

**MACROECONOMIC POLICIES AND EXTERNAL DEBT IN GHANA: LESSONS
FROM THE LATIN AMERICAN COUNTRIES**

ABIGAIL D. NARNOR

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MACROECONOMIC POLICIES AND EXTERNAL DEBT IN GHANA: LESSONS FROM
THE LATIN AMERICAN COUNTRIES

ABIGAIL D. NARNOR

Date of Defence: December 8, 2023

Dr. Alexander Bilson Darku	Associate Professor	Ph.D.
Supervisor		

Dr. Pascal Ghazalian	Associate Professor	Ph.D.
Committee Member		

Dr. Kien Tran	Professor	Ph.D.
Committee Member		

Dr. Md Kamar Ali	Associate Professor	Ph.D.
Chair, Thesis Examination Committee		

DEDICATION

To my supervisor, Professor Alexander Bilson Darku, who has been enormously supportive.

ABSTRACT

Managing external debt in Ghana remains challenging. This thesis examines the relationship between various macroeconomic variables and external debt in Ghana from 1970 to 2020 using the autoregressive distributed lag (ARDL) model. It also takes lessons from the Latin America (Mexico, Argentina, and Brazil) debt crisis and forecasts Ghana's external debt for the next decade (2021-2030) using the autoregressive integrated moving average (ARIMA) and ARIMA with exogenous variables (ARIMAX) models. The thesis finds that budget balance and current account balance are the only macroeconomic variables that have an impact on external debt in Ghana in both the short and long run. Interest rate on domestic debt impacts external debt in the long run, while inflation, real GDP, interest rate on external debt and money growth impact external debt in the short run. The forecasting exercise reveals that external debt will increase by 109.35% and 18.26% by the next decade based on the ARIMA and ARIMAX models, respectively.

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LIST OF ABBREVIATIONS

ARDL	Auto Regressive Distributed Lag
ARIMA	Auto Regressive Integrated Moving Average
ARIMAX	Auto Regressive Integrated Moving Average with Explanatory Variable
ERP	Economic Recovery Program
BoP	Balance of Payments
HIPC	Heavily Indebted Poor Countries
MDRI	Multilateral Debt Relief Initiative
IMF	International Monetary Funds
IDA	International Development Association
EWS	Early Warning System

CHAPTER ONE: INTRODUCTION

If A Country Can Grow, It Can Pay Its Debt.

-George, 2013, p.11

1.1 Background

The increasing burden of external debt and the associated debt service payments in developing countries are consistently causing apprehension. External debt is not inherently problematic. However, it can become a problem when the borrowed funds are not used for productive investments or when the debtor country experiences a significant shock to its critical macroeconomic factors (Adane et al., 2018). External debt problems first emerged in the 1970s when many developing countries started taking significant loans from the global financial markets (Berg, 1988). However, the 2007–2008 global financial crisis and subsequent sovereign debt crisis in Europe piqued a global interest in external debt in general, especially its relationship with the growth and development of a country (Salmon, 2021). This led to various discussions among both researchers and policymakers. The discussions focused on assessing the sustainability of both external and domestic debt in relation to government revenue and expenditure patterns. Additionally, they analyze whether current fiscal and monetary policies hold optimally (Bulime, 2019).

Ghana's external debt history dates to the early years of its independence. During that period, the country embarked on major industrial and agricultural projects, that required substantial foreign loans (Osei, 1995). As a result, the external debt increased rapidly. Ghana went from essentially no debt at independence to an external debt of US\$1.48 billion (approximately 114% of GDP) at the end of 1982. In 1983, Ghana implemented a structural adjustment program [the Economic Recovery Program (ERP)] with the support of the World Bank and the International Monetary

Fund (IMF). The program aimed to boost economic growth and exports and promote capitalism. However, the ERP also led to more external borrowing for Ghana. By 2003, Ghana's external debt reached US\$7549 million (African Forum and Network on Debt and Development, 2013).

In 2004, Ghana benefited from the Heavily Indebted Poor Countries (HIPC) initiative, which reduced its external debt to US\$6447.8 million. In 2006, Ghana received further debt relief under the Multilateral Debt Relief Initiative (MDRI), which lowered its debt by 65.7% from US\$6347.8 million in 2005 to US\$2176.6 million in 2006. Ghana continued to borrow from external sources in the following years. In 2007, Ghana issued its first Eurobond of US\$750 million with a maturity of 10 years. This was followed by more Eurobonds of US\$500 million in 2015 and US\$750 million in 2016, as well as other foreign loans. By 2021, Ghana's external debt had increased to US\$ 36.18 billion (African Forum and Network on Debt and Development, 2013).

The main factors contributing to the external debt overaccumulation in Ghana are the continuous dependence on a few commodity exports for foreign exchange earnings and imprudent borrowing, which implies that exports do not generate sufficient revenue for the repayment of new debts. (Jubilee Debt Campaign, 2016). As the Ministry of Finance, Ghana (2020) reported, the country's debt-financed expenditures rose in 2020, leading to a fiscal deficit exceeding the initial budgetary target.

In July 2022, Ghana sought IMF's assistance for its external debt crisis. In December of the same year, Ghana suspended all external debt payments under specific categories. (Ministry of Finance, Ghana, 2022). Ghana signed the IMF bailout program, worth US\$3 billion over three years, and received the first tranche of US\$600 million from the IMF in May 2023. This marks Ghana's 17th IMF intervention since independence (Naadi, 2023).

The problem of external debt is not unique to Ghana, as evidenced by the historical case of the Latin American debt crisis, which had severe consequences of unsustainable external debt levels. The 1980 Latin American debt crisis was the most severe in the region's history. The 1970s oil crisis marked the beginning of a prolonged economic downturn that contributed to the debt crisis. The Latin American crisis, particularly the cases of Mexico, Argentina, and Brazil, imparts invaluable lessons that can be judiciously applied in analyzing Ghana's external debt.

Mexico defaulted on its debt in 1982 after pursuing a more expansionary fiscal policy. The Federal Reserve of the United States of America raised interest rates to curb the 1970s oil-based inflation, making debt repayment harder for Mexico as most interest payments were based on variable interest rates (Brinke, 2013). Argentina could not handle several economic shocks in the late 1990s because of its hard currency peg to the US Dollar, pro-cyclical fiscal policies, and substantial foreign borrowing. This ultimately caused a severe currency, sovereign debt, and financial crisis. Due to a persistent political standstill, the nation made poor policy decisions and suffered worse terms of crisis. Argentina defaulted in 2001 (van de Wiel, 2013). Brazil borrowed a lot from foreign banks for its economic development and growth. Its debts increased and changed in structure. The second oil shock in 1979 raised global interest rates and triggered a debt crisis for Brazil in the 1980s (Pedras, 2010).

The issue of debts, primarily external debts, is of great concern to every country. While macroeconomic policy management aims to avert external debt crises, it is noteworthy that such management can inadvertently contribute to the emergence of external debt problems. As such, earlier studies have established the impacts of macroeconomic policies on external debt accumulation, shedding light on the intricate relationship between fiscal decisions, monetary measures, and the dynamics of external indebtedness (Ramzan & Ahmed, 2014; Abdullahi et al.,

2015; Urungbodi & Odhiambo, 2018; Mansoor et al., 2020). These studies have shown that inflation (Assibey-Yeboah et al., 2016), budget deficit (Awan et al., 2015; Dornbusch, 1984), current account balance (Ibhagui, 2018) and exchange rate (Palić et al., 2018; Awan et al., 2011) contribute significantly to external debt accumulation.

While previous studies on Ghana have focused on estimating the relationship between macroeconomic variables and external debt, there have been limited attempts to project the future trajectory of external debt in Ghana under various macroeconomic scenarios. This study aims to fill that gap. The main objective of the study is to examine the short-run and long-run relationship between a set of macroeconomic variables and external debt in Ghana using the autoregressive distributed lag (ARDL) model, while drawing some lessons from the Latin America debt crisis. The macroeconomic variables are budget balance, inflation, real GDP, current account balance, money growth and interest rate. To fill the gap in the literature, the study will forecast the external debt accumulation in Ghana for the next decade. Forecasting Ghana's external debt could offer valuable insights to policymakers and stakeholders, helping them anticipate the risks and challenges the country might encounter in maintaining and managing its debt sustainability. The study will employ two forecasting models: auto-regressive integrated moving average (ARIMA) and auto-regressive integrated moving average with explicatory variables (ARIMAX). ARIMA is a time series forecasting model that captures the trends, patterns, and seasonality in the data to forecast the dependent variable. ARIMAX is an extension of ARIMA that incorporates exogenous variables that may affect the dependent variable. The ARDL model results will help identify the relevant exogenous variables for the ARIMAX model.

1.2 Statement of the Problem

Over the years, researchers have tried to find the causes of a debt crisis. Many of them established a relationship between some macroeconomic variables (like GDP, interest rate, investment rate, savings rate, and exchange rate, among others,) and external debt. The rationale is that if a significant relationship is identified, then that relationship can be a basis for policy recommendations. When a country accumulates high levels of debt to the point that it either defaults on its debt or reschedules its debt payments, it is said to have a debt crisis. Debt crisis makes it more difficult for the country to expand infrastructure, launch new projects, continue existing ones, and acquire the capital goods and raw materials it needs from other nations. This is due to the country's declining creditworthiness (Geiger,1990). Deshpande (1997), Iyoha and Milton (1999), Abdelmawla and Mohamed (2005), and Cunningham (1993) reached similar conclusions. However, other studies have attempted to demonstrate a significant positive relationship between external debt and economic growth and development. According to Bilginoğlu and Ahmet (2008), the relationship between external debt stock and economic growth can be demonstrated with an inverted "U" curve. They found that expected returns on external debt increase as the debt stock increases to a certain threshold. After the threshold point, excessive debt ratios affect economies negatively, so the expected return on debt declines as the debt stock increases. Munir and Mehmood (2018) and Checherita-Westphal and Rother (2012) confirmed this inverted "U" curve relationship in their study.

