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Addis Ababa University

College of Business and Economics

Department of Economics

**DOES EXTERNAL PUBLIC DEBT AFFECT ETHIOPIA'S
ECONOMIC GROWTH?**

A research thesis submitted to the department of economics in partial fulfillment of the requirements for the award of Masters of Science in Economic Policy and Analysis.

By: Leulseged Abebe Kassaye

Advisor: Dr. Abdurezack H.

June, 2023

Addis Ababa University

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Statement of Declaration

I Leulseged Abebe Kassaye hereby declare that this thesis entitled “**DOES EXTERNAL PUBLIC DEBT AFFECT ETHIOPIA'S ECONOMIC GROWTH?**” is my original work for the award of Masters of Science in Economic Policy and Analysis and wasn't anyone else to fulfill requirements at any university. All source of information used in this study has been duly acknowledged.

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Date of submission: June, 2023

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List of Acronyms

ADF – Augmented Dickey-Fuller

ADLI – Agricultural Development Led Industrialization

ARDL – Auto regressive distributed lag

BOP – Balance of Payment

CEE – Central and Eastern Europe

CSA – Central Statistics Authority

ECM – Error correction model

FDI – Foreign Direct Investment

FE – Fixed Effect

GDP – Gross Domestic Product

GNP – Gross National Product

HIPC – Highly Indebted Poor Country

IMF – International Monetary Fund

NBE – National bank of Ethiopia

OLS – Ordinary least square

RE – Random Effect

SAP – Structural Adjustment Program

VAR – Vector Auto Regressive

VECM – Vector Error Correction Model

WB – World Bank

Abstract

Ethiopia is a highly indebted poor country (HIPC), but empirical research concerning about the relationship between external debt and growth is lacking and ambiguous. In the current research, Auto-Regressive Distributed Lag Model (ARDL) is used to evaluate the connection between Ethiopia's real GDP and external debt, utilizing yearly time series secondary data beginning from 1985 to 2021. The outcome demonstrates that the total stock of external debt has a significant negative relationship with its real GDP. However, the aggregate amount of lagged debt service has a short-run positive influence on the country's economic growth. This reveals there is a debt overhang effect but not a crowding-out impact. Additionally, labor force and internal conflict exert a negative influence on the nation's real GDP in the short run, while gross capital formation and trade openness have a positive impact. Only gross capital formation and total amount of external debt have long-run positive and negative relationship with real GDP, respectively. The study provides a definite response to the topic of how foreign public debt affects Ethiopian economic growth.

Keywords: *ARDL, Ethiopia, External Debt, Gross Capital Formation, HIPC, Real GDP.*

CHAPTER ONE

1. Introduction

1.1. Background of the study

External debt is the most crucial measure of a country's capacity to pay its way into the global economy (World Bank). The main economic roadblock for Africa has been the external debt crisis. Over the past ten years, African nations have racked up enormous amounts of external debt to finance balance-of-payment deficits, implement development programs, and for other reasons. With annual servicing costs of over \$100 billion, Africa's total external debt was surpass \$1 trillion by 2021. This is due to a number of factors, including the continent's sluggish economic growth prospects, low financial reserves, the possibility of rising borrowing costs and currency depreciation, and more constrained access to international capital. The major characteristics of African nations, particularly Ethiopia, have been enormous external debt stocks and a severe external debt payment burden (EIU, 2022).

According to the Dual gap theory, underdeveloped country economies face low growth rates due to inadequate savings which are unable to meet their financial needs in all sectors of their economies (Hunt, 2007). Thus, external borrowing becomes necessary and important if a borrowing country invests in a project that provides greater returns than the cost of borrowing (McKinnon, 1964). An increasing capital stock improves economic performance, and savings continue to expand. After a certain level of saving growth, capital will be strong enough to maintain capital development, resulting in self-propelling economic expansion. (Sachs, 2002 cited in Abdullahi et al., 2016). But, developing nations like Ethiopia find it challenging to achieve long-term capital formation in the absence of outside assistance in the form of foreign finance (Bakare, 2011).

Although external debt can be a beneficial tool for financing development, it can also poses significant challenges for country's economy. High amounts of external debt can result in debt servicing challenges, in which a country fails to meet required debt payments. As a result, it can limit the capacity to invest in social programs and infrastructure, while also producing macroeconomic instability. (World Bank, 2021).

External debt has been a major concern for Ethiopia since the early 1980s and 1990s due to the exacerbating the economic and social consequences of structural adjustment and war (Hailu, Y., 2018). "The amount of money owed by a country to foreign creditors, including as other governments, international organizations, and commercial entities, is referred to as external debt." (World Bank, 2021). It has contribute a significant role in funding the country's development initiatives, including infrastructure projects and social services. However, the accumulation might have detrimental impact on the economy, particularly if borrowing is not used efficiently or if the debt service payments become too large. The World Bank and IMF classify Ethiopia as a substantially indebted poor nation (HIPC). This suggests that Ethiopia is suffering with unsustainable debt, despite the fact that the government has taken many efforts to minimize the vulnerability of foreign debt, such as restricting external borrowing, debt service re-profiling, transitioning to a market-based exchange rate, and liberalizing the FX market. However, none of the aforementioned remedies may alleviate the above-mentioned shock caused by the COVID-19 epidemic. (World Bank, 2020)

The Ethiopian economy stood out for having an ample gap between gross domestic saving and investment even before the COVID-19 pandemic. This suggests the monetization of deficits, a shortfall in the BOP and an increment in debt levels. Thus, according to the NBE's 2019 annual report, the nation's debt as a share of GDP was above 55.6% in 2019/20, and the export-import gap continued to be large because the country had been importing more than it had been exporting for more than a decade. Moreover, the macroeconomic situation also deteriorated following COVID-19 as a result of lower remittances and foreign direct investments (FDI), which negatively affected the balance of payment (BoP) of Ethiopia. In addition, Domestic production, external debt and debt servicing, and the availability of foreign currency have all suffered as a result of this drop (Geda. 2021). As a result, the Ethiopian government has been seeking debt relief from its creditors, including through participation in the G20 debt service initiative. (World Bank Group, 2020).

According to World Bank reports, the nation's outstanding external debt reached close to \$30.02 billion in 2021, or around 51 % of GDP, and it has skyrocketed substantially over the previous decade, from \$7.5 billion in 2010 to its present level. Multilateral organization like World Bank and the African Development Bank, as well as bilateral creditors such as China and the Paris Club,

hold the majority of Ethiopia's external debt. Hulsmann, J., (1996) point out that excessive external debt can cause a drop in investment and also contribute to weaker overall economic growth.

A number of scholars have undertaken comparable research on the long-term impact of external debt on the Ethiopian economy performance. However, the end result is not compatible and contentious. On the one hand, the entry of foreign financing has enabled the government to fund big infrastructure and other projects, which has boosted economic growth. A high level of debt stock and debt service payment, on the other hand, diverts resources away from other economic activity and is also a source of instability in the country.

For instance, Atinafu, W. (2020), Kassa, W. (2014), Getinet, B., & Ersumo, F. (2020), Antonio Afonso et al (2014), Gebrekidan, A., (2005), Mengistu Negussie and Malefia Ebabu (2021), Habtu (2015), Mekonnen and Ayele (2011), Alemu and Gebremariam (2018), Sisay Demissew and Balazs Kotosz (2020) and Befikadu (1992) had concluded external debt has a notable detrimental influence on Ethiopia's economic growth. However, this outcome is contradicting the finding obtained by Amsalu D. (2017), Eyayu T.(2021), Dr. Kumar, A.M. (2017), Benedict et al (2003), Gebru et al. (2014), Abebe and Yami (2013), Beyene (2012), Abate (2012), Tefera (2011) and Yared (2011) which reveals that external debt has a favorable and significant role to the Ethiopian economy.

Recently, the continuous rise in Ethiopia's external debt burden has raised concern about the repayment ability and the potential effect on its growth scenario. So the focus of the present paper is to ascertain the effect of Ethiopia's foreign public debt stock as well as debt service on aggregate economic growth in Ethiopia from 1985 to 2021 by using the ARDL model.

1.2. Statement of Problem

Emergent nations have faced many challenges regarding external debt problems. A Large debt burden drains out scarce financial resources from domestic development needs due to debt servicing which is more than the actual amount taken (Clements et al, 2003). For a number of factors, the problem of public foreign debt is worsening. Firstly, the debt is high compared to the size of the economy, which can deters private investment in addition to causing capital flight. Second, a sizeable amount of the annual export revenues are used to pay down debt. Resources that might otherwise be used to provide other essential services and enhance citizen welfare must

be severely depleted in order to pay debt service. Thirdly, the execution and success of adjustment plans being launched are threatened by the debt loads of a significant number of sub-Saharan African nations. Fourth, the current debt management system has a disastrous macroeconomic influence on the size of an economy. (Ajayi and Khan, 2000 cited in Getinet, B., & Ersumo, F. (2020).

Currently, Ethiopia has facing unsustainable debt levels. In 2021, Ethiopia's public debt-to-GDP reached 51 percent. This rise in public debt stocks and debt service reflects the public sector-led growth model focused on public infrastructure investment and state-owned Enterprises (SOEs). During the same period, inflation rose to an average of 14 percent and Covid-19 pandemic and conflict in Tigray region have compounded the macroeconomic challenges. All of these have recently had an effect on Ethiopia's growth. So debt sustainability and growth-enhancing public outlay are key policy challenges for Ethiopia. (African development bank group, 2022)

Foreign debt is a major factor that has affected Ethiopia's economic growth. Based on a World Bank report, Ethiopia's indebtedness has an enormous adverse effect on economic growth. This is because the high cost of servicing debt and the scarcity of foreign exchange reserves take resources away from productive investments that might otherwise boost growth. In addition, the increased risk associated with external debt can hinder private investments. (Mabugu, R. 2012).

In 2021, general government revenue was less than 120 billion relative to the government's total expenditure in Ethiopia (Knoema Data Platform). This indicates the government of Ethiopia must find a way to finance its activity. An increase in external debt has generated a problem for Ethiopia due to the high amount of public expenditure and shortage of foreign exchange reserves. This leads to resource depletion in the form of capital flight and accumulation of interest and principal that alter the capability of the country to meet its obligation. (Kassa, W. 2014). Therefore, it is crucial to consider how Ethiopia's external debt affects the growth performance.

Tadesse, (2003) did one of the first investigations on the issue. The influence of foreign debt on Ethiopian economic growth was investigated using a dynamic panel data technique in this study. The study's findings revealed a statistically noteworthy unfavorable link between foreign debt and economic growth. In addition, the study also revealed that the influence stronger in agriculture than in industry. In addition a study by Habtu (2015), Mekonnen and Ayele (2011), Alemu and Gebremariam (2018), Sisay Demissew and Balazs Kotosz (2020), Befikadu (1992), Gebrekidan,

A., (2005). Atinafu, W. (2020), Getinet, B., & Ersumo, F. (2020) and Antonio Afonso et al (2014) support the above literature and indicate that excessive accumulation of external debt can lead to reduce the country's economic expansion.

As opposed to the above study, Gebreyes and Gebreselassie (2015), conducted an empirical investigation to examine the influence of external public debt on Ethiopian economic growth. This outcome showed that external indebtedness is favorably associated with country's economic growth. A study by Gebru et al. (2014), Abebe and Yami (2013), Beyene (2012), Abate (2012), Kumar, A.M. (2017), Benedict et al (2003), Eyayu T., (2021), Tefera (2011), Yared (2011) support the above idea. Different from the two Minale Worku's (2014) and Jonse's (2002) finding indicated that the debt burden indicator has no meaningful direct influence on the growth of production. Which indicates there is minimal consensus and that different conclusive findings exist. So, more research is needed to assess how Ethiopia's foreign public debt affects the economic performance of the country.

To the best of researcher knowledge, there hasn't been enough study done on the matter, despite evidence of both the good and bad consequences of external indebtedness on Ethiopia's growth. Regard of the effect on long-term economic growth, this is especially true. So, this paper helps us to comprehend the influence on Ethiopia's economic progress and adds to the argument. The precise long-term and short-term influence of external indebtedness on Ethiopian economic growth are also described in great detail in these studies, after accounting internal conflict as an indicator for political variables as well as exchange rate as a control variable, both of which were ignored in previous research.

The ARDL bound testing approach used in this research, as used by Ganesan, P., and Joseph, T. (2016), Agarwal et al. (2017), and other scholars, to examine the impact using the period 1985–2021 because it provides unbiased and significant results in a shorter estimation period and can be applied regardless of whether the regressor has $I(1)$ or $I(0)$. (Pesaran et al., 1999). Furthermore, in comparison to other approaches, the auto-regressive distributed lag model is regarded as best technique to co-integration due to its ability to capture short-run and long-run relationships between variables, flexibility in estimation, and ability to work with cross-sectional, time-series, and panel data. (Kumar, P. (2013).

The unit root test, the co-integration test, the bound test developed by Pesaran et al. in 2001, the co-integration test, and diagnostic tests (serial correlation, heterokedasticity, normality, and stability tests) are all used in this study in addition to the ARDL estimation.

1.3. Research question

1.3.1. Main question

What effect does external public debt on the economic growth of Ethiopia from the period 1985-2021?

1.3.2. Sub-questions

The research aims to answer each of the subsequent additional questions:-

- What connection exists between Ethiopia's foreign debt and economic growth?
- What are the trend as well as the compositions of external public debt in Ethiopia and its linkage with the gross domestic product (GDP)?
- In comparison to other variables like political factor (represented by internal conflict), labor force, capital formation, exchange rate, and trade openness, what effect does foreign debt have on economic growth?
- What solutions are there to minimize the burden of foreign public debt on economy?

1.4. Objective of the study

1.4.1. General objectivity

The research's main goal is to ascertain the effect of Ethiopia's external public debt on economic growth using data from 1985 to 2021.

