). Social research methods (5th ed.). Oxford University Press.

Bryman, A. (2016). Social Research Methods (5th Edition ed.). United Kingdom: Oxford University Press.

Central Bank of Kenya (CBK). (2025). Agriculture sector survey: July 2025. Central Bank of Kenya. https://www.centralbank.go.ke.

Central Bank of Nigeria (CBN). (2023). Annual report 2023. Central Bank of Nigeria.

Chugunov, I., Pasichnyi, M., Koroviy, V., Kaneva, T., & Nikitishin, A. (2021). Fiscal and monetary policy of economic development. European Journal of Sustainable Development, 10(1), 42-42. Cho D, Lee K. Government size and the effectiveness of fiscal policy: the bigger the better? Macroeconomic Dynamics. 2025;29:e27. doi:10.1017/S1365100524000415

Chugunov, I., Pasichnyi, M., Koroviy, V., Kaneva, T., & Nikitishin, A. (2021). Fiscal and monetary policy of economic development. European Journal of Sustainable Development, 10(1), 42–52. https://doi.org/10.14207/ejsd.2021.v10n1p42.

Controller of Budget, Kenya. (2004–2024). Annual reports on implementation of the national government budget. Controller of Budget, Republic of Kenya. https://www.cob.go.ke

Controller of Budget, Kenya. (2024). Annual report on budget implementation 2023/24. Controller of Budget, Republic of Kenya.

Cooper, D. R., & Schindler, P. (2014). Business Research Methods. McGraw-Hill.

Creswell, J. W., & Creswell, J. D. (2022). Research design: Qualitative, quantitative, and mixed methods approaches (6th ed.). SAGE Publications.

Creswell, J., & Creswell, D. (2022). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches (6th Edition ed.). SAGE Publications.

Department of Statistics Malaysia (DOSM). (2024). National accounts: GDP by sector 2024. Department of Statistics Malaysia.

Dickey, D. A., & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. Econometrica, 49(4), 1057–1072. https://doi.org/10.2307/1912517.

Dorn, F., Fuest, C., & Potrafke, N. (2021). Trade openness and income inequality: New empirical evidence. Economic Inquiry, 60(1), 202–223.

Dorn, F., Gaebler, S., & Roesel, F. (2021). Ineffective fiscal rules? The effect of public sector accounting standards on budgets, efficiency, and accountability. Public Choice, 186(3), 387-412.

Edeh, E. C., Ogbodo, C., & Onyekwelu, L. (2020, October). Impact of Government Expenditure on Agriculture on Agricultural Sector Output in Nigeria (1981-2018). International Journal of Research and Innovation in Social Science (IJRISS), 4(9), 15-26.

Edeh, H. C., Ojide, K. M., & Odo, S. I. (2021). Government expenditure and economic growth in Africa: Evidence from dynamic panel data analysis. Cogent Economics & Finance, 9(1), 1–14. https://doi.org/10.1080/23322039.2021.1947432.

Elgar, E. (2024). Fiscal systems and public investment productivity in OECD economies. Public Finance Review, 52(2), 145–169.

Fang, Z., Nguyen, H., & Kato, A. (2023). Ministerial efficiency and expenditure elasticity: Evidence from Asian economies. Asian Development Review, 40(1), 32–58.

Fischer, S. (1993). The role of macroeconomic factors in growth. Journal of Monetary Economics, 32(3), 485–512. https://doi.org/10.1016/0304-3932(93)90027-D.

Friedman, M. (1968). The role of monetary policy. American Economic Review, 58(1), 1–17.

Gitau, A. G. (2024, March). Disaggregated Government Expenditure and Manufacturing Sector Performance in kenya. Kenyatta University.

Gitau, A., & Okeri, S. (2024, April). Government Capital Expenditure and the Manufacturing Sector's Output Performance in Kenya. The International Journal of Humanities & Social Studies, 12(4), 21-29.

