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**The Effectiveness of Fiscal Policy in Driving
Economic Growth in Ethiopia: A macro-economic
perspective**

By

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Abstract

This study examines the effectiveness of fiscal policy in driving economic growth in Ethiopia from a macroeconomic perspective, using time-series data spanning 1991 to 2023. Employing the Autoregressive Distributed Lag (ARDL) model, focusing on key variables such as government expenditure, government revenue, investment, inflation, interest rates, and real GDP growth. The analysis reveals that Ethiopia's fiscal policy, characterized by significant government spending on development projects, has contributed to sustained economic growth despite persistent fiscal deficits. However, the findings highlight challenges such as inflation volatility, inefficiencies in revenue collection, and the reliance on borrowing to finance deficits, which undermine macroeconomic stability. The study underscores the need for improved policy coordination to enhance revenue mobilization, control inflation, and optimize public spending, ensuring fiscal policy continues to support sustainable growth in Ethiopia.

Keywords: Fiscal policy, GDP Growth, ARDL

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CHAPTER ONE

1.Introduction

Fiscal policy plays a crucial role in driving economic growth, particularly in developing economies like Ethiopia. Through government revenue and expenditure, fiscal policy seeks to influence macroeconomic outcomes such as GDP growth, inflation control, and investment stimulation. Ethiopia, as a country facing rapid population growth, infrastructural needs, and economic volatility, heavily relies on effective fiscal policy to balance economic stability with growth objectives. Despite its importance, the effectiveness of fiscal policy in Ethiopia remains underexplored, particularly in terms of its long-term impacts and the interplay between key variables like inflation, interest rates, government revenue, and expenditure. Understanding these dynamics is critical for designing fiscal strategies that foster sustainable growth, especially given the structural challenges of high inflation, reliance on imports, and limited private sector investment (Ilzetzki, Mendoza, & Végh, 2013).

The economic trajectory of a nation is significantly influenced by fiscal policy, which includes government spending, taxation, and budget management. Fiscal policy is a vital instrument for promoting sustainable economic growth in Ethiopia. But in order to guarantee the best results and guide evidence-based policy choices, the effectiveness of Ethiopia's fiscal policy initiatives needs to be carefully assessed. From a macroeconomic standpoint, this study seeks to evaluate Ethiopia's fiscal policy's efficacy. It focuses on analyzing how the nation's GDP growth rate is affected by public investment, exchange rates, tax revenue, government spending, budget surpluses and deficits (Geda, 2019).

In order to handle the country's economic issues such as unemployment, poverty reduction, infrastructure development, and sustainable resource allocation. Important variables affecting economic growth and stability include the distribution of government spending among the various sectors, the effectiveness of tax collection, the management of the budget surplus or deficit, and the wise use of public investment (Geda, 2019).

Lastly, by examining the effects of government expenditure, tax income, budget surplus or deficit, public investment, currency rates, on the GDP growth rate of the nation, this study aims to assess the efficacy of fiscal policy in Ethiopia from a macroeconomic standpoint. The

study is to shed light on these links in order to offer insightful information that would support evidence-based policymaking and promote Ethiopia's sustainable economic development.

1.1 Background of the Study

Fiscal policy, which encompasses the government's use of taxation and spending to influence the economy, plays a crucial role in managing economic growth, controlling inflation, and promoting social welfare. In Ethiopia, fiscal policy has been central to addressing various economic challenges, including poverty alleviation, infrastructure development, and macroeconomic stability. Since 1989, Ethiopia's economic landscape has undergone significant transformations, which can be divided into distinct phases.

During the pre-1991 era, the Derg regime maintained a centrally planned economy characterized by state control over resources, with fiscal policy focusing heavily on military expenditure and collectivization. This approach resulted in economic stagnation and widespread poverty. Following the fall of the Derg regime, the Ethiopian People's Revolutionary Democratic Front (EPRDF) introduced a series of economic reforms aimed at liberalizing the economy. These reforms included the privatization of state-owned enterprises, the promotion of foreign investment, and the decentralization of fiscal responsibilities. The government emphasized infrastructure development and poverty reduction through targeted fiscal policies (world bank, 2023).

From the 2000s to 2015, Ethiopia experienced one of the fastest economic growth rates in Africa, averaging around 10% per year. Fiscal policy played a key role in this growth, focusing on public investment in infrastructure such as roads, energy, and education as well as social services and agricultural development. However, this rapid growth often came with high public debt and inflationary pressures. The latter part of the study period, from 2016 to 2023, has seen Ethiopia grappling with multiple challenges, including political unrest, rising inflation, and the impacts of the COVID-19 pandemic. As a result, fiscal policy has had to adapt, with increased government spending aimed at stabilizing the economy while managing fiscal deficits (IMF, 2023).

The Ethiopian government has been implementing various economic policies and development strategies to address the country's socio-economic challenges and achieved sustainable growth.

Fiscal policy, as a key component of economic policy, plays a crucial role in shaping the country's economic growth.

To support growth and raise the standard of living for its people, Ethiopia seeks to raise revenue, distribute public funds, and putting in place right economic policy. To accomplish these goals, the government has been using taxation, public spending, and debt management strategies. Nonetheless, there has been discussion about Ethiopia's fiscal policy's efficiency, and a thorough assessment is necessary (Tadesse T. and Zegeye K., 2020).

Even with these encouraging advancements, Ethiopia continues to confront many difficulties. Poverty, income inequality, high unemployment rates, and restricted access to essential services continue to be problems. Furthermore, the nation's economic stability may be impacted by external shocks like changes in the price of commodities globally.

The study recognizes how crucial it is to take into account the institutional framework and governance structures that influence Ethiopia's budgetary policies. The institutional ability to carry out and enforce fiscal measures influences the efficacy of fiscal policy in addition to its conception and execution. Thus, in order to comprehend the dynamics of fiscal policy efficacy, it is imperative that the institutional structures, transparency, accountability systems, and capacity-building initiatives be examined (Tadesse T. and Zegeye K., 2020).

The study also recognizes the possible drawbacks and difficulties in assessing the efficacy of fiscal policy. These include the difficulties of capturing the causal relationship between fiscal policy measures and macroeconomic consequences, measurement issues, and data availability and quality. The research will endeavor to publicly tackle these problems and offer a comprehensive analysis of the constraints and consequences of its discoveries (Gebremariam G. & Gebreselasie A., 2021).

The study acknowledges the potential policy implications of its findings. The evaluation of fiscal policy effectiveness will provide policymakers with valuable insights into the areas that require attention, potential policy adjustments, and avenues for reform. The study aims to offer practical policy recommendations that can guide decision-making processes and contribute to the ongoing efforts to enhance fiscal policy effectiveness in Ethiopia.

This study aims to evaluate the effectiveness of Ethiopia's fiscal policy from 1991 to 2023, focusing on several key objectives: assessing the design and implementation of fiscal policy instruments such as taxation, government expenditure, and public debt management; evaluating the impact of these policies on macroeconomic indicators like GDP growth, inflation, employment, and poverty levels; and identifying the challenges and opportunities faced in implementing effective fiscal policy.

1.2 Statement of the Problem

The effectiveness of fiscal policy in Ethiopia has been a critical concern, particularly in its ability to foster sustainable economic growth, manage inflation, and alleviate poverty. Despite various reforms and strategies implemented over the past three decades, the relationship between fiscal policy interventions and economic outcomes remains inadequately understood, leading to questions about the appropriateness and impact of these policies.

Despite averaging a GDP growth rate of about 10% from 2004 to 2015, Ethiopia has faced persistent challenges such as high inflation rates, which reached over 20% in 2020. Furthermore, the country's public debt has surged, with debt-to-GDP ratios climbing from approximately 30% in 2010 to over 60% by 2022. These figures highlight the pressing need to evaluate the effectiveness of fiscal policy in maintaining economic stability and promoting inclusive growth (World Bank Group, 2023).

The extent of the problem is evidenced by the socio-economic disparities that have persisted despite economic growth. According to the World Bank, approximately 24% of the population lived below the national poverty line in 2020, indicating that fiscal policies have not sufficiently addressed poverty alleviation. Additionally, regional disparities remain stark, with rural areas experiencing much higher poverty rates compared to urban centers. This suggests that fiscal policy measures may not be equitably reaching all segments of the population.

There are significant gaps in the existing literature regarding the comprehensive assessment of fiscal policy effectiveness in Ethiopia. While some studies have analyzed specific aspects of fiscal policy, such as public spending or taxation, there is a lack of holistic evaluations that incorporate the interplay between various fiscal instruments and their collective impact on economic growth and social welfare. Furthermore, limited empirical research exists on the

qualitative aspects of fiscal policy, such as public perception and institutional capacity, which are vital for understanding effectiveness.

This study aims to fill the identified gaps by providing a comprehensive analysis of the effectiveness of fiscal policy in Ethiopia from 1991 to 2023. By employing a mixed-methods approach, the research will not only quantify the impacts of fiscal policy on key economic indicators but also explore the qualitative perspectives of stakeholders involved in fiscal policy formulation and implementation. The findings will add value by offering actionable recommendations for policymakers aimed at enhancing the effectiveness of fiscal policy, ultimately contributing to sustainable economic growth and poverty reduction in Ethiopia. Additionally, the study's insights may serve as a valuable reference for other developing nations facing similar fiscal challenges.

Like many developing countries, Ethiopia has formidable economic obstacles that call for well-thought-out policy changes to support development and prosperity that is sustainable. Fiscal policy, or the use of taxes and spending by the government to control the economy, is a key component of economic policy. Nonetheless, it is imperative to assess effectiveness of Ethiopia's fiscal policy Particularly, from a macroeconomic standpoint.

The issue is that there isn't enough thorough study and analysis on how fiscal policy affects Ethiopia's macroeconomic metrics. Although the implementation of fiscal policy aims to achieve a number of goals, including stabilizing the economy, encouraging investment, and reducing poverty, its actual efficacy in accomplishing these goals is yet unknown. In the absence of a comprehensive evaluation, decision-makers lack the information required to make well-informed choices and modify budgetary policies accordingly (Berhanu K.. & Gebregziabher Z., 2020).

The proper execution of fiscal policy in Ethiopia is hampered by a number of variables. The government's constrained financial resources and ability to raise money are major obstacles. Ethiopia has a restricted fiscal environment as a result of its heavy reliance on loans and aid from abroad to fund its development projects. This restriction raises questions about how well fiscal policy tools work together to achieve the intended results.

Another major barrier is the problem of fiscal leakages and inefficiencies in the government's spending system. The intended impact of fiscal reforms can be undermined by inefficient

allocation and utilization of public money, resulting in sub optimal consequences. As a result, it becomes imperative to evaluate the efficacy of fiscal policy in terms of the efficiency and openness of public expenditure management, in addition to its design and implementation.

This study intends to close this information gap by carrying out a thorough assessment of Ethiopia's fiscal policy's efficacy from a macroeconomic standpoint. This study will shed important light on the relationship between fiscal policy measures and macroeconomic variables like GDP growth, inflation, employment, and poverty rates. It will also show how much fiscal policy influences Ethiopia's economic progress. In the end, the results will help decision-makers create empirically supported budgetary plans that will successfully tackle the nation's economic problems and advance sustainable growth and development.

1.3 Research Gap

The effectiveness of fiscal policy in driving economic growth in Ethiopia from 1991 to 2023 highlights several specific research gaps that are particularly pertinent to the country's economic context. First, while previous studies have examined individual variables such as government revenue, government expenditure, investment, inflation, and interest rates, there is a notable lack of comprehensive analyses that assess how these variables collectively influence economic growth. Most existing research tends to focus on isolated aspects rather than evaluating their interactions, which limits the understanding of their combined impact on real GDP and overall economic growth (International Monetary Fund, 2023).

Additionally, the relationship between fiscal policy and inflation has not been sufficiently explored. Given Ethiopia's experience with high inflation rates, understanding how government expenditure and revenue affect inflation dynamics is crucial for effective policy formulation. Furthermore, the role of interest rates in this context remains under-researched; particularly, how changes in fiscal policy might influence interest rates and, subsequently, investment levels is an area that requires further investigation. For instance, the impact of government spending on crowding out private investment has not been adequately addressed in the literature (World Bank Group, 2023)

Moreover, the coordination between fiscal and monetary policy, especially concerning interest rates and inflation, is another significant gap. Effective coordination could enhance the overall effectiveness of fiscal measures in stabilizing the economy, but existing literature often

overlooks this interaction. This is especially relevant in light of Ethiopia's ongoing efforts to manage inflation while fostering economic growth through fiscal stimulus.

The severity of inflation in Ethiopia has been a critical issue, particularly in recent years, where inflation rates have soared, and surpassing 30% in recent years due to factors such as global commodity price shocks, domestic supply issues, and monetary policy choices. This persistent inflation undermines the purchasing power of consumers and can destabilize the economy. Understanding how fiscal policy specifically government expenditure and revenue affects inflation dynamics is crucial for effective policy formulation. Moreover, the lack of investment, exacerbated by high inflation and interest rates, poses a significant challenge to economic growth. The relationship between fiscal policy measures and their influence on investment levels remains under-researched, particularly regarding how government spending can either stimulate or crowd out private investment (world economic outlook, April 2022).

Furthermore, the role of interest rates in this context is inadequately addressed; specifically, how changes in fiscal policy might influence interest rates and subsequently affect investment decisions is an area that requires further investigation. For instance, high interest rates can deter investment, particularly in a developing economy like Ethiopia, where access to finance is already limited.

Previous studies have frequently concentrated on the consequences of either tax income or spending by the government, failing to offer a comprehensive study that takes into account the combined effects of both fiscal policy tools. Understanding the relative significance and interactions between different policy tools is thus left with a gap.

Furthermore, there has been considerable variation in the empirical data regarding the effectiveness of Ethiopian fiscal policy; some studies have found modest or even negligible consequences, while others have reported large ones. This may be because different approaches, data sources, or time periods were used, underscoring the need for a more thorough and uniform approach. Additionally, the literature currently in publication has not sufficiently examined how institutional and political environments, as well as economic integration and growth stages, influence Ethiopia's fiscal policy's efficacy. The transmission channels and final effects of fiscal policy can be significantly influenced by these variables.

Lastly, the available research has not offered enough specific policy advice to help policymakers create and carry out successful fiscal policies in Ethiopia, especially when it comes to the best combination and timing of fiscal policy tools. The proposed study intends to fill these research gaps by offering a more thorough and dynamic analysis of the effectiveness of fiscal policy in Ethiopia, taking into account the role of contextual factors and the interdependence between fiscal policy instruments and macroeconomic outcomes. The results will have significant ramifications for how fiscal policies are created and carried out by policymakers in order to support Ethiopia's economic growth and stability.