However, researchers are calling for more inquiry and insights concerning the factors that contribute to external debt accumulation and how we can foresee and prevent the crisis (Manasse et al., 2003; Rodriguez & Rodriguez, 2006; Dawood et al., 2017; Liu et al., 2022; Manasse & Roubini, 2009; Barney & Alse, 2001).

The Ghanaian economy has been characterized by rising debt levels. The level of debt and the rate of increase continue to rise without limit. Ghana relies primarily on external sources of financing to fund its public expenditures. However, excessive external debt can pose severe challenges to fiscal sustainability and macroeconomic stability. In many cases, Ghana has relied on the International Monetary Fund (IMF) for financial assistance and policy guidance. Despite benefiting from the debt relief initiatives of the Heavily Indebted Poor Countries (HIPC) and Multilateral Debt Relief Initiative (MDRI), Ghana's external debt has continued to grow.

Ghana's external debt has become so large that many economists and policymakers consider it a significant economic problem (Frimpong & Oteng-Abayie, 2006; Kwakye, 2012; Owusu-Nankwi & Erickson, 2016). Excessive debt accumulation is troubling, as evidenced in the numerous research published on external debt crisis. Recent studies have shown that excessive external debt accumulation impedes a country's economic growth and development (Greene & Khan, 1990; Zouhaier & Fatma, 2014). High sovereign debt levels make a nation vulnerable to rises in interest payments on debt (Calvo, 1988; Corsetti & Dedola, 2011).

1.3 Objectives of the Study

The main objective of this study is to examine the relationship between macroeconomic policy variables and external debt in Ghana. The study will investigate how key macroeconomic variables such as inflation, GDP, current account balance, money growth, interest rate, and budget balance contribute to external debt accumulation in Ghana over the period 1970 to 2020.

The study will also explore lessons from the Latin America (Mexico, Argentina, and Brazil) debt crisis, which occurred in the 1980s and 1990s and had severe consequences for the region's economic and social development. By analyzing the policy responses of Mexico, Argentina, and

Brazil to the debt crisis, this study seeks to identify lessons and recommendations for Ghana to address its external debt challenges.

Finally, the study will provide a forecast analysis of Ghana's external debt for the next ten years and provide valuable insights and recommendations to policymakers and stakeholders on managing external debt effectively and sustainably.

1.4 Research Questions

Following the objectives of the study, the study aims to answer the following vital research questions:

1. What is the link between macroeconomic policy variables and external debt accumulation in Ghana?
2. What lessons can be learned from the Latin American debt crisis?
3. What will Ghana's external debt look like in the next ten years?

1.5 Justification and Significance of the Study

Ghana is one of the most indebted countries in Africa. As of 2020, the country's external debt was US\$31.8 billion, which represents 76.1% of its GDP (Klutse et al., 2023). This implies that Ghana owes foreign creditors more than three-quarters of its annual economic output. The high level of external debt poses some hinderances to economic growth, fiscal stability, and social development in Ghana. Also, external debt accumulation increases a nation's susceptibility to external shocks, such as fluctuations in exchange rates and interest rates. Moreover, servicing external debt reduces the fiscal space for the government to invest in public goods and services, such as health, education, and infrastructure, as a substantial amount of the annual revenue is used for debt repayment.

Therefore, it is essential to examine the relationship between macroeconomic policy variables and external debt in Ghana and learn from the experiences of other countries that faced similar debt crises. By doing so, the study seeks to identify the primary causes and effects of external debt accumulation in Ghana and to recommend possible solutions and alternatives for external debt management.

The study is significant for several reasons. Firstly, it will contribute to the existing literature on external debt and macroeconomic policy by providing empirical evidence from Ghana, a country which has undergone debt relief initiatives and reforms over time. The study will also draw lessons from the Latin America (Mexico, Argentina, and Brazil) debt crisis. By analyzing the policy responses of these countries to the debt crisis, this study seeks to identify what worked and what did not work for them and apply those lessons to Ghana's context. This will provide valuable insights and recommendations for policymakers on how to balance the benefits and risks of external borrowing. Lastly, the study will address a gap in the current literature by forecasting Ghana's external debt for the next decade.

1.6 Structure of the Study

The rest of the study consists of five chapters. Chapter two examines the historical development of external debt in Ghana and the Latin American debt crisis to understand the causes, consequences, and policy responses to their external debt crisis. Chapter three reviews the relevant theoretical and empirical literature on debt accumulation and its relationship with macroeconomic variables. Chapter four describes the research methodology and data used in the analysis. Chapter five presents and discusses the main findings of the study. Chapter six summarizes the results and conclusions of the study and offers policy recommendations.

CHAPTER TWO: OVERVIEW OF EXTERNAL DEBT CRISIS IN GHANA, MEXICO, ARGENTINA, AND BRAZIL

2.0 Introduction

Over the years, the external debt crisis has been a persistent problem for many developing countries. This chapter seeks to provide an overview of the external debt conditions of Ghana, Mexico, Argentina, and Brazil. In the case of Ghana, we will cover the period from post-independence to 2020. We will only discuss the periods from 1980 to the early 2000s (the Latin American crisis period) for Mexico, Argentina, and Brazil. We will also examine the causes of the external debt crisis in these countries, how it affected their economies, and the measures taken to address it.

This chapter is important because it highlights the difficulties developing countries have faced and continue to face in managing their external debt. Also, policymakers can make more informed decisions to prevent these crises from occurring in the future if the causes of these crises are well understood.

2.1 Ghana

Like many other developing nations, Ghana experiences a severe savings and investment gap that has primarily slowed economic growth and sustainable development. Due to this, it has become vital to find external funds to bolster domestic revenue. However, the accumulation of these loans from abroad and their strict repayment requirements have left developing nations like Ghana in a dire fiscal position (Asafo & Matuka, 2019). External debt accumulation in Ghana dates back to the early post-colonial era. Over the past few decades, there has been a significant evolution in the size, structure, and management of public debt (Ministry of Finance, Ghana, 2017). Ghana's external debt history can be divided into four distinct periods: (1) from the early independence period to the end of 1982, the period when independent Ghana first embarked on developmental

projects; (2) from 1983 (initiation of the Economic Recovery Program [ERP]) to early 2000s (pre-HIPC period); (3) the HIPC and post-HIPC period until 2006; (4) the issuance of a US\$750 million 10-year Eurobond in 2007 to present-day Ghana.

2.1.1. Early Independence to 1982

This period begins from the early years of independence in Ghana. In those years, the first president of independent Ghana envisioned a quick transformation to a socialist system. As a result, funds were directed toward agricultural and new industrial ventures. Construction of the Akosombo Dam and the Volta Aluminum Company, as well as the development of the New Township and Industrial City, and the building of roads and expansion of schools and health care facilities, were all state-sponsored projects. To correct colonial imbalances, areas that the British had previously ignored received special attention. However, Ghana lacked the finances necessary to finance the public sector projects. So, most of the projects were financed by borrowed funds (African Forum and Network on Debt and Development, 2013).

The rate of growth in external debt in Ghana was determined by the industrialization program and the speed with which it was carried out. It was as if we were trying to accomplish in ten years what others have done in hundred years. Heavy foreign borrowing became necessary in haste to industrialize because of a steep decline in export revenues, especially after 1961. Credits from foreign suppliers were a major source of funding for the factories and equipment. Due to the quick maturation of these credits and the excessive reliance on them, debt issues emerged early in the post-independent development effort (Osei, 1995). At independence, there was essentially no external debt; by the end of 1965, there was about \$600 million in external debt; supplier credits accounted for more than 80% of this amount. Ghana found herself in a situation where her debts increased, and repayments became due at the time inflation was rising. To make matters worse,

export earnings did not improve, and this was due to the neglect of cocoa and external factors. Hence, by the end of 1965, Ghana was facing debt repayment crises, which were partly resolved through debt rescheduling agreements in 1966, 1968, and 1970 respectively (Osei, 1995). In the early 1970s, the Debt Management Division (DMD) of the Ministry of Finance was created to help manage Ghana's debt. DMD is now known as the External Debt Secretariat. After that, the Division underwent several adjustments until becoming a full-fledged Ministry Division in 2004 (Ministry of Finance, Ghana, n.d).

At the end of 1982, Ghana's external debt reached US\$1.48 billion (see Figure 1 below), approximately 114% of GDP. This debt crisis was brought on by increased oil prices on the world market, sharp increases in interest rates abroad, recession in the West, and inadequate economic management at home (Frimpong & Oteng-Abayie, 2006).