1.4.2. Specific objectivity

- To evaluate the connection between foreign debt and growth in Ethiopia.
- To investigate the trend and composition of Ethiopia's external public debt, as well as its link with GDP growth.
- To compare the impact of external debt to other factors such as political factor, labor force, capital formation, exchange rate and trade openness on economic performance of Ethiopia.
- To suggest a possible solutions to minimize the burden of external debt.

1.5. Significance of the study

- The research makes additional contributions to comprehend the correlation between external debt and the economic performance of Ethiopia and to get a brief look on the debate.
- The study makes additional contributions to government, non-government, academicians, and policymakers as a source of reference and important to take policy action related to external debt and the economic performance of Ethiopia.
- The study contribute to the establishment of an econometric base by evaluating the impact of foreign debt on Ethiopia's economic growth.
- More researchers will be encouraged and assisted by this study to be more inventive and creative in their future work.

1.6. Limitations of the study

This study might have some drawbacks. It is caused by errors in the data and an insufficient sample size given by a different organization. Even data from the same institution demonstrated variations in year-to-year outcomes. Furthermore, access to data for large time series yearly data is restricted, and the research relies on aggregate data that does not adequately reflect the influence on different sectors of the economy. Future research could use larger sample sizes and examine the micro-level impact of external debt on Ethiopia's economic growth.

1.7. Scope of the study

Debt is one of the most pressing issues confronting many developing countries. Most African nations' external debt became a burden since the contractual loan was not efficiently deployed, resulting in a return on investment that was insufficient to satisfy the maturing obligation and did not leave a positive balance to stimulate domestic economic growth (Kletzer,1988). Given this context, the current study uses the ARDL model and secondary data to assess the impact of Ethiopia's external debt on its economic growth from 1985 to 2021. To investigate the link the study employed a combination of quantitative and qualitative approaches to research.

1.8. Organization of the study

The following is how this paper is organized. The first chapter deals with the introduction part, which consists of the background of the study, the statement of the problem, the research questions, the objective of the study, the significance of the study, the limitations of the study, and the scope of the study. The next chapter contains both theoretical reviews and empirical reviews. The three chapters are about the external debt of Ethiopia and the macroeconomic performance of the Ethiopian economy. The fourth chapter will be about the methodology, regression results, description of the variable, hypotheses, and data presentation and analysis. Finally, the last chapter, which is Chapter Five, deals with the conclusions and recommendations.

CHAPTER TWO

2. Literature Review

2.1. Definition of external debt

External debt can be described as a nation's total debt due to foreign creditors, encompassing borrowing from both the government and the private sector. It can take the form of bonds, loans, and other financial instruments and is usually dominated by foreign currency. Due to the risks associated with foreign borrowing that might result in debt crises, developing nations pay greater attention to external debt than domestic debt. After all, underdeveloped nations' national banks cannot print money to refund their foreign debt, creating a transfer problem (Ugo P.2008). When a country has a large external debt, it may be more exposed to currency fluctuations and economic shocks, which can make it difficult to repay the debt and lead to financial instability. (IMF, 2021)

External debt can also be a result of a government inability to effectively manage its finance. This can happen when the government takes on too much debt to finance its operation, or when its funds to pay for programs and projects that are not in the best interests of the country. In addition, external debt can be caused by a country's imports more than its exports. (Gillespie, A. 2020)

2.2. Theoretical Foundation of the Debt Growth Nexus

Those fundamental economic ideas serve as the foundation of this research:-

2.2.1. Harrod-Domar Growth Model

The relationship between the capital stock and growth rate of an economy is outlined in the Harrod-Domar model. It is basic model of economic growth developed by British Economists Roy Harrod and Evsey Domar in the 1940s and 1950s. The model was developed to explain the causes of business cycles and has since been used as a tool to analyze the factors that affect long-term economic growth.

The premise of the Harrod-Domar model of economic growth is that capital accumulation via investment results in economic growth. In the model, capital is defined as the physical capital used to produce goods and services in an economies. The model assumes that an economy's capacity to produce capital goods is limited and that an economy cannot grow unless it invests a certain amount of its resources in the production of capital goods (Todaro, 2015).

Simple model of economic growth:-

Let saving (S) be certain national earning proportions (I) such as:

$$S = sY \dots\dots\dots (I)$$

Investment (I) is designated by ΔK and can be described as the change in the stock of capital, K, in such a way that:

$$I = \Delta K \dots\dots\dots (II)$$

The capital-output ratio, k, denotes the relationship between total capital stock, K, and national income, Y, such that $K/Y = k$.

This capital-output ratio may also be expressed as a marginal value:

$$\Delta K / \Delta Y = k \dots\dots\dots (III)$$

This is sometimes referred to as the incremental capital-output ratio. Because the equilibrium value of saving, S, must equal the entire investment, I, it follows that $sY = k\Delta Y$ or in a more common phrase,

$$\Delta Y / Y = s/k \dots\dots\dots (IV)$$

The aforementioned equation shows how the national capital output ratio, k, and national saving ratio, s, affect the pace of output growth. The ability of an economy to save and invest a given amount of GDP determines how much it can expand its GDP, which is inversely related to the country's capital production ratio. As a result, the economy cannot grow unless a portion of its resources are used to produce capital products.

According to World Bank (2021) estimates that Ethiopia's savings level is low, at 25.1% of GDP in 2021. This is the main challenge to growth and development. The majority of emerging countries have poor levels of capital accumulation due to inadequate savings. Governments may thus try to address the "savings gap" by foreign borrowing or private foreign investment. When borrowing from abroad to make up for a shortfall in savings, problem with external debt repayment eventually arise. External borrowing, according to the Harrod-Domar growth model, may be used to fund investments and boost economic growth, depending on the quantity borrowed and the effectiveness of investments. (Investopedia).

External debt, on the other hand, has a detrimental influence on the Harrod-Domar model. When a country incurs too much debt, a situation known as "debt overhang" develops. This occurs when the burden is greater than the expected economic growth from the investments. This can lead to a vicious circle in which the debt burden continues to rise in the absence of economic growth (Al-hubiMar, F., 2019)

2.2.2. Debt overhang Hypothesis

The debt overhang effect refers to a phenomenon where the existence of a high level of debt stock can constrain economic activity (Hulsmann, J. Guido. (1996). According to Peter A. Diamond, there are two ways that foreign debt has impacted economic growth under the neo-classical growth model. First, by raising taxes that are required to pay for the interest payments, then can lower individual taxpayer consumption. Taxes also lower his savings, which in turn lowers his capital stock, by cutting his disposal income.

Hulsmann argued that high levels of debt can cause a decline in investment, which in turn can lead to a decline in economic growth. Hulsmann, J. Guido. (1996)

A more recent study by Mendicino, Caterina, Javier Bianchi, & Carlo Canneti. (2019) found that debt overhang can result in credit freezes, Growth and investment may decline as a result of this. The authors also found that credit freezes are more likely to occur in countries with a high debt burden.

In the debt overhang situation, a country's creditworthiness is reduced because the creditor does not expect debt to be covered fully, resulting in lower capital inflow and reduced private investments and a foreign direct investment due to the fear of higher taxes imposed by a government. Secondly, it also depresses investments and growth by increasing uncertainty about actions and policies. This diverts potential private investors from long-term activities to quick returns activities (Corden, 1989; Deshpande, 1997; cited under Jarju, et al. (2016), Ayhan K. and Eswar P. (2010), Alesina, A., and Ardagna, S. (2010). There have been different studies that support debt overhang theories. Some of them include Atinafu, W. (2020), Ngangnchi, F. H., and Joefendeh, R. (2021). Getinet, B., & Ersumo, F. (2020), Paul N., (2017) and others support the idea of debt overhang theories.

But the empirical evidence for this hypothesis is mixed. Some studies have found that the increases in public debt beyond a certain threshold level do lead to slower economic growth, while others have found no significant effect. Furthermore, the degree to which public debt affects economic growth is also disputed. While some studies suggest that the effect of public debt is significant, other suggest it is small (Goldstein, M. and Woglom, G. (1992)

In the framework of Solow growth, is an economic model that explains long-run economic growth through physical and human capital accumulation. One of the fundamental assumptions of the Solow growth model is that the rate of investment is corresponds positively to the level of savings, which can be used to finance the investment. This assumption, however, may not hold true when a country has a high level of debt, as a high level of debt may discourage investment and impair economic progress. (Dornbusch, R., & Fischer, S. (1991).

2.2.3. Debt crowding out Hypothesis

The debt crowding out effect is the decline in private investment caused by greater government borrowing. This occurs because an increase the government borrowing increases the demand for loanable funds, leading to a higher interest rate. As a result, private investment becomes more expensive, discharging firms and individuals from investing.

There is an extensive body of research on the debt crowding out effect. For instance, Barro, R. J. (1974) argued that the relationship between the public borrowing and private sector investments is complicated and can rely on different factors like the expectations of future tax rates and inflation. He concluded that under certain conditions, government borrowing can result in a reduction in private-sector investment. Milton Friedman argues that the relationship between government borrowing and private sector investment can be affected by the level of exchange rate flexibility. He proposed that allowing the exchange rate to vary in response to changes in interest rates might help to lessen the impact of government borrowing on the private sector.

Several researches have been conducted to study the link between external debt and private investment. For instance, in a study of U.S. economy between 1981 and 2002, Blanchard and Perotti (2002) found that a 10% increment in public debt-to-GDP ratio was related with a 0.8% reduction in private investment. An analysis of the Canadian economy from 1985 to 2010 discovered that a 10% rise in the public debt-to-GDP ratio was connected with a 0.4 percentage

point increase in long term interest rates. (Bredin, D. and Larochele, C. 2012). By the same, Rehman (2009) found that a rise in external debt results a drop in private investment in Pakistan.

2.3. Empirical Literature

Using a variety of tools and methodologies, scholars have studied the link between external public debt and economic growth in various countries around the world and showed that there is a positive, negative, and non-linear relation between the variable. The following section reviews some empirical literature focused on Ethiopia and international perspectives.

2.3.1. International empirical literature

Abdullaziz H., et al. (2019) used a seemingly unrelated regression model to find out the relationship between external debt, investment, and economic growth for 23 poorer nations from 2000 to 2017. They found an inverse relationship between external debt and growth in both less and more indebted countries, as well as a nonlinear relationship between foreign debt and investment and economic growth in low-income countries. Therefore, a threshold of foreign debt in both less and more indebted nations has little bearing on investment and growth in these countries.

Using panel regression and Granger causality analysis, Serhan Ciftcioglu and Amin Sokhanvar (2018) aimed to examine the debt-growth nexus in 12 CEE (central and eastern Europe) nations from 1995 - 2014. And draw the conclusion that certain emerging CEE economies experience slower economic growth due to external debt. In order to prevent further external borrowing, the countries must depreciate the real exchange rate.

Senadza, Fiagbe, and Quartey (2017) revealed that Sub-Saharan African countries' economic growth is adversely affected by their foreign debt using 23 years of yearly data from 1990 to 2013. Because of the enormous saving mismatch, they pushed these nations' governments to invest foreign money in successful investments rather than discontinue lending.

M.S. Ogunmuyiwa (2010) evaluated the influence of foreign debt on the growth of the Nigerian economy from 1970 to 2007 using a vector error correction model and concluded that external debt is not a distinct factor determining the rate of economic growth in the Nigerian economy. And he advised that there be a strong sense of responsibility and fiscal discipline in handling public finances in order to encourage progress in Nigeria and other developing nations.

Yi-bin Chiu and Chien Chian Lee (2017) assert that a link between debt and growth has changed depending on how risky a country is. The link was inverse under significant political and environmental risk. They used a panel data technique to examine the nonlinear impacts of four national risk indices (composite, economic, political, and financial risk indices) on the debt-growth nexus for 61 nations.

Hassan, A.S., and Meyer, D.F. (2020) examined the connection between external debt and economic growth in 30 sub-Saharan African nations from 1985 to 2018. Through the use of augmented mean group and common correlated effect mean group estimators, they sought to take into account the cross-sectional dependency between the variables under discussion. Additionally, they hypothesized that external debt has a nonlinear effect on economic growth in Sub-Saharan Africa and that there is a threshold level of external debt above which it slows down economic growth in the region (44-53% of GDP and 196-232% of exports), as indicated by an inverted U-shape relationship between the two variables.

Manamba E. and William M. (2021) used fixed effect (FE) and random effect (RE) panel data models to examine the effect of external debt on 45 African countries from 1990 to 2017. They discovered that relatively low levels of external debt to GDP ratio have a positive effect on economic growth and public investment in Africa. Significantly high amounts of foreign debt, on the other hand, are likely to stifle both economic development and public investment. Similarly, the debt service-to-export ratio has a negative impact on public investment, resulting in weaker economic growth. Ineffective external debt management measures might have a detrimental impact on GDP growth.

Data from Sri Lanka from 1975 to 2014 were used in a study by Naeem A. (2017), which employed the ARDL method. He observed in Sri Lanka that, while debt servicing has a poor association with per capita GDP and investment, state international debt has supported economic growth.

Antoine, N., et al. (2021) used the ARDL approach for the period 1986–2015 to assess the impact of external debt on economic growth in the case of the Republic of the Congo and to investigate the optimum amount of outside public debt. Furthermore, the factor under consideration has an inverted U-shaped connection with an optimal debt level of 21.6% of GDP. Above this, every increase in external debt harms the country's economic development.

Yoong et al. (2020) used the auto-regressive distributed lag model (ARDL) to examine the relationship between Malaysia's public debt and its economic progress between 1970 and 2015 and found out that long-term government spending had a substantial impact on GDP per capita. Regardless of the findings, Malaysia's debt and economic development are inextricably linked, with each increase in the debt ratio lowering GDP per capita.

Fosu (1996) used the ordinary least squares (OLS) technique to analyze the impact of external debt on economic progress in Sub-Saharan Africa from 1970, to 1986, using data from this region. The findings corroborate the debt hypothesis and show that debt has had a negative impact on GDP through decreasing capital's marginal efficiency, irrespective of the debt burden measurement used. GDP growth in nations with high levels of debt declines by an average of 1% annually, showing that debt's "long-term" effects are not monotonic.