Filling in these research gaps can help us gain a more thorough picture of Ethiopia's fiscal policy's success and help us make evidence-based policy decisions. By concentrating on these topics, researchers can close current knowledge gaps and offer insightful opinions on the formulation, execution, and assessment of the nation's fiscal policy initiatives.

1.4 Hypothesis of the Study

Based on the theoretical and empirical literature on the relationship between fiscal policy and macroeconomic outcomes,

H1: There is a significant positive relationship between government revenue and RGDP in both the short run and long run.

H2: Government expenditure has a positive effect on RGDP.

H3: Higher inflation rates negatively affect RGDP.

H4: Increased interest rates negatively impact RGDP.

H5: Investment has positive effect on RGDP.

1.5 Objectives of the study

1.5.1 General objective

The primary goal of this research is to evaluate the effectiveness of fiscal policy in driving economic growth in Ethiopia from 1991-2023.

1.5.2 Specific Objectives

1. Examine how changes in government revenue impact the economic growth rate in Ethiopia.
2. Analyze how fluctuations in interest rates influence investment levels and, consequently, economic growth in Ethiopia.
3. Investigate the effects of government expenditure on stimulating economic growth in Ethiopia.
4. Determine the relationship between inflation rates and economic growth in Ethiopia, focusing on how inflation affects overall economic performance.
5. Explore how investment levels, affect economic growth in Ethiopia.

1.6 Significance of the study

The study aims to generate evidence-based knowledge on the effectiveness of fiscal policy in Ethiopia. This knowledge can serve as a foundation for evidence-based decision-making, enabling policymakers to rely on empirical findings and analysis when formulating and implementing fiscal policies

Economic Stability and Growth: Understanding the effectiveness of fiscal policy measures in promoting macroeconomic stability and sustainable economic growth is crucial for policymakers.

Poverty Reduction and Inclusive Development: By evaluating the impact of fiscal policy on poverty reduction and distributional outcomes, the study can provide insights into the effectiveness of policy interventions in promoting inclusive development.

Overall, the study informs evidence-based policymaking, promote economic stability and growth, and reduce poverty and inequality.

1.7 Scope of the Study

The scope of the study encompasses the evaluation of the effectiveness of fiscal policy in Ethiopia from 1991-2023. It focuses on assessing the impact, implementation, and outcomes of fiscal policy measures within the Ethiopian context.

The study considers various dimensions and factors that influence fiscal policy effectiveness, including macroeconomic indicators, institutional arrangements, policy coherence, distributional impacts, and citizen engagement.

The study also explore the coordination and coherence of fiscal policy with other macroeconomic policies, such as monetary policy. It will assess the synergies and potential trade-offs between fiscal policy and other macroeconomic measures.

1.8 Organization of the study

The study Organized into five chapters to ensure a logical flow of information and analysis. Chapter 1 covers Introduction, Background of the study, and other introductory topics. Chapter 2 focuses on literature review related to fiscal policy effectiveness. Chapter 3 mainly deals with methodology of the study. Chapter 4 concentrates on analysis and interpretation of empirical results, and implications and synthesis of the findings of the empirical results Finally, Chapter 5 presents conclusion and recommendations of the study.

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

2.1 Theoretical Review of Literature on Fiscal Policy

Keynesian economics provides the theoretical foundation for analyzing the effectiveness of fiscal policy in Ethiopia. Keynes (1936) argued that during periods of economic downturns, government intervention through increased spending or tax cuts could stimulate aggregate demand and spur economic growth. Conversely, during periods of inflation, contractionary fiscal measures could help reduce demand and control price levels. Keynes (1936) laid the foundation for understanding fiscal policy's role in managing aggregate demand and stabilizing the economy. According to Keynesian theory, fiscal policy interventions, such as change in government Spending and taxation, can have multiplier effects on economic activity, influencing output, employment, and inflation dynamics.

From a demand-side perspective, fiscal policy influences aggregate demand through government spending and taxation. Increased government expenditure directly raises aggregate demand by funding public goods and services, which boosts consumption and investment. Similarly, tax reductions increase disposable income, encouraging household spending and private sector investment. Keynesian economics emphasizes the importance of fiscal stimulus during periods of economic downturn to mitigate unemployment and stimulate economic activity. For Ethiopia, where consumption drives a significant portion of GDP, government spending on infrastructure and subsidies has been crucial for demand stimulation. However, excessive fiscal expansion risks inflation, especially in contexts like Ethiopia's, where supply-side constraints persist. Studies by Blanchard and Perotti (2002) and Afonso and Sousa (2012) corroborate the importance of fiscal interventions in influencing short-term aggregate demand, particularly in developing economies.

Moreover, countries like Ethiopia, with a high reliance on imported goods, may see a portion of this increased demand leak out through imports, diluting the fiscal multiplier effect (Ilzetzki et al., 2013). These dynamics underline the importance of carefully calibrated demand-side fiscal measures to achieve sustainable growth without triggering macroeconomic imbalances.

This phenomenon occurs when a significant portion of domestic demand, spurred by government spending or tax cuts, is directed toward imported goods rather than locally produced items. As a result, the fiscal multiplier the measure of the economic impact of government spending is weakened because the stimulated demand benefits foreign producers instead of driving domestic production and employment.

Ilizetzi et al. (2013) discuss this issue in their study on fiscal multipliers, emphasizing that open economies with greater import reliance tend to experience smaller multipliers compared to more closed economies. In Ethiopia's context, this challenge is exacerbated by supply-side constraints such as limited industrial capacity, which fails to meet domestic demand effectively. These dynamics underscore the need for a balanced fiscal strategy that not only boosts aggregate demand but also invests in domestic production capacity to reduce import dependence and enhance the multiplier effect sustainably.

Supply-side fiscal policies are vital for enhancing an economy's productive capacity by addressing long-term growth determinants. In Ethiopia, investments in sectors like education and health have improved human capital, while infrastructure spending roads, telecommunications, and energy has facilitated trade and industrial growth. Supply-side economics emphasizes the role of tax incentives and efficient public spending in creating a business-friendly environment that fosters private sector growth and innovation. However, inefficient allocation of resources and bureaucratic bottlenecks often dilute the intended supply-side benefits in developing economies like Ethiopia. As Barro (1990) suggests, while government expenditure on public goods can boost productivity, excessive or misallocated spending risks crowding out private investment. Ethiopia's context highlights this trade-off, where large-scale public projects, such as the Grand Ethiopian Renaissance Dam (GERD), have sparked debates on whether they adequately balance public and private sector interests. Tax policy reforms aimed at broadening the tax base and reducing distortive taxes are also key to stimulating supply-side improvements while maintaining fiscal sustainability.

The analysis of fiscal policy effectiveness often revolves around its impact on aggregate demand and supply. According to Dornbusch et al. (2018), expansionary fiscal policies can boost aggregate demand by increasing government spending or lowering taxes, thereby

stimulating consumption and investment. Conversely, contractionary fiscal policies can reduce demand, leading to lower output and employment levels.

Theoretical models such as those developed by Barro (1974) and Fischer (1977) consider the possibility of crowding-out effects associated with fiscal policy. These models suggest that increased government borrowing to finance deficit spending can crowd out private investment, leading to higher interest rates and reduced private sector activity.

The concept of Ricardian equivalence, proposed by Barro (1974), posits that changes in government spending or taxation may have offsetting effects on private consumption and savings. According to this theory, individuals anticipate future tax liabilities associated with government deficits and adjust their behavior accordingly, mitigating the stimulative effects of fiscal expansion.

Institutional and political economy considerations: Institutional and political economy factors play a significant role in shaping the effectiveness of fiscal policy in Ethiopia. Acemoglu and Robinson (2012) argue that factors such as fiscal decentralization, bureaucratic capacity, and political stability can influence the implementation and outcomes of fiscal policy interventions. Additionally, governance structures and policy-making processes, including corruption and rent-seeking behavior, can affect the efficiency and effectiveness of fiscal policy measures (Mauro, 1998).

Adding to the discussion, structuralist economists like Prebisch (1959) emphasize the importance of structural transformation and industrial policy in developing economies. They argue that fiscal policy should be geared towards supporting structural change, promoting industrialization, and reducing dependency on primary commodity exports. Structuralist perspectives highlight the need for strategic government interventions to address structural constraints and promote long-term economic development.

Dependency theorists such as Frank (1967) argue that developing countries like Ethiopia are structurally disadvantaged within the global economic system, characterized by unequal exchange and dependency relationships with advanced industrialized nations. From this perspective, fiscal policy should aim to reduce dependence on external sources of finance and promote self-reliant development strategies, including import substitution and export diversification.

New Keynesian economics builds upon Keynesian principles and incorporates micro economic foundations and price rigidities which examine how New Keynesian theory can inform the analysis of fiscal policy effectiveness in Ethiopia. It also explores the role of fiscal policy in addressing nominal rigidities, such as sticky wages and prices, and the potential effects of fiscal policy on inflation dynamics and monetary policy coordination (Keynes ,1936).

Rational expectations theory posits that economic agents form expectations based on all available information, including their expectations of future fiscal policy actions. The literature discusses how rational expectations theory can shape the effectiveness of fiscal policy in Ethiopia. It may explore how forward-looking behavior of households and firms, influenced by their expectations of future fiscal policy measures, can impact consumption, investment, and other economic variables (Krugman, 2008).

Optimal fiscal policy theory seeks to identify the ideal fiscal policy actions that maximize social welfare or achieve specific policy objectives. This explores how fiscal policy measures can be designed and implemented to achieve desired outcomes, considering factors such as inter-temporal trade-offs, distortionary effects of taxation, and the role of public goods provision (Keynes, 1936)

Keynesian economics suggests that fiscal policy, particularly government spending, can be used to stimulate aggregate demand and stabilize the economy may examine how Keynesian principles apply to Ethiopia, analyzing the role of fiscal policy in addressing demand deficiencies, encouraging economic growth, and reducing unemployment. It may explore the effectiveness of expansionary fiscal policies in stimulating economic activity and the potential limitations or challenges associated with implementing such policies in Ethiopia.

Krugman’s analysis highlights the cyclical nature of political decisions, where fiscal policies may align with electoral objectives rather than long-term economic goals, a phenomenon relevant to Ethiopia's political context. He underscores the importance of robust political institutions and transparent governance in mitigating these influences, advocating for mechanisms that ensure fiscal policy serves inclusive growth. In Ethiopia, strengthening institutional capacity could play a pivotal role in fostering sustainable fiscal measures that balance economic growth with equity.

Moreover, Krugman's insights into governance suggest that effective fiscal policy requires minimizing corruption and rent-seeking behavior, common barriers in politically fragile economies. His broader perspective on political economy underscores the need to address structural and political constraints to design and implement fiscal policies that are both efficient and equitable (Krugman, 2020).

2.2 Empirical Review on Fiscal Policy

Abebe et al. (2018) conducted a comprehensive assessment of fiscal policy multipliers in Ethiopia using a Dynamic Stochastic General Equilibrium (DSGE) model calibrated to the Ethiopian economy. Their results indicated that government spending shocks have significant positive effects on GDP growth, particularly in the short to medium term, highlighting the stimulative fiscal policy's effects on economic activity.

Tadesse and Zegeye (2020) investigated the redistributive impacts of fiscal policy in Ethiopia, focusing on the incidence of taxation and social spending on income inequality and poverty. Using household survey data and econometric techniques, they found that taxation tends to be progressive, while social spending contributes to poverty reduction and income redistribution, albeit with varying effectiveness across different regions and population groups.

Asfaw et al. (2019) explored the impact of fiscal decentralization on economic development in Ethiopia, examining the allocation of resources and expenditure responsibilities between the federal government and regional administrations. Their analysis revealed mixed effects of fiscal decentralization on economic outcomes, with some regions benefiting from increased autonomy and local decision-making, while others faced challenges related to capacity constraints and fiscal sustainability.

Mamo and Guta (2021) investigated the environmental implications of government expenditure patterns, focusing on the allocation of resources to sectors such as agriculture, energy, and transportation. Their analysis revealed that certain areas of government spending, particularly investments in renewable energy and sustainable agriculture, have the potential to mitigate environmental degradation and promote climate resilience. However, challenges remain in aligning fiscal policy priorities with broader environmental objectives, necessitating integrated approaches that reconcile economic development with environmental sustainability.

Gebremichael et al. (2020) examined the spatial distribution of fiscal policy impacts across different regions of Ethiopia, considering disparities in access to public services, infrastructure, and social protection programs. Their findings underscored the importance of targeted fiscal interventions to address regional inequalities and promote inclusive growth, highlighting the need for tailored policy measures that account for regional heterogeneity and socioeconomic disparities.

Empirical studies have consistently shown that higher levels of investment, both public and private, contribute positively to GDP growth. For instance, a study by Khan and Kumar (1997) highlighted that private investment has a larger and more sustained impact on economic growth compared to public investment in developing countries. This underscores the importance of fostering an environment that supports private sector participation alongside strategic public investments.

McKay (2020) Studied on "Fiscal Policy in a Low-Inflation Environment: The Case of Ethiopia" examine how fiscal policy interacts with inflation in Ethiopia. They find that while fiscal expansion can stimulate growth, it must be managed carefully to avoid inflationary pressures, particularly in a developing economy.

Khan and M. A. J. (2018) On "Fiscal Policy and Its Sustainability in Ethiopia: An Empirical Analysis" The study investigates the sustainability of Ethiopia's fiscal policy using cointegration and error correction models. It finds that while fiscal policy has been expansionary, it is crucial to ensure that revenue growth keeps pace with expenditure to maintain sustainability.

Recent studies have highlighted the importance of considering the dynamic interactions between fiscal policy and other macro-economic variables, such as monetary policy and exchange rate dynamics. Work by Berhanu and Gebregziabher (2020) employed a vector error correction model (VECM) to analyze the long-run equilibrium relationship between fiscal policy, monetary policy, and inflation in Ethiopia. Their findings suggested that It is essential that monetary and fiscal authorities work together for maintaining price stability and macro-economic equilibrium, underscoring the interconnected nature of policy interventions in the Ethiopian context.

Gebremariam and Gebreselasie (2021) examined the impact of fiscal policy on exchange rate dynamics and external sector stability in Ethiopia, considering the implications for trade competitiveness and balance of payments sustainability. Their analysis revealed complex feedback loops between fiscal policy decisions, exchange rate movements, and external imbalances, emphasizing the need for coherent policy frameworks that balance domestic objectives with external constraints.