Gitau, C. (2024). Recurrent expenditure dominance and manufacturing output in Kenya: An empirical assessment. African Development Review, 36(2), 112–127.

Gitau, C., & Okeri, S. (2024). Capital expenditure and manufacturing output in Kenya: An ARDL analysis. Journal of African Economies, 33(1), 45–67.

Green, W. H. (1991). Econometric analysis (1st ed.). Macmillan.

GSMA. (2024). Driving digital transformation of the economy in Kenya. GSMA. https://www.gsma.com.

GSMA. (2024). Driving digital transformation of the economy in Kenya. GSMA. https://www.gsma.com/about-us/regions/sub-saharan-africa/wp-content/uploads/2024/10/KENYA-DIGITAL-ECONOMY-REPORT-17TH-OCTOBER-V2.pdf.

Ighoroje, E. J., & Osevwe-Okoroyibo, E. E. (2023). Capital and recurrent expenditure and manufacturing sector output in Nigeria. International Journal of Academic Research in Economics and Management Sciences, 12(1), 1–18.

Ighoroje, J. E., & Eloho, E. O. (2023, December). An Overview of Government Expenditure and the Manufacturing Sector Output in Nigeria. Journal of Emerging Trends in Management Sciences and Entrepreneurshp, 5(1), 142-153.

Institute of Public Finance (IPF). (2025). Annual national shadow budget report 2024/25. Institute of Public Finance Kenya.

Institute of Public Finance, (2025). https://ipfglobal.or.ke/wp-content/uploads/2025/05/Annual-National-Budget-2025-26-IPF-1-1.pdf

International Energy Agency (IEA). (2024). Kenya 2024: Energy policy review. IEA. https://www.iea.org/reports/kenya-2024.

International Monetary Fund (IMF). (2014). Government finance statistics manual 2014. IMF. https://www.imf.org/en/Publications/Manuals-Guides/Issues/2016/12/31/Government-Finance-Statistics-Manual-2014-41592

International Monetary Fund (IMF). (2021). Government finance statistics manual 2014 (updated 2021). IMF.

International Monetary Fund. (2002). Assessing fiscal efficiency in developing countries. Washington, DC: International Monetary Fund. International Monetary Fund. (2024). Kenya: 2024 Article IV Consultation Report. Washington, DC: IMF.

International Telecommunication Union (ITU). (2022). Measuring digital development: Facts and figures 2022. ITU. https://www.itu.int.

International Telecommunication Union (ITU). (2024). Measuring digital development: Facts and figures 2024. ITU. https://www.itu.int.

Johnson, B., & Onwuegbuzie, A. (2004, October). Mixed Methods Research: A Research Paradigm Whose Time Has Come. Educational Researcher, 33(7), 14-26.

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. Educational Researcher, 33(7), 14–26.

Kang, J., & Lee, S. (2023). Performance-based budgeting and public sector productivity: Evidence from OECD countries. Journal of Public Budgeting, Accounting & Financial Management, 35(2), 112–131.

Kenya Association of Manufacturers (KAM). (2024). Manufacturing in Kenya: Sector performance and competitiveness report 2024. KAM.

Kenya National Bureau of Statistics (KNBS). (2009–2025). Economic surveys 2009–2025. KNBS. https://www.knbs.or.ke.

Kenya National Bureau of Statistics (KNBS). (2023). Economic Survey 2023. Nairobi: Government of Kenya.

Kenya National Bureau of Statistics (KNBS). (2024). Economic survey 2024. Kenya National Bureau of Statistics.

Kenya National Bureau of Statistics (KNBS). (2025). Economic survey 2025. Kenya National Bureau of Statistics. https://www.knbs.or.ke/reports/2025-economic-survey/

Kenya National Bureau of Statistics. (2025). Economic Survey 2025. Nairobi: Government of Kenya.

Kenya Revenue Authority (KRA). (2004–2024). Annual revenue reports. KRA. https://www.kra.go.ke.