Using the ARDL bound test, (Toama and Boke Aime Arnaud, 2019) examined the nature of Côte d'Ivoire's link between foreign indebtedness and economic progress. The results revealed that external loan considerably boosted growth over time. The short-run influence of external debt on economic development in Côte d'Ivoire is not examined in this study.

Another research by (Erdal Karagöl, 2002) find out the linkage between foreign debt service and gross national product in Turkey and discovered that debt service is a useful policy variable that is both long-run and short-run negatively connected to GNP. Data from 1956 to 1996 were analyzed using the maximum likelihood co-integration method developed by Johanson and Juselius. The study also revealed that education investment perhaps not appropriate proxy for human capital & that human capital has no long-run or short-run link with GNP.

(Abera, D., 2013) examined the consequences of international debt on economic development in a sample of heavily indebted poor African countries from 1991 to 2010. And achieved that external influence on economic development via debt crowding out rather than debt overhang.

According to a research conducted by Isaac et al. (2021), using the Prais-Winsten regression method, from 1991 to 2019, the correlation between external financing and economic expansion in Ghana was strong and adversely skewed.

(Ngangchi, F.H., and Joefendeh, R., 2021) used the dynamic ordinary least squares method to examine Cameroon's external debt, public investment, and economic growth from 1980 to 2018.

The findings also show that while the country's international debt accumulation has a negative and considerable effect on Cameroon's economic growth, public investment has a positive and big influence on it. According to the findings, developing nation's governments must foster an atmosphere that promotes investment in the private sector.

2.3.2. Empirical literature case of Ethiopia

Atinafu, W. (2020) investigated the impact of external public debt on economic growth in Ethiopia using the ARDL model beginning from 1970–2017, attempting to determine if the accumulation of external public debt and the servicing has any discernible influence on economic progress. He found that in the long run, a large stock of public foreign financing has a considerable adverse effect on economic growth (debt overhang). However, external debt servicing has no major effect (no crowding out effect) on economic growth. Long-term expansion of Ethiopian economy has also been positively impacted by both human and physical capital, but trade openness and labor force have not been significant factors in explaining the Ethiopian economy. However, in the short run, the stock of external debt has a positive and significant impact on Ethiopia's economic growth, while the servicing of external debt has a negligible and unobservable impact. Instead, it is discovered that the lag value of debt servicing has a favorable and notable impact on the nation's economic development. And the finding suggested the government of Ethiopia should invest in productive investment to reduce the dependency.

Getinet, B., and F. Ersumo (2020) used the ARDL technique to investigate the influence of public foreign debt on the economic growth in Ethiopia from 1983 - 2018. The result revealed that accumulation of debt and debt servicing variables had a substantial inverse influence on Ethiopian economic growth in both the short and long run. Furthermore, debt payment ratio to export has a negative (crowding out) effect in the near run. Similarly, they observed that trade openness had a short-term favorable influence on growth but in long-term it has negative and significant impact.

Amsalu Dachito (2017) used the Johansen Co-integration Test and the Vector Error Correction Model to investigate the influence of Ethiopia's foreign public debt on growth scenarios from 1981/82 to 2015/2016. The result showed that the amount of foreign debt has a strong and beneficial long-term association with economic growth to some ideal point, and after some point it continue to be non-linear. External debt service, on the other hand, shows a significant inverse

connection with growth, demonstrating that the relationship is nonlinear and only positive up to a specific optimal level.

A. Gebrekidan (2005) looked at how Ethiopia's borrowing from abroad affected its economic expansion from 1993/64 to 2003/04. Johansen Co-integration was utilized to examine the long-run connection between the variables under study. According to empirical findings, the previous external stock of debt and debt servicing harms economic development.

Hanna A. (2013) examined how Ethiopia's external debt affects its economic growth using time series data from 2001 to 2010. Depending on her results, external debt has no influence on economic growth. She also observed that foreign debt servicing had a positive association with GDP as a result of debt relief, debt rescheduling, and debt forgiveness, demonstrating that indebtedness has a favorable influence on economic growth rather than a negative one.

Dr. Kumar, A.M. (2017) demonstrated a long-run association between foreign debt & economic growth in Ethiopia from 1981 to 2014. Furthermore, he also observed that foreign accumulation of debt and economic growth have a favorable association if funds are channeled to genuine productive sectors by the government, regardless of mishandling and mismatch of money and/or diversion of funds to private hands. The researcher employed a VAR model to estimate the model.

Maruta (2013) analyzed how foreign debt affects economic development in Ethiopia from 2000 to 2010, discovering that it had no effect while debt service payments had a positive impact on GDP. Ayele and Kalluraya (2017) claim that because low-income nations like Ethiopia are still developing and need a lot of assistance in this respect, they frequently keep borrowing debt.

According to Clements et al. (2003), foreign borrowing enhances a country's investment and economic growth up to a point, beyond which debt servicing has a detrimental influence on economic advancement since most funds are transferred for debt repayment rather than investment. More generally, according to Ayele and Kalluraya (2017)'s analysis of Ethiopia, the economic theory contends that a developing nation's ability to borrow at reasonable rates will likely contribute to greater economic growth.

The study by Tewodros Girma and Solomon Tilahun (2022) employed an autoregressive distributed lag (ARDL) model to anticipate the influence of foreign aid on the economic growth in Ethiopia from 1985 to 2019. The empirical data shows, while foreign borrowing has a minimal

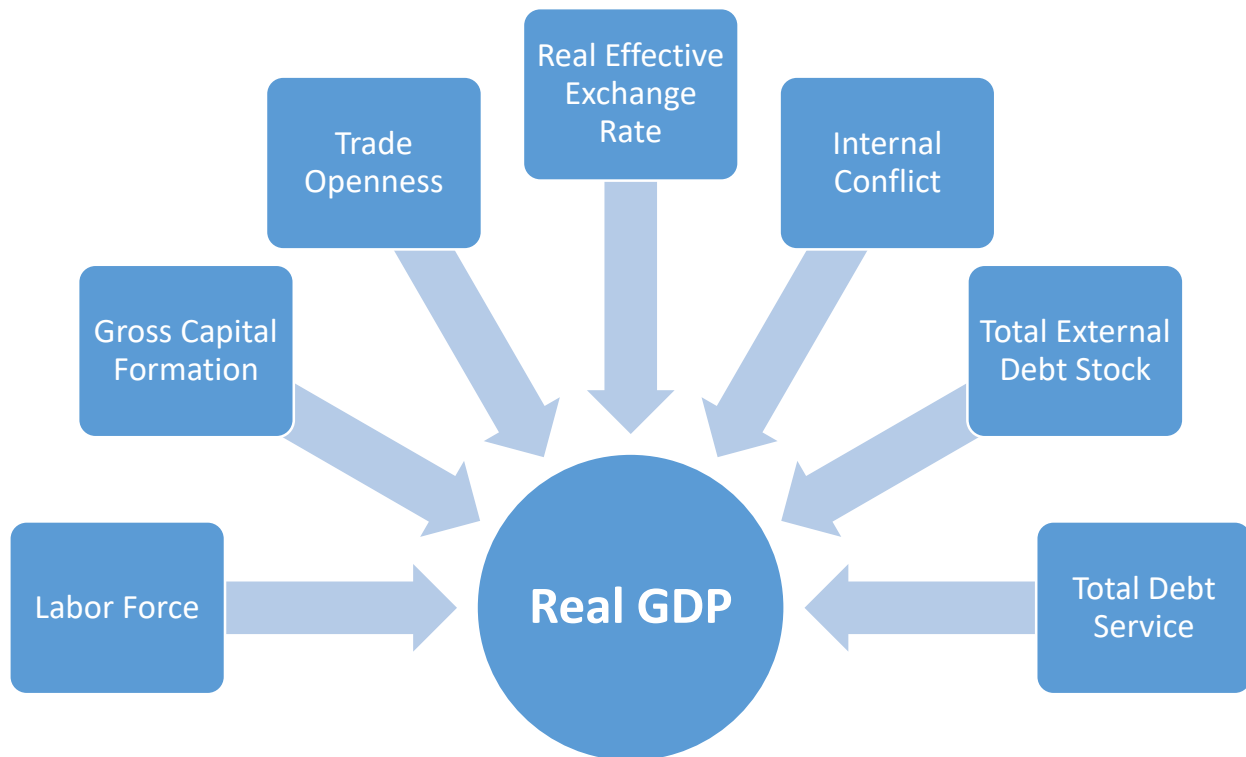
short-term influence on economic growth, it has a positive long-term benefit. Once again, this study reveals that predictability of foreign aid benefits economic growth in both the immediate and long-term. In light of aforementioned empirical findings, the report advised that the government direct foreign aid toward effective development efforts rather than consumption.

From the period 1991/92 to 2018/19, Mengistu Nigussie and Ebabu Tekea (2021), used an Auto regressive distributed lag model to predict the impact of public debt on economic growth in Ethiopia. The research findings demonstrate a negative permanent and temporary relationship between GDP and the ratio of international debt to GDP at significance levels of 1% and 5%, respectively. On the contrary hand, GDP is unaffected by debt servicing, the stock of total foreign debt, or the debt service export ratio. In addition, it was advised that government should encourage increased commerce, investments from abroad, and domestic capital investment.

Eyayu Tesfaye Mulugeta (2021) conducted research on the macroeconomic causes of foreign debt accumulation in Ethiopia from 1981 - 2018 utilizing the ARDL bound test technique. Then he discovered that per capita GDP growth, budget deficits, and political instability all had a large upward impact on the country's external debt stock in the long and short run. Whereas trade openness and infrastructure development have a negative and considerable impact on the country's debt stock. As a result, the government needs raise borrowing in order to achieve economic development.

2.4. Conceptual Framework

According to the literature review, economic and political factors like the labor force, gross capital formation, trade openness, real effective exchange rate, political risk factor (represented by internal conflict), and total external debt stock and total debt service (% of exports of goods, services, and primary income) have a major impact on the country's growth. In order to do this, the researcher developed the conceptual framework shown below:



Source: Author's computations

Figure 1: Conceptual framework

CHAPTER THREE

3. Macro-Economic Performance of the Ethiopian Economy

3.1. Real GDP and its Sectorial Contribution

Ethiopia's real GDP growth has varied over time because of different internal and foreign economic factors (Commission for Planning and Development, 2018). The Ethiopian economy was defined by a command economic structure from 1974 to 1991. A robust agricultural sector fueled real GDP growth, but the economy was hampered by a continuing civil war and persistent droughts. The economic growth significantly decreased as a result. (Andualem Tilaye, 2021). The Ethiopian economy expanded at a rate of 2.1% per year throughout this time period, but this was insufficient to maintain the level of per capita income steady given the country's 2.8% annual population growth. Income per person fell by around 0.7%. (Geda, 2002 cited in Gebrekidan, A., 2005).

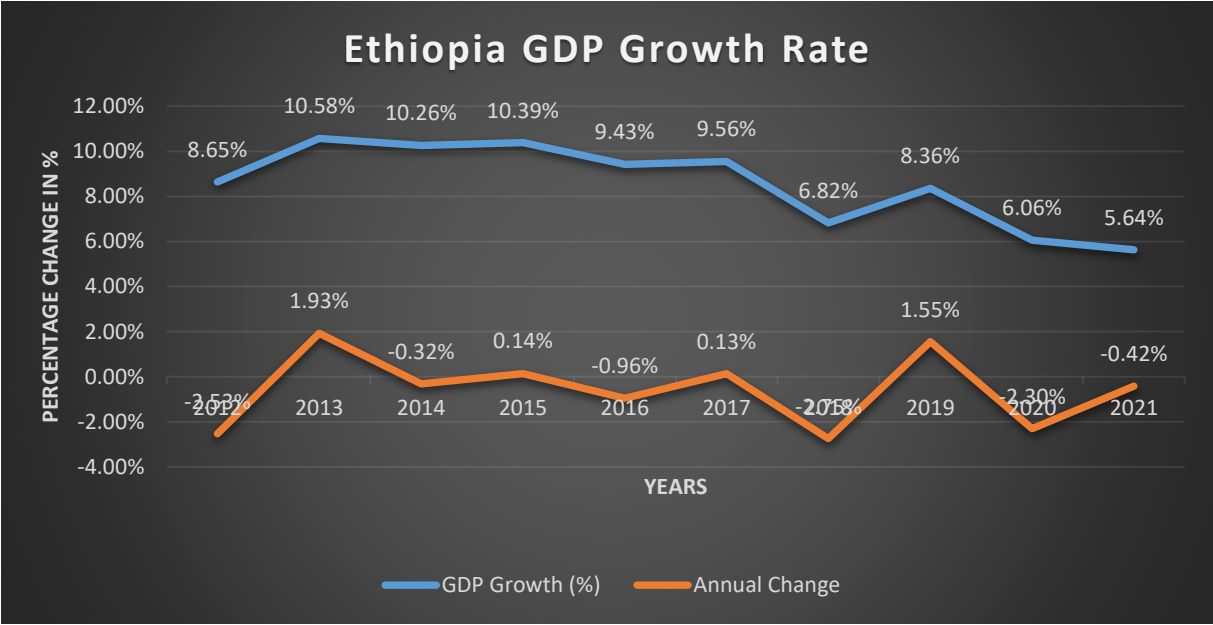
The Ethiopian government started putting institutional and structural reforms into place in the late 1990s with the goal of enhancing the economic climate of the nation. This period's policies featured privatization, the adoption of a market economy, agricultural development-led industrialization (ADLI), and the establishment of an open trading system. The recovery in Ethiopia's real GDP growth, which peaked at 8.3% in 2002/03 and has remained in the 5%-9% range since then, has been attributed to these measures. (Gebrewahid, G., and Asfaw, S. (2013) and Bigsten, Gebreeyesus and Söderbom (2016).