In Ethiopia, efforts to increase government revenue through tax reforms and other fiscal measures have been instrumental in supporting the country's ambitious growth agenda. However, challenges such as tax evasion, narrow tax bases, and reliance on external sources have limited the potential impact of government revenue on economic growth. A study by Tsegaye and Kassa (2021) found that in Ethiopia, efficient utilization of government revenue is crucial for achieving sustained GDP growth, underscoring the need for robust fiscal policy frameworks and transparent governance mechanisms.

Additionally, recent empirical studies have started to investigate the effectiveness of fiscal policy in addressing emerging challenges such as technological disruption and climate change. For instance, research by Tesfaye and Ayele (2022) explored the role of fiscal policy in fostering technological innovation and digital transformation in Ethiopia's economy. Their findings underscored the importance of targeted fiscal incentives and investments in research and development to enhance productivity, competitiveness, and job creation in the digital era.

Hailemichael et al. (2023) investigated the potential of fiscal policy to mitigate climate change impacts and promote environmental sustainability in Ethiopia. Through econometric analysis and scenario modeling, they assessed the effectiveness of carbon pricing mechanisms, green investment incentives, and renewable energy subsidies in reducing carbon emissions and enhancing climate resilience. Their findings given insightful information for the design and implementation of fiscal policy measures that align with Ethiopia's commitments to the Paris Agreement and sustainable development goals.

Furthermore, recent empirical literature has begun to explore the distributional implications of fiscal policy in Ethiopia, focusing on how different socio-economic groups are affected by government revenue and expenditure decisions. A study by Teklewold and Tafesse (2022) examined the incidence of taxation across income quintiles in Ethiopia, finding that indirect taxes disproportionately burden low-income households while direct taxes tend to be more

progressive. This research highlights the importance of considering equity considerations in fiscal policy design and implementation to guarantee the equitable distribution of the gains from economic growth across society.

Abebe and Tadesse (2023) investigated the impact of social spending programs, such as cash transfers and social insurance, on poverty reduction and income inequality in Ethiopia. Their findings suggested that targeted social assistance measures have the potential to significantly improve welfare outcomes for vulnerable populations, contributing to poverty alleviation and social cohesion. However, challenges remain in ensuring the effectiveness and sustainability of social protection programs, particularly in the face of budgetary constraints and administrative capacity limitations.

These studies represent important contributions to the literature on fiscal policy effectiveness in Ethiopia by addressing emerging policy challenges and opportunities. By integrating insights from these evolving fields, future research can offer a more comprehensive understanding of the dynamic interactions between fiscal policy, technology adoption, environmental sustainability, and inclusive growth, how government interventions can be tailored to promote equitable development outcomes and foster social inclusion in Ethiopia, thereby informing evidence-based policy-making and advancing Ethiopia's development agenda in the 21st century.

2.3 Conceptual Framework for Fiscal Policy

Economic theories suggest that government fiscal policies (revenue and expenditure) and macroeconomic indicators significantly influence economic growth (RGDP). The ARDL approach allows for the examination of both short-term dynamics and long-term equilibrium relationships (Pesaran et al., 1998). Changes in government revenue (increase or decrease) and expenditure are expected to influence RGDP positively in the short term. Inflation and interest rates might have a negative impact on RGDP in the short run. A stable long-term relationship is expected between RGDP and the independent variables, indicating that sustained changes in government fiscal policies and macroeconomic conditions will affect economic growth. Any deviation from the long-run equilibrium will lead to adjustments in RGDP over time, captured by the error correction term (Banerjee, Dolado, Galbraith, & Hendry, 1993).

Expansionary fiscal policy (increase in government spending and/or decrease in tax revenue) is expected to have a positive impact on economic growth (Keynesian theory) The impact of fiscal policy on inflation and interest rates is ambiguous and depends on factors such as the monetary policy stance, the level of public debt, and the credibility of the government's fiscal policy (Monetarist and New Keynesian theories).

The conceptual model illustrates the hypothesized relationships between the fiscal policy variables and the macroeconomic outcome variables.

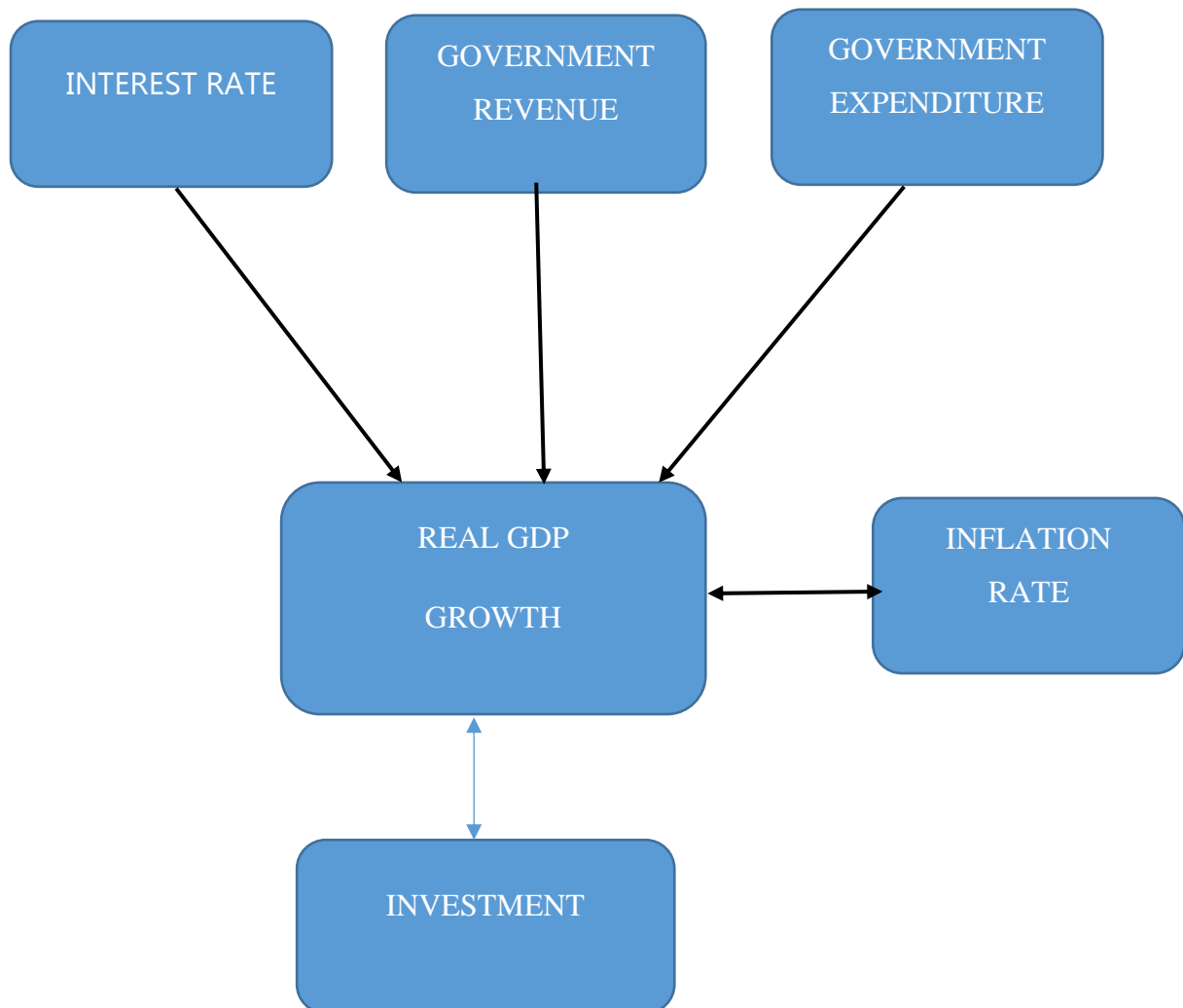


FIGURE. 2.1 Conceptual framework

The diagram illustrates a conceptual framework that outlines the relationships between various economic variables. At the top, it identifies three independent variables: "Interest Rate," "Government Revenue," and "Government Expenditure." These variables are positioned to indicate their influence on the dependent variable, "Real GDP Growth." This dependent

variable represents the overall growth of the economy, adjusted for inflation. To the side, a control variable is noted: "Inflation Rate and investment," which accounts for external factors that could affect the relationships between the independent variables and GDP growth. Solid arrows connect each independent variable to the dependent variable, indicating a direct influence. a dashed line from the Inflation Rate and investment to the arrows suggests that inflation and investment moderate or alter the strength of these relationships, emphasizing its role in the economic framework.

CHAPTER THREE

3.RESEARCH METHODOLOGY

3.1 Introduction

Research methodology serves as the cornerstone of any study, providing a structured approach to investigating complex phenomena and generating reliable insights. In the context of examining the effectiveness of fiscal policy in Ethiopia from a macro-economic perspective, a robust research methodology is essential to systematically evaluate the effects of government fiscal actions on key economic indicators and outcomes.

3.2 Research Approach and Design

3.2.1 Research Approach

The study adopts a quantitative approach to analyze the relationships between fiscal policy variables and the GDP growth rate. This approach involves the collection and analysis of numerical data, employing statistical techniques to identify patterns, correlations, and potential causal relationships.

3.2.2 Research Design

The study uses secondary data collected from various sources, including official reports, governmental publications, international organizations, and academic databases. These sources provide comprehensive and reliable data on fiscal policy variables (government spending, tax revenue, budget deficit/surplus, public investment, exchange rates, etc) as well as the GDP growth rate in Ethiopia. The use of secondary data allows for a cost-effective and efficient analysis of a large-scale dataset.

The use of secondary data analysis and statistical techniques allows for a rigorous evaluation of the relationships between fiscal policy variables and the GDP growth rate, contributing to a better understanding of the macroeconomic dynamics in Ethiopia.

3.3. Types and Sources of Data

When studying fiscal policy effectiveness in Ethiopia, researchers can utilize various types of data to analyze the impact and outcomes of fiscal policy measures. Macroeconomic Data:

Macroeconomic data provides an overview of the overall economic conditions in Ethiopia. This includes data on GDP, inflation rates, exchange rates, interest rates, employment, and other macroeconomic indicators. These data are typically obtained from national statistical agencies, central banks, and international organizations like the World Bank or the International Monetary Fund.

Government Budget Data: Government budget data provides information on government revenues, expenditures, and fiscal deficits or surpluses. This includes data on tax revenues, non-tax revenues, government spending on different sectors (such as education, healthcare, infrastructure), and debt levels. Budget data can be obtained from official government reports, budget documents, or fiscal reports published by the Ministry of Finance or other relevant government agencies.

Tax Data: Tax data includes information on tax revenues, tax rates, tax compliance, and tax exemptions. These data can be used to analyze the impact of tax policies on revenue generation, tax burdens on different sectors or income groups, and the effectiveness of tax incentives or exemptions. Tax data can be obtained from tax authorities, government reports, or tax administration databases.

When conducting research on fiscal policy effectiveness in Ethiopia, researchers can obtain data from various sources. Here are some common sources of data:

Government Reports and Publications: Government reports and publications, such as budget documents, fiscal reports, and economic development plans, often contain valuable data related to fiscal policy. These documents provide insights into government revenue and expenditure patterns, policy objectives, and the implementation of fiscal measures. Researchers can access these reports from the websites of relevant government ministries or through official publications.

International Organizations: International organizations like the World Bank, the International Monetary Fund (IMF), and the United Nations provide extensive data and reports on various aspects of the Ethiopian economy. These organizations publish data on macroeconomic indicators, poverty and inequality, sector-specific data, and policy-related analysis. Researchers can access these data through the organizations' websites, databases, or specialized

platforms such as the World Bank's World Development Indicators or the IMF's International Financial Statistics.

3.4 Methods of Data Analysis

3.4.1 Quantitative Methods of Data Analysis

For the purpose of evaluating the effectiveness of fiscal policy in Ethiopia using the ARDL (autoregressive distributed lag) model, ARDL model is an appropriate choice because Accommodating variables with different order of integration: The ARDL model is suitable when the variables in the model have a mix of $I(0)$ (stationary) and $I(1)$ (non-stationary) order of integration. This is often the case in macroeconomic time series data, where some variables may be stationary while others are non-stationary. The ARDL also model allows for the estimation of both short-run and long-run relationships in between fiscal policy variables and economic outcomes. The ARDL approach is flexible in terms of model specification, allowing for the inclusion of various control variables and the exploration of different fiscal policy instruments, such as government spending, taxation. Small sample size: The ARDL approach provides reliable results even with a small number of observations, making it suitable for the available data on fiscal policy and economic outcomes in Ethiopia (Pesaran & Shin, 1998).

The following quantitative data analysis methods are commonly employed:-

Unit Root Tests: Conducting unit root tests using Augmented Dickey-Fuller to determine the stationarity properties of the variables, which is a key requirement for the ARDL model.

ARDL Cointegration Analysis: Estimating the ARDL model to examine the long-run and short-run relationships between fiscal policy variables and macroeconomic outcomes.

Performing the Bounds Testing approach to cointegration will be performed to determine the existence of a long-run relationship. If the bounds test for cointegration indicates the existence of long-run relationship, interpretation of estimated coefficients and their statistical significance to evaluate the success of fiscal policies (Pesaran, Shin, & Smith, 2001).

Generating impulse response functions to analyze the dynamic responses of macroeconomic variables to shocks in fiscal policy variables, variance decomposition analysis help quantify the contribution of fiscal policy variables in explaining the variations in macroeconomic outcomes.

Diagnostic Checking and Stability Tests: Diagnostic tests, such as serial correlation, heteroscedasticity, and normality tests help ensure the validity of the ARDL model assumptions. Granger Causality tests help investigating the direction of causality between fiscal policy variables and macroeconomic outcomes.

Scenario Analysis and Policy Simulations: Attempt will be made to simulate the impact of changes in fiscal policy variables (e.g., government spending, tax rates) on macroeconomic outcomes using the estimated ARDL model. Scenario analysis help assess the effectiveness of fiscal policy under different economic conditions or policy frameworks (Pesaran & Shin, 1998).

3.4.1.1 Model Specification

Specifying appropriate econometric model is a crucial step in evaluating the effectiveness of fiscal policy in Ethiopia. The ARDL model is a widely used approach to analyze the long-run and short-run relationships in between fiscal policy variables and macroeconomic outcomes (Pesaran & Shin, 1998).