2.1.2. 1983 to Early 2000s (ERP to Pre-HIPC period)

Due to the fragile state of the economy, Ghana agreed to undergo structural adjustment reforms in 1983 with the help of the World Bank and the International Monetary Fund (IMF). The Economic Recovery Program (ERP) was created to promote private initiative and investment, increase economic growth and exports, and initiate capitalism. Additionally, it aimed to help Ghana develop and grow out of debt and Balance of Payment (BOP) issues by increasing exports and attracting foreign direct investment (African Forum and Network on Debt and Development, 2013). However, the country accumulated new debts throughout the ERP era, as most of the projects were heavily financed by foreign loans, particularly loans from the IMF. The government used 4.2 billion dollars from external sources in 1983 to restore infrastructure, finance energy imports for machines, and support export industries to stabilize the financial structure and boost production in the export sectors. Additionally, the ERP's inability to significantly impact non-export industries

like food production and reduce unemployment brought on by the privatization of state-owned firms gave rise to even more expensive policies that caused foreign debt to soar. Foreign investors were eager to lend even more money to Ghana because the country, by this point, had developed a reputation for sound financial reform (African Forum and Network on Debt and Development, 2013).

At the end of 2000, Ghana's public and publicly guaranteed debt was \$6 billion in nominal terms, including US\$81 million in arrears. In terms of net present value, Ghana's external debt totaled US\$3.9 billion, representing nearly 571 percent of fiscal revenue and 157 percent of exports (Frimpong & Oteng-Abayie, 2006). Ghana's external debt rose from US\$6,021 million in 2000 to US\$7,549 million in 2004 (Kwakye, 2012).

2.1.3. HIPC and post-HIPC period to 2006

In 2001, Ghana declared its intent to apply for debt relief under the Highly Indebted Poor Countries (HIPC) Initiative. After submitting its request for debt reduction, the nation reached the HIPC completion point in July 2004, which led to a 14.6% decrease in external debt from the end-of-2003 level of US\$7549 million to US\$6 447.88 million by the end of 2004. Again, Ghana received debt relief under the Multilateral Debt Relief Initiative (MDRI). As a result, the stock of outstanding external debt significantly decreased by 65.7% from US\$6347.8 million in 2005 to US\$2176.6 million in 2006, as shown in Figure 1 below. This indicates a fall in external debt-to-GDP from 60% in 2005 to 10% as of the end of 2006 (African Forum and Network on Debt and Development, 2013). The MDRI initiative ensured that all loans owed to the IMF, the African Development Bank (AFDB), and the International Development Association (IDA) of the World Bank were completely cancelled (Kwakye, 2012).

After the debt cancellation, both domestic and external debt grew again. The debt-to-GDP ratio increased rapidly until it reached 48 percent in 2012. Under a new debt sustainability framework (DSF), the IMF and World Bank established country-specific public debt sustainability standards for 2012 regarding debt-to-GDP ratios. The standard debt threshold of Ghana is set at 75%, and the stringent level is set at 60%. According to these criteria, Ghana's debt-to-GDP ratio in 2012, of about 48 percent, was within both thresholds, implying a tolerable risk of debt distress. A further examination shows that the primary balance was in surplus from 2000–2002. However, the debt-to-GDP ratio was overwhelmed by other factors, including high debt ratios, high real interest rates, and low real growth. Contrarily, during the sustainable period (2003–2011), the primary balance was frequently deficit, especially during 2006–2008, but it appears that this had little influence on the debt because of factors such as lower debt stocks, lower real interest rates, and faster real economic growth (Kwakye, 2012).

2.1.4. 2007 to Present-Day Ghana

Following the HIPC period, Ghana witnessed an economic boom, with an average annual GDP growth rate of 7.78%, reaching a peak of 14.05% in 2011. However, fiscal indiscipline resurfaced during this period, resulting in fiscal deficits that exceeded the level of growth performance necessary for sustainable debt accumulation. Consequently, Ghana resorted to increased external borrowing to finance its fiscal deficits, which led to a 181.3% rise in its external debt from 2006 to 2011 (Darku, 2023). The government of Ghana continued to borrow because of the significant borrowing space created by debt reduction. This was evidenced by the issuance of a US\$750 million 10-year Eurobond for the first time on the international capital market in 2007, the acquisition of new loan facilities from both multilateral and bilateral creditors targeted at the sectors of energy, water resources, and health in 2008, and the further purchase of new loans to fund sectoral priority areas in health, rural development, agriculture, highways (roads & bridges),

communication, and housing for public sector employees in 2010. Consequently, the external debt increased by 329% from US\$2176.6 million at the end of 2006 to US\$ 9.43 billion as of June 2013, surpassing in nominal terms the pre-MDRI levels (African Forum and Network on Debt and Development, 2013). The external debt stock of Ghana continued to increase rapidly from 2014 to 2021 (see Table 1 below).

Table 1: External Debt Stock of Ghana (2014 to 2021)

YEAR	EXTERNAL DEBT STOCK (in US\$)
2014	17.84 billion
2015	20.08 billion
2016	21.32 billion
2017	22.52 billion
2018	23.58 billion
2019	27.08 billion
2020	31.87 billion
2021	36.18 billion

Source: World Bank, International Debt Statistics

In 2015, the country initially planned to issue USD 1.5 billion but reduced it by USD 1 billion due to uncertainties in the global economy. The shortfall in the Eurobond was filled through aggressive domestic financing and even saved around USD 500 million. In August 2016, there was a tender offer to buy back up to USD 100 million of the Eurobond, maturing in October 2017. This buyback was financed using the cash buffer accumulated in the Sinking Fund. Additionally, USD 30.4 million was repurchased in the secondary market using the proceeds from the 2015 Eurobond. In

September 2016, however, a Eurobond of USD 750 million was issued, with a coupon of 9.25 percent and final maturity of 6 years (International Monetary Fund [IMF], 2016).

Following the Government's Debt Sustainability Analysis (DSA) declaration that Ghana's domestic and foreign public debt is unsustainable, Ghana formally asked the IMF for intervention in July 2022. A Staff-Level Agreement (SLA) was reached and announced on 13th December 2022. This is aimed at restoring macroeconomic stability and debt sustainability. Given the SLA, the Ministry of Finance launched an invitation to exchange the country's domestic debt on Monday, 5th December 2022. This domestic debt exchange program is a component of a bigger strategy to restore public debt sustainability. Pending an IMF-support program to be adopted in early 2023, Ghana announced a suspension of all external debt payments under specific categories on 19th December 2020. This included payments on the Eurobonds, commercial term loans, and most of the bilateral debt. The payment of the multilateral debt, any new obligations (whether multilateral or otherwise), debts incurred after December 19, 2022, or debts relating to certain short-term trade facilities were not to be subject to this suspension (Ministry of Finance, Ghana, 2022). In 2023, Ghana and the IMF reached an agreement of a US\$3 billion bailout over three years and received the first tranche of US\$600 million from the IMF in May 2023 (Naadi, 2023).

In a nutshell, the primary cause of external debt accumulation in Ghana is the country's rising fiscal deficit (Aimola & Odhiambo, 2021; Owusu-Nantwi & Erickson, 2016). Other factors include external shocks, increased foreign interest rates, mismanagement of funds and currency crises (Frimpong & Oteng-Abayie, 2006).