The Ethiopian economy grew by 9.6% on average between 2010/11 and 2018/2019; however, after 2019/20, the growth rate was reduced to 5.6%, owing mostly to the consequences of the COVID-19 pandemic. (IMF, 2020, and World Bank). The weakest growth rate in terms of real GDP growth over the previous ten years was in 2021, which is 5.6%. The country still has a low level of human development, coming in at 173 out of 189 countries and territories, even though the economy increased total human development indices by 15% between 2010 and 2019. (Human Development Report 2020, UNDP)

The country's ambition to leave the lower middle income countries by 2025 is tough to achieve with the per capita gross national income of \$ 960 in 2021. (World Bank, 2022). Public investments financed by borrowing from overseas have played a significant role in the country's substantially

economic growth rate during the last 10 years. This resulted in increased macroeconomic imbalances as well as hazards, including a foreign currency crisis and a large debt burden. The government unveiled its comprehensive Home Grown Economic Transformation Plan in 2019 to address this issue. But even after the program, a high inflation rate could pose a threat to the economy. "With food inflation at 23.0% and non-food inflation at 20.1%, the average annual inflation rate for January 2021 was 20.1%, with food inflation at 23.0% and non-food inflation at 19.1%."(CSA). Furthermore, the nominal national budget of the government has grown by 57%, from ETB 369 billion in 2016/17 to ETB 582 billion in 2021. But, throughout the same time span, the national budget actually shrank by 12% (UNICEF, 2021).

Figure 2: Real GDP growth rate from 2012-2021



Source: Own calculation based on data from World Bank, 2022

The history of Ethiopia’s real GDP growth is one that has experienced both highs and lows, but with a general trend of improvement. The percentage of the agriculture sector in the Ethiopian economy has significantly dropped as a result of the development of the service and industrial sectors over the previous 10 years. Agriculture made up 63% of GDP in 1992, but in 2019 it only made up 33%. (Andualem, T. 2021). The booming financial services, government, and retail industries were the primary drivers of the service sector's rapid growth. (African Development

Bank group, 2010). Amount of agriculture in the economy in 2021 the service sector made for around 36.25% of Ethiopia's GDP, with industry contributing roughly 21.85%. (Neill, 2023)

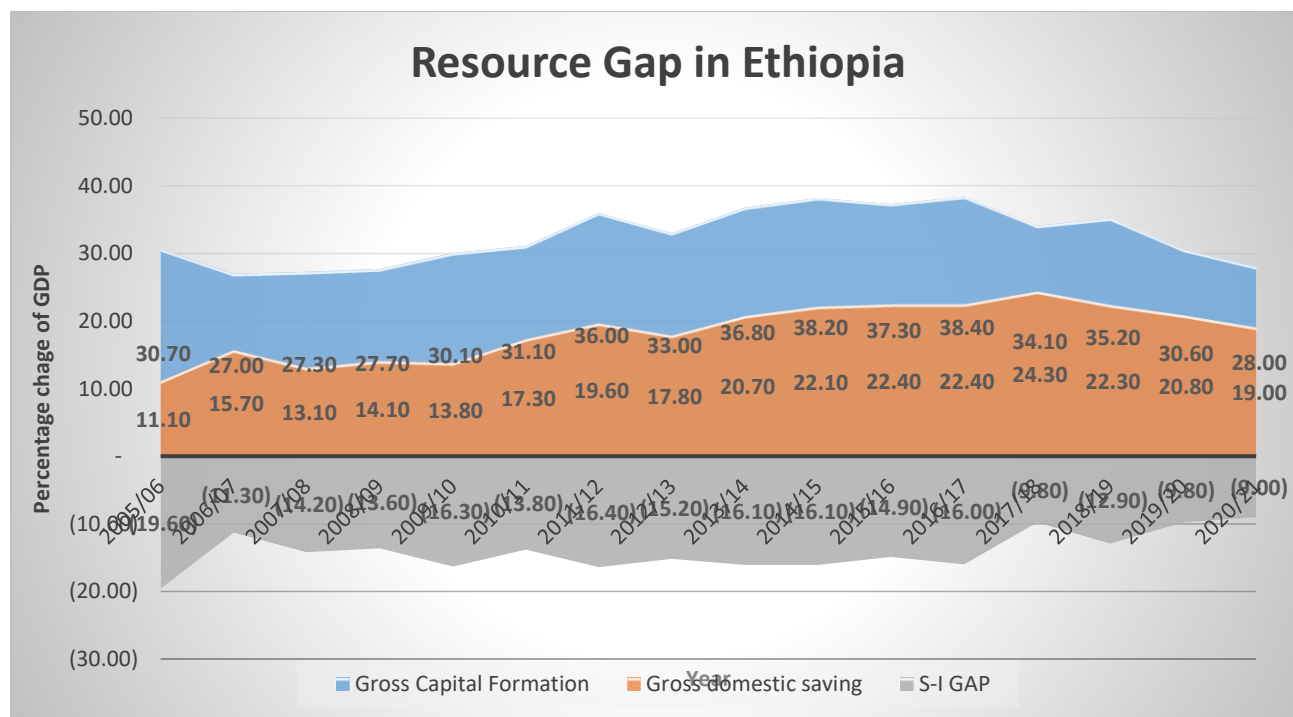
Table 3.1 in annexes shows that over the past five years, the service sector has taken the lion's share of GDP, followed by agriculture, which increased GDP by 39.6 percent. The data shown in Table 3.1 predicts that agriculture's share of GDP will decrease to 32.5 percent in 2021 while increasing to 29 percent from the previous year. The industrial sector rose by 7.3 percent annually, represented 29.3 percent of the total GDP, and made up 33.6 percent of the expansion in GDP. In addition, the service sector maintained its hegemony over the economy in 2020–21, generating 38.3 percent of GDP growth and accounting for 39.6 percent of GDP.

3.2. Trend in Saving and Investment

Saving has been noted as a vital factor in economic progress during the mercantilist and Adam Smith eras. Which makes it possible for an environment to be easily transformed into capital investment and for labor and other resources to be successfully mobilized for the increase in the level of production in an economy. According to Athukorala and Sen (2004) domestic saving, which is a key factor in determining economic growth, drives domestic investment primarily. (Worku Gebeyehu, 2011).

Savings in Ethiopia are insufficient to support its development. From 1981 to 2021, Ethiopian capital investment as a share of GDP averaged 9.42 %, ranging from a minimum of 0% in 1981 to a maximum of 40.67% in 2015 (Global Economy).

Figure 3: Resource Gap in Ethiopia from 2005/06-2020/21.



Source: Own calculation based on data from Planning and Development Commission

In Ethiopia, there are two possible sources of funding for financial mechanisms: domestic and foreign. The figure shows that the country's savings fall short of required investment for the last ten years. This suggested that there is a considerable desire for outside funding.

3.3. Public Sector and Balance of Payment

“Balance of Payment (BoP) is defined as a systematic record of all economic transactions between the residents of the reporting country and residents of foreign countries during the given period of time” (Kindle, B.). It displays a categorized list of all recipients for commodities exported, services rendered, and capital received by residents, together with payments made by them for goods imported and services obtained from capital transferred to non-residents or foreigners. (Reserve Bank of India). It records all business activities between a nation and the rest of the world over a given period of time. The concept is useful in understanding the economic relationship between countries and how it affects the economy. Ethiopia has a long and complicated history with the balance of payments and has gone through several phases of BoP deficit and surpluses.

Ethiopia has a population of over 100 million people and an economy based primarily on agriculture and tourism. Its economy has experienced rapid growth in recent year and is a largest

in the region. Ethiopia's BOP has traditionally been characterized by a large deficit, reflecting the country's dependence on external source for financing.

The Ethiopian economy has been defined mostly by massive imports and a dearth of high-value exports such as minerals or petroleum; annual merchandise trade account deficits would exceed USD 10.6 billion in 2021 (NBE, 2021). Using the national bank report has never been positive in Ethiopia for the past 20 years.

From at least the late 2000s, Ethiopia has had significant current account deficits. (World Bank, 2022). Nonetheless, the total balance of payments showed a surplus of USD 298.7 million in 2020/21 as opposed to a deficit of USD 833.4 million the previous year. The decline in goods commerce, the restoration of service account balances, and increased net private transfers are all responsible for this development. Notwithstanding a reduction in both net capital account inflows and net official transfers. (NBE 2020/21)

The capital account had a surplus of USD 3.8 billion, which was 11.7% less than the previous year. This loss was primarily caused by a decline in net long-term government capital of 65.8% and declines in net long-term private capital of 17.7% and 6.6%, respectively. (NBE, 2020/21).

3.4. External Debt

Over the past two decades, Ethiopia's external debt has significantly increased. This trend was mainly due to the country's need for funds to finance its infrastructural investment in order to realize its ambitious plans for economic growth and development. Ethiopia's public external debt has increased from USD 4.4 billion in 2000 to USD 24.2 billion in 2018. (World Bank, 2019). Ethiopia started applying for loans from the IMF in 1974, and since then, according to Befikadu and Birhanu (2000), the country has grown to be so reliant on foreign debt that it cannot survive without it. (Gebrekidan, A., (2005). Prior to 1992, Ethiopia's economy grew slowly as debt servicing costs and the total amount of debt increased significantly. For instance, the nation's external stock steadily expanded from USD 1.6 billion, or 20.6 percent of GDP, at the end of June 1985 to USD 3.62 billion, or 31.5 percent of GDP, by the end of June 1991. As a result, debt service liabilities climbed more quickly by 179.5%, from USD 136 million in 1984/1985 to USD 379.5 million in 1990/1991; these obligations accounted for over 70% of exports. (NBE, 2018)

Even after the Ethiopian transitional government came into power in 1992, it established a program known as the structural adjustment program (SAP) with the aim of easing debt overhang problems. However, the stock of external debt increased further, rising 125% from USD 3.2 billion at the end of June 1992 to USD 7.2 billion at the end of June 2004. The government's recently signed international financing agreement, specifically for the execution of the postwar social and economic reform agenda, is to blame for this. At the same time, due to debt relief from the debtor, debt servicing liabilities reduced from USD 404.5 million in 1992 to USD 183.8 million in 2004 (NBE, 2018).

Ethiopia's debt stock, on the other hand, has increased significantly since the benefits of debt relief, from USD 2.75 billion at the end of June 2008 to USD 21.7 billion by the end of June 2016, owing primarily to the government's increased investment needs for infrastructure and the poverty reduction program. (African Economic Outlook 2016).

The huge amount of external debt Ethiopia currently has poses a significant problem for its economy. The debt load has been progressively rising over the years as a result of a large portion of Ethiopia's investment in the past few years being financed by borrowing from outside. As of June 2020, the external debt to GDP ratio was 27%, and the overall public debt as a proportion of GDP was 51% (Ministry of Finance, 2020). Because of poor performance in the aviation, tourism, and hotel industries, as well as diminished remittances, the pandemic has a detrimental influence on debt servicing capacity.

The data in table 3 in annexes shows that over the past three years, the total rise in debt stock has increased by USD 2.5 billion, or 9%; nearly all of this debt is owed by central banks. The overall cost of servicing external debt, which was around 2 billion USD in 2019, fell to approximately 1.8 billion USD in 2021.

As a result of the increased national budget, the state's budgetary demands increased from ETB 351.1 billion in 2016/17 to ETB 591.6 billion in 2020/21. External borrowing is expected to rise by 4% in 2020/21, following domestic revenue and domestic borrowing. (Ministry of Finance)

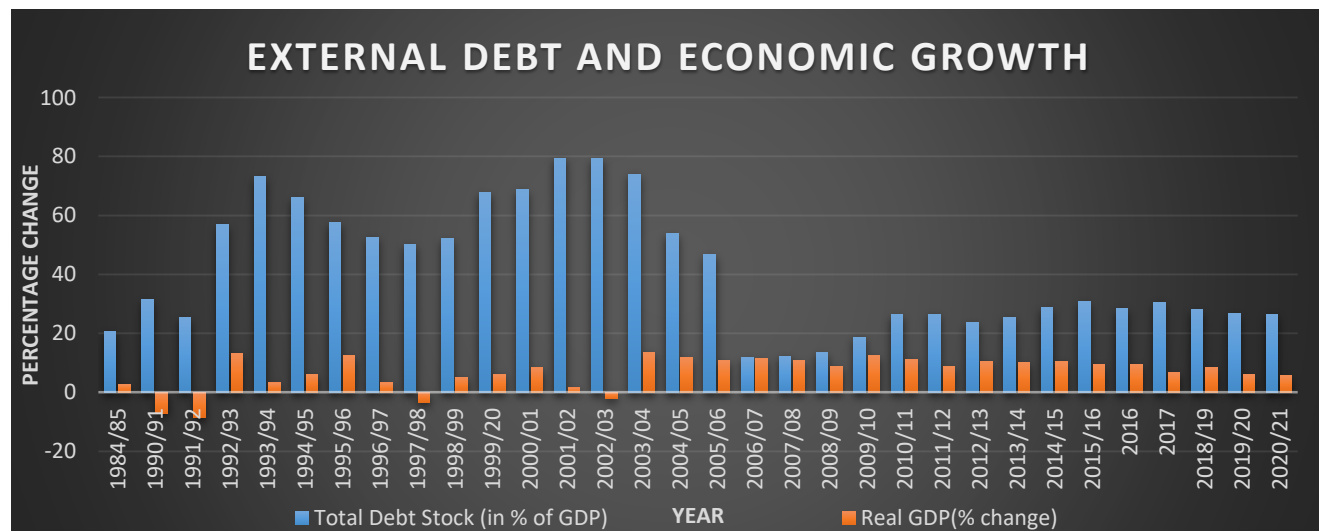
The majority of Ethiopia's bilateral and multilateral development partners are responsible for its foreign public debt. China, India, and Japan are the key bilateral partners, and African Development Bank, the World Bank, and the International Monetary Fund are main multilateral

partners. Official multilateral and bilateral lending has grown dramatically in recent years, accounting for around 88.7% of the total stock of external debt in 2020/2021. (World Bank and NBE, 2021)

Official creditors (Multilateral and bilateral creditors) own the majority of the nation's overall external debt. This represented 73.73 percent in 2017/18; however, in 2019/20, it grew to 77.3 percent. Multilateral lenders made up 40.67 percent of all external debtors in this group. This percentage rose in 2017/18 and will reach 50% by September 2020. This is mainly because while the government put a moratorium on external commercial borrowing and China has halted new lending over the same period, stock of foreign public debt from multilateral sources has increased substantially. To be more precise, the overall stock of Ethiopia's foreign debt from the World Bank climbed from US\$ 7.75 billion at the end of 2017/18 to US\$ 10.15 billion in 2019/20, or from making up 30% to 35% of the country's external debt (United nation Ethiopia, 2020).