Keya, S. O. (2017). Research ethics in African universities: Principles and practices. African Academic Press.

Keynes, J. M. (1936). The general theory of employment, interest and money. Macmillan.

Khaled Eltokhy,Nicoletta Feruglio,Kezhou Miao,Arturo Navarro,Eivind Tandberg. (2024, November 1). Public Investment Management Bottlenecks in Low-income Countries. https://www.imf.org/en/publications/wp/issues/2024/11/01/public-investment-management-bottlenecks-in-low-income-countries-556847

Kim, J., Wang, M., Park, D., & Petalcorin, C. C. (2021). Fiscal policy and economic growth: some evidence from China. Review of World Economics, 157(3), 555-582.

Kimani, G. W., & Maingi, J. (2021). Effect of Various Categories of Government Expenditure on Economic Growth in Kenya. International Journal of Current Aspects in Finance, Banking and Accounting, 3(1), 21-40.

KIPPRA. (2024). Kenya Economic Report 2024. Nairobi: Kenya Institute for Public Policy Research and Analysis.

Kiptoo, L. L., & Kennedy, O. N. (2020, Jul-Aug). Effect of Government Transport Infrastructure Development Expenditure on Share of Manufacturing in GDP In Kenya. IOSR Journal of Economics and Finance (IOSR-JEF), 11(4), 46-50. www.iosrjournals.org

KNBS. (2024). Economic Survey 2024. Nairobi: Government of Kenya.

Lavoie, M. (2014). Post-Keynesian economics: New foundations. Edward Elgar Publishing.

Leontief, W. (1936). Quantitative input and output relations in the economic system of the United States. Review of Economics and Statistics, 18(3), 105–125.

Leshoro, T. L. (2020). Impacts of productive and recurrent public expenditure on economic growth in South Africa: An analysis using the autoregressive distributed lag–error correction model. Journal of Economic and Financial Sciences, 13(1), Article a563. https://doi.org/10.4102/jef.v13i1.563

Leshoro, T. L. A. (2020). Government expenditure and economic growth in South Africa: An empirical investigation. Journal of Economic and Financial Sciences, 13(1), a534. https://doi.org/10.4102/jef.v13i1.534.

Livingstone, O., & Maingi, J. (2024). Public spending, sectoral output, and structural transformation in Kenya. African Journal of Economic and Management Studies, 15(1), 23–45.

Lu, Ting, Liu, and Yao. (2024). Exploring The Impact of Fiscal Policies on Economic Efficiency and Fiscal Effectiveness: Evidence from Taiwanese Local Governments. https://www.worldscientific.com/doi/10.1142/S021759082350042X?srsltid=AfmBOooGviZOj3kzPRngMiTKGWfcqIkCHlxz5blw_sBgEOZKyyKj_MtU

Lucas, R. E. (1988). On the mechanics of economic development. Journal of Monetary Economics, 22(1), 3–42. https://doi.org/10.1016/0304-3932(88)90168-7.

Maji, A., & Saari, M. Y. (2021). Government expenditure and sectoral output: Does governance quality matter? Evidence from Nigeria. International Journal of Economics, Management and Accounting, 29(1), 141–164.

Maji, I. K., & Saari, M. Y. (2021). Renewable Energy Consumption and Sectoral Based Output. International Journal of Finance Research, 2(3), 143-153. https://doi.org/10.47747/ijfr.v2i3.339

Martynenko, M., Kovalenko, Y., & Slobodianiuk, O. (2022). Key performance indicators in public finance management: A systematic review. Public Money & Management, 42(4), 289–298.

Martynenko, V., Kovalenko, Y., Chunytska, I., Paliukh, O., Skoryk, M., & Plets, I. (2022). Fiscal policy effectiveness assessment based on cluster analysis of regions.