The ARDL model can be specified as follows:

$$\Delta \text{RGDP}_t = \alpha + \sum_{i=1}^p \beta_{1,i} \Delta \text{RGDP}_{t-i} + \sum_{i=0}^q \beta_{2,i} \Delta \text{GOVREV}_{t-i} + \sum_{i=0}^q \beta_{3,i} \Delta \text{GOVEXP}_{t-i} + \sum_{i=0}^q \beta_{4,i} \Delta \text{INV}_{t-i} + \sum_{i=0}^q \beta_{5,i} \Delta \text{INFRATE}_{t-i} + \sum_{i=0}^q \beta_{6,i} \Delta \text{INT.RATE}_{t-i} + \delta_1 \text{RGDP}_{t-1} + \delta_2 \text{GOVREV}_{t-1} + \delta_3 \text{GOVEXP}_{t-1} + \delta_4 \text{INV}_{t-1} + \delta_5 \text{INFRATE}_{t-1} + \delta_6 \text{INT.RATE}_{t-1} + \epsilon_t$$

Δ : Represents the first difference of the variable.

α : Constant term.

β_i : Coefficients for the differenced independent and control variables.

δ_i : Coefficients for the lagged levels of the independent and control variables.

ϵ_t : Error term.

Long-Run Model

$$\text{RGDP}_t = \alpha + \delta_1 \text{RGDP}_{t-1} + \delta_2 \text{GOVREV}_{t-1} + \delta_3 \text{GOVEXP}_{t-1} + \delta_4 \text{INV}_{t-1} + \delta_5 \text{INFRATE}_{t-1} + \delta_6 \text{INTRAET}_{t-1} + ut$$

where,

RGDP_t = Real Gross Domestic Product at time t

α = Constant term (intercept)

$\delta_1, \delta_2, \delta_3, \delta_4, \delta_5$ = Coefficients measuring the impact of the lagged variables

GOVREV_{t-1} = Lagged Government Revenue

GOVEXP_{t-1} = Lagged Government Expenditure

INV_{t-1} = Lagged Investment

INFRATE_{t-1} = Lagged Inflation Rate

INTRATE_{t-1} = Lagged Interest Rate

u_t = the long-run error term at time t.

This ARDL model specification allows for the examination of the long-run and short-run relationships between RGDP and (GOVEXP, INV, INFRATE, INTRATE and GOV REV).

The real GDP growth rate (RGDP) is the primary measure of economic performance and is expected to be influenced by independent variables and control variable.

CHAPTER FOUR

4. FINDINGS, ANALYSIS AND INTERPRETATIONS OF EMPIRICAL RESULTS

4.1 Introduction

The analysis and interpretation of the empirical results are presented in this chapter. The primary sources of my data for the analysis were the world bank and the international monetary fund, annual secondary data from 1991-2023 was gathered for the entire study.

4.2 Descriptive statistics

Descriptive statistics are employed to enumerate and characterize a dataset's primary characteristics. They give brief explanations of the measurements and the sample. Prior to executing more intricate inferential statistics, descriptive statistics give researchers and analysts crucial insights into the data by assisting them in understanding trends, patterns, and distributions (McClave & Dietrich, 2019).

Table 4.1 Descriptive statistics of the variables

	GOVERNMENT...	GOVERNMENT...	INFLATION...	INVESTMENT...	REAL_GDP...	PRIME
Mean	18.61989	15.06654	13.67879	24.28909	7.951515	6.059433
Median	17.91297	15.61251	10.70000	23.00000	8.700000	5.380000
Maximum	27.04148	21.44948	44.40000	39.42000	13.50000	11.50000
Minimum	10.76000	7.859000	1.200000	9.000000	1.100000	3.500000
Std. Dev.	4.006212	3.414525	10.92136	8.925066	3.715098	2.066175
Skewness	0.430872	-0.404914	0.963779	0.177419	-0.475001	0.609996
Kurtosis	2.699362	2.516612	3.367578	1.973685	2.130326	2.471936
Jarque-Bera Probability	1.145353	1.223044	5.294566	1.621445	2.280899	2.429942
	0.564014	0.542525	0.070843	0.444537	0.319675	0.296719
Sum	614.4564	497.1959	451.4000	801.5400	262.4000	199.9613
Sum Sq. Dev.	513.5914	373.0874	3816.835	2549.018	441.6624	136.6105
Observations	33	33	33	33	33	33

Source ; Researcher's own computation using Eviews12

The table provides descriptive statistics for variables assessing the effectiveness of fiscal policy in driving economic growth in Ethiopia. The variables analyzed include government expenditure, government revenue, investment, inflation rate, interest rate, and real GDP growth, with data collected over 33 observations. Each variable reflects critical aspects of fiscal and macroeconomic policy.

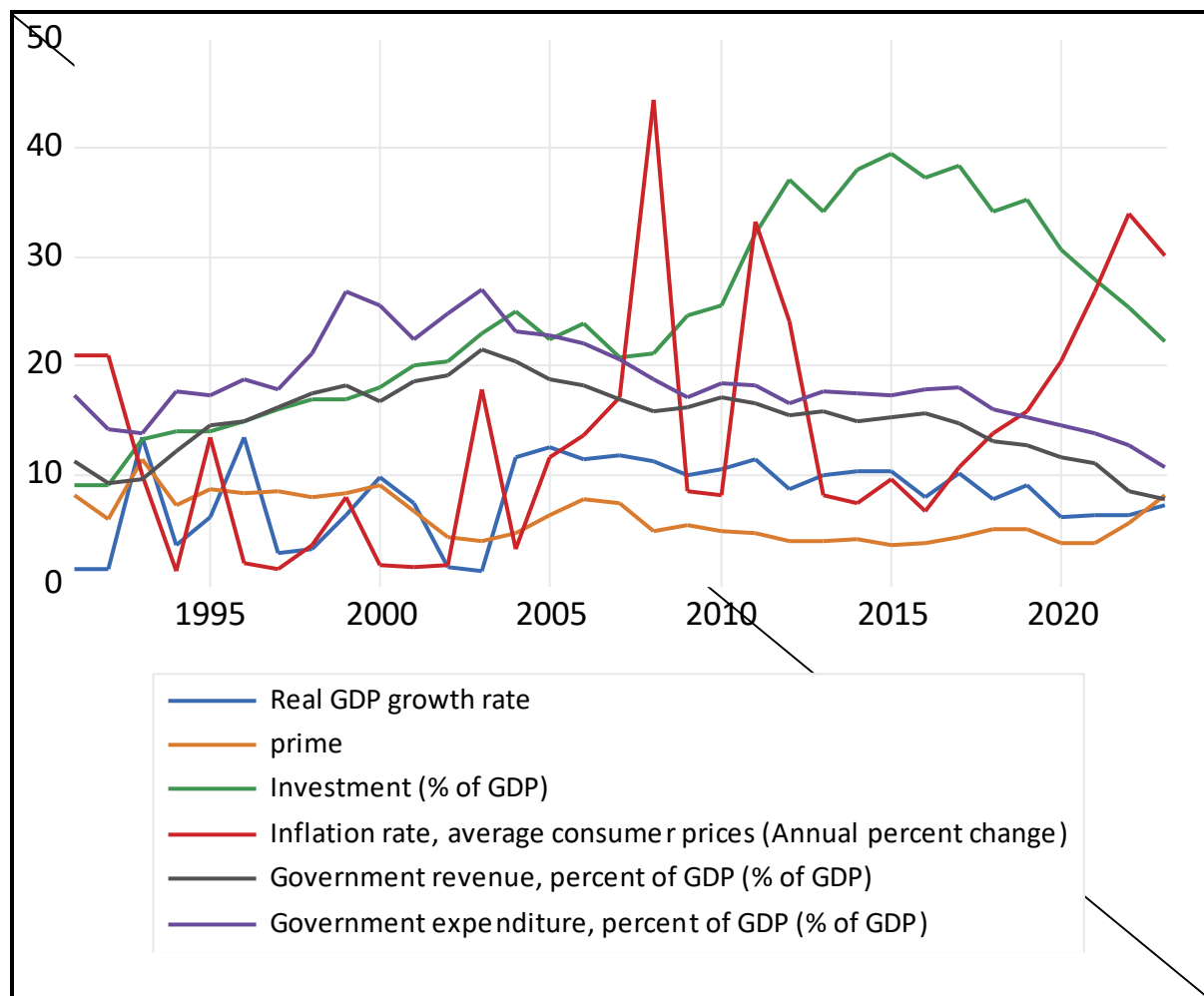
Government expenditure and government revenue have average values of 18.6 and 15.1, respectively, indicating a consistent focus on public spending and revenue generation. The median values for these variables (17.9 and 15.61) are close to the mean, suggesting relatively symmetric distributions. However, government expenditure shows slight positive skewness (0.3169), implying occasional higher-than-average spending, while government revenue is negatively skewed (-0.3998), indicating a few instances of lower-than-average revenue collection. Both variables have kurtosis values below 3, suggesting distributions with light tails.

The inflation rate averages 13.7%, with significant variation, as shown by a high standard deviation (10.70%). This indicates substantial price-level fluctuations, with inflation ranging from a low of 1.2% to a high of 44.4%. The positive skewness (1.0) and kurtosis greater than 3 (3.4) further confirm the presence of extreme inflationary periods. The interest rate, with a mean of 6.1% and a standard deviation of 2.06%, is relatively stable compared to inflation, ranging between 3.5% and 11.5%. Its moderate positive skewness (0.61) indicates a slight tendency toward higher rates.

Real GDP growth has an average of 7.95%, with a standard deviation of 3.72%, reflecting Ethiopia's growth trajectory over the period. The range of GDP growth is from 1.1% to 13.5%, with slight negative skewness (-0.48), indicating a tendency for growth rates to cluster toward the higher end. Its kurtosis (2.13) suggests a flatter-than-normal distribution.

Generally, the statistics highlight key dynamics in Ethiopia's fiscal and economic policies. High volatility in inflation contrasts with relative stability in government finances and interest rates, while GDP growth remains consistent but slightly skewed. These insights suggest that managing inflation and ensuring effective use of government expenditure and revenue are crucial for sustaining economic growth.

Figure 4.1 Graphical presentation of time series of the variables



Source ; Researcher's own computation using Eviews12

The graph presents trends in key economic indicators that assess the effectiveness of fiscal policy in driving economic growth in Ethiopia. The variables include government expenditure, government revenue and investment (as percentages of GDP), inflation rate (annual percent change in consumer prices), the prime interest rate, and the real GDP growth rate.

The graph provides a detailed visual representation of the interactions among various economic variables and their impact on Real GDP growth over time.

Starting with the Real GDP Growth Rate, represented by the blue line, the graph shows fluctuations that indicate periods of economic expansion and contraction. Notably, there are peaks and troughs, reflecting the economy's responsiveness to various internal and external factors.

The Prime Rate, depicted by the orange line, shows average interest rates over the same period. This line often appears to have an inverse relationship with the Real GDP growth rate; when interest rates are high, economic growth tends to slow, likely due to increased borrowing costs that discourage investment and consumer spending. Conversely, when the prime rate is lower, economic growth appears to accelerate, suggesting that lower borrowing costs foster greater economic activity.

The Investment variable, shown as a percentage of GDP in the green line, captures trends in capital formation. Periods of rising investment often coincide with higher GDP growth rates, indicating that greater investment in infrastructure, businesses, and technology can stimulate economic activity. Peaks in this line may signify times of heightened business confidence and increased spending, driving growth.

The Inflation Rate, represented by the red line, shows variability in consumer price changes. Instances of high inflation can erode purchasing power, leading to reduced consumer spending and potentially stalling economic growth. The line's volatility suggests that inflation can significantly impact economic stability, with high rates often correlating with economic downturns.

Government Revenue, illustrated by the black line as a percentage of GDP, reflects the government's ability to generate income through taxes and other means. A stable or increasing revenue line may suggest a healthy economy, where government policies effectively capture economic activity. However, fluctuations can indicate changes in fiscal policy or economic conditions, impacting government spending decisions.

Finally, Government Expenditure, shown in the purple line as a percentage of GDP, presents insights into fiscal policy. Increases in government spending can stimulate growth, particularly during economic downturns, while austerity measures may lead to slower growth. The relationship between government expenditure and GDP growth is complex, as excessive spending can lead to inflation, while insufficient investment in public services can hinder economic performance.

The graph reflects critical economic dynamics in Ethiopia, where fiscal and monetary policies play a significant role in shaping economic growth. Ethiopia, as a developing country, has

pursued ambitious public investment programs, often financed through government expenditure. These investments have been critical for infrastructure development, industrialization, and poverty reduction. However, the chart also reveals key challenges faced by the Ethiopian economy, such as persistent fiscal deficits, inflation volatility, and the need for sustained GDP growth.

The upward trend in government expenditure as a percentage of GDP reflects Ethiopia's developmental agenda, characterized by large-scale public investment projects like the Grand Ethiopian Renaissance Dam (GERD), road construction, and expansion of health and education services. However, the consistent gap between expenditure and revenue highlights a fiscal deficit, which has often been financed through borrowing. This reliance on external and domestic debt has sometimes strained public finances, especially during periods of economic shocks such as droughts, global commodity price hikes, or political instability. The slower growth in government revenue reflects challenges in tax collection, a narrow tax base, and inefficiencies in revenue administration.

The inflation rate, marked by sharp fluctuations, is a persistent issue in Ethiopia's economy. High inflation spikes shown in the graph often coincide with periods of macroeconomic instability. For instance, during times of drought or supply chain disruptions, food prices a significant component of the inflation basket rise sharply. Furthermore, inflation has also been fueled by expansionary fiscal policies and the devaluation of the Ethiopian birr to improve export competitiveness. The government's increased reliance on domestic borrowing from the central bank has contributed to money supply growth, exacerbating inflationary pressures. Inflation volatility adversely impacts the purchasing power of households, particularly in an economy where a significant portion of the population depends on fixed or low incomes.

The relative stability of the prime interest rate in Ethiopia, as shown by the red line, reflects the government's cautious approach to monetary policy. Ethiopia's financial sector is highly regulated, with the National Bank of Ethiopia (NBE) playing a central role in controlling interest rates. This stability helps maintain predictability for businesses and investors. However, in the context of high inflation, real interest rates (nominal rates adjusted for inflation) often turn negative, discouraging savings and contributing to further inflationary pressures. This dynamic highlights the challenges of balancing monetary policy with inflation control.