Concerns regarding Ethiopia's ability to repay its debt are raised by the fact that it's external debt increasing more quickly than its economy. Over the past 20 years, the ratio of the nation's external debt to GDP has increased from 11% to 50% while economic growth has remained largely stagnant. This demonstrated that the probability of Ethiopian loan default is rising as a result of the country's public external debt outpacing its economic performance.

Figure 4: External debt and Economic growth rate in Ethiopia from 1984/85 - 2021



Source: World Bank and NBE, 2021

CHAPTER FOUR

4. Methodology and Regression Result

4.1. Source of data and types

The availability and suitability of data is critical to the success of any research paper. The study conducted based on secondary time series data from different international institution databases. It uses annual time series data over 36 years from the year 1985 - 2021 of External debt Stock (EDS), total debt servicing (TDS), the total labor force (LF), gross capital formation (GCF), Trade Openness (TO), internal conflict (IC) as a proxy to Political factors, real effective exchange rate (REER) and Ethiopia economic growth measured by the real GDP (RGDP) will collect from different international sources. The research is bound with this time interval because of the availability of information. World Bank development indicators database (2022), International country risk guide (PRS) and others were among the relevant and major sources for data that could support the study from conceptual and empirical backgrounds.

4.2. Method of Data Collection

- Collected data from databases system of the World Bank and IMF.
- Reviewing different report prepared by research scholars, articles, Journal and different previous empirical studies and Websites
- Books and Newspapers.

4.3. Method of data analysis

For data analysis in this work, descriptive statistical methods and econometric analysis are used. After collecting relevant data from secondary sources the data will be analyzed by using Eview-12 and other Statistical software.

4.4. Econometric Analysis

4.4.1. Stationary and Unit root

In the multivariate time series model, we cannot consider explaining of stochastic process of a single time series but rather explaining one variable (dependent variable) from its past including the current or lagged value of the second variable. In time series analysis as many statistical models and techniques depends on the assumption of stationary. A stationary time series data collection is

one in which statistical features such as mean and variance stay constant throughout time (Hyndman, R.J., and Athanasopoulos, G. (2018)). The assumption of stationary is the foundation of the bulk of econometric theory (Verbeek, 2004). Non-stationary suggests that the shock today has a long-term influence, and evaluating whether a process has a unit root is interesting in and of itself (Wooldridge, 2000).

Performing regression on a dependent variable that is not stationary and an independent variable that is also not stationary can result in false regression, where the estimators and test statistics are not accurate. When two or more I (1) variables are co-integrated, an important exception occurs, that is, if it happen a certain linear combination of the non-stationary variable that is stationary (Verbeek, 2004). If a time series' mean, variance, and auto covariance are constant regardless of the method used to measure them, or if they are time-independent, they are said to be stationary. Such time series frequently vary and revert to their average. (Mean reversion).

In fact, however, most time series data are non-stationary, mean that that the average and variance change with time and have no tendency to return to predefined levels. In this case, the series is called non-stationary time series. It can affect long-run relationships because traditional statistical techniques such as linear regression produce biased results. This is because non-stationary time series can violate the assumption of homoscedasticity, which is the key assumption of linear regression (Enderes, W. (2010)). Non-stationary time series regression is characterized by high R² statistics, highly auto-correlated residuals, and a significant value of a coefficient. This will lead to a problem known as **Spurious Regressions**. In spurious regression, two independent non-stationary series are spuriously (non-sense) related due to they are both trended (Granger and Newbold, 1974). While all that was produced was evidence of contemporaneous correlation rather than meaningful causal linkage, it was deduced that the variables in the regression model have statistically significant long-run correlations (extremely high R² values and significant t-ratios). (Gujarati, 2003)

4.4.2. Unit Roots Test

Numerous financial and economic series tend to trend or have a non-stationary mean. So before going to analysis, we must transform the data to stationary series. In order to test for stationary (or not) we can use a very popular approach known as Unit root test. To address the issue of non-stationary, researchers often use techniques such as differencing, which involves subtracting

consecutive values of time series to make it stationary or they use more sophisticated methods such as co-integration analysis (Hamilton, J. D. (1994). Time trend regression is effective for trend stationary I (0) time series, whereas first differencing is effective for trend stationary I (1) time series. The unit root test may be used to assess if trending data should be differenced or regressed on a deterministic function of time. The Augmented Dickey-Fuller (ADF) test, an upgraded variant of the Dickey-Fuller test that includes the lagged values of the dependent variables, can be used to do unit root testing.

4.4.3. Co-integration Test

When two non-stationary series have the same stochastic trend in common and have linear relationship between them the series are co-integrated. The presence of a co-integrating vector indicates that the variables under examination have an unbroken long term equilibrium connection. That is, the mean and variance are constant and time-dependent. However, most empirical studies have revealed that the mean and variance constancy is not fulfilled when evaluating time series variables (Emeka N. and Aham K., 2016).

Because there must be a process that pushes the variable to its long-run equilibrium relationship, the existence of a long-run connection has consequences for the short-run behavior of I (1) variables. An Error Correction Mechanism can be used to simulate this mechanism. (Verbeek, 2004). The issue of false regression arises when the variable doesn't co-integrate and the result therein becomes meaningless. The long-run information about the relationship between the variables that has been lost of the relevant long-run features or information of the equilibrium due to differencing can be recovered via co-integration. (Emeka N. and Aham K, 2016)

To determine whether or not co-integration exists, economists developed different approaches such as Granger (1981), Engle-Granger two-step procedures (1987), Johansen co-integration approaches (1990), Auto regressive distributed lag co-integration technique or Bound test of co-integration (Pesaran and Shin 1999 and Pesaran et al, 2001) become a solution. So far, Engle-Granger two-step procedures (1987) and Johansen co-integration approaches (1990) has used largely applied in empirical literatures. But for this study Autoregressive distributed lag co-integration technique (ARDL) is applied for empirical analysis.

Autoregressive distributed lag co-integration technique is a type of econometric model used for analyzing both short and long run relationships among variables (Kumar, A.M. (2017). In contrast to other co-integration approach ARDL co-integration approach has many advantages to use it.

To begin, the ARDL approach yields normally distributed estimates of the long run coefficient irrespective of whether the underlying regressor is I(0), I(1), or both. Which means the ARDL model allows for more parameters and lag in estimation, meaning that it can capture more complex relationships between variable. As a result it avoids the volatility linked with the pretesting for the order of integration of individual variables. (Pesaran et al, 2001)

Secondly, ARDL approach can be applied on relatively small sample size compare to Engle-Granger two step procedures (1987) and Johansen co-integration approaches (1990) which needed large data. It avoid problem of serial correlation and endogeneity (Pesaran and shin, 1995).

Third, ARDL co-integration technique doesn't require pre-tests for unit root unlike other approaches of co-integration (Emeka N. and Aham K.2016). However, in the case of I (2) variables, the estimated F-statistic for the existence of integration is invalid without first checking for the unit root. (Pesaran et al, 2001). As a result, before performing the ARDL co-integration test or estimating the model's long-run connection, we ensure that the variables are not I (2) or higher in order to avoid misleading regression. (Wessene K., 2014). Not only is that it also helpful to make an estimation by OLS after lag order of the model obtained (Pesaran and shin, 1997).

Fourth, the ARDL model is able to be estimated in a non-linear fashion and able to handle both homogeneous and heterogeneous data. It is especially useful when exploring relationships where non-linear effects may exists. This is an advantage over other co-integration tests, as these are often limited to linear and homogeneous data. (Genesan, P., & Joseph, T. (2016).

4.4.4. Model specification

The model can be specified in the following functional manner:-

$$RGDP_t = f (EDS, TDS, LF, GCF, TO, IC, REER).....*$$

The model can be specified as below:-

ARDL (r, n) model is:-

$$RGDP_t = \alpha_{oi} + \sum_{i=1}^r \delta_i RGDP_{t-i} + \sum_{i=0}^n \beta_{ni} X_{t-i} + u_{it},$$

Where,

- The dependent and independent variable are allowed to be purely $I(0)$ and $I(1)$ or co-integrated: β and δ are coefficients; α is the intercept; $i = 1, \dots, k$; r, n are optimal lag orders for dependent and independent variables respectively; u_{it} is a vector of error terms – unobservable zero mean white noise vector process (serially uncorrelated and independent).
- X is independent variables.

The conditional ARDL (r, n_1, n_2, \dots, n_7) model with eight variables is stated as follows in order to run the bound test for co-integration:

Hypothesis:

$H_0 = \beta_{ni} = 0$, (where $i=1, 2, 3, 4, 5, 6, 7$) or no Co-integration, $H_1 = \beta_{ni} \neq 0$, Co-integration,

The general model can be described as follows:

$$\begin{aligned} \Delta LRGDP_t &= \alpha_{01} + \beta_{11} LRGDP_{t-1} + \beta_{21} LEADS_{t-1} + \beta_{31} TDS_{t-1} + \beta_{41} LLF_{t-1} + \beta_{51} GCF_{t-1} + \beta_{61} TO_{t-1} \\ &+ \beta_{71} IC_{t-1} + \beta_{81} REER_{t-1} + \sum_{i=1}^r \delta_{1i} \Delta LRGDP_{t-i} + \sum_{i=1}^n \delta_{2i} \Delta LEADS_{t-i} + \sum_{i=1}^n \delta_{3i} \Delta TDS_{t-i} + \sum_{i=1}^n \delta_{4i} \Delta LLF_{t-i} \\ &+ \sum_{i=1}^n \delta_{5i} \Delta GCF_{t-i} + \sum_{i=1}^n \delta_{6i} \Delta TO_{t-i} + \sum_{i=1}^n \delta_{7i} \Delta IC_{t-i} + \sum_{i=1}^n \delta_{8i} \Delta REER_{t-i} + u_{1t} \dots \dots \dots \text{(I)} \end{aligned}$$

$$\begin{aligned} \Delta LEADS_t &= \alpha_{02} + \beta_{12} LRGDP_{t-1} + \beta_{22} LEADS_{t-1} + \beta_{32} TDS_{t-1} + \beta_{42} LLF_{t-1} + \beta_{52} GCF_{t-1} + \beta_{62} TO_{t-1} \\ &+ \beta_{72} IC_{t-1} + \beta_{82} REER_{t-1} + \sum_{i=1}^n \delta_{1i} \Delta LEADS_{t-i} + \sum_{i=1}^r \delta_{2i} \Delta LRGDP_{t-i} + \sum_{i=1}^n \delta_{3i} \Delta TDS_{t-i} + \sum_{i=1}^n \delta_{4i} \Delta LLF_{t-i} \\ &+ \sum_{i=1}^n \delta_{5i} \Delta GCF_{t-i} + \sum_{i=1}^n \delta_{6i} \Delta TO_{t-i} + \sum_{i=1}^n \delta_{7i} \Delta IC_{t-i} + \sum_{i=1}^n \delta_{8i} \Delta REER_{t-i} + u_{2t} \dots \dots \dots \text{(II)} \end{aligned}$$

$$\begin{aligned} \Delta TDS_t &= \alpha_{03} + \beta_{13} LRGDP_{t-1} + \beta_{23} LEADS_{t-1} + \beta_{33} TDS_{t-1} + \beta_{43} LLF_{t-1} + \beta_{53} GCF_{t-1} + \beta_{63} TO_{t-1} \\ &+ \beta_{73} IC_{t-1} + \beta_{83} REER_{t-1} + \sum_{i=1}^n \delta_{1i} \Delta TDS_{t-i} + \sum_{i=1}^r \delta_{2i} \Delta LRGDP_{t-i} + \sum_{i=1}^n \delta_{3i} \Delta LEADS_{t-i} + \sum_{i=1}^n \delta_{4i} \Delta LLF_{t-i} \\ &+ \sum_{i=1}^n \delta_{5i} \Delta GCF_{t-i} + \sum_{i=1}^n \delta_{6i} \Delta TO_{t-i} + \sum_{i=1}^n \delta_{7i} \Delta IC_{t-i} + \sum_{i=1}^n \delta_{8i} \Delta REER_{t-i} + u_{3t} \dots \dots \dots \text{(III)} \end{aligned}$$

$$\Delta LLF_t = \alpha_{04} + \beta_{14} LRGDP_{t-1} + \beta_{24} LEADS_{t-1} + \beta_{34} TDS_{t-1} + \beta_{44} LLF_{t-1} + \beta_{54} GCF_{t-1} + \beta_{64} TO_{t-1}$$

$$+ \beta_{74}IC_{t-1} + \beta_{84}REER_{t-1} + \sum_{i=1}^n \delta_{1i} \Delta LLLF_{t-1} + \sum_{i=1}^n \delta_{2i} \Delta LRGDP_{t-1} + \sum_{i=1}^n \delta_{3i} \Delta LEDES_{t-1} + \sum_{i=1}^n \delta_{4i} \Delta TDS_{t-1} + \sum_{i=1}^n \delta_{5i} \Delta GCF_{t-1} + \sum_{i=1}^n \delta_{6i} \Delta TO_{t-1} + \sum_{i=1}^n \delta_{7i} \Delta IC_{t-1} + \sum_{i=1}^n \delta_{8i} \Delta REER_{t-1} + u_{4t} \dots \dots \dots (IV)$$