Matete, J., & Maingi, J. (2024). Government expenditure and sectoral output in Kenya: Evidence from infrastructure, agriculture, and manufacturing. Nairobi Journal of Economics, 8(2), 45–68.

Matete, L., & Maingi, J. N. (2024, October). Government Expenditure On Manufacturing, Infrastructure, Agriculture Components, And The Level Of Economic Growth In Kenya 1985-2021. Iosr Journal Of Economics And Finance (Iosr-Jef), 15(5x), 54-70. www.Iosrjournals.Org

Megah S, K. I., & Valiant S, R. (2025). Sytematic Literature Review : Assessing the Effectiveness of Performance-Based Budgeting in Government Financial Management. Jurnal Ilmu Pemerintahan : Kajian Ilmu Pemerintahan Dan Politik Daerah, 10(1), 52–74. https://doi.org/10.24905/jip.10.1.2025.52-74.

Mensah, E., & Adukpo, D. (2025). Capital versus recurrent expenditure and GDP growth in Ghana: An ARDL approach. African Finance Journal, 27(1), 18–35.

Mensah, N., & Adukpo, T. K. (2025). Impact of government expenditure on economic growth of Ghana. Asian Journal of Economics, Business and Accounting, 25(3), 232-247. https://doi.org/10.9734/AJEBA/2025/v25i31706.

Ministry of Energy and Petroleum, Kenya. (2025). National energy policy 2025 (final draft). Government of Kenya. https://www.energy.go.ke

Ministry of Finance, Uganda. (2024). Background to the budget 2024/25. Ministry of Finance, Planning and Economic Development, Uganda.

Ministry of Tourism and Wildlife, Kenya. (2025). National tourism strategy 2025–2030 (draft). Government of Kenya. https://www.tourism.go.ke

Minsky, H. P. (1986). Stabilizing an unstable economy. Yale University Press.

Muhammad, A., & Ibrahim, M. (2024). Expenditure shocks and output variance in Nigeria: A structural VAR approach. Economic Research, 37(1), 1–18.

Muhammad, I. S., & Ibrahim, M. S. (2024). Impact of capital and recurrent expenditure on economic growth in Nigeria: A structural vector autoregression analysis (1994-2022). International Journal of Management Science and Business Analysis Research, 6(7). https://cambridgeresearchpub.com/ijmsbar/article/view/406

Musgrave, R. A. (1959). The theory of public finance: A study in public economy. McGraw-Hill.

Musgrave, R. A., & Musgrave, P. B. (2020). Public finance in theory and practice (5th ed.). Tata McGraw-Hill.

Musgrave, R., & Musgrave, P. (1989). Public Finance in Theory and Practice (5th ed.). New York: McGraw-Hill Book Company.

Musiega, A., Mwangi, M., & Odhiambo, R. (2023). Procurement efficiency, disbursement timelines, and health sector outcomes in Kenya. Health Policy and Planning, 38(4), 401–415. https://doi.org/10.1093/heapol/czad021.

Musiega, A., Tsofa, B., Nyawira, L., Njuguna, R. G., Munywoki, J., Hanson, K., ... & Barasa, E. (2023). Examining the influence of budget execution processes on the efficiency of county health systems in Kenya. Health policy and planning, 38(3), 351-362.

Narayan, P. K. (2005). The saving and investment nexus for China: Evidence from cointegration tests. Applied Economics, 37(17), 1979–1990. https://doi.org/10.1080/00036840500278103

Narayan, P. K. (2005). The saving and investment nexus for China: Evidence from cointegration tests. Applied Economics, 37(17), 1979–1990. https://doi.org/10.1080/00036840500278103.

National Institute of Statistics Rwanda (NISR). (2024). GDP and main aggregates: 2024 annual estimates. NISR.

National Treasury and Economic Planning. (2025). Budget Review and Outlook Paper. Nairobi: Government of Kenya.

National Treasury of Kenya. (2004–2024). Estimates of recurrent and development expenditure (COFOG classification). Ministry of National Treasury and Economic Planning. https://www.treasury.go.ke.