The real GDP growth rate, depicted by the black line, reflects Ethiopia's overall economic resilience. The country has achieved high growth rates over the past two decades, driven by structural transformation and investments in agriculture, manufacturing, and services. However, the variability in growth rates shown in the chart underscores the impact of challenges such as inflation volatility, political unrest, and external shocks like the COVID-19 pandemic. Despite these obstacles, Ethiopia's growth has been supported by its agricultural base, foreign direct investment in industrial parks, and remittances.

The graph highlights the interconnection between fiscal and monetary policies in Ethiopia. Persistent fiscal deficits, driven by high government spending and insufficient revenue, contribute to inflationary pressures, especially when financed through central bank borrowing. Inflation volatility undermines economic stability, eroding the benefits of Ethiopia's rapid growth. However, the steady growth in GDP suggests that fiscal policies focused on development spending have had positive impacts on the economy, despite the challenges.

To ensure sustainable growth, Ethiopia must focus on addressing fiscal imbalances by expanding its tax base, improving tax collection efficiency, and reducing reliance on debt. Inflation control is critical and requires better coordination between fiscal and monetary policies. The government should also prioritize targeted spending to maximize the impact of public investments on economic growth while minimizing inflationary pressures. Lastly, ensuring political stability and maintaining investor confidence will be vital for sustaining long-term growth in Ethiopia.

Over all the graph highlights the complex interplay between fiscal and monetary policies. Persistent fiscal deficits, as indicated by the gap between government expenditure and revenue, may contribute to inflationary pressures, particularly when financed through borrowing or monetary expansion. Despite these challenges, Ethiopia's real GDP growth remains robust, suggesting that fiscal and monetary policies have partially succeeded in fostering growth. Nonetheless, the significant volatility in inflation underscores the need for improved policy coordination to achieve macroeconomic stability while sustaining economic growth. This requires controlling inflation, managing public spending efficiently, and enhancing revenue generation to reduce fiscal deficits.

4.3 Stationarity Tests of the Variables (Unit Root Tests)

Augmented Dickey-Fuller (ADF) Test- is a statistical test used to determine whether a time series is stationary or contains a unit root. Stationarity is a key property in time series analysis because many statistical methods and models assume that the data are stationary (Dickey & Fuller, 1979)

Table 4.2 Unit test result

variables	t-statistics	t-critical at 5%	P-value at level	P-value at first d/ce
LNRGDP	-4.79	-2.96	0.000	
LNINFRATE	-8.49	-2.96		0.000
LNINVET	-1.73	-1.55		0.041
LNGOVEXP	-6.42	-3.57		0.000
LNGOVREV	-4.01	-2.96		0.004
LNINTRATE	-3.71	-2.96		0.009

Source ; Researcher's own computation using Eviews12

The results in the above table shows that variables LNRGDP is stationary at level while variables LNGOVEXP, LNINFRATE, LNGOVREV, LNINVET and LNINTRATE are stationary at first difference.

4.4 Optimal lag order selection

By using Akaike Information Criterion (AIC), which Lower AIC values suggest a better model. Modified LR test statistic (LR), final prediction error (FPE), schwarz information criterion (SIC) and Hannan Quinn information criterion Similar to Akaike Information Criterion but imposes a stronger penalty for model complexity and to determine the optimal lag order for the model.

Table 4.3 optimal lag order selection

VAR Lag Order Selection Criteria						
Endogenous variables: LNREAL_GDP_GROWTH_RATE LNPRIME LNINVESTMENT...						
Exogenous variables: C						
Date: 12/06/24 Time: 19:43						
Sample: 1991 2023						
Included observations: 30						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-18.32994	NA	2.04e-07	1.621996	1.902235	1.711647
1	80.69172	151.8332	3.22e-09	-2.579448	-0.617772	-1.951891
2	129.2996	55.08894	1.90e-09	-3.419974	0.223140	-2.254510
3	217.2608	64.50491*	1.61e-10*	-6.884056*	-1.559506*	-5.180687*

* indicates lag order selected by the criterion
 LR: sequential modified LR test statistic (each test at 5% level)
 FPE: Final prediction error
 AIC: Akaike information criterion
 SC: Schwarz information criterion
 HQ: Hannan-Quinn information criterion

From above table result the ideal optimum lag by lowest AIC and HQ is lag 3

Source ; Researcher’s own computation using Eviews12

4.5 Long - run relation- ship existence(Bound Test)

The bounds test is used to determine whether there is a long-run relationship in between variables in a time series context. A long-run relationship between two or more variables suggests that they move together in the long term, even if they may deviate from each other in the short term. The Bounds Test, developed by Pesaran et al. (2001), compare the computed F-statistic with the critical bounds provided by Pesaran et al. (2001). If the F-statistic is above the upper bound critical value, you can reject the null hypothesis and conclude that there is a long-run relationship. If the F-statistic is below the lower bound critical value, you cannot reject the null hypothesis. If the F-statistic falls between the bounds, the test is inconclusive.

This test is particularly useful when dealing with variables that are integrated of different orders, such as I(0) or I(1) but not I(2) or higher. this test shows if there is long term relationship in between the variables. all variables have stationary value at level and firs difference as shown at table above, allowing ARDL model to continue (Pesaran et al., 2001).

Table 4.4 Bound test for co-integration

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic: n=1000				
F-statistic	20.33465	10%	2.26	3.35
k	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68

Source ; Researcher’s own computation using Eviews12

From table above the F- statistic (20.33) is larger than all thresholds of significance at 1%,5% and 10%. it represent the long-term relation-ship in between the variables exist. Since there is a long-term relationship between all of these macro variables, the ARDL model could be built.

4.6 Long Run Model Estimation

Once a long-run relationship between the series has been established through the use of the bounds testing approach, the long-run coefficients of ARDL estimation need to be defined. Following are the findings of a long run model using real GDP as dependent variable and government revenue, government expenditure, inflation rate and interest rate as independent variables (Pesaran et al., 2001).

Table 4.5 The result of long run model with ARDL (3,1,3,3,2,3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNPRIME	1.155765	0.265064	4.360322	0.0018
LNINVESTMENT___O...	1.215264	0.290991	4.176298	0.0024
LNINFLATION_RATE___...	0.810864	0.115946	6.993464	0.0001
LNGOVERNMENT_RE...	1.516582	0.613486	2.472071	0.0354
LNGOVERNMENT_EXP...	-0.076742	0.768657	-0.099839	0.9227

Source ; Researcher’s own computation using Eviews12

The Friedman Hypothesis suggests that sustained inflation can hinder economic growth by creating uncertainty, decreasing investment, and eroding purchasing power. The Keynesian Perspective emphasizes that increased government revenue allows for more public investment, leading to economic growth. Higher revenue enables the government to spend on infrastructure and services crucial for development. According to the Multiplier Effect in Keynesian economics, government spending can stimulate economic activity. Productive government expenditure enhances infrastructure, education, and health, contributing to long-term growth.

The ARDL long run form and bounds test results presented in the table show the relationship between the Real GDP Growth Rate and the Government Expenditure, Government Revenue, Inflation rate, and the interest rate.

In the Ethiopian context, the analysis of the five variables provides insight into the impact of fiscal policy on economic growth, The positive impact may reflect Ethiopia’s efforts to promote financial inclusion and investment by adjusting interest rates. It indicates that higher interest rates might be encouraging savings and investment through banking systems, boosting GDP growth. Inflation as control variable has a positive effect, which may indicate that moderate inflation is driving consumer demand, supporting economic growth. In Ethiopia, inflation often results from supply-side shocks, but if kept within reasonable limits, it can stimulate economic activity this findings was in line with McKay (2020) Studied on "Fiscal Policy in a Low-Inflation Environment: The Case of Ethiopia" examine how fiscal policy interacts with inflation in Ethiopia.

The positive relationship suggests that revenue generation through taxation or other fiscal means positively affects Ethiopia's economic growth. This may be tied to better public infrastructure, health, and education investments, driving long-term growth. In line with study by Khan and M. A. J. (2018) On "Fiscal Policy and Its Sustainability in Ethiopia: An Empirical Analysis".

The negative coefficient of government expenditure suggests inefficiencies in government spending in Ethiopia. This could mean that increased public spending might be crowding out private sector investments, or funds may not be optimally allocated, which hinders economic growth. In line with (Krugman, 2020).

The findings indicate that Ethiopia's fiscal policy should focus on more efficient government spending, improved revenue collection, and controlling inflation while fostering economic activities that boost private sector growth.

The significant positive relationship (Coefficient: 1.16) suggests that Ethiopia's higher interest rates can encourage economic growth by stimulating savings and investment. The coefficient of 0.689577 indicates that a 1% increase in the interest rate leads to a 1.16% increase in Real GDP Growth Rate. This is crucial for a developing country like Ethiopia, where financial sector reform and access to credit are key for fostering industrial and agricultural development. Inflation, serving as a control variable, also exhibits a positive effect on GDP growth. With a coefficient of 0.81 and significance at the 5% level (p-value = 0.000), a 1% rise in inflation correlates with a 0.81% increase in GDP. This moderate positive effect could reflect how controlled inflation encourages consumption and investment before further price rises. However, managing inflation carefully is crucial as excessive inflation can destabilize the economy, especially when food prices in Ethiopia fluctuate due to droughts or supply chain issues.

The coefficient of 1.52 is quite large and highly significant, with a p-value of 0.03. This means that a 1% increase in government revenue leads to a 1.52% increase in GDP growth. This suggests that higher government revenues, potentially from taxes or other sources, have a strong positive impact on Ethiopia's economic growth, possibly through better public investment or financial stability. The highly significant positive effect (Coefficient: 1.52) reflects Ethiopia's potential to boost growth through fiscal revenues. Increased government

revenue could lead to better infrastructure, education, healthcare, and other public investments, which are vital for Ethiopia's development. The negative coefficient (-0.077) suggests inefficiencies in public spending, which may result from corruption, misallocation, or low productivity in government projects. This could imply that while Ethiopia invests in public projects, the returns on these investments may not be fully realized due to inefficiency.

Investment as a percentage of GDP, this variable is vital for understanding capital formation in the economy. Investment drives productivity improvements and long-term growth. A positive coefficient would imply that increases in investment contribute positively to GDP growth. The analysis suggests a significant positive relationship between investment and growth, indicating that as investment increases, economic growth tends to rise. This highlights the necessity for fiscal policies that encourage both domestic and foreign investments, such as tax incentives or infrastructure development. So Creating a favorable investment climate through stable interest rates, regulatory reforms, and investment incentives can attract both domestic and foreign investments. This is critical for sustaining economic growth.

The interest rate and inflation have positive effects on GDP growth in the long run, government revenue strongly promotes GDP growth, Government expenditure has a large negative effect on GDP, suggesting inefficient allocation of resources or fiscal mismanagement. This indicates that in the context of Ethiopia's fiscal policy, careful management of both revenue generation and expenditure is crucial to enhancing long-term economic growth. This suggests that for balanced long-term growth, policy adjustments should focus on efficient expenditure management and fostering productive investments while balancing inflation.

The control variable, inflation rate, significantly influences the independent variables in the fiscal policy framework. Inflation directly affects interest rates through monetary policy interventions. When inflation rises, central banks often increase interest rates to curb excessive price levels, thereby influencing borrowing costs and investment decisions. This relationship underscores the pivotal role inflation plays in shaping interest rate policies and, consequently, economic outcomes.

Inflation also impacts government revenue by altering the nominal value of incomes, expenditures, and transactions. Higher inflation may boost tax revenues, particularly through consumption taxes like VAT, as the prices of goods and services increase. However, excessive

inflation can erode real incomes and reduce purchasing power, potentially undermining compliance with income taxes and reducing the overall tax base. Thus, the inflation rate is a critical factor in determining the effectiveness of government revenue collection mechanisms.

In terms of government expenditure, inflation increases the cost of providing public goods and services. Rising inflation may lead to higher nominal government spending as the prices of inputs and services increase. Additionally, inflation can affect the real value of debt obligations, potentially easing fiscal burdens in highly indebted economies. However, if inflation is not controlled, it can distort fiscal priorities, misallocate resources, and reduce the overall efficiency of public spending. Inflation as a control variable plays a crucial role in moderating the effects of interest rates, government revenue, and government expenditure. Its influence underscores the importance of maintaining stable inflation to support the effective implementation of fiscal policy.

To sum up, for Ethiopia the effectiveness of fiscal policy in driving economic growth in Ethiopia is contingent on the interplay between various fiscal variables. The regression analysis highlights the significant positive roles of investment and government revenue, while underscoring the complex dynamics of interest rates and inflation. By focusing on efficient revenue generation and targeted public expenditure, Ethiopia can enhance its fiscal policy framework to promote sustainable economic growth and development. Policymakers must prioritize strategic investments and maintain a stable economic environment to realize these goals.

4.7 Diagnostic Tests

The researcher has performed various residual diagnostic tests, such as the Breusch-Godfrey test for serial correlation, the Breusch-Pagan-Godfrey test for heteroskedasticity, and the Jarque-Bera test for normality, to ensure the validity of the ARDL model assumptions.

4.7.1 Normality test

The Jarque-Bera test helps evaluate whether the residuals in a model follow a normal distribution by testing the skewness and kurtosis of the distribution. JB Statistic 0.84. A lower JB statistic indicates that the residuals' skewness and kurtosis do not deviate much from normality. Probability P-value 0.65. Since this value is higher than 0.05, it implies that the null

hypothesis of normality is not rejected, suggesting the residuals are normally distributed (Gujarati & Porter, 2009).

Table 4.6 Normality test

Jarque-Bera	Probability
0.84	0.65

Source ; Researcher’s own computation using Eviews12

This means that the error terms in the model are well-behaved and normally distributed, indicating the model’s assumptions of normality is valid. This is particularly important in time series analysis or regression models.

In the Ethiopian context, this normality ensures that the model evaluating the effectiveness of fiscal policies on GDP growth is statistically reliable, supporting accurate economic forecasting and policy-making decisions.

4.7.2 Breusch-godfrey serial correlation LM test

LM test is a statistical test used to detect the presence of autocorrelation in the residuals of a regression model. Autocorrelation occurs when the errors from a regression model are correlated with each other, which can invalidate the standard assumptions of regression analysis and lead to inefficient estimates and incorrect inferences (Godfrey, 1978)

LM Test: The Lagrange Multiplier (LM) test, also known as the Breusch-Godfrey test, is used to check for the presence of serial correlation at lags beyond the first. It extends the Durbin-Watson test, which only detects first-order serial correlation (Godfrey, 1978).

The null hypothesis (H_0) is that there is no serial correlation in the residuals.