$$\Delta GCF_t = \alpha_{05} + \beta_{15}LRGDP_{t-1} + \beta_{25}LEDES_{t-1} + \beta_{35}TDS_{t-1} + \beta_{45}LLF_{t-1} + \beta_{55}GCF_{t-1} + \beta_{65}TO_{t-1}$$

$$+ \beta_{75}IC_{t-1} + \beta_{85}REER_{t-1} + \sum_{i=1}^n \delta_{1i} \Delta GCF_{t-1} + \sum_{i=1}^n \delta_{2i} \Delta LRGDP_{t-1} + \sum_{i=1}^n \delta_{3i} \Delta LLLF_{t-1} + \sum_{i=1}^n \delta_{4i} \Delta LEDES_{t-1} + \sum_{i=1}^n \delta_{5i} \Delta TDS_{t-1} + \sum_{i=1}^n \delta_{6i} \Delta TO_{t-1} + \sum_{i=1}^n \delta_{7i} \Delta IC_{t-1} + \sum_{i=1}^n \delta_{8i} \Delta REER_{t-1} + u_{5t} \dots \dots \dots (V)$$

$$\Delta TO_t = \alpha_{06} + \beta_{16}LRGDP_{t-1} + \beta_{26}LEDES_{t-1} + \beta_{36}TDS_{t-1} + \beta_{46}LLF_{t-1} + \beta_{56}GCF_{t-1} + \beta_{66}TO_{t-1}$$

$$+ \beta_{76}IC_{t-1} + \beta_{86}REER_{t-1} + \sum_{i=1}^n \delta_{1i} \Delta TO_{t-1} + \sum_{i=1}^n \delta_{2i} \Delta LRGDP_{t-1} + \sum_{i=1}^n \delta_{3i} \Delta GCF_{t-1} + \sum_{i=1}^n \delta_{4i} \Delta LLLF_{t-1} + \sum_{i=1}^n \delta_{5i} \Delta LEDES_{t-1} + \sum_{i=1}^n \delta_{6i} \Delta TDS_{t-1} + \sum_{i=1}^n \delta_{7i} \Delta IC_{t-1} + \sum_{i=1}^n \delta_{8i} \Delta REER_{t-1} + u_{6t} \dots \dots \dots (VI)$$

$$\Delta IC_t = \alpha_{07} + \beta_{17}LRGDP_{t-1} + \beta_{27}LEDES_{t-1} + \beta_{37}TDS_{t-1} + \beta_{47}LLF_{t-1} + \beta_{57}GCF_{t-1} + \beta_{67}TO_{t-1}$$

$$+ \beta_{77}IC_{t-1} + \beta_{87}REER_{t-1} + \sum_{i=1}^n \delta_{1i} \Delta IC_{t-1} + \sum_{i=1}^n \delta_{2i} \Delta LRGDP_{t-1} + \sum_{i=1}^n \delta_{3i} \Delta TO_{t-1} + \sum_{i=1}^n \delta_{4i} \Delta GCF_{t-1} + \sum_{i=1}^n \delta_{5i} \Delta LLLF_{t-1} + \sum_{i=1}^n \delta_{6i} \Delta LEDES_{t-1} + \sum_{i=1}^n \delta_{7i} \Delta TDS_{t-1} + \sum_{i=1}^n \delta_{8i} \Delta REER_{t-1} + u_{7t} \dots \dots \dots (VII)$$

$$\Delta REER_t = \alpha_{08} + \beta_{18}LRGDP_{t-1} + \beta_{28}LEDES_{t-1} + \beta_{38}TDS_{t-1} + \beta_{48}LLF_{t-1} + \beta_{58}GCF_{t-1} + \beta_{68}TO_{t-1}$$

$$+ \beta_{78}IC_{t-1} + \beta_{88}REER_{t-1} + \sum_{i=1}^n \delta_{1i} \Delta REER_{t-1} + \sum_{i=1}^n \delta_{2i} \Delta LRGDP_{t-1} + \sum_{i=1}^n \delta_{3i} \Delta IC_{t-1} + \sum_{i=1}^n \delta_{4i} \Delta TO_{t-1} + \sum_{i=1}^n \delta_{5i} \Delta GCF_{t-1} + \sum_{i=1}^n \delta_{6i} \Delta LLLF_{t-1} + \sum_{i=1}^n \delta_{7i} \Delta LEDES_{t-1} + \sum_{i=1}^n \delta_{8i} \Delta TDS_{t-1} + u_{8t} \dots \dots \dots (VII)$$

Where:-

- α_{0i} = constant
- LRGDP = logarithm of real GDP at time t
- LEDES = logarithm of stock of external debt (-)
- TDS = Total debt servicing(-)
- LLF = Natural logarithm of labor force(+)
- GCF= Gross capital formation (+)
- TO = Trade openness(+)
- IC = Internal conflict (-)
- REER = Real effective exchange rate (-)
- Δ = First difference operator
- δ_i = Short run dynamic coefficient

- β_i = Long run coefficients
- u_t = Random error term

By designating each variable as a dependent variable, the Bound test co-integration leads to the execution of eight separate co-integration tests. The error correction model (ECM) representation is defined as follows if the null hypothesis, according to which co-integration does not exist, is rejected:

$$\Delta \text{LRGDP}_t = \alpha_1 + \sum_{i=1}^n \delta_{1i} \Delta \text{LRGDP}_{t-1} + \sum_{i=1}^n \delta_{2i} \Delta \text{LEDS}_{t-1} + \sum_{i=1}^n \delta_{3i} \Delta \text{TDS}_{t-1} + \sum_{i=1}^n \delta_{4i} \Delta \text{LLF}_{t-1} + \sum_{i=1}^n \delta_{5i} \Delta \text{GCF}_{t-1} + \sum_{i=1}^n \delta_{6i} \Delta \text{TO}_{t-1} + \sum_{i=1}^n \delta_{7i} \Delta \text{IC}_{t-1} + \sum_{i=1}^n \delta_{8i} \Delta \text{REER}_{t-1} + \lambda \text{ECT}_{t-1} + u_t$$

But when there is No co-integration, the ARDL ($r, n_1, n_2 \dots n_7$) model is specified as:

$$\Delta \text{LRGDP}_t = \alpha_1 + \sum_{i=1}^n \delta_{1i} \Delta \text{LRGDP}_{t-1} + \sum_{i=1}^n \delta_{2i} \Delta \text{LEDS}_{t-1} + \sum_{i=1}^n \delta_{3i} \Delta \text{TDS}_{t-1} + \sum_{i=1}^n \delta_{4i} \Delta \text{LLF}_{t-1} + \sum_{i=1}^n \delta_{5i} \Delta \text{GCF}_{t-1} + \sum_{i=1}^n \delta_{6i} \Delta \text{TO}_{t-1} + \sum_{i=1}^n \delta_{7i} \Delta \text{IC}_{t-1} + \sum_{i=1}^n \delta_{8i} \Delta \text{REER}_{t-1} + u_t$$

Where;

- λ = speed of adjustment
- ECM = Error correction term
- δ_{ni} = Short run dynamic coefficient

4.5. Description of variables and hypothesis

Economic growth

Economic growth is the model's endogenous variable, and it is quantified by the country's Real GDP. "GDP is defined as the total gross value contributed by all inhabitants of the economy, plus any relevant product taxes, less any unaccounted-for subsidies." (World Bank, 2022). The information comes from the World Bank database (2022).

Total External debt stock

Mengistu N. and Malefia E. (2021) investigated foreign debt as a control of Ethiopia's economic advancement from 1991/92 to 2018/19. Furthermore, at 5% and 1% significance levels, the ratio of external indebtedness to GDP hinders Ethiopian growth performance in the short and long run.

As a result, I anticipate that external debt stock has hampered Ethiopia's economic growth for this study. The information comes from the World Bank database (2022).

Total debt service (% of exports of goods, services, and primary income)

Define the ratio of a country's debt service payments made or due to that country's export revenues. It is seen as an important indication of a country's debt load (IMF, 2003). The information comes from the World Bank database (2022).

Labor Force

The entire labor force consists of people aged 15 and above who contribute work for the growth of goods and services throughout a certain time period. According to Solow's (1956) growth model, labor and human capital are the primary sources of growth. Furthermore, for this research the labor force is anticipated favorable influence on Ethiopia's economic advancement. The information comes from the World Bank database (2022).

Gross Capital Formation

Refers to the total value of new physical assets that are produced in an economy during a given period of time, such as building, machinery, equipment and infrastructure. (World Bank, 2019) According to Solow-swan growth model, capital formation is the main determinant of growth and a larger stock of capital increases an economy's potential output. The model stated that the higher investment leads to higher output and that the marginal productivity of capital is the driving factor in economic growth. For this study purpose, we can use gross Capital formation as a proxy variable and expected to have a positive sign. The data for the analysis is taken from the World Bank database (2022).

Trade openness

“Defined as the total of a country's exports and imports expressed as a percentage of GDP” (Feenstra, R., et al). If a country has more open to international trade it has a higher probability to implement leading technology and increase competitiveness and a higher level of investment. (Romer (1993) cited in Atinafu, W. (2020)). It has expected to have a positive sign. The information comes from the World Bank database. (2022) and Federal Reserve Economic Data.

Real Effective exchange rate

The effective exchange rate measures the strength of a currency in relation to a basket of other currencies. (Wikipedia, 2022). The data for the analysis is taken from the National bank of Ethiopia.

Political risk factor

The political risk rating of a nation can be used to determine its level of political stability, according to Llewellyn D. Howell's (Ph.D.) "International Country Risk Guide (ICRG), PRS Group has rated nations based on a variety of factors, including government stability, socioeconomic conditions, investment politics, internal and external conflicts, corruption, military involvement in politics, religious tension, law and order, ethnic tensions, democratic accountability, and bureaucratic quality, in order to assess each nation's political stability." Due to the availability of data that assessed political violence and its possible impact on the nation's governance, we employed internal conflict as a measure of political instability for this study. Nations with the highest score have no organized civil or armed opposition to the government and no arbitrary direct or indirect violence against their own people. The country with the lowest score is still in the grip of civil conflict. The risk rating is composed of three subcomponents, each of which has a maximum score of four points and a minimum score of zero points. A score of 4 indicates Very Low Risk, while a score of 0 indicates Very High Risk. Economic growth is influenced by governmental elements such as laws and regulations, as well as advances in industry and technology, according to Simon Kuznet.

4.6. Empirical analysis and results

4.6.1. Unit root tests

Since the variable cannot be used to the Auto Regressive Distributed Lag Model (ARDL) model if it is stationary at the second difference, $I(2)$, the maximum order of integration must be established. Even though the pretest for unit root is not a first requirement in the ARDL model, this is still the case. In light of this, if the variables are integrated according to various orders, an auto regressive distributed lag model can be specified. That is a model where some variables have integration orders of $I(0)$, $I(1)$ or both, but not $I(2)$. Therefore, we can test for the variable's unit root in order to test the order of integration first. I'm going to use the Augmented-Dickey Fuller

unit root test to determine whether the variables in this model have a stationary property before applying regressing.

Table 1: Unit root test

Variables	Level		1 st differencing		Order of integration
	Constant	Constant and trend	Constant	Constant and trend	
Log(RGDP)	0.9742*	0.9130*	0.0251*	0.0442*	I(1)
Log(EDS)	0.8594*	0.9255*	0.0005*	0.0026*	I(1)
TDS	0.2741*	0.5282*	0.0000*	0.0006*	I(1)
Log(LF)	0.9887*	0.2676*	0.0000*	0.0001*	I(1)
GCF	0.9946*	0.9263*	0.0014*	0.0013*	I(1)
TO	0.7679*	0.9763*	0.0000*	0.0000*	I(1)
IC	0.4351*	0.6908*	0.0043*	0.0247*	I(1)
REER	0.0908*	0.3579*	0.0000*	0.0000*	I(1)

Note: P-values indicated by (*)

Source: Estimated by author using Eview 12.

Hypothesis: Null hypothesis: Non-Stationary, Alternative hypothesis: Stationary

Hence, if the value of P-values small than 5%, then reject Null hypothesis that is stationary; if the failure to reject H₀, that means Non-Stationary.

Because the P-value is more than 5%, we can infer from table 4.1 above that all variables are not stationary at level. However, when we observe the variable's at first difference, all included variables are stationary because the P-value is less than 5%.

The necessity of integrating all of our processes at the initial differencing stage I (1) and at a maximum level of importance of 5% was once again reaffirmed. Therefore, it is a good idea to run the ARDL model.

4.6.2. Optimal Lag Selection

The ideal lag in the model needs to be selected in order to prevent degree of freedom loss, multi-collinearity, and serial correlation in the error term. The researcher chooses from the Akake Information Criteria (AIC), Schwartz Information Criteria (SIC), and Hannan Qinn Information

Criteria (QIC) to calculate the greatest lag selection. The model that has the lowest or most negative number for each of the three criteria is the most suitable one.

Table 2: Lag selection Criterion

Lags	Final prediction error(FPE)	Akaike information criterion(AIC)	Schwarz information criterion(SC)	Hannan-Quinn information criterion(HQ)
0	4.52e+21	72.56471	72.92022	72.68744
1	1.33e+16*	59.73159*	62.93116*	60.83608*
2	2.47e+16	59.73279	65.77643	61.81906

Source: Estimated by author using Eview 12.

From the above table 4.2, we understood that AIC is the lowest value relative to other criteria, and in addition, based on FPE, SC, and HQ tests, the maximum lag length used in this model is one.

4.6.3. Co-integration test

If the sample size is limited, we compare the F-statistics with the critical value to see if the variables are related by co-integration. The null hypothesis is rejected if the calculated F-statistics for the bound test are greater than the critical value at all levels of significance, or there is a co-integration connection between the variables.