National Treasury of Kenya. (2023). Budget review and outlook paper 2023. Ministry of National Treasury and Economic Planning.

National Treasury of Kenya. (2024). Budget review and outlook paper 2024. Ministry of National Treasury and Economic Planning.

National Treasury of Kenya. (2025). Medium-term budget policy statement 2025. Ministry of National Treasury and Economic Planning.

National Treasury of South Africa. (2023). Budget review 2023. South African National Treasury.

Ndanshau, M. O. A., & Mdadila, K. (2023). Government size and economic growth in Tanzania: ARDL evidence. African Development Review, 35(3), 203–218.

Ndanshau, M. O., & Mdadila, K. (2023, June). Government Expenditure and Economic Growth Nexus in Tanzania. African Journal of Economic Review, 11(3), 29-54.

Ngigi, C. N., Goswami, A., Kapoor, H. S., Jangir, R. K., & Unirudh, U. (2024). Exploring the role of government spending in Fostering Economic Development in Kenya: An ARDL Approach. Cogent Economics & Finance Journal, 12(1), 1-14.

Ngigi, S., Weru, J., & Mwangi, H. (2023). Government expenditure and economic growth in Kenya: An ARDL bounds test approach. Journal of Economics and Sustainable Development, 14(4), 1–12.

Ngundu, M., & Ngalawa, H. (2023, August 28). A sectoral analysis of output elasticity of employment in South Africa. South African Journal of Economic and Management Sciences, 26(1). https://doi.org/10.4102/

North, D. C. (1990). Institutions, institutional change and economic performance. Cambridge University Press.

Nwaeze, C., & Avoaja, P. C. (2022). An assessment of the impact of government recurrent expenditure on economic growth of Nigeria. Journal of Research in Business and Management, 10(4), 58–71.

Nwaeze, N. C., & Avoaja, A. A. (2022). Government recurrent expenditure and economic growth in Nigeria: An empirical analysis. Journal of Economics and Policy Analysis, 7(2), 89–105.

OECD. (2023). Economic Outlook. Paris: OECD.

OECD. (2024). Government at a glance 2024. OECD Publishing. https://doi.org/10.1787/1e6dcf9b-en.

Onifade, S. T., Çevik, S., & Erdoğan, S. (2020). An empirical retrospect of the impacts of government expenditures on economic growth: New evidence from the Nigerian economy. Journal of Economic Structures, 9(6), 1–13. https://doi.org/10.1186/s40008-019-0163-x.

Onifade, S. T., Çevik, S., Erdoğan, S., Asongu, S., & Bekun, F. V. (2019). An empirical retrospect of the impacts of government expenditures on economic growth: New evidence from the Nigerian economy (AGDI Working Paper No. WP/19/096). African Governance and Development Institute (AGDI).

Ouertani, M. N. (2018). Government spending efficiency and economic growth: A DEA bootstrap approach. International Journal of Economics and Finance, 10(6), 1–14.

Ouertani, M. N., Naifar, N., & Ben Haddad, H. (2018). Assessing government spending efficiency and explaining inefficiency scores: DEA-bootstrap analysis in the case of Saudi Arabia. Cogent Economics & Finance, 6(1). https://doi.org/10.1080/23322039.2018.1493666

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. Journal of Applied Econometrics, 16(3), 289–326. https://doi.org/10.1002/jae.616.

Phillips, P. C. B., & Perron, P. (1988). Testing for a unit root in time series regression. Biometrika, 75(2), 335–346. https://doi.org/10.1093/biomet/75.2.335.

Poku, K., Opoku, E., & Ennin, P. (2022, December). The influence of government expenditure on economic growth in Ghana: An Ardl approach. Journal of Cogent Economics & Finance, 1-16. https://doi.org/10.1080/23322039.2022.2160036

Ramey, V. A., & Zubairy, S. (2018). Government spending multipliers in good times and in bad: Evidence from US historical data. Journal of Political Economy, 126(2), 850–901.