Source: Data from World Bank, International Debt Statistics

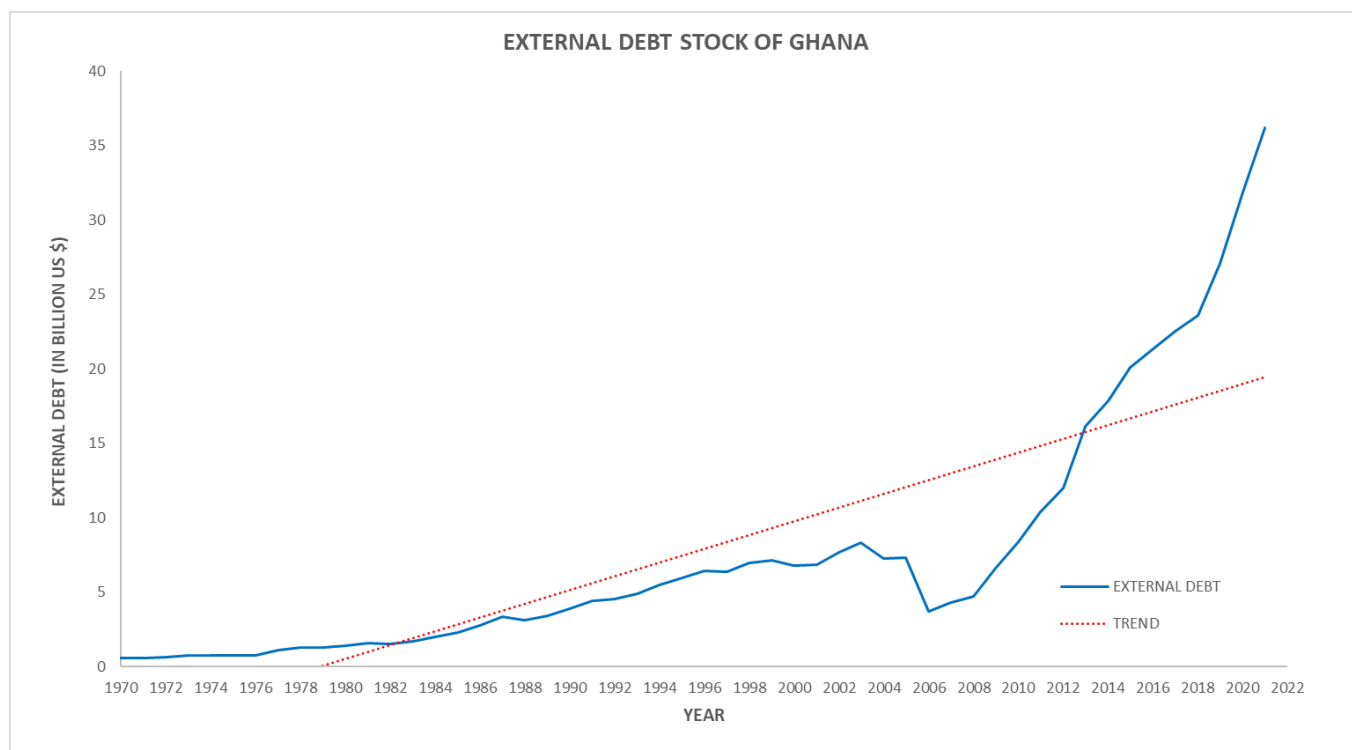


Figure 1: External Debt Stock of Ghana from 1970 To 2021

2.2 Mexico

Mexico was the first of many Latin American nations to default on its sovereign debt in August 1982. The evolution of Mexico's debt crisis can be divided into three distinct phases. The first phase spans from the early 1970s until the IMF's intervention. The second phase covers the period from the discovery and exploitation of oil in 1979 until the debt default and rescheduling in the late 1980s. The third phase encompasses the Brady Plan agreement and the aftermath of the tequila crisis. Before Mexico's debt crisis, the country experienced economic growth and macroeconomic stability from the mid-1950s to the early 1970s. Throughout that period, the annual economic growth averaged 7% and the inflation rate was never higher. Mexico had a fixed exchange rate

system from 1954 to 1976, by which the peso was pegged at 12.5 pesos to the US dollar (Brinke, 2013).

2.2.1. Early 1970s to the IMF intervention

In the 1970s, Mexico's economic policy changed significantly with the change of government. There was an enormous fiscal expansion, and public debt started to increase. Employment in the public sector doubled during the next five years, while public sector spending as a percentage of GDP increased from 20.5 to 30 percent. Real current spending by public sector businesses increased at an average annual rate of 18% between 1971 and 1975, while capital spending increased at a pace of 29.3 percent. In 1972, there was another failed attempt at tax reform. As a result, the fiscal deficit increased dramatically, reaching 10% of GDP in 1975 and 1976. Instead of using the printing press to raise money, the government forced "loans" from the commercial banking system by imposing high reserve requirements of 34 percent. Compared to the average level of the 1960s, the growth rate of the monetary base increased from 19.8% in 1972 to 33.8 percent in 1975. In 1973 and 1974, inflation exceeded 20%. The balance of payment deteriorated. The real exchange rate rapidly increased and became significantly overpriced due to rising inflation. In 1976, the total amount of foreign debt increased sharply to 31% of GDP (Buffie & Krause, 1989). The peso devalued by approximately 50% on August 31, 1976, as a result of severe balance of payments pressure and a recession. Shortly thereafter, IMF came to the rescue with a stabilization plan. In the first year of the stabilization plan, the current account deficit, inflation, and budget deficit all started to decline (Brinke, 2013).

2.2.2. 1979 to the late 1980s (debt defaults and rescheduling)

The IMF program, however, was short-lived. The program was terminated, and a more expansionary fiscal policy was put in place, following the production of the newly discovered oil

reserves in 1979. Real GDP growth ranged between 8.0 and 9.1% from 1978 to 1981. Although inflation rate increased, it stayed below 30% (Brinke, 2013).

Oil prices increased in 1979 during the second oil shock. As an oil exporter, Mexico benefited from this because it raised its oil revenue. The subsequent global recession, however, had a significant negative impact on net exports. The same year, global interest rates hit all-time highs. The Federal Reserve's decision to combat the 1970s oil-based inflation led to an increase in interest rates in the US. As a result, the value of the US dollar increased, making debt servicing more challenging. This was followed by a decrease in oil demand and prices which affected Mexico negatively. In addition to this, debt service payments increased and made debt repayment more challenging since almost three-quarters of interest payments were linked to variable interest rates (Brinke, 2013). Though Mexico reached its historical maximum of 8 percent of economic growth in 1981, its foreign debt increased dramatically (see Figure 2). The new indebtedness was unsustainable and increasingly dependent on the government's ability to finance debt payments in foreign currency. The overvalued exchange rate of the peso was another issue. It resulted in more capital flight due to fears of devaluation. Higher devaluation expectations and capital outflows were a result of the absence of adjustments to fiscal and exchange rate policies. On February 17th, 1982, the peso suffered a devaluation of 80%. In 1980, government spending escalated which resulted in large fiscal deficits (Meza, 2018).

In 1981, the budget deficit increased steadily to 14.7%. External debt had already risen to 33% of GDP and public debt accounted for 42% of GDP in that year. The peso's depreciation and an increase in world interest rates caused Mexico's external debt to exceed 49% of GDP in 1982. Debt service absorbed 24% of GDP and 142% of total current account income (Buffie, 1989). On the 20th of August 1982, Mexico declared that it lacked the funds necessary to pay the principal of the

debt due for the remainder of the year. The total amount of foreign debt had reached 84 billion dollars (see Figure 2), of which 68.4% was public, 21.8% was private, and 9.7% was debt with banks (Meza, 2018).

In August 1982, Mexico defaulted on its sovereign debt. In December 1982, Mexico began implementing extensive structural reforms as a requirement for the IMF loan. Some of the changes were fiscal austerity, state-owned company privatization, trade barrier reduction, industrial deregulation, and liberalization of foreign investment. The budget deficit decreased by half, from 17.6% in 1982 to 8.9% in 1983, as a result of strict enforcement of fiscal restraint. Strict monetary policy was implemented in tandem with fiscal austerity. Additionally, the tax system underwent several modifications that reinforced penalties for tax evasion while promoting capital inflows (Brinke, 2013).

Mexico renegotiated its debts with its commercial bank lenders in the years 1982–1983. This was to reschedule USD 23 billion in capital payments on the public sector debt. In all, Mexico entered into eight restructuring agreements with commercial and Paris Club creditors between 1983 and 1989 (Barkbu et al., 2011).

2.2.3. Brady Plan Agreement to the Tequila Crisis

In April 1990, Mexico entered a Brady Plan agreement. This plan combined a significant net present value reduction with the collateralization of principal, using United States Treasury zero-coupon bonds and reserves kept in escrow accounts to cover interest payments. The Brady Plan created a model through which a variety of countries' debts were subsequently restructured. (Barkbu et al., 2011). Mexico's ability to service its external debt was significantly enhanced by the Brady Plan by lowering interest and principal payments (Dornbusch & Werner, 1994). The main idea was to provide a smaller but safer payment stream in exchange for the initial claim,

which was unable to be fully serviced, to make debt relief acceptable to commercial bank creditors (Federal Deposit Insurance Corporation, 1997). Most banks (47%) chose the par bond, which suggests a decrease in interest rates. Some banks gave fresh loans (13%), while others decided to lower the principal (40%). Another deal covering USD 2.6 billion in principal and interest payments due in the years 1989-1992 was made with the Paris Club, which represents creditor governments (van Wijnbergen, 1991).

Unfortunately for Mexico, there was another crisis in 1994 known as the Tequila Crisis. The Mexican central bank devalued the peso between 13 and 15 percent on December 20, 1994, (which caused other currencies in Latin America to decline as well). The bank also increased interest rates to stop the excessive capital outflow. The increase in borrowing costs brought on by the increase in short-term interest rates to 32% posed a threat to the state of the economy. In response to the crisis, the United States president coordinated a \$50 billion bailout package which was administered by the International Monetary Fund (IMF) (Chen, 2021).



Figure 2: External Debt Stock of Mexico from 1970 To 1996

Source: Data from World Bank, International Debt Statistics

2.3 Argentina

Argentina's sovereign debt crisis and its severe social cost came as a surprise to many, even to those who predicted it after Brazil's devaluation in 1999 (Perry & Servén, 2003). Argentina's debt crisis extends from the early 1980s to the early 2000s. During the first period, the country engaged in debt renegotiation but enjoyed an economic boom until 1995. The second period, however, was marked by contagion from the Tequila Crisis and, subsequently, a depression., starting from 1995. This was followed by an economic downturn and, finally foreign debt default.

2.3.1. Early 1980s to 1994

This period begins with Argentina's debt renegotiation. At this point, the country was not in a debt crisis yet. In 1982–1983, Argentina renegotiated its debts with its commercial bank creditors, but

the settlements that resulted were only a mix of new finance and short-term principal rescheduling. In 1984, it became apparent that the settlements would not be sufficient, so, Argentina and its creditors shifted to negotiating multi-year rescheduling agreements with modest net present value reductions. This agreement was meant to avoid significant harm to the bank balance sheets. Argentina negotiated new debt restructuring agreements between 1987 and 1988, exchanging debt for exit bonds that had a lower face value and engaging in debt buybacks at depressed market prices. In 1989, Argentina agreed on a Brady Plan. Between 1985 and 1992, Argentina entered into six restructuring agreements with its commercial and Paris Club creditors. This was followed by a Brady agreement in July 1993. (Barkbu et al., 2011).