The alternative hypothesis (H_1) is that there is serial correlation.

If the test statistic is significant (i.e., the p-value is less than the chosen significance level), you reject the null hypothesis and conclude that there is serial correlation.

If the test statistic is not significant, you do not reject the null hypothesis and conclude that there is no evidence of serial correlation (Gujarati & Porter, 2009).

Table 4.7 Autocorrelation (Breusch-Godfrey Serial Correlation LM Test)

Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 3 lags			
F-statistic	12.34287	Prob. F(3,6)	0.5600
Obs*R-squared	25.81674	Prob. Chi-Square(3)	1.0418

Source ; Researcher’s own computation using Eviews12

Both the F-statistic (p-value = 0.56) and the the LM test statistic (p-value = 1.04) are much greater than the typical significance level thresholds (0.05 or 0.01).Since the p-values are high, we fail to reject the null hypothesis of no serial correlation.

The results suggest that there is no evidence of serial correlation in the residuals of the ARDL model. This is a favorable outcome, as it indicates that the residuals are behaving independently and that the model's assumptions are met.The absence of serial correlation strengthens the validity of the model's estimations and inferences. It implies that the model is likely to produce reliable predictions and conclusions, as serial correlation can lead to inefficient estimates and biased standard errors.

Overall, the Breusch-Godfrey test results indicate that the ARDL model is correctly specified concerning the assumption of no serial correlation in the residuals.

4.7.3 Heteroskedasticity Test

The Breusch-Pagan-Godfrey test is used to detect the presence of heteroskedasticity in the residuals. Heteroskedasticity refers to the condition where the variance of the errors in a regression model is not constant across observations. This violates one of the key assumptions of regression, which assumes homoscedasticity (constant variance of errors). Heteroskedasticity can lead to inefficient estimates and biased statistical tests. The LM tests for heteroskedasticity is obtained by regressing the ratio of squared residuals to the average sum of squared residuals on a subset of the original regressors (Godfrey, 1978).

Null Hypothesis (H₀): Homoscedasticity (constant variance).

Alternative Hypothesis (H₁): Heteroskedasticity (variance is not constant).

If the p-value is less than the specified significance level (e.g., 0.05), reject the null hypothesis and conclude that there is evidence of heteroskedasticity.

Table 4.8 Heteroskedasticity Test(Breusch-Pagan-Godfrey)

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
Null hypothesis: Homoskedasticity			
F-statistic	1.677506	Prob. F(20,9)	0.2146
Obs*R-squared	23.65454	Prob. Chi-Square(20)	0.2578
Scaled explained SS	1.499650	Prob. Chi-Square(20)	1.0000

Source ; Researcher’s own computation using Eviews12

The output presented in the above table used to assess the presence of heteroskedasticity in the residuals of a regression model. Heteroskedasticity refers to the situation where the variance of the residuals is not constant across observations, which can affect the efficiency of the estimators.

The null hypothesis (H_0) states that the residuals are homoscedastic, meaning the variance of the residuals is constant across observations.

Both the F-statistic (p-value = 0.2) and the LM test (p-value = 0.25) are significantly greater than common significance levels (0.05 or 0.01). Since these p-values are high, we fail to reject the null hypothesis.

The results suggest that there is no evidence of heteroskedasticity in the residuals of the ARDL model. This indicates that the variance of the residuals is constant across the observations, satisfying one of the key assumptions of ARDL model.

The absence of heteroskedasticity strengthens the validity of the model's estimations and inferences. With homoscedastic residuals, the standard errors of the coefficient estimates are reliable. This ensures that hypothesis tests and confidence intervals constructed from these estimates are valid. If heteroskedasticity were present, it could lead to inefficient estimates and biased standard errors, potentially affecting the reliability of the conclusions drawn from the regression analysis.

Generally, the Breusch-Pagan-Godfrey test indicates that the residuals of the ARDL model are homoscedastic, supporting the reliability and robustness of the model's findings. This positive outcome is crucial for ensuring that the model can be used confidently for inference and prediction.

4.7.4 Structural Stability Tests

In this sub-section attempt is made to conduct stability tests, such as the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) tests, to check for any structural breaks or parameter instability (Hendry & Mizon, 2013).

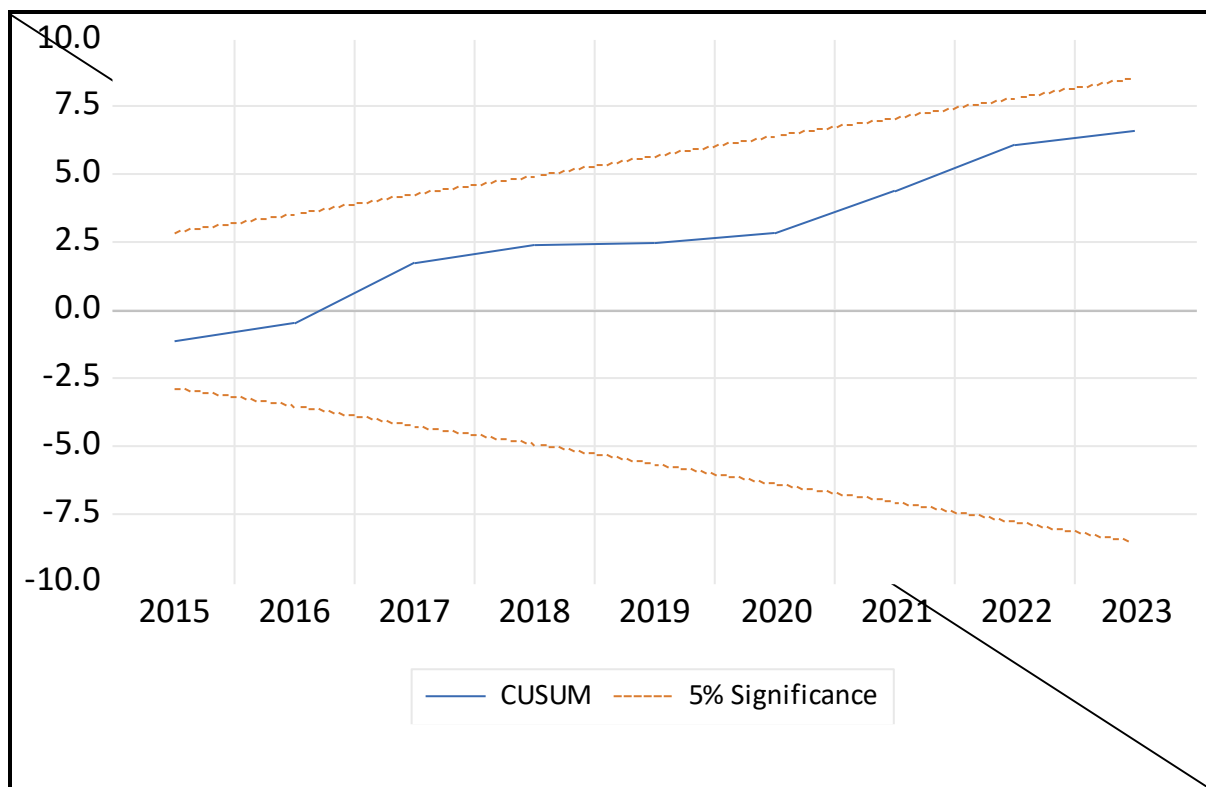
The graph shows the results of the CUSUM test and the 5% significance line for an ARDL model. The CUSUM test is a stability test used to assess the structural stability of the estimated ARDL model over the sample period.

The blue line represents the CUSUM statistic, which plots the cumulative sum of the recursive residuals. The red dashed line represents the 5% significance level bound. This is the critical boundary that the CUSUM line should not cross if the model is considered structurally stable.

The CUSUM line stays within the 5% significance lines throughout the sample period, indicating that the model is structurally stable. This means that the coefficients in the ARDL model do not exhibit any significant structural breaks or parameter instability over the analyzed time frame. The model appears to be well-specified and stable, which is a desirable property for the reliability of the ARDL analysis.

Overall, the CUSUM plot shows that the ARDL model is structurally stable, which supports the credibility and reliability of the model's findings and inferences.

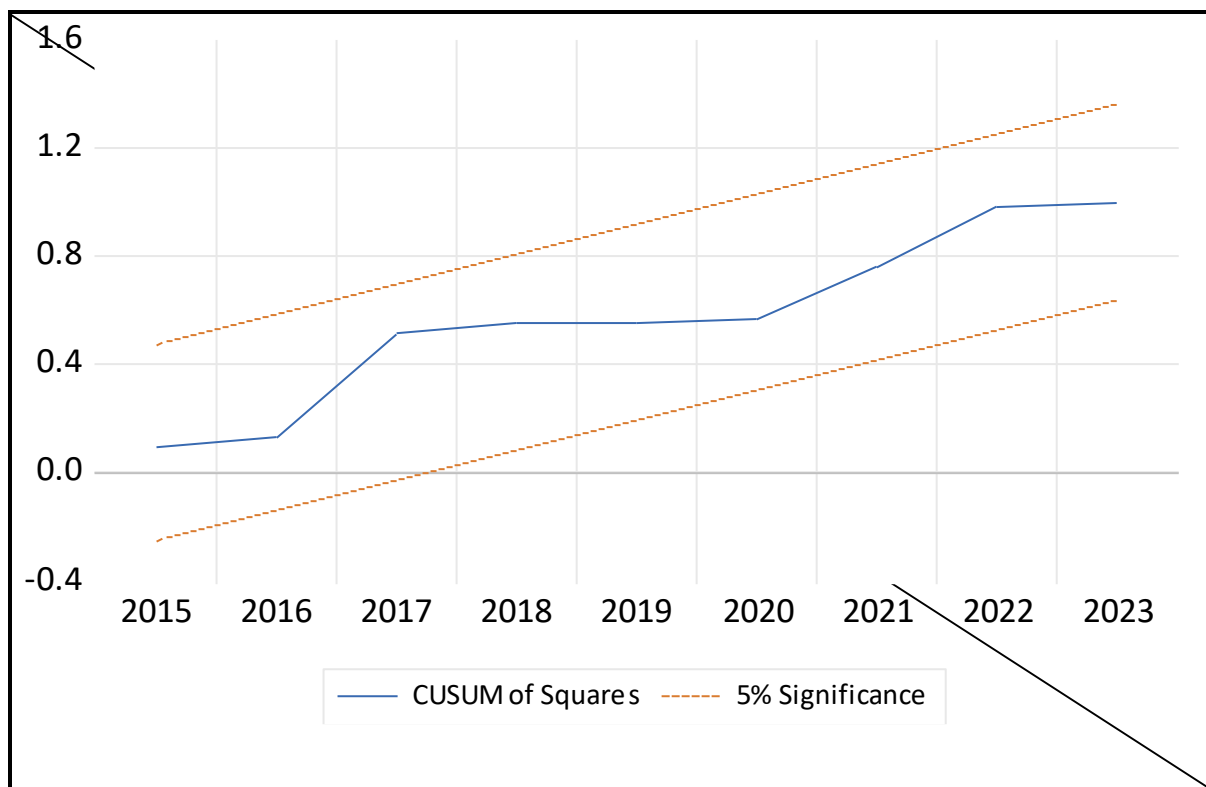
Figure 4.2 Result of Stability Tests(CUSUM test)



Source ; Researcher's own computation using Eviews12

The graph below shows the results of the CUSUMSQ test and the 5% significance bound for an ARDL model. The CUSUMSQ test is another stability test used to assess the structural stability of the estimated ARDL model over the sample period.

Figure 4.3 Result of Stability Tests(CUSUMSQ test)



Source ; Researcher's own computation using Eviews12

The blue line represents the CUSUMSQ statistic, which plots the cumulative sum of the squared recursive residuals.

The red dashed line represents the 5% significance level bound. This is the critical boundary that the CUSUMSQ plot should not cross if the model is considered structurally stable.

The CUSUMSQ stays within the 5% significance lines throughout the sample period, indicating that the model is structurally stable. This means that the coefficients in the ARDL model do not exhibit any significant structural breaks or parameter instability over the analyzed time frame.

The CUSUM of Squares test is another important diagnostic check in the ARDL modeling framework, as it helps ensure the stability of the estimated relationships between the variables, including the short-run and long-run coefficients.

Overall, the CUSUM of Squares plot shows that the ARDL model is structurally stable, which further supports the credibility and reliability of the model's findings and inferences.

4.8 SHORT RUN MODEL (ECM)

In econometrics, an Error Correction Model (ECM) is used to analyze the short-run dynamics of a time series while incorporating information about the long-run equilibrium relationship between variables. ECM is particularly useful when dealing with non-stationary data that are cointegrated, meaning they share a long-term equilibrium relationship despite short-term fluctuations (Banerjee, Dolado, Galbraith, & Hendry, 1993).

Table 4.9 The Result of Short Run Effects of Variables Using ARDL model (3,1,3,3,2,3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-13.56366	0.981460	-13.81988	0.0000
D(LNREAL_GDP_GRO...	0.454668	0.065223	6.971018	0.0001
D(LNREAL_GDP_GRO...	0.095513	0.061446	1.554428	0.1545
D(LNPRIME)	1.111976	0.166503	6.678404	0.0001
D(LNINVESTMENT___...	-0.096770	0.376865	-0.256775	0.8031
D(LNINVESTMENT___...	-2.391893	0.407677	-5.867134	0.0002
D(LNINVESTMENT___...	-1.022354	0.432286	-2.364996	0.0423
D(LNINFLATION_RATE...	0.187922	0.042268	4.446005	0.0016
D(LNINFLATION_RATE...	-0.572289	0.071806	-7.969918	0.0000
D(LNINFLATION_RATE...	-0.255707	0.045713	-5.593787	0.0003
D(LNGOVERNMENT_R...	3.628501	0.572198	6.341339	0.0001
D(LNGOVERNMENT_R...	3.058046	0.561246	5.448669	0.0004
D(LNGOVERNMENT_E...	0.218193	0.493714	0.441943	0.6690
D(LNGOVERNMENT_E...	0.615910	0.415653	1.481789	0.1725
D(LNGOVERNMENT_E...	3.065982	0.347502	8.822932	0.0000
CointEq(-1)*	-1.445692	0.104940	-13.77643	0.0000

Source ; Researcher's own computation using Eviews12

To maintain the effectiveness of fiscal policy, it is crucial to manage inflation through prudent fiscal and monetary policies. Stabilizing prices can enhance the purchasing power of consumers and the effectiveness of government spending, leading to more sustainable economic growth.