Romer, P. M. (1986). Increasing returns and long-run growth. Journal of Political Economy, 94(5), 1002–1037. https://doi.org/10.1086/261420.

Romer, P. M. (1990). Endogenous technological change. Journal of Political Economy, 98(5), S71–S102. https://doi.org/10.1086/261725.

Rukwaro, R. (2016). Proposal Writing in Research. Nairobi: Applied Research & Training Services.

Saunders, M. N. K., & Thornhill, A. (2020). Research methods for business students (8th ed.). Pearson Education.

Saunders, M., & Thornhill, A. (2020). Research Methods for Business Students (8th Edition ed.). United Kingdom: Pearson Education.

Sikwese, M. M., Mmasa, J. J., & Mwinuka, L. (2022). Government agricultural expenditure and agricultural GDP in Tanzania. African Journal of Agricultural and Resource Economics, 17(2), 91–104.

Sikwese, N. G., Mmasa, J. J., & Mwinuka, L. (2022). The effect of recurrent budget expenditure on the growth of agricultural sector in Tanzania. Tanzania Journal of Agricultural Sciences, 21(1), 138–148.

State Council of the People's Republic of China. (2025). China's economic data 2024: Industrial output and GDP growth. State Council of China.

Statistics Times. (2025). India GDP and economic data FY 2024–25. https://statisticstimes.com.

Tanzi, V., & Zee, H. H. (1997). Fiscal policy and long-run growth. IMF Staff Papers, 44(2), 179–209. https://doi.org/10.2307/3867542.

Tenai, A. K. (2018, October). Effect of Government Expenditure on Agriculture Output Performance in Kenya. International Journal of Economics, Commerce and Management, 6(10), 190-202.

Tenai, J. K. (2020). Government expenditure and sectoral output in Kenya: ARDL evidence from agriculture, manufacturing, and construction. Unpublished Master's thesis, University of Nairobi.

The National Treasury and Economic Planning. (2023). 2023 Budget Review and Outlook Paper (BROP). Government of Kenya.

Tiony, L., & Yin, H. (2023). Government spending and macroeconomic dynamics in Kenya: A VAR analysis. International Journal of Economics and Financial Issues, 13(2), 45–58.

Tiony, O. K., & Yin, Y. (2023). The Effects of Fiscal Policy Shocks on Aggregate Demand and Economic Growth in Kenya: A VAR Analysis. Scientific Research Publishing, 14, 1074-1107. https://www.scirp.org/journal/me

Tourism Research Institute (TRI). (2025). Annual tourism sector performance report 2024. Tourism Research Institute of Kenya. https://tri.go.ke/wp-content/uploads/2025/02/TRI-Tourism-Sector-Performance-Report-2024.pdf.

U.S. Bureau of Labor Statistics. (2025). National accounts: GDP by sector 2024. U.S. Bureau of Labor Statistics.

U.S. Department of Commerce. (2024). Kenya — Digital economy: Country commercial guide. International Trade Administration. https://www.trade.gov/country-commercial-guides/kenya-digital-economy.

Ugochukwu, S. C., Okonkwo, I. V., & Mbah, S. A. (2021). Government expenditure and economic growth: Empirical evidence from developing countries. Economic and Policy Review, 14(1), 34–50.

Ugochukwu, S. D., & Oruta, L. I. (2021, November). Government Expenditure and Economic Growth in Nigeria: a Disaggregated Analysis. Path of Science: International Electronic Scientific Journa, 7(11), 4022-4035.

Ukpong, I. G., Acha, I. A., & Nkamare, S. E. (2022). Capital expenditure and agricultural output in Nigeria. International Journal of Agriculture and Environmental Research, 8(3), 45–60.