Due to the central government's low tax collections, it became desperate for revenues to finance its growing expenditure. The government resorted to the central bank as a lender of last resort, who imposed taxes on bank deposits and printed money recklessly. This resulted in inflation escalating over three decades and peaking at an astounding 2,600 percent per year in 1989 and 1990. The banking system collapsed under the weight of this monetary mayhem. The crisis of 1989 and 1990 was the catalyst for a radical reform that started with the Convertibility Plan of 1991 that pegged the peso to the U.S. dollar. Other reforms include tax reforms, financial sector reforms, banking sector reforms, amongst others (Pou, 2000). From 1990 to 1994, however, Argentina outperformed the other Latin American countries, in terms of growth, with an average real GDP growth of 6.7. In those years, the external environment (capital inflows, terms of trade, sovereign spread, and world growth) was largely favourable (Perry & Servén, 2003).

2.3.2 From Tequila Crisis Contagion to Depression

In 1995, Argentina suffered a severe contagion due to Mexico's Tequila crisis (Perry & Servén, 2003). Despite the weak economic ties between the two nations and the fact that Argentina's

convertibility system differed significantly from Mexico's monetary system, the December 1994 currency devaluation in Mexico raised fears that Argentina would also devalue. Therefore, interest rates in Argentina surged in 1995, but the government was able to calm fears about a currency devaluation or default by securing a financial package from private local investors and foreign financial institutions. Argentina experienced a sharp recession in 1995. Following this, the federal government of Argentina stabilized the financial sector by privatizing or shutting numerous badly managed banks held by state governments. In 1996 and 1997, growth resumed, but in the middle of 1998, Argentina was affected greatly by currency crises in both Brazil, Argentina's main trading partner and neighbor, and Russia. Like in the case of the 1995 crisis, Argentina's interest rates increased again. By October, Argentina's economy went into a recession again (Saxton, 2003).

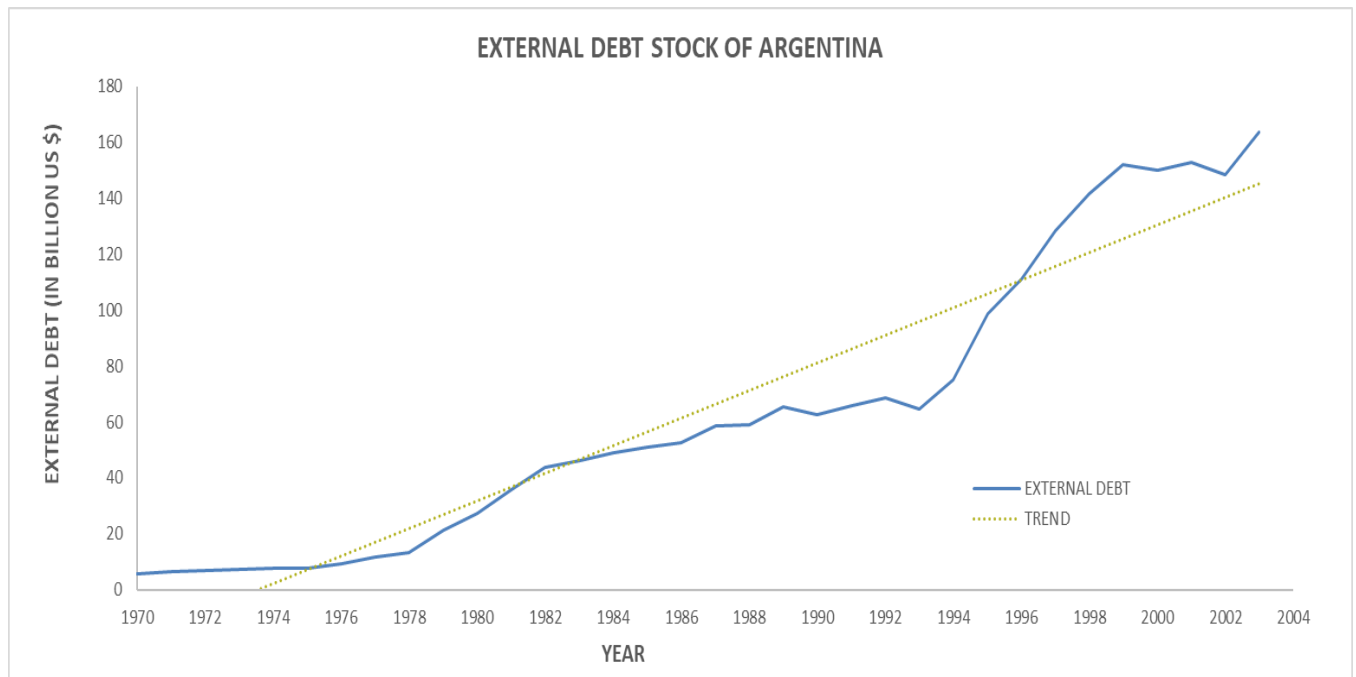
The global downturn in capital flows in 1999 affected virtually all Latin American countries. Argentina was affected but not more severely than other countries. Thus, Argentina was initially able to maintain the same enormous current account deficits that it had been running in prior years. Many of the Latin American countries saw a recovery in capital flows after 1999, except for Argentina, where they continued to decline, particularly dramatically in 2001. Therefore, the preliminary finding is that Argentina-specific factors, rather than global ones, were primarily responsible for the decline in capital flows to Argentina at the end of the decade (Perry & Servén, 2003). Again, due to Argentina's strict currency peg to the US Dollar, pro-cyclical fiscal policies, and significant foreign borrowing in the late 1990s, the nation was unable to handle various economic shocks. This ultimately caused a massive currency, sovereign debt, and banking crisis (van de Wiel, 2013). Argentina plunged into a recession. However, a regular recession became a depression due to Argentina's poor economic management (Saxton, 2003).

2.3.3 External Debt Default

Between 2000 and 2001, there were three significant tax hikes which hampered growth, while financial system manipulation in the middle of 2001, fueled concerns about currency depreciation. As a result, people lost faith in Argentina's government's financial stability. In a series of mistakes that worsened the situation, succeeding governments undermined property rights between December 2001 and early 2002 by freezing bank deposits, carelessly defaulting on the government's foreign debt, severing the Argentine peso's historic link to the dollar, forcibly converting the dollar deposits and loans into Argentine pesos at unfavorable rates, and nullifying contracts (Saxton, 2003). As Argentina went through its worst economic crisis, the Convertibility Plan was abandoned in 2001, and the crisis pushed inflation to 25.9 percent in 2002 (Ozdemir, 2007). Also, the imposition of a freeze on bank deposits led to turmoil and demonstrations since earlier freezes implemented in the 1980s had denied the populace the chance to protect their money from high inflation. Argentina continued to fall short of the requirements for the rescue program, which has been in existence since September 2001; therefore, the IMF declared that it would stop assisting in December 2001. Argentina thereby lost access to its final and main source of foreign funding. The funds that Argentina received from the IMF alone in 2000 and 2001, totaled about USD 22 billion, which was more than IMF's support for any country at that time. In December 2001, Argentina defaulted on US\$ 93 billions of sovereign debt (van de Wiel, 2013).

The crisis had a profound influence on both the economy and society. The economic growth was already in the negative since 1998, and in 2002, the economy contracted by 11%. The unemployment rate increased from 14.8% in 1998 to a peak of 22.5% in 2001. The percentage of Argentines living below the national poverty line dramatically increased from an already high 25.9% in 1998 to 57.5% in 2002 because of the country's poor economic situation. However, the Argentine economy was able to recuperate quickly because of the sustained global economic

growth in the early 2000s and the fact that Argentine producers benefited from the significant currency depreciation. Therefore, significant reforms were not carried out (van de Wiel, 2013). The trend of Argentina's external debt is shown in Figure 3.



Source: Data from World Bank, International Debt Statistics

Figure 3: External Debt Stock of Argentina from 1970 To 2003

2.4. Brazil

Brazil experienced the debt crisis a little later than Argentina and Mexico, but the repercussions were no less devastating. Brazil's external debt history during those years can be divided into three distinct periods: (1) from 1964 to the end of the 1970s when a significant amount of debt was accumulated due to the country's growth and the oil shocks; (2) from the 1980s until mid-1995

notwithstanding the late 1990s global crises; (3) the new qualitative issuance policy, which started in 2006 (Pedras, 2010).

2.4.1. 1964 to the end of the 1970s

Throughout much of the 1960s and 1970s, Brazil borrowed substantial amounts from some foreign commercial banks to help finance its economic development and produced one of the highest sustained growth rates in the world. Not only did Brazil's outstanding debts increase substantially, but also their structures changed dramatically. Between 1974 and 1980, the share of public debt in total external debt increased from about 50% to nearly 70%. (Pedras, 2010). Brazil experienced its first oil shock during the height of its economic "miracle," when its product had been growing at a rate of 10% annually since 1968. There were obvious indications of economic overheating and excessive import demand. The impact of the oil shock was particularly harsh on Brazil, the largest petroleum-importing developing nation, whose economy and transportation depended heavily on the car and truck sector. A political transition was just underway, and this made matters even more delicate (Cardoso & Fishlow, 1989). During the oil shock, there was a rise in the cost of loans mainly because the United State Federal Reserve increased interest rates, to curb inflation. For the first time in a decade, Brazil quickly lost its reserves, and the country's balance of payments went from a \$4.3 billion surplus to a \$3.2 billion deficit (Pedras, 2010).