Table 3: Result of Bound test of co-integration

Test statistics	Value	No. of independent variables	Significance level	Bound critical values (Unrestricted Constant and Unrestricted Trend)	
				I(0)	I(1)
F-statistics	5.090944	7		I(0)	I(1)
			10%	2.38	3.45
			5%	2.69	3.83
			2.5%	2.98	4.16
			1%	3.31	4.63

Null Hypothesis: No levels relationship

Source: Estimated by author using Eview 12.

The estimated F-statistics value is 5.090944, which is more than the upper and lower bound tests, as shown in the above table 4.3 bound test result. The upper limit critical values at the 1% and 5% significance levels are 4.63 and 3.83, respectively. This implies that the alternative hypothesis of a co-integrating link is acceptable. That is, real GDP is co-integrated (has a long-run connection) with independent variables.

Table 4: Correlation results of the variables

	LOGRGDP	LOGEDS	TDS	LOGLF	GCF	TO	I_C	REER1
LOGRGDP	1.000000							
LOGEDS	0.651355	1.000000						
TDS	-0.070687	0.330816	1.000000					
LOGLF	0.881211	0.492076	-0.423793	1.000000				
GCF	0.915480	0.838507	0.086498	0.816359	1.000000			
TO	0.167914	-0.474873	-0.713300	0.363332	-0.105415	1.000000		
I_C	0.236193	0.303140	-0.483655	0.542444	0.369713	-0.004076	1.000000	
REER	0.175060	-0.002370	-0.009057	0.153936	0.120713	0.095228	-0.272305	1.000000

Source: Estimated by author using Eview 12.

The correlation matrix of all variables included in the model was shown in **Table 4.4**. As a result, real GDP has a positive relationship with external debt stock, labor force, gross capital formation, trade openness, internal conflict, and real effective exchange rate. Total debt servicing is inversely linked to real GDP.

External debt stock, labor force, and gross capital formation are all highly and positively correlated with real GDP, whereas trade openness, internal conflict, and the real effective exchange rate are less so. In light of the results, one could be inclined to conclude that the stock of foreign debt, the labor force, and gross capital formation all support real GDP. Without a more detailed model and the appropriate analytical approach, it will be impossible to draw a conclusion. As a result, we employed the auto-regressive distributed lag model.

Table 5: Results of the Auto Regressive Distributed Lag Model (ARDL)

DV: LOGRGDP				
Method: Auto Regressive Distributed Lag Model				
Evaluated models: 128				
Selected Model: ARDL(1, 1, 0, 0, 0, 0, 1, 0)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOGRGDP(-1)	0.846234	0.074544	11.35221	0.0000
LOGEDS	-0.029379	0.066382	-0.442573	0.6622
LOGEDS(-1)	-0.184828	0.069329	-2.665945	0.0138
TDS	0.005244	0.002841	1.846170	0.0778
TDS(-1)	0.003086	0.002692	1.146314	0.2635
LOGLF	-2.693678	1.182859	-2.277261	0.0324
GCF	2.41E-11	6.63E-12	3.643501	0.0014
TO	0.015336	0.005750	2.667360	0.0138
I_C	-0.109838	0.041138	-2.669998	0.0137
I_C(-1)	0.137415	0.053029	2.591303	0.0163
REER	0.000157	0.000568	0.277273	0.7840
C	52.64326	19.78482	2.660790	0.0140
@TREND	0.084937	0.033192	2.558960	0.0175
R-squared	0.995715			
Adjusted R-squared	0.993479			
S.E. of regression	0.075680			
Sum squared residual	0.131730			
Log likelihood	49.90755			
F-statistic	445.3398			
Durbin-Watson stat	2.287655			
Prob(F-statistic)	0.000000			

Source: Estimated by author using Eview 12.

The output from table 4.5 reveals that the package's analysis of 128 models and selection of the lags (1, 1, 1, 0, 0, 0, 1, and 0) based on Akaike Information Criteria (AIC) produced the auto

regressive distributed lag model. Both the adjusted (R^2) and coefficients of determination (R^2) are quite high, at 99.3 and 99.5 percent, respectively. During the study period, all independent variables explained more than 99% of the systematic variance in real GDP. At the 1% level, the F-statistic (445.33) value is extremely significant. The adjusted R^2 , which is very close to the coefficient of determination, demonstrates how important the lag and all of the model's variables are in determining real GDP. The Durbin-Watson statistic (2.2876552~2) also illustrates that the residuals are not serially correlated.

Log value of Real GDP is positively affected by its own first lag at 1 percent probability value. This suggested that the last year real GDP of the country has a positively impact on the current year real GDP growth. As we can see from the above table 4.5; when a 1 percent increment in the lagged value of log of real GDP results a 0.84 percent increment in the current year log value of real GDP. The real effective exchange rate (0.00015) has a somewhat positive influence on the log of real GDP.

Trade openness and gross capital formation have a positive and strong relationship with log of real GDP. This implies that real GDP will increase when new economic value is produced through investment as opposed to consumption. The findings also show that trade openness supports Ethiopia's economic expansion. This results is consistent with that of Keho, Y. (2017), who concluded that trade-led growth is valid and further advised lowering trade barriers and fostering global commerce by eliminating regulations and control.

Real GDP also affected by the current year and last year internal conflict significantly at 5 percent significance level. But the impact on real GDP alternate in signs when we considered the first lagged value of internal conflict value. The reason for changing the sign of coefficient is not clear. But when we see the current year value the data actually demonstrated how civil wars caused by political, economic, and religious factors impede a nation's ability to develop by preventing foreign investment, restricting the free flow of goods and services, and having other adverse effects. The current work force has a negative and significant influence on the country's real GDP. When labor force can increase by 1 percent the real GDP of the nation reduce by 2.69 percent.

External debt stock and overall debt servicing are the most crucial factors. External debt stock has a negative and insignificant association with the log value of GDP in real terms. However, with a 5% probability, the one-year lag of this variable exhibits a negative (-0.18) & significant

connection with the endogenous variable. The investigation suggests that the current amount of external debt has no significant impact on real GDP. Similarly, at the 10% significance level, current total debt service affects real GDP marginally.

Table 6: Estimates of Short run, Long run Coefficients and Error Correction Representation Model (ECRM)

Endogenous variable: D(LOGRGDP)				
Variable	Short run Coefficient		Long run coefficient	ECRM
C	52.64326	(0.0140)**		52.64326(0.0000)*
@TREND	0.084937	(0.0175)**		0.084937(0.0000)*
LOGRGDP(-1)	-0.153766	(0.0506)**	-	
LOGEDS(-1)	-0.214207	(0.0023)*	-	
TDS			0.054174 (0.1370)	
TDS(-1)	0.008330	(0.0611)***		
LOGLF	-2.693678	(0.0324)**	-17.51809 (0.1794)	
GCF	2.41E-11	(0.0014)*	1.57E-11 (0.0686)***	
TO	0.015336	(0.0138)**	0.099737 (0.1241)	
I_C(-1)	0.027577	(0.5685)	-	
I_C	-	-	0.179347 (0.6030)	
REER	0.000157	(0.7840)	0.001024 (0.7734)	
D(LOGEDS)	-0.029379	(0.6622)		-0.051674(0.5177)
LOGEDS	-	-	-1.393076 (0.0960)***	
D(TDS)	0.005244	0.0778)***		0.005244 (0.0023)*
D(I_C)	-0.109838	(0.0137)**		0.109838(0.0005)*
CointEq(-1)*				-0.153766 (0.0000)*
R-squared		0.773127		
Adjusted R-squared		0.735315		
S.E. of regression		0.066265		
Sum squared resid		0.131730		
Log likelihood		49.90755		
Durbin-Watson stat		1.888609		
Prob(F-statistics)		0.000000		
CointEq(-1)* (t-statistics)		-7.288545		

*Means significant @ 1%; ** means significant @ 5%; *** means significant @ 10%.

Source: Estimated by author using E-view 12

The ARDL error correction model result shows in table 4.6 above, High R^2 and Adjusted R^2 , indicating a coefficient of determination of roughly 77.31 percent, which is a strong match for the short run model. The CointEq (-1)* coefficient estimate is -0.153766. This indicates that the rate of adjustment to long-run equilibrium is quicker, clocking in at 15.37 percent in a single time period. The coefficient is significant, & the t-statistics is -7.288545.

Table 4.6 represent the current estimate of the selected ARDL model's short run coefficient, long run coefficient, and error correction representation model. The short-run coefficient demonstrates that there is a significant and negative link between the lag-log value of the country's external debt stock and the lag value of real GDP. When all other factors are held constant, a 1% increase in lag value of Ethiopia's stock of external debt reduces economic growth by 0.21 percent at the 1 % level of significance. However, there is no significant relationship between the difference in the external debt stock for the current year and the nation's real GDP in the short run. This outcome is in line with prior forecasts and lends credibility to debt overhang hypothesis, which holds the growth of the debt stock reduced economic performance by raising taxes and reducing spending among taxpaying individuals. Furthermore, the government lacks incentive to implement new macroeconomic reforms because the return will only be used to pay off existing debt, negating the need for new macroeconomic reforms. (Ngangnchi & Joefendeh, 2021). The findings of Ngangnchi and Joefendeh, (2021) for the Cameroon case, Atinafu, W. (2020), Gebrekidan, A. (2005), Getinet, B., and Ersumo, F. (2020), who point out that long-term economic progress has been hampered by external debt, but who come to different conclusions in the short term, are all consistent with this result. For example, Atinafu, W. (2020), disagreed with the present result and concluded that the stock of foreign debt has a statistically significant and positive impact on Ethiopia's economy in the short run. Additionally, Mengistu Nigussie and Malefiya Ebabu Tekea (2021) claimed that Ethiopia's foreign debt stock has no significant short-run or long-run effects. Additionally, it completely contradicts the findings of Hanna, A.M. (2013), Eyayu T. (2021), and Dr. Kumar, A.M., who claimed that the stock of the country's foreign debt has a positive and significant association with its real GDP.

Lag of Total debt servicing and its difference, the other external debt variable, according to the empirical result has a positive impact on the nation's real GDP and at 10% significant relationship in the short run. A 1 percent increment in total debt servicing implies 0.0083 percent increment in real GDP of Ethiopia, which is against the conventional theory. This could occur, in accordance with Atinafu, W. (2020), as a result of the country's positive reputation gained in the international creditors due to its consistent commitment to repaying its debt even in the worst circumstance in short run. And Hanna, A.M. (2013), who found that debt relief, forgiveness, and rescheduling lowered debt servicing significantly while having no detrimental effects on investments, supports this finding as well. But it's against the finding of Gebrekidan, A., (2005) and Getinet, B., and Ersumo, F. (2020), who found debt servicing has a negative impact on the performance of the country.

At 1% and 5%, respectively, the coefficients of gross capital formation and trade openness shows a positive and statistically significant short term association with real GDP. According to theory, open nations are better at luring foreign investors into their domestic markets (Calvo et al., 2003, cited in Eyayu T., 2021), and through horizontal FDI spillovers, the degree of openness greatly increases the productivity of indigenous manufacturing firm. (Ermias, 2003, cited in Eyayu T., 2021). Additionally, study that appeared in African Development Review in 2018 found a link between openness to trade and economic expansion in Ethiopia. Report lists some of the advantages of trade liberalization, including greater export revenues, technological transfers, and enhanced competitiveness (Ayalew, S., 2018). This study backs up the aforementioned conclusions and suggests a liberal economy to foster economic growth and gross capital formation.

Moreover, the variable labor force and the current year's internal conflict have negative & significant correlations with real GDP of the country in the short term. According to this analysis, Ethiopia's economic development is reduced by 2.69 percent for every 1 percent increase in the work force. It might be the result of lower labor force productivity, unskilled workers, a lack of employment opportunities, and lower investments in technological advancement. Internal conflict also have detrimental influence on the economy in the short run, which leads to disruption in production process, destruction of infrastructure and assets, displacement of workers and businesses. Furthermore, it also leads to public spending on securities and military operations, which divert the resources away from critical social and economic sectors.

At the 10% significance level, the long-term coefficient demonstrates that the variable log of external debt stock as well as gross capital creation have a negative and positive connection with the country's real GDP respectively. We may deduce from the preceding table that, over time, gross capital formation has the greatest influence on the nation's real GDP. However, this investment is financed by either public taxes or borrowing from outside sources, which results in the creation of debt. This finding strengthens earlier work on the Cameroon case by Ngangchi, F.H., and Joefendeh, R. From the results, we can also deduce that the impact of the foreign debt load will be minimized when the government of a nation encourages an expansion of investment and excellent management in the usage of incoming resources.

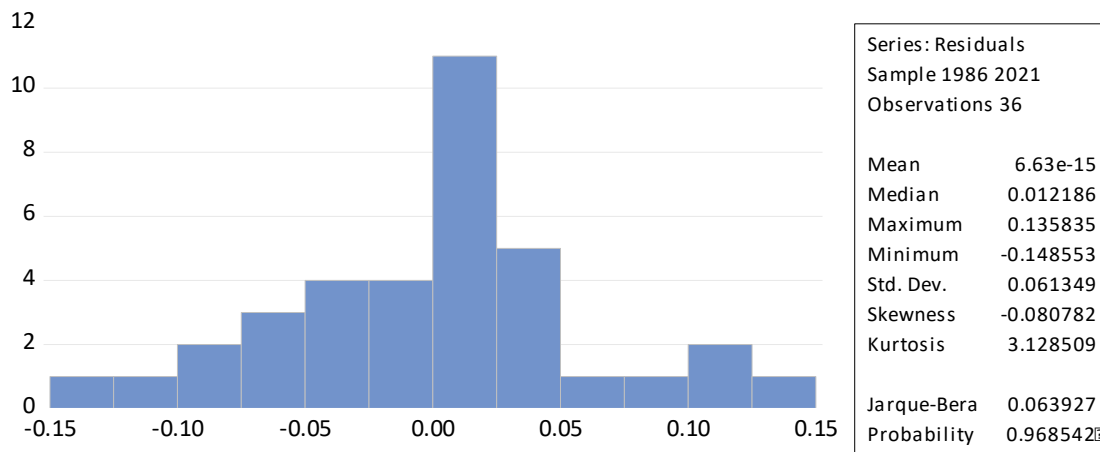
4.7. Diagnostic Test for ARDL model

4.7.1. Residual diagnostics

Jarque-Bera test – It's crucial to determine if the error terms in a small sample have a normal distribution because normality is a key assumption in regression analysis. According to Jarque-Bera test, the following is true:-

Conditions: If probability value $p \geq 0.05$, we accept the Null hypothesis, which is data is normally distributed and if $p \leq 0.05$, we reject the Null hypothesis.