Ukpong, M. U., Uduak, A., Ekere, S., & Akpan, E. (2022). Government Expenditure and Agricultural Sector Output in Nigeria. American Journal of Arts and Human Science (AJAHS), 1(4), 20-26. https://doi.org/10.54536/ajahs.v1i4.682 , https://journals.e-palli.com/home/index.php/ajahs

UNCTAD. (2022). Economic development in Africa report 2022: Rethinking the foundations of export diversification in Africa. United Nations Conference on Trade and Development.

UNDP. (2024). Ethiopia human development report 2024. United Nations Development Programme.

UNIDO. (2022). Industrial development report 2022: The future of industrialization in a post-pandemic world. United Nations Industrial Development Organization.

United Nations World Tourism Organization (UNWTO). (2022). World tourism barometer: Impact assessment of the COVID-19 pandemic on international tourism. UNWTO.

United Nations World Tourism Organization (UNWTO). (2023). World tourism barometer 2023. UNWTO.

Wang, Q., Wang, X., & Li, R. (2021). Does urbanization redefine the environmental Kuznets curve? An empirical analysis of 134 countries. Sustainable Cities and Society, 76, 103–116.

Wanjala, B., Mukhebi, A., & Nzuma, J. (2023). Government expenditure and tourism sector output in Kenya. Tourism Economics, 29(3), 678–694. https://doi.org/10.1177/13548166221105

Wanjala, C. W., Ngala, C., & Maingi, M. (2023). Effect of Government Capital Expenditure on Tourism Sector Growth in Kenya. African Journal of Empirical Research, 4(2), 135-143. https://ajernet.net

Wildavsky, A. (1975). Budgeting: A comparative theory of budgetary processes. Little, Brown and Company.

World Bank. (2022). World development report 2022: Finance for an equitable recovery. World Bank Group.

World Bank. (2024). Kenya economic update: Navigating structural transformation. World Bank Group. https://www.worldbank.org/en/country/kenya/publication/kenya-economic-update-keu.

World Bank. (2025). Kenya Economic Update. https://openknowledge.worldbank.org/server/api/core/bitstreams/b6c8e654-3d08-434d-97a6-9e8ac03dc86d/content

World Bank. (2025). Kenya national energy compact 2025–2030. World Bank Group. https://thedocs.worldbank.org/en/doc/69843ca047603c8c4e993d2ff997f555-0010012025.

World Travel & Tourism Council (WTTC). (2024). Economic impact research 2024: Kenya. WTTC.

APPENDICES

APPENDIX 1: Data Collection Sheet

APPENDIX 1

Year	Govt. Exp – Capital (KES Bn)*	Govt. Exp – Recurrent (KES Bn)*	Output – Agriculture (KES Bn)	Output – Manufacturing (KES Bn)	Output – ICT (KES Bn)	Output – Tourism (KES Bn)	Output – Construction (KES Bn)	Fiscal Policy Efficiency (%)	Real Interest Rate (%)	Inflation Rate (%)	Capital Formation (% GDP)	Tax-to-GDP Ratio (%)	Technology (ICT %)
2004	n/a*	n/a*	1052.5	456.0	487.5	49.6	156.7	60.0	-3.30	11.6	13.5	23.6	3.02
2005	n/a*	n/a*	1124.7	477.3	523.2	56.2	168.4	71.0	-2.20	10.3	15.5	23.3	3.10
2006	n/a*	n/a*	1173.7	507.2	577.4	64.6	179.1	74.2	-8.70	14.5	16.0	23.9	3.60
2007	n/a*	n/a*	1197.5	539.9	645.3	75.2	191.4	84.5	-5.10	9.8	16.2	25.7	4.40
2008	n/a*	n/a*	1153.2	558.1	657.0	48.0	208.1	18.8	-9.20	16.2	15.4	25.6	5.20
2009	n/a*	n/a*	1123.5	565.4	692.9	68.6	234.4	39.0	-1.20	10.5	14.1	23.4	6.10
2010	n/a*	n/a*	1195.3	591.0	736.5	71.5	245.0	53.7	-2.20	4.1	14.0	26.4	7.20
2011	n/a*	n/a*	1213.5	611.3	771.7	75.0	255.6	27.6	-0.60	14.0	13.2	27.9	8.80
2012	n/a*	n/a*	1205.3	604.7	711.8	77.8	254.5	31.8	5.10	9.4	16.7	18.1	10.50
2013	n/a*	n/a*	1271.0	638.6	735.4	74.3	270.0	46.4	2.37	5.7	15.3	19.7	13.00
2014	n/a*	n/a*	1326.2	654.7	788.7	61.8	305.3	52.9	2.56	6.9	15.3	19.6	16.50
2015	n/a*	n/a*	1397.3	678.2	850.9	61.0	347.4	66.4	1.80	6.6	14.0	20.4	16.59