2.4.2. 1980s to late 1990s

Following the financial crisis, Brazil struggled to pay its external debt, therefore international multilateral organizations and creditor states granted a bridge loan of US\$ 4.2 billion until Brazil established a firm agreement with creditors. However, the resources provided by multilateral institutions were just enough to continue debt servicing. Brazil virtually ran out of reserves when an additional US\$ 4.5 billion were taken out of its foreign reserves. Brazilian negotiators were

under pressure because of these circumstances to start formal rescheduling agreements with the IMF and creditor institutions in November 1982. Another aspect of Brazil's external debt settlement was its policymakers' compliance with the conditions of the negotiation. The government announced an economic policy in a letter to the IMF in December 1982 that claimed to significantly lessen both the external and internal disequilibrium. The IMF strategy was successful in lowering creditor banks' exposure to Brazil by mandating larger net financial transfers, but it was less successful in lowering Brazil's debt load. The Brazilian external debt continued to rise between 1982 and 1987 despite the startling outflow of resources, as the transfers were solely used to pay interest on the existing debt (Dalto, 2019). Between 1983 and 1989, Brazil entered into nine restructuring agreements with commercial and Paris Club creditors. This was followed by a Brady agreement in April 1994 (Barkbu et al., 2011).

In December 1990, the Federal Senate passed a resolution (Resolution n° 82) and established principles for resolving external public debt. A fraction of the funds still owed to creditors was distributed at the same time. An arrangement to regularize the interest due was reached in April 1991; part of these sums was paid in cash, while others (\$7 billion) were swapped for a new bond issued by the government in November 1992 called Interest Due and Unpaid (IDU) Bonds (Pedras, 2010). But after 1991, Brazil experienced a sharp rise in capital inflows. The capital account surplus expanded from US\$ 4,148 million in 1991 to US\$ 29,820 million in 1995. Short-term capital increased from US\$ 2,9 million negative to US\$ 17,554 million between 1991 and 1995, resulting in a rapid and risky increase in external debt (Jayme Jr, 2001).

2.4.3 Early 2000s to IMF Invention and the New Qualitative Issuance Policy

At the end of April 2002, the benchmark bond for Brazil, the 10-year C-bond, had an interest rate spread of 785 basis points (over the equivalent US Treasury security). Also, there was a significant

depreciation of the real exchange rate, which also contributed to a notable increase in Brazil's ratio of net public debt to GDP because over 40% of the domestic public debt and virtually all of the external debt are related to the exchange rate. The second half of 2002 also saw an increase in inflation, with consumer price inflation jumping from an annual rate of roughly 5–6 percent in June to 12 percent at the end of 2002, reflecting both the significant real depreciation and a rapid expansion of the monetary base. In the face of these crises, the Brazilian authorities were forced to change their earlier stance that no additional official financial assistance would be required to prevent a crisis. In fact, by early August, the situation had gotten so bad that Brazil requested and was granted a US\$30 billion IMF rescue package, the largest single loan (in absolute amounts) ever given by the Fund (Goldstein, 2003).

When the C-Bond was turned into the A-Bond, a bond with comparable features, it marked a turning point in Brazil's debt. The next year saw the completion of this operation, which served as the beginning of retiring the outstanding Brady Bonds. That same year, the debt strategy started to concentrate on defining benchmarks and repeatedly opening the same security to the market to boost its market liquidity. The goal of this plan was to create an external yield curve that was more effective. The country was no longer dependent on foreign issuances as a source of funding in 2006 as a result of the significantly reduced demand for external borrowing to reduce the debt and the significant inflow of dollars. Since then, a total of \$35.7 billion worth of operations have been carried out to prepay the external government debt (see Figure 4). Regarding the contractual debt, the nation paid off its \$20.4 billion debt to the IMF in 2005 and purchased the remaining debt with the Paris Club for \$1.7 billion (Pedras, 2010).

Source: Data from World Bank, International Debt Statistics

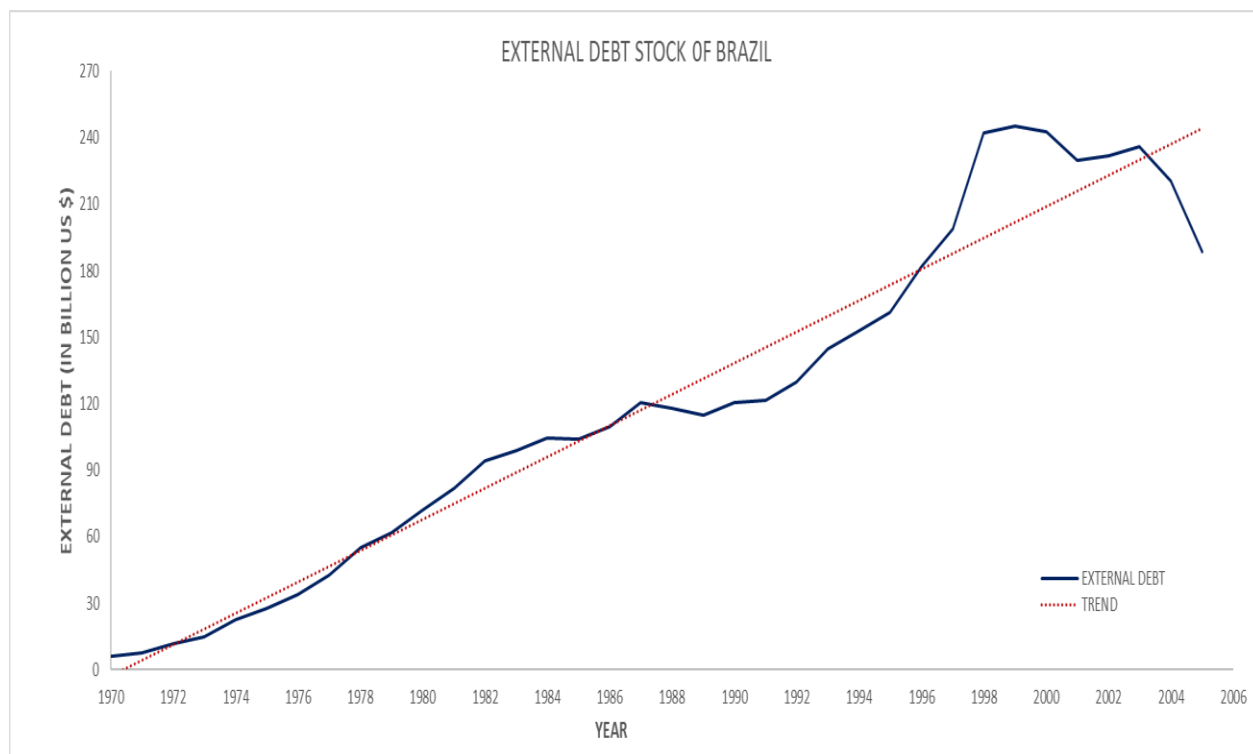


Figure 4: External Debt Stock of Brazil From 1970 to 2005

2.5 Lessons from Mexico, Brazil and Argentina

- **Export Diversification:** One lesson that Ghana can learn from Mexico is the importance of reducing over-reliance on commodity exports. As a large oil exporting country, Mexico was negatively affected by the oil shocks in the 1970s and 1980s, which contributed to the country's inability to service its external debt. Like Mexico, Ghana is heavily dependent on commodity exports. Ghana's top exports are gold, crude petroleum, and cocoa beans, all of which are commodities which are vulnerable to price fluctuations and external shocks (The Observatory of Economic Complexity, n.d). Mexico learnt from its experience and was able

to expand its manufacturing exports through the North American Free Trade Agreement (NAFTA) and as a result, stabilized its economy and improved its overall status (North American Production Sharing Inc., 2020).

- **Monetary policy and fiscal discipline:** Excessive monetary financing of the fiscal deficit should be avoided, as it can generate hyperinflation and currency crisis, and undermine public trust and market confidence. This was the case in Argentina, where excessive money creation led to annual inflation rates of 2,600 percent in 1989 and 1990 and eventually contributed to the debt crisis (Pou, 2000). The central bank's credibility and independence should also be enhanced. Argentina's central bank lost its reputation and autonomy when it was coerced to monetize the government's expenditure and debt obligations, which resulted in inflation and currency devaluation (van de Wiel, 2013). Ghana should aim to improve its tax collection, control its money creation and enforce autonomy of the central bank.
- **Managing imports demands and diversifying economic sectors:** Ghana can learn from Brazil, the need to control excessive import demands and develop all major sectors that can generate income and revenue. Brazil relied too much on the car and truck sector, which used a lot of oil. This made the country vulnerable to oil price fluctuations, especially during the oil shock. Being the largest oil-importing developing country, Brazil imported most of its oil needs, which caused lots of foreign reserve lost, and increased its trade deficit and foreign debt (Cardoso & Fishlow, 1989).
- From the Latin America countries' experiences, we see that debt restructuring is insufficient for solving debt problem and achieving long-term economic stability. Ghana needs to implement sound fiscal and monetary policies, diversify its economy, improve its governance and institutional quality, and enhance its domestic revenue mobilization. Some

of the macroeconomic policies that these Latin America countries adopted to resolve their debt crisis are fiscal austerity, inflation targeting, import substitution, tax reforms like reinforcing penalties for tax evasion, and financial and banking sectors reforms.

In conclusion, this chapter has underscored how essential it is to address the external debt crisis in developing countries. To avert future debt crises, it is crucial to implement policies that promote sustainable economic growth, lessen reliance on borrowing from abroad, and strengthen domestic institutions. Such policies will help developing countries establish long-term economic stability and improve the standard of living for their people.