Monetarist economists typically attempt to bypass the zero-bound dilemma in favor of controlling money supply and cutting interest rates as ways to address the economy's problems. Lowering interest rates to stimulate the economy loses effectiveness as they go closer to zero since there is less motivation to invest rather than to hold cash or close alternatives like short-term Treasury bonds (Friedman & Schwartz, 1963).

If interest rate manipulation is unable to encourage investment, it may no longer be sufficient to create new economic activity and the effort to create an economic recovery may come to a full standstill. One kind of liquidity trap is this one. Keynesian economists contend that other tactics, namely fiscal policy, must be used when lower interest rates are ineffective.

Monetarists argue that excessive government spending, if not matched by revenue growth, can lead to inflation. High inflation can deter investment by creating uncertainty about future costs and returns.

According to classical economic theory, when the government increases its borrowing to finance fiscal deficits, it can lead to higher interest rates, which may crowd out private investment. This effect can limit the overall impact of fiscal policy on economic growth.

In the short run, the IS-LM Model illustrates how changes in interest rates affect output. Higher interest rates can lead to reduced investment and consumption, decreasing RGDP. The Phillips curve suggests an inverse relationship between inflation and unemployment in the short run. High inflation can reduce real income and consumption, negatively affecting RGDP (Blanchard & Johnson, 2012).

According to Keynesian theory, increased government revenue allows for higher public spending, which can stimulate aggregate demand. This is particularly important in developing economies like Ethiopia, where private sector investment is insufficient. So that Effective revenue generation is essential for sustainable fiscal policy. This, in turn, provides the government with the resources needed to invest in infrastructure and social services, ultimately driving economic growth.

In Keynesian theory, short-term variability in government revenue can lead to fluctuations in government spending. A drop in revenue can reduce public expenditure, negatively impacting RGDP.

According to Public Goods Theory government expenditure on public goods (e.g., infrastructure, education, healthcare) is crucial for economic development. Such investments can enhance productivity and create a conducive environment for private sector growth.

Prioritizing public investment in key sectors can yield substantial returns in economic growth. However, it is vital that expenditures are targeted and efficient, focusing on projects that

generate the highest economic impact. Additionally, careful monitoring and evaluation of public spending are necessary to ensure accountability and effectiveness (Barro, 1990) and (World Bank,2020).

Government spending can have immediate stimulative effects on the economy. According to the Keynesian Aggregate Demand Model, increased government expenditure boosts demand, leading to higher RGDP in the short run (Barro, 1990).

The Error Correction Model (ECM) regression analysis offers critical insights into the relationships between government expenditure, government revenue, and interest rates as independent variables, with real GDP as the dependent variable in the context of Ethiopia. Additionally, investment and inflation are included as control variables to better understand their influence on economic growth.

In Ethiopia, government expenditure plays a pivotal role in shaping economic outcomes. The analysis indicates that higher government spending can lead to immediate boosts in economic activity, particularly in infrastructure development, education, and healthcare. However, the relationship is nuanced; while increased expenditure can stimulate growth, it must be executed efficiently to avoid potential inefficiencies and waste. In the Ethiopian context, where resources are often limited, ensuring that government spending is directed towards high-impact projects is essential for maximizing its economic benefits.

Government revenue generation is also crucial. The analysis suggests that increased government revenue, particularly through effective tax collection, directly correlates with higher GDP growth. This relationship underscores the importance of establishing a robust tax system that enhances revenue without stifling economic activity. In Ethiopia, improving tax compliance and broadening the tax base can provide the government with the necessary resources to invest in development initiatives, further stimulating economic growth.

Interest rates, as another independent variable, have significant implications for investment and consumption in Ethiopia. A positive relationship between interest rates and GDP growth indicate that higher rates reflect increased confidence in the economy, encouraging investments. However, if interest rates are excessively high, they could deter borrowing and investment, thus negatively impacting growth. Policymakers must strike a balance between

maintaining interest rates that foster investment while ensuring that they do not become prohibitive for businesses and consumers.

Investment, included as a control variable, is crucial for driving economic growth. The analysis suggests that higher investment levels lead to increased productivity and output, reinforcing the need for fiscal policies that promote both domestic and foreign investments. In Ethiopia, targeted incentives for key sectors such as agriculture, manufacturing, and technology can enhance investment flows, contributing significantly to GDP growth.

The findings suggests that , a 1% increase in the real GDP growth rate is associated with a 0.45% increase in the dependent variable, holding other factors constant-which is statistically significant and the impact of the lagged real GDP growth rate on the dependent variable is significant. This indicates that past growth rates also influence current values. Increases in the interest rate are associated with significant increases in the dependent variable, suggesting a strong relationship and the lagged interest rate also has a significant positive effect, indicating persistence in its impact.

According to William H. Greene (2012) Theoretically, the error correction term should range between 0 and 1 in absolute terms, indicating that the system adjusts towards equilibrium at a certain rate.

Empirical analyses sometimes find that the error correction term can exceed 1 in absolute value. This suggests that the system might be responding too aggressively to deviations from equilibrium.

An error term between -1 and -2 indicates oscillatory convergence, meaning that instead of a smooth adjustment towards equilibrium, the system may overshoot and oscillate around the equilibrium point. This behavior is typically seen in systems where adjustments are influenced by feedback loops or external shocks.

Monotonic convergence implies a steady approach to equilibrium without overshooting, while oscillatory convergence involves oscillations around the equilibrium, eventually settling down.

From the result above adjustment coefficient: -1.45 ($p < 0.000$) this negative coefficient for the error correction term indicates that the system adjusts towards the long-run equilibrium at the speed of 145%, i.e., full adjustment to equilibrium takes about two third of a year.

The statistical significance suggests a strong relationship, meaning that deviations from the long-run equilibrium are corrected over time, with a significant speed of adjustment.

The results suggest that both current and lagged economic indicators of GDP growth and government revenue/expenditure play crucial roles in influencing economic dynamics. The significant and negative coefficient of the error correction term indicates that the model corrects towards a long-run equilibrium, which is a fundamental aspect of the ARDL approach.

In the short run, the coefficients reveal how fluctuations in the independent and control variables affect real GDP. The coefficient for government expenditure ($D(LNGOVERNMENT_E)$) is positive, suggesting that increases in government spending lead to an immediate increase in GDP. This aligns with Keynesian theory, which posits that government expenditure can stimulate economic activity, especially in the short term. Conversely, the coefficient for interest rates ($D(LNINFLATION_RATE)$) is negative, indicating that higher interest rates may dampen economic growth, as they increase the cost of borrowing and discourage investment. The negative coefficient for inflation ($D(LNINFLATION_RATE)$) also suggests that rising inflation can adversely affect GDP, as it erodes purchasing power and creates uncertainty in the economy. In line with McKay (2020) Studied on "Fiscal Policy in a Low-Inflation Environment.

The control variable investment ($D(LNINVESTMENT)$) has a negative coefficient, indicating that in the short term, factors affecting investment may constrain GDP growth (Khan & Kumar, 1997).

In the long run, the coefficients reflect more stable relationships between the variables. The error correction term ($Cointeq(-1)$) is negative and significant, indicating that any deviation from the long-run equilibrium will be corrected over time. This suggests that the economy has a tendency to return to its growth path following shocks.

In the long run, government revenue ($D(LNGOVERNMENT_R)$) and government expenditure ($D(LNGOVERNMENT_E)$) are also expected to have a more pronounced positive impact on GDP, reinforcing the classical view that effective fiscal policies can sustainably drive economic growth. The long-term coefficients imply that increases in government revenue and expenditure can lead to substantial improvements in GDP, provided they are efficiently

allocated. Additionally, interest rates will likely show a more muted effect in the long run, as the economy adjusts to their levels, balancing investment needs with borrowing costs. In line with (Tsegaye T. & Kassa W., 2021).

The negative and significant coefficient of the error correction term indicates that the model adjusts towards a long-run equilibrium. The magnitude of -1.45 suggests that deviations from this equilibrium are corrected significantly, with the system returning to a stable state over time. This adjustment mechanism is crucial for understanding how the variables interact over both short and long horizons, indicating that while short-term fluctuations may occur, the long-term relationship remains robust.

To sum up, the ECM regression analysis underscores the interdependent relationships between government expenditure, government revenue, interest rates, investment, inflation, and real GDP in Ethiopia. By focusing on improving the efficiency of public spending, enhancing revenue generation, and maintaining appropriate interest rates, the Ethiopian government can create a conducive environment for sustainable economic growth. Additionally, targeted strategies to promote investment and manage inflation will be crucial in ensuring that economic growth is both robust and equitable. Ultimately, a coordinated fiscal policy approach that considers these variables will be essential for achieving long-term sustainable development in Ethiopia.

CHAPTER FIVE

5. SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

5.1. SUMMARY OF THE FINDINGS

This study investigates the relationships between key economic variables using an Autoregressive Distributed Lag (ARDL) model, focusing on the government revenue, government expenditure, investment, inflation rate and interest rates on economic growth.

The results reveal strong and statistically significant relationships between real GDP growth rate and independent variables. Notably, government revenue, investment, interest rate and inflation rate are positively correlated with economic performance, while the government expenditure shows negatively and insignificant impact.

The positive coefficients on lagged GDP growth suggest a reinforcing feedback loop where increases in economic activity lead to further growth. This highlights the importance of maintaining momentum in economic policies to sustain growth.

The findings emphasize the critical role of government policies. Increased government revenue and investment are associated with improved economic performance, supporting the notion that strategic public investments can stimulate economic activity, particularly during downturns.

The significant positive effect of the prime rate indicates that interest rates play a crucial role in shaping economic outcomes. Policymakers should carefully consider the implications of interest rate adjustments, as they can significantly influence borrowing costs and investment decisions.

Long-run equilibrium adjustment: the significant error correction term indicates that the model adjusts towards a long-run equilibrium, suggesting that while short-term fluctuations may occur, the long-term relationships between the variables remain stable. This underscores the importance of adhering to sound economic policies to maintain equilibrium over time.

The results of this study can be directly applied to inform policymaking. By understanding the significant drivers of economic growth, governments can tailor their fiscal and monetary

policies to enhance economic performance. This strategic alignment can lead to better resource allocation, improved public services, and overall economic resilience.

5.2 CONCLUSION

This research highlights the critical interplay between economic growth and various influencing factors, particularly government policy and interest rates. The evidence presented underscores the importance of a cohesive economic strategy that prioritizes sustainable growth through effective revenue generation and expenditure. By leveraging the insights gained from this analysis, policymakers can foster a more stable and prosperous economic environment, ultimately benefiting society as a whole.

The analysis indicates that while government revenue and investment plays a crucial role in both the short and long run, the impacts of interest rates and inflation are more complex, affecting short-term growth negatively while stabilizing over longer periods. The findings underscore the importance of sound fiscal management and monetary policy in fostering sustainable economic growth in Ethiopia.

5.3 Policy Implications

Based on the findings of this study, the following recommendations are proposed to enhance economic growth and stability: it is recommended that policymakers focus on enhancing government revenue and strategically increasing public expenditure to foster economic growth. Additionally, careful management of interest rates is essential to encourage investment and economic stability.

A. Strengthen Revenue Generation

Implement tax reforms aimed at broadening the tax base and improving compliance. This can increase government revenue, providing more resources for public investment. Explore alternative revenue sources, such as enhancing property taxes, introducing environmental taxes, or developing new sectors (e.g., digital economy) to boost fiscal capacity.

B. Enhance Public Expenditure Efficiency

Focus government spending on high-impact sectors that can drive growth, such as infrastructure, education, and others. these investments can create jobs and stimulate economic

activity. Regularly assess the effectiveness of public expenditure programs to ensure funds are allocated efficiently and achieve desired outcomes.

C. Monitor and Adjust Interest Rates

Maintain a flexible monetary policy that can adapt to changing economic conditions. This includes adjusting interest rates to manage inflation while supporting economic growth. Develop programs that provide support for small and medium-sized enterprises to access credit, especially during economic downturns, to stimulate investment and innovation.

D. Stabilize Inflation

Implement policies aimed at controlling inflation, such as monitoring supply chains and ensuring adequate supply of essential goods. Stable prices contribute to economic certainty and foster consumer and investor confidence.

E. Increasing investment level

To enhance the effectiveness of fiscal policy in driving economic growth in Ethiopia, policymakers should prioritize increasing public investment in infrastructure. Improved infrastructure such as transportation networks, electric supply, and communication systems lowers the cost of doing business and creates a conducive environment for private sector investment. This complementary relationship between public and private investment can amplify overall economic growth and development.

As summary, policymakers can create a more conducive environment for sustainable economic growth. The interplay between government revenue, expenditure, interest rates, and inflation rate with economic performance highlights the need for integrated strategies that address both short-term challenges and long-term objectives. The focus should be on fostering resilience, innovation, and stability to ensure robust economic development in the future.

5.4 Implications for Future Research

This study opens avenues for further research. Future studies could explore the impact of additional variables, such as foreign direct investment, trade balances, or external shocks, on economic growth. Additionally, utilizing different econometric models or methodologies could provide a broader perspective on the relationships examined.