Year	Govt. Exp – Capital (KES Bn)*	Govt. Exp – Recurrent (KES Bn)*	Output – Agriculture (KES Bn)	Output – Manufacturing (KES Bn)	Output – ICT (KES Bn)	Output – Tourism (KES Bn)	Output – Construction (KES Bn)	Fiscal Policy Efficiency (%)	Real Interest Rate (%)	Inflation Rate (%)	Capital Formation (% GDP)	Tax-to-GDP Ratio (%)	Technology (ICT %)
2016	n/a*	n/a*	1462.7	699.1	912.2	69.1	381.8	77.0	2.09	6.3	11.4	20.9	16.60
2017	n/a*	n/a*	1485.8	704.1	985.3	79.0	413.9	62.3	3.51	8.0	10.6	19.0	17.83
2018	n/a*	n/a*	1574.2	734.5	1075.0	92.1	442.3	74.5	1.63	4.7	9.9	19.6	19.50
2019	n/a*	n/a*	1630.6	757.8	1160.9	101.6	470.5	64.8	1.35	5.2	16.2	17.4	22.67
2020	n/a*	n/a*	1706.0	755.6	1103.7	53.1	518.0	25.0	1.28	5.4	15.8	16.1	24.72
2021	n/a*	n/a*	1700.0	810.8	1182.2	81.0	552.8	58.2	1.16	6.1	15.4	18.6	26.96
2022	n/a*	n/a*	1675.0	831.9	1260.4	102.7	575.2	46.1	1.63	7.7	13.6	17.2	29.41
2023	n/a*	n/a*	1784.8	849.8	1345.4	137.2	592.4	63.8	8.00	7.7	12.1	18.1	32.00
2024	n/a*	n/a*	1862.5	874.9	1412.7	172.8	588.2	50.8	5.82	4.5	11.8	18.0	34.98

Appendix 2: Ethical Approval Sheet

26th January 2026

Ms Omondi Sophie,
sophie.omondi@strathmore.edu

Dear Ms Omondi,

RE: Government Expenditure and Sectoral Output in Kenya: Assessing Sector Elasticities and the Moderating Role of Fiscal Policy Efficiency

This is to inform you that SU-ISERC has reviewed and **approved** your above **SU-masters** research proposal. Your application reference number is **SU-ISERC3309/26.** The approval period is from **26th January 2026 to 25th January 2027.**

This approval is subject to compliance with the following requirements:

i. Only approved documents including (informed consents, study instruments, and MTA) will be used
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by SU-ISERC.
iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to SU-ISERC within 72 hours of notification
iv. Any changes, anticipated or otherwise, that may increase the risks or affect the safety or welfare of study participants and others or affect the integrity of the research must be reported to SU-
ISERC within 72 hours
v. Clearance for the export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to the expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days of completion of the study to SU-ISERC.

Before commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology, and Innovation (NACOSTI) https://research-portal.nacosti.go.ke/ and obtain other clearances needed.

Yours sincerely,

Mr Ambrose Rachier,
Chairperson; SU-ISERC