CHAPTER THREE: LITERATURE REVIEW

3.0 Introduction

This chapter briefly reviews the relevant literature on external debt crisis. The chapter is divided into two sections: theoretical literature review and empirical literature review. The theoretical literature review focuses on some modern debt theories on debt crisis and default, while the empirical literature review focuses on five critical active external debt crisis research areas: the relationship between macroeconomics variables and external debt, causes of debt crisis, the forecast of the crisis, the effectiveness and or contribution of economic policies, and the impacts of the crisis on the economy.

3.1 Theoretical Literature Review

This literature review examines the theoretical frameworks that explain the relationship between macroeconomic variables and external debt levels, the impact of external debt on investment decisions and debt default models. Specifically, it explores how fiscal gaps, savings-investment gaps and balance of payments affect the accumulation and sustainability of external debt, how the expectation of future tax liabilities [due to debt accumulation] and debt repayments influences investment behavior, and how various factors affect the probability and cost of debt default.

The Gap Theory

The two-gap theory was first introduced by Chenery and Bruno (1962). This theory posits that external debt accumulation is a result of two distinct gaps: the savings-investment gap and the export-import gap. A third gap called the fiscal gap was later explored Bacha (1990) and Taylor (1993).

The savings-investment gap, or the resource gap, reflects the insufficiency of domestic savings to finance the investment needs of a developing country. Developing nations often lack the domestic

savings necessary to fund projects that promote economic growth. As such, they rely on external sources of financing to fill this gap. The export-import gap emphasizes the role of international trade in the accumulation of external debt. When a developing country's export earnings are insufficient to pay for its imports, it faces balance of payments disequilibrium. To close this gap, countries may borrow externally, which can increase their debt burden (Bacha, 1990). The fiscal gap focuses on the financial position of a government. It examines the discrepancy between the government's revenue and expenditure, and its impact on public investment and inflation. A government incurs a fiscal deficit when its expenditure surpasses its revenue. To finance this deficit, governments may borrow, which can also add to external debt accumulation. A large fiscal gap can crowd out private investment and reduce the effectiveness of foreign aid or capital inflows (Taylor, 1993).

Debt Overhang

Debt overhang is a problem that arises when a country's debt level is so high that it discourages investment and growth. Debt overhang happens when a country owes more money than it expects to make from future resources or projects (Krugman, 1988). Myers (1977) first introduced the concept of debt overhang to explain how excessive debt can deter firms from pursuing profitable investments. The rationale is that when the debt level exceeds the entity's income or assets, the entity faces difficulties in obtaining additional financing for new projects, even if they have positive net present values. This is because the existing creditors will capture most of the returns from the new projects, leaving little incentive for the entity to invest. Consequently, the entity may underinvest in productive activities and fall into a vicious cycle of debt and low growth. Bulow and Rogoff (1990) argue that debt overhang is a major source of distortion and stagnation in economic growth, especially for highly indebted countries. Several studies, such as Krugman

(1988), Fosu (2007) and Chowdhury (2004), have confirmed the theory of debt overhang in the context of sovereign debt.

Ricardian Equivalence

Some theories of government debt aim to tackle the timeless question of whether public debt issue is equivalent to taxation. It started with the Ricardian Equivalence, which is attributed to David Ricardo. The theory shows that the impacts of taxation and government borrowing on the economy are indistinguishable. Such equivalence may occur because government borrowing typically leads to higher taxes in the future (to repay the interest and principal on the government debt). As long as the present value is equivalent, individuals may react to future taxes similarly to present taxes (Barro, 1974). The Ricardian view assumes that people have foresight, make rational decisions regarding savings and consumption, and encounter borrowing constraints (Mankiw, 2009).

As Lucas and Stokey (1983) point out, a theoretical model that approximates reality can only produce a policy or policy rule that is approximately optimal for the real world. Leiderman and Blejer (1988) found that there is likely to be a discrepancy in the Ricardian equivalence theorem (which states that the substitution of debt for taxes does not affect the wealth of the private sector). Though agents could be entirely rational, factors such as borrowing limitations or distortionary taxes, which deviate from Ricardian assumptions, may cause their optimal behavior to result in the non-equivalence of taxes and debt concerning aggregate demand. Furthermore, private consumption will not remain constant if substituting debt for taxes signals forthcoming changes in government spending or money creation or both. According to Seater (1993), the logical consistency of the Ricardian equivalence is evident. However, it should be noted that the numerous restrictions that must be satisfied for the model to be valid are unlikely to be fulfilled in reality. Nevertheless, these limitations alone do not justify dismissing the model outright.

In his tax-smoothing model, Barro (1979) demonstrates that if the interest rate remains constant, government debt should be used to smooth out distortionary taxation when government expenditure fluctuates. Martin (2006) argues that Barro's model clarifies the reason behind the rise in government debt during times of war. However, it fails to account for the increase in debt levels observed in some countries during peacetime, where there is no corresponding increase in expenditure. The theory also asserts that current government debt levels are not crucial in determining current debt issues. Instead, the model predicts that debt levels move randomly due to unexpected government expenditure and income shocks. As such, this model focuses solely on explaining changes in debt rather than the level of debt itself.

Barro's intertemporal tax-smoothing model has been quite successful in explaining the behavior of budget deficits for the federal governments of the United States and Canada. While their budgetary behavior is generally in line with the tax-smoothing model, there are instances where the taxes imposed do not follow the predicted optimal path. For instance, during the Vietnam War, the United States delayed raising taxes to pay for the war. In the early 1980s, the actual budget deficit was more significant than the optimal deficit. In Canada, the actual budget deficit was smaller than the anticipated deficit until the mid-1970s; since then, it has been significantly larger than the optimal deficit (Ghosh, 1995). Adler (2006) examined Barro's 1979 tax-smoothing hypothesis, using data from the central government of Sweden spanning the years 1952 to 1999. Based on empirical evidence, the study indicates that the tax-smoothing model serves as a valuable benchmark and that tax-smoothing behavior can account for approximately 60 per cent of the variations observed in the Swedish central government's budget surplus.

Ramsey's model of optimal taxation can be seen as a micro-foundation for Barro's 1979 model. Ramsey (1927) proposed that commodity tax should be "proportional to the sum of the reciprocals

of its supply and demand elasticities" so that the reduction in utility may be a minimum. Lucas and Stokey (1983) applied Ramey's model of optimal taxation to optimal debt policy. They demonstrate that, with debt commitment that has a rich maturity structure, an optimal policy, if one exists, faces a fundamental problem of time consistency. In a similar paper, Díaz-Giménez et al. (2004) add that nominal debt poses a challenge for monetary policy not only because it requires repayment but also because it generates a problem of time inconsistency that distorts interest rates. Using alternative tax methods may alleviate this burden if there is sufficient commitment to fiscal policy.

Krusell et al. (2006) examined Lucas and Stokey's (1983) lack of debt commitment theory. Here, the government has the motivation to manipulate interest rates, which causes a desire to postpone taxation and increase debt. As a result, the government is limited by the highest level of debt it can maintain with its tax revenue. Although there is typically an incentive for a one-time tax reduction or debt increase under commitment, which suggests ever-increasing debt under lack of commitment, this is not always the case. The incentives that arise from the dynamic interactions between successive governments can help limit the issue of time consistency. This can lead to limited debt accumulation; in some cases, long-term debt levels can be lower than under commitment.

Debt Default Models

Some recent models of sovereign debt default have explored the quantitative analysis of the Eaton and Gersovitz model. The model suggests that a country's likelihood to default on its debts increases monotonically with its debt service obligation. As the debt service obligation grows, the more likely the country is to default, especially when the country faces low income or adverse shocks. Other implications of the model are as follows: a country's desired borrowing is the

minimum of the amount it wants and its credit ceiling, a country's desired borrowing increases with its income growth rate, as it anticipates higher future income to service its debt, and a country's borrowing capacity increases with the exogenous penalty for default (Eaton & Gersovitz, 1981). Models from Aguiar and Gopinath (2006), Arellano (2008) and Asonuma (2016) are all based on the Eaton and Gersovitz model.

Aguiar and Gopinath (2006) show that growth shocks are crucial in determining borrowing costs and the probability of default. This is because growth shocks have a more significant effect on the default decision than standard temporary shocks, making interest rates relatively less affected by the amount borrowed and relatively more affected by the shock outcome. The model aligns with four empirical regularities observed in emerging markets. These regularities are as follows: defaults occur in equilibrium, interest rates exhibit a countercyclical pattern, net exports display a countercyclical behavior, and there exists a positive correlation between interest rates and the current account.

According to Arellano (2008), a small open economy faces a trade-off between borrowing from foreign creditors and defaulting on debt. The government may choose to default when it faces a negative income shock, but this leads to losing access to credit markets and lower output. When the economy cannot insure against income shocks, it is more likely to default when its income is low. This implies that default events tend to happen during recessions. Also, the interest rate that the creditors charge depends on the default risk of the borrower and the probability of default changes with income and output levels. This model reflects a positive default probability and a counter-cyclical interest rate spread.

Asonuma (2016) suggests that countries that have defaulted more often in the past may have a higher probability of defaulting again and face worse borrowing conditions than countries that have

defaulted less or never. A country's default history affects its bargaining power and recovery rates in debt renegotiations.

Tomz and Wright's (2005) model of sovereign debt and default is based on asymmetric information between borrowers and creditors and its interaction with limited enforcement. Their model showed that bailouts by supranational institutions could prevent defaults and achieve the optimal level of capital flows. Nevertheless, the bailouts had to be done surprisingly: they had to tax countries when they would default and lend money when the countries were high on output. The logic behind this is that the taxes make countries reveal their actual output instead of defaulting to hide it.