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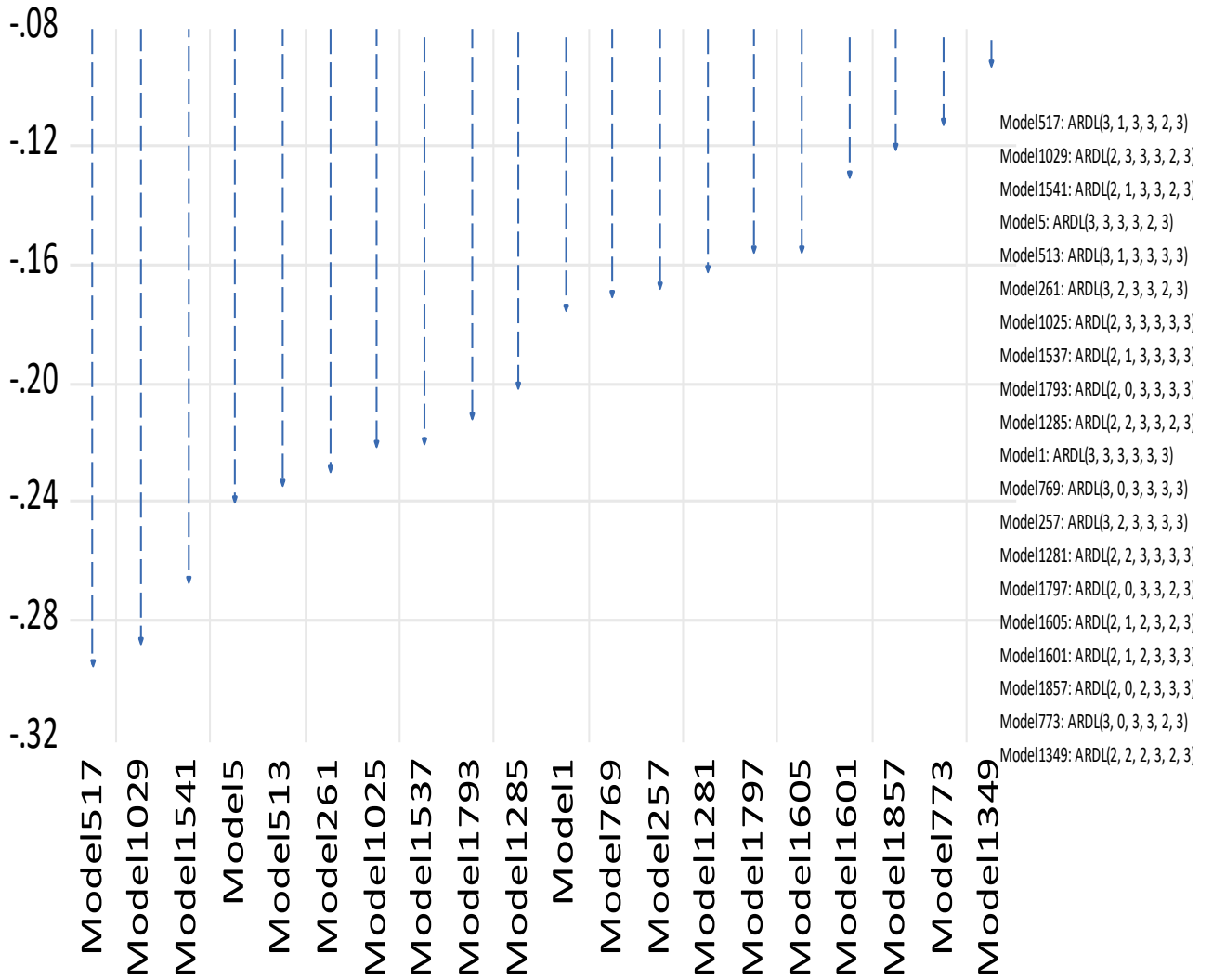
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APPENDIX

optimum model selection by akaike information criteria

Akaike Information Criteria (top 20 models)



ARDL Long Run Form and Bounds Test
 Dependent Variable: D(LNREAL_GDP_GROWTH_RATE)
 Selected Model: ARDL(3, 1, 3, 3, 2, 3)
 Case 3: Unrestricted Constant and No Trend
 Date: 12/06/24 Time: 19:46
 Sample: 1991 2023
 Included observations: 30

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-13.56366	2.347167	-5.778734	0.0003
LNREAL_GDP_GROW...	-1.445692	0.182307	-7.929995	0.0000
LNPRIME(-1)	1.670881	0.385965	4.329094	0.0019
LNINVESTMENT___O...	1.756898	0.420923	4.173916	0.0024
LNINFLATION_RATE___...	1.172259	0.131247	8.931700	0.0000
LNGOVERNMENT_RE...	2.192510	0.996988	2.199133	0.0554
LNGOVERNMENT_EXP...	-0.110946	1.117880	-0.099246	0.9231
D(LNREAL_GDP_GRO...	0.454668	0.112259	4.050185	0.0029
D(LNREAL_GDP_GRO...	0.095513	0.101110	0.944651	0.3695
D(LNPRIME)	1.111976	0.329332	3.376462	0.0082
D(LNINVESTMENT___...	-0.096770	0.750596	-0.128924	0.9003
D(LNINVESTMENT___...	-2.391893	0.550694	-4.343412	0.0019
D(LNINVESTMENT___...	-1.022354	0.608547	-1.679992	0.1273
D(LNINFLATION_RATE...	0.187922	0.068419	2.746649	0.0226
D(LNINFLATION_RATE...	-0.572289	0.100130	-5.715454	0.0003
D(LNINFLATION_RATE...	-0.255707	0.073023	-3.501728	0.0067
D(LNGOVERNMENT_R...	3.628501	0.873857	4.152284	0.0025
D(LNGOVERNMENT_R...	3.058046	1.087769	2.811302	0.0203
D(LNGOVERNMENT_E...	0.218193	0.852540	0.255933	0.8038
D(LNGOVERNMENT_E...	0.615910	0.843811	0.729914	0.4840
D(LNGOVERNMENT_E...	3.065982	0.588275	5.211822	0.0006

* p-value incompatible with t-Bounds distribution.

Levels Equation
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNPRIME	1.155765	0.265064	4.360322	0.0018
LNINVESTMENT___O...	1.215264	0.290991	4.176298	0.0024
LNINFLATION_RATE___...	0.810864	0.115946	6.993464	0.0001
LNGOVERNMENT_RE...	1.516582	0.613486	2.472071	0.0354
LNGOVERNMENT_EXP...	-0.076742	0.768657	-0.099839	0.9227

$$EC = LNREAL_GDP_GROWTH_RATE - (1.1558*LNPRIME + 1.2153 *LNINVESTMENT_OF_GDP_ + 0.8109*LNINFLATION_RATE_AVERAGE_CONSUMER_PRICES_ANNUAL_PERCENT_CHANGE_ + 1.5166 *LNGOVERNMENT_REVENUE_PERCENT_OF_GDP_OF_GDP_ -0.0767*LNGOVERNMENT_EXPENDITURE_PERCENT_OF_GDP_OF_GDP_)$$

F-Bounds Test Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic: n=1000				
F-statistic	20.33465	10%	2.26	3.35
k	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68
Finite Sample: n=30				
Actual Sample Size	30	10%	2.578	3.858
		5%	3.125	4.608
		1%	4.537	6.37

t-Bounds Test Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-7.929995	10%	-2.57	-3.86
		5%	-2.86	-4.19
		2.5%	-3.13	-4.46
		1%	-3.43	-4.79

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	12.34287	Prob. F(3,6)	0.5600
Obs*R-squared	25.81674	Prob. Chi-Square(3)	1.0418

Test Equation:

Dependent Variable: RESID

Method: ARDL

Date: 12/07/24 Time: 10:26

Sample: 1994 2023

Included observations: 30

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNREAL_GDP_GROWTH_RATE(-1)	0.067059	0.063573	1.054846	0.3321
LNREAL_GDP_GROWTH_RATE(-2)	0.087230	0.046399	1.879999	0.1092
LNREAL_GDP_GROWTH_RATE(-3)	0.245396	0.066319	3.700213	0.0101
LNPRIME	0.444083	0.173298	2.562537	0.0428
LNPRIME(-1)	-0.247692	0.184068	-1.345657	0.2270
LNINVESTMENT___OF_GDP_	0.634412	0.409043	1.550964	0.1719
LNINVESTMENT___OF_GDP_(-1)	1.267760	0.432902	2.928515	0.0263
LNINVESTMENT___OF_GDP_(-2)	-0.150770	0.288740	-0.522165	0.6203
LNINVESTMENT___OF_GDP_(-3)	-1.689372	0.442230	-3.820118	0.0088
LNINFLATION_RATE__AVERAGE_CONS...	-0.067939	0.035684	-1.903927	0.1056
LNINFLATION_RATE__AVERAGE_CONS...	-0.061608	0.029475	-2.090142	0.0816
LNINFLATION_RATE__AVERAGE_CONS...	-0.073653	0.036614	-2.011611	0.0910
LNINFLATION_RATE__AVERAGE_CONS...	-0.001565	0.034089	-0.045910	0.9649
LNGOVERNMENT_REVENUE__PERCE...	-2.412664	0.578492	-4.170607	0.0059
LNGOVERNMENT_REVENUE__PERCE...	-0.088039	0.538104	-0.163610	0.8754
LNGOVERNMENT_REVENUE__PERCE...	0.385758	0.540145	0.714176	0.5019
LNGOVERNMENT_EXPENDITURE__PE...	-0.242660	0.444959	-0.545352	0.6052
LNGOVERNMENT_EXPENDITURE__PE...	1.129256	0.450092	2.508944	0.0460
LNGOVERNMENT_EXPENDITURE__PE...	0.296525	0.413342	0.717386	0.5001
LNGOVERNMENT_EXPENDITURE__PE...	1.010938	0.349913	2.889108	0.0277
C	-1.704262	1.241788	-1.372426	0.2190
RESID(-1)	-1.670965	0.326788	-5.113298	0.0022
RESID(-2)	-1.404404	0.440654	-3.187091	0.0189
RESID(-3)	-1.191663	0.338910	-3.516163	0.0126

R-squared	0.860558	Mean dependent var	-2.25E-15
Adjusted R-squared	0.326030	S.D. dependent var	0.105493
S.E. of regression	0.086605	Akaike info criterion	-2.064359
Sum squared resid	0.045002	Schwarz criterion	-0.943401
Log likelihood	54.96539	Hannan-Quinn criter.	-1.705755
F-statistic	1.609939	Durbin-Watson stat	2.318163
Prob(F-statistic)	0.288535		

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	1.677506	Prob. F(20,9)	0.2146
Obs*R-squared	23.65454	Prob. Chi-Square(20)	0.2578
Scaled explained SS	1.499650	Prob. Chi-Square(20)	1.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 12/05/24 Time: 15:57
Sample: 1994 2023
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.159539	0.132894	-1.200492	0.2606
LNREAL_GDP_GROWTH_RATE(-1)	-0.003083	0.006557	-0.470250	0.6494
LNREAL_GDP_GROWTH_RATE(-2)	-0.006408	0.005020	-1.276408	0.2338
LNREAL_GDP_GROWTH_RATE(-3)	0.013847	0.005725	2.418817	0.0387
LNPRIME	0.025464	0.018646	1.365645	0.2052
LNPRIME(-1)	-0.015129	0.019811	-0.763670	0.4646
LNINVESTMENT___OF_GDP_	0.026084	0.042498	0.613759	0.5546
LNINVESTMENT___OF_GDP_(-1)	-0.005166	0.042666	-0.121071	0.9063
LNINVESTMENT___OF_GDP_(-2)	-0.004798	0.035285	-0.135970	0.8948
LNINVESTMENT___OF_GDP_(-3)	-0.000525	0.034455	-0.015228	0.9882
LNINFLATION_RATE__AVERAGE_CONS...	-0.001823	0.003874	-0.470604	0.6491
LNINFLATION_RATE__AVERAGE_CONS...	-0.008262	0.003404	-2.426956	0.0382
LNINFLATION_RATE__AVERAGE_CONS...	0.000369	0.004177	0.088227	0.9316
LNINFLATION_RATE__AVERAGE_CONS...	0.004983	0.004135	1.205136	0.2589
LNGOVERNMENT_REVENUE__PERCE...	-0.024413	0.049477	-0.493426	0.6335
LNGOVERNMENT_REVENUE__PERCE...	-0.057495	0.056370	-1.019969	0.3344
LNGOVERNMENT_REVENUE__PERCE...	0.047831	0.061588	0.776619	0.4573
LNGOVERNMENT_EXPENDITURE__PE...	0.046586	0.048270	0.965116	0.3597
LNGOVERNMENT_EXPENDITURE__PE...	0.043200	0.047113	0.916949	0.3831
LNGOVERNMENT_EXPENDITURE__PE...	-0.065493	0.050488	-1.297196	0.2268
LNGOVERNMENT_EXPENDITURE__PE...	0.043296	0.033308	1.299893	0.2259

R-squared	0.788485	Mean dependent var	0.010758
Adjusted R-squared	0.318451	S.D. dependent var	0.012987
S.E. of regression	0.010722	Akaike info criterion	-6.037073
Sum squared resid	0.001035	Schwarz criterion	-5.056235
Log likelihood	111.5561	Hannan-Quinn criter.	-5.723295
F-statistic	1.677506	Durbin-Watson stat	2.494291
Prob(F-statistic)	0.214641		

ARDL Error Correction Regression
 Dependent Variable: D(LNREAL_GDP_GROWTH_RATE)
 Selected Model: ARDL(3, 1, 3, 3, 2, 3)
 Case 3: Unrestricted Constant and No Trend
 Date: 12/05/24 Time: 15:55
 Sample: 1991 2023
 Included observations: 30

ECM Regression				
Case 3: Unrestricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-13.56366	0.981460	-13.81988	0.0000
D(LNREAL_GDP_GRO...	0.454668	0.065223	6.971018	0.0001
D(LNREAL_GDP_GRO...	0.095513	0.061446	1.554428	0.1545
D(LNPRIME)	1.111976	0.166503	6.678404	0.0001
D(LNINVESTMENT___...	-0.096770	0.376865	-0.256775	0.8031
D(LNINVESTMENT___...	-2.391893	0.407677	-5.867134	0.0002
D(LNINVESTMENT___...	-1.022354	0.432286	-2.364996	0.0423
D(LNINFLATION_RATE...	0.187922	0.042268	4.446005	0.0016
D(LNINFLATION_RATE...	-0.572289	0.071806	-7.969918	0.0000
D(LNINFLATION_RATE...	-0.255707	0.045713	-5.593787	0.0003
D(LNGOVERNMENT_R...	3.628501	0.572198	6.341339	0.0001
D(LNGOVERNMENT_R...	3.058046	0.561246	5.448669	0.0004
D(LNGOVERNMENT_E...	0.218193	0.493714	0.441943	0.6690
D(LNGOVERNMENT_E...	0.615910	0.415653	1.481789	0.1725
D(LNGOVERNMENT_E...	3.065982	0.347502	8.822932	0.0000
CointEq(-1)*	-1.445692	0.104940	-13.77643	0.0000
R-squared	0.977831	Mean dependent var	-0.020706	
Adjusted R-squared	0.954079	S.D. dependent var	0.708519	
S.E. of regression	0.151830	Akaike info criterion	-0.627587	
Sum squared resid	0.322732	Schwarz criterion	0.119718	
Log likelihood	25.41380	Hannan-Quinn criter.	-0.388517	
F-statistic	41.16795	Durbin-Watson stat	2.994689	
Prob(F-statistic)	0.000000			

* p-value incompatible with t-Bounds distribution.

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	20.33465	10%	2.26	3.35
k	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68

t-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-13.77643	10%	-2.57	-3.86
		5%	-2.86	-4.19
		2.5%	-3.13	-4.46
		1%	-3.43	-4.79