Figure 5: Jarque-Bera Normality Test



Source: Estimated by author using Eview 12.

Based on figure 4.1. Above, the probable value of the JB statistics is 0.063927. Because the p-value is 0.968542, which is considerably greater than the 0.05 significance level, so we refuse to accept H1 and accept H0.

4.7.2. Breusch-Godfrey Serial Correlation LM Test

When the residual term from a model are correlated with one another across time or across observations, this phenomenon is known as serial correlation, also known as auto correlation. This may result in inaccurate statistical inference and skewed estimations of the model parameter. With the use of this test, we were able to demonstrate that the error term from the ARDL model was devoid of serial correlation with the chosen lag model. The occurrence of serial correlation between error terms indicates that the null hypothesis has been rejected.

Table 7: Breusch-Godfrey Serial Correlation LM Test:

Null hypothesis: No serial correlation at up to 1 lag

F-statistic	0.722464	Prob. F(1,22)	0.4045
Obs*R-squared	1.144625	Prob. Chi-Square(1)	0.2847

Source: estimated by author using Eview 12.

Because the data show that there is no serial correlation among the residuals ($0.2847 > 0.05$), we accept the Null hypothesis.

4.7.3. Heteroskedasticity Test: Breusch-Pagan- Godfrey:-

It involves regressing the squared residual from the original regression model on the error model on the error terms error term are homoscedastic (have constant variance across all levels of independent variable), while the alternative hypothesis is that the residual terms are heteroskedastic (have non-constant variance across different levels of independent variables).

Table 8: Breusch-Pagan-Godfrey Heteroskedasticity Test Result

Null hypothesis: Homoskedasticity

F-statistic	1.517391	Prob. F(12,23)	0.1883
Obs*R-squared	15.90715	Prob. Chi-Square(12)	0.1955
Scaled explained SS	6.910169	Prob. Chi-Square(12)	0.8635

The Null Hypothesis Homoscedasticity is one of the prerequisites for accurate regression model. So by looking at p-values, if it is more than 5 percent we can easily accept the null hypothesis and reject Alternative one. The obs*R-square is 15.90715 and probability value is 0.1955.

4.7.4. Stability Diagnosis

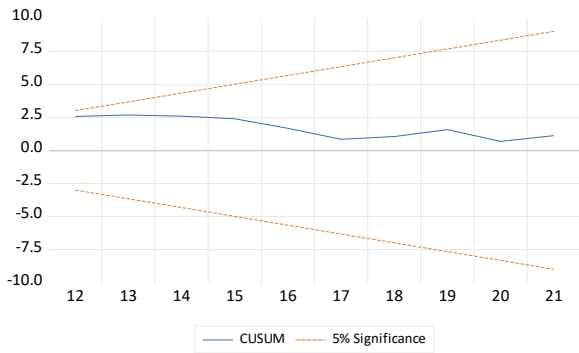
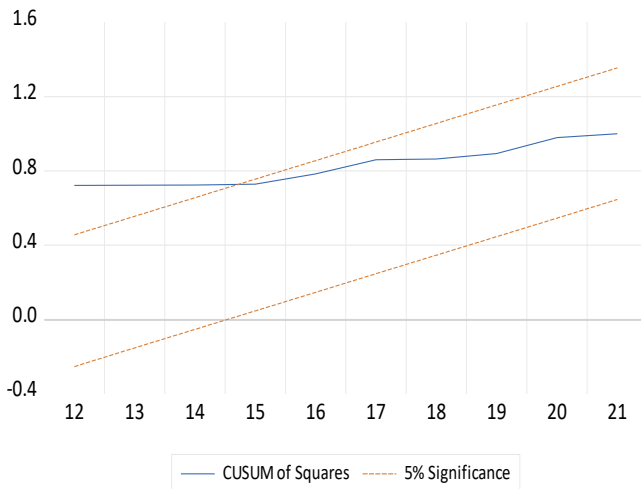


Figure 6: CUSUM Test

The stability of the model would be assessed using cumulative sum of recursive residuals test (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ) stability tests.



The aforementioned model passes all diagnostic statistical tests, such as the normality test, the LM test, the heteroskedasticity test, and the CUSUM test of model stability, but it fails the CUSUMSQ test since it crosses the small red line, despite still being a trustworthy model.

Figure 7: CUSUMSQ Test

4.7.5. Ramsey RESET Test

It served to verify the correct functional form. The likelihood result of F-stat is 0.9653 indicating that the framework was properly described.

Table 9: Ramsey RESET Test

Specification: LOGRGDP LOGRGDP(-1) LOGEDS LOGEDS(-1) TDS TDS(-1) LOGLF GCF TO I_C I_C(-1) REER C @TREND

	Value	df	Probability
t-statistics	0.044056	22	0.9653
F-statistics	0.001941	(1, 22)	0.9653
Likelihood ratio	0.003176	1	0.9551

CHAPTER FIVE

5. Conclusion and Recommendation

5.1. Conclusion

Because of the financial crisis affecting underdeveloped countries in general and Ethiopia in particular, external loan has become an important and useful tool for Ethiopia's economic growth. However, it is unclear how Ethiopia's foreign public debt affects its economic performance. So, using data from 1985 - 2021 and the ARDL bound test, this paper analyzes the influence of foreign public debt on Ethiopia's economic performance over the long run and short run. It also looks at the effects of a few other factors on growth. This study positively contribute to the body of knowledge about the relationship between Ethiopia's economic growth performance and its external indebtedness.

The outcome demonstrated that there is a statistically significant and negative link between Ethiopia's foreign debt stock position and the performance of her economy, in both the short run and long run. This suggested that country's economy would suffer if its government took on additional debt from foreign lenders. Total debt servicing, a vital indicator of debt, also indicated that, in the short run, it has a positive and significant influence on the nation's real GDP. Additionally, trade openness as well as gross capital formation are positively and significantly correlated with the short-term real GDP of the nation. This pointed to an increase in investment and a more open economy, both of which contributed to an increase in the nation's real GDP. However, additional result revealed a significant inverse association between internal conflict, the work force, and the nation's real GDP. Results from a long-run connection showed that gross capital formation is important for the country's growth performance and has the potential to reduce Ethiopia's load of foreign debt.

5.2. Recommendation

Based on the above result and conclusion, this section will provide policy recommendations and strategies for debt management and economic growth in Ethiopia. Policy suggestions may include debt restructuring, debt relief, and debt consolidation. By reducing unnecessary spending, the Ethiopian government should concentrate on lowering the amount of debt owed to foreign governments and international financial institutions. To pay off its debts, the Ethiopian government should increase the effectiveness of public debt management and make investments in profitable ventures. The government should promote domestic saving by encouraging foreign and domestic investors, investing in education and skill development to increase productivity and gross capital formation, as well as to reduce the impact of conflict on the economy, the government of the country should maintain peace and stability through diplomatic and humanitarian means.

Because of the absence of previous data, this paper was restricted only 36 years of yearly data and was only carried out in Ethiopia. As a result, the conclusion cannot be applied to all emerging nations. Future studies should thus focus more on developing nations in general and on data from bigger sample sizes. Additionally, the majority of earlier studies including my own research article employed aggregate data, which would not adequately reflect the different impacts of foreign debt on different sectors or regional areas of the economy. Therefore, a disaggregating study is required to look at the micro level effects of external public debt on Ethiopia's economic growth.

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ANNEXES

Table 10: Sectorial Contributions to GDP and GDP Growth

(In billion birr)

Items		2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Sector	Agriculture	544.1	580.4	600.9	623.8	650.3	686.4
	Industry	343.9	413.8	464.4	526.2	576.9	618.8
	Services	575.9	619.3	673.9	745.7	786.9	836.2
Total		1,463.9	1,613.5	1,739.3	1,895.7	2,014.1	2,114.4
Less <i>FISIM</i>		14.5	17.0	19.8	21.0	24.5	27.2
Real GDP		1,449.4	1,596.5	1,719.5	1,874.7	1,989.6	2,114.2
Growth in Real GDP		8.0	10.1	7.7	9.0	6.1	6.3
Per capita GDP(USD) (Nominal)		815	876	883	985	1,080	1,092
Growth rate in per capita GDP		9.5	7.5	0.9	11.6	9.6	1.1
Mid-year population (In millions)		91.2	93.4	95.5	97.6	99.7	101.9
Share in GDP (In %)	Agriculture	37.5	36.3	34.9	33.3	32.7	32.5
	Industry	23.7	25.9	27.0	28.1	29.0	29.3
	services	39.7	38.8	39.2	39.8	39.5	39.6
Agriculture	Absolute growth	2.3	6.7	3.5	3.8	4.3	5.5
	Contribution to GDP growth	0.9	2.5	1.3	1.3	1.4	1.8
	Contribution in %	11.3	24.6	16.5	14.6	22.8	29.0
Industry	Absolute growth	22.2	20.3	12.2	12.6	9.6	7.3
	Contribution to GDP growth	4.7	4.8	3.1	3.6	2.6	2.1
	Contribution in %	58.8	47.3	40.8	39.5	42.4	33.6
Services	Absolute growth	8.7	7.5	8.8	11.0	5.3	6.3
	Contribution to GDP growth	3.4	3.0	3.4	4.1	2.1	2.4
	Contribution in %	42.5	29.4	44.0	45.8	34.3	38.3

Source: Planning and Development Commission and NBE

Table 11: Balance of Payment

S/N	particular	2018/19	2019/20	2020/21	Percentage change	
		(A)	(B)	(C)	(B/A)	(C/B)
1.	Exports, f.o.b.	2,666.5	2,987.7	3,617.0	12.0	21.1
2.	Import	15,112.0	13,881.3	14,287.9	-8.1	2.9
3.	Trade balance (1-2)	-12,445.5	-10,893.6	-10,670.9	-12.5	-2.0
4.	Service, net	-564.4	-219.0	29.7	-61.2	-113.5
5.	Private transfer, net	5,975.2	5,185.7	6,118.4	-13.2	18.0
6.	Current account balance excluding off. Transfers (3+4+5)	-7,034.7	5,926.9	-4,522.8	-15.7	-23.7
7.	Official transfers, net	2,086.7	1,525.0	1,368.9	-26.9	-10.2
8.	Current account balance including official transfers(6+7)	-4,948.0	-4,401.9	-3,153.9	- 11.0	-28.3
9.	Capital account	4,822.4	4,326.5	3,818.6	-10.3	-11.7
10.	Errors and Omissions [11-(9+8)]	-816.1	-758.0	-365.9		
11.	Overall balance (-13)	-941.6	-833.4	298.7		
12.	Financing (13+16)	941.6	833.4	-298.7		
13.	Reserves [Increase(-), Decrease (+)] (14+15)	941.6	833.4	-298.7		
14.	Central bank (NFA)	916.7	770.1	386.4		
	Asset	-567.8	304.5	244.0		
	Liability	1,484.5	465.6	142.4		
15.	Commercial bank (NFA)	25.0	63.3	-685.1		
16.	Debt relief	-	-	-		

.Source: National bank of Ethiopia, 2020/21

Table 12: Ethiopian Debt Stock and Debt Service

Fiscal year	Total Debt Stock (in million USD)	Debt Stock (in % of GDP)	Debt Service (million USD)	debt service ratio in % of export
1984/85	1,611.80	20.60	136.00	24.5
1990/91	3,622.20	31.50	379.50	69.9
1991/92	3,164.90	25.40	404.50	76.9
1992/93	6,695.10	56.80	408.40	53
1993/94	4,454.50	73.20	317.30	56.9
1994/95	4,436.70	66.00	483.10	36.7
1995/96	4,287.60	57.60	271.30	34.5
1996/97	4,166.40	52.70	411.60	39.8
1997/98	4,056.70	50.20	199.20	19.2
1998/99	4,202.60	52.10	209.10	22.9
1999/20	5,483.20	67.70	273.60	27.8
2000/01	5,555.90	68.70	201.80	22.2
2001/02	6,187.10	79.40	137.80	14
2002/03	6,779.20	79.20	160.00	22.3
2003/04	7,200.30	74.00	183.80	17
2004/05	6,021.20	53.90	181.50	11.5
2005/06	6,029.10	46.60	209.10	7.6
2006/07	2,300.10	11.80	29.80	2.5
2007/08	2,753.60	12.30	76.80	5.2
2008/09	4,364.80	13.50	67.60	3.3
2009/10	5,569.80	18.70	94.70	4.7
2010/11	7,318.80	26.30	196.00	8
2011/12	8,846.30	26.50	391.40	12.3
2012/13	11,222.70	23.70	648.60	20.8
2013/14	14,008.10	25.50	652.70	19.8
2014/15	18,194.10	28.80	878.20	29.1

2015/16	21,740.40	30.70	968.20	16.7
2016	23,337.20	28.50	1,288.10	20.6
2017	27,039.30	30.60	1,602.60	22.7
2018/19	27,076.20	28.20	2,036.20	26.7
2019/20	28,894.60	26.80	2,003.30	26.1
2020/21	29,537.40	26.50	1,843.90	21.7

Source: NBE Annual Report, 20/21