In conclusion, scholars have given different perspectives on the debt crisis, defaults, debt restructuring, and renegotiation. Despite differences in their approaches and conclusions, there is general agreement that, depending on several variables, such as borrowing terms, debt sustainability, and macroeconomic conditions, external debt can be both a source of funding and a potential problem for governments.

3.2 Empirical Literature Review

Debt crises are recurrent and negatively impact countries' economic and social well-being. There exists a large body of literature on debt crisis with various methods, datasets, and perspectives. This empirical literature review provides a brief but comprehensive overview of the main findings. Areas covered, among others, include the impact of macroeconomic policy variables on external debt and the consequences of a debt crisis.

In their study on the impact of external debt on economic growth and the role of macroeconomic policies in Pakistan, Ramzan and Ahmed (2014) used budget deficit, inflation, and trade openness to capture the fiscal policy, monetary policy, and trade policy, respectively. This approach was first

adopted by Burnside and Dollar (1997, 2000, and 2004). They found that the country's macroeconomic policies determine the impact of external debt on economic growth. Therefore, there is a higher possibility that the external debt will positively impact economic growth positively if the country implements better policies regarding open trade, low inflation, low budget deficit. They explained that countries with stable macroeconomic policies are more appealing to investors. Macroeconomic instability can be caused by high inflation, large budget deficits, and trade restrictions, all discouraging investment. In the event of large budget deficits, external debt is used to boost government spending rather than investment.

Abdullahi et al. (2015) add that a continuous increase in external debt results from macroeconomic problems like weak exchange rates, persistent budget deficits, high interest rates and low savings. Urungbodi and Odhiambo (2018) proposes that the government conduct fiscal operations necessary to reduce public debt. Furthermore, the central bank's autonomy in using its monetary policy instruments and the efficient coordination of fiscal, monetary, and debt management policies must be strengthened. Mansoor et al. (2020), in their study of Pakistan's external debt, argued that when a country gets to the stage of unsustainable debt burden in the long run, a negative relationship exists between current account balance, fiscal balance and the external debt to GDP ratio.

Due to the occurrence of debt crisis, the literature is replete with the causes of a debt crisis. Khan and Knight (1983) found that both external factors (such as the decline in terms of trade, stagnation of economic activity in industrialized nations, and the dramatic increase in real foreign interest rates) and domestic (roughly represented by the expansion of fiscal deficits and the appreciation of real exchange rates) factors contribute significantly to a debt crisis. Krumm (1985) also found that oil price shocks, the decline in export earnings and high international real interest rates are causes of a debt crisis.

Türker (2015), in a study of the debt crisis in Turkey discovered that low GDP, high inflation, inadequate equity capital, poor foreign exchange reserves, insufficient bank returns, the short position-hot money policy, capital outflows, manipulated credit ratings, and bank inertia are the leading causes of the debt crisis. Nier and Merrouche (2010) observe that capital inflows and the accompanying compression of the spread between long and short interest rates were the primary causes of financial imbalances. They added that when the supervisory environment was relatively weak, the impact of capital inflows on the build-up was amplified.

Wade (1998) examined the Asian debt crisis and found that there were massive international inflows of financial assets from excess liquidity in Japan and Europe. These were channeled through financial institutions digging-up Asia for higher returns and lending at nominal rates lower than domestic borrowers could borrow from domestic sources, creating a deep structure of foreign debt.

According to Greene and Khan (1990), the most common cause of debt crisis among developing countries is overborrowing. There is a strong assumption that foreign savings can and should be used to increase the stock of capital over and above what could be generated by local savings because most developing countries, particularly those in Africa, experience a shortage of capital. Accordingly, the typical developing nation ought to be a net foreign borrower. In particular, the inability to acquire enough foreign exchange through export earnings, low savings, and low rate of return on investments made with borrowed money are the reasons behind Ghana's debt problems (Osei, 1995).

There is significant literature on forecasting sovereign debt crises with several methodologies. This system of forecasting sovereign debt crisis is initially termed the Early Warning System (EWS), and these are both parametric and non-parametric models. Some of the models used in the literature

are logit and binary recursive tree analysis (Manasse et al., 2003), logit and probit models (Jedidi, 2013; Rahnama-Moghadam et al., 1991; Odedokun, 1995; Dawood et al., 2017). Other models used are the solvency ratio of external debt (SRED) (Ucal & Oksay, 2011), artificial neural networks (Fioramanti, 2008), autoregressive integrated moving averages (ARIMA) and autoregressive integrated moving average model with exogenous variables (ARIMAX) models (Rahman & Pujiati, 2021; Zhuravka et al., 2019. Zhuravka et al., 2021). Kongcharoen and Kruangpradit (2013) compared the ARIMA and ARIMAX and found that the ARIMAX model performed better than the ARIMA.

The debt crisis forecast result of Dawood et al. (2017) highlights the importance of the debt exposure variables—the external debt to GDP ratio and IMF credit—as significant indicators across all regions (developed and developing). Jedidi (2013) discovered a group of variables that can reliably be used to forecast sovereign debt crises. According to their findings, the most accurate early warning indicators of a sovereign debt crisis are the ratios of imports to GDP, total gross external debt to GDP, total gross central government debt to GDP, and foreign exchange reserves.

Existing models on sovereign debt crisis have shown that, to some extent, the amount of external debt, the volume of foreign exchange reserves, and the capacity of export earnings to pay off debt are the best factors for forecasting sovereign debt crisis (Alaminos et al., 2019).

Another area of active research is economic policies and debt crisis. According to Ucal and Oksay (2011), inappropriate monetary policies are the root cause of the majority of debt crises that originate in emerging markets, including the Mexican crises of 1982 and 1994–5, the Asian crisis of 1997–8, the Brazilian and Russian crises of 1998–9, the Turkish Crisis of 2000, and the Argentinean and Uruguay crises of 2001–2.

A debt crisis could be avoided through monetary policy by increasing output while decreasing the real interest rate and inflation. These enhance tax revenues and seigniorage while decreasing the real value of outstanding debt and the cost of new borrowing (Bacchetta et al., 2018). However, variations in monetary policy cannot account for variations among countries in accumulating financial imbalances ahead of the crisis (Nier & Merrouche, 2010).

Some empirical evidence suggests that a change in private savings has compensated for at least half of the change in fiscal balances in advanced nations; therefore, fiscal deficits and debt problems could be offset by policies that promote private savings (Masson et al., 1998; Bernheim, 1987; and Loayza et al., 2000).

Roman and Bilan (2012) noted that unsustainable public finances that could trigger a severe sovereign debt crisis could significantly harm the banking industry and overall financial stability. Therefore, economic policies are essential in averting the financial system's collapse and reducing the crisis's consequences on the real economy and price stability.

External debt negatively affects the economy, but with sound macroeconomic policy, this detrimental effect can be mitigated or even reversed. Some of these appropriate policies include the reduction of the budgetary deficit, the reduction of inflation, and the achievement of trade openness. These are necessary to realize some beneficial impacts of external debt on the economy (Ramzan & Ahmad, 2014).

Neaime and Gaysset (2017) observe that a country's exchange rate regime is important regarding economic policies and external debt. In his study of Egypt, he concluded that despite Egypt's large volume of debt, the country's movement to a floating exchange rate regime was a step in the right direction. The exchange rate regime has decreased the servicing of an enormous amount of

accumulated external debt and will help to relieve pressure on interest rates. It will also aid in boosting exports and easing pressure on current account deficits, which would positively impact foreign reserves. Jordan, on the other hand, maintains a fixed exchange rate regime with the US dollar. Given the accumulating substantial external debt, any exchange rate devaluation would significantly increase Jordan's external debt service, potentially leading to a currency and debt crisis.

The consequences of debt crisis cannot be overemphasized. Debt crisis is characterized by severe development crises such as rising unemployment and import prices and decreasing output and living standards. Low-income earners are in danger, and the middle class feel their lifetime savings and security have been taken from them. The loss of productivity and security is tragic and nearly as brutal as war (Wade, 1998). Due to the severity and duration of a debt crisis, some observers have been left to wonder if the world might not have been better off under the institutional framework that was in place prior to the 1960s (Eichengreen & Lindert, 1992).

According to Furceri and Dzdienicka (2012), debt crises do not only result in substantial and persistent output losses but have a worse impact on the economy than banking and currency crises. Navarra and Rodrigues (2018) indicate that a debt crisis may negatively affect the poor. This is a result of both direct factors, such as price increases, and indirect ones, like budget cuts and the withdrawal of aid funding.

Debt crisis may lead to government cutbacks. Usually, this means cuts in public pensions, unemployment benefits, and health care. Additionally, governments attempt to raise money by increasing taxes to pay off debt. However, because of the loss of government jobs and those in sectors that depended on government contracts, budget cuts to the government frequently result in higher unemployment (Ciaran, 2017).

The literature shows that debt crisis and the burden of debt servicing contribute significantly to the decline in investment and economic growth (Kaminsky & Pereira, 1996; Oks & Wijnbergen, 1995; Lin & Sosin, 2001; Schclarek, 2004; Malik et al., 2010; Bilan & Iulian, 2015; and Azam et al., 2013)

To conclude, debt analysis, like medicine, is more like art than science. Just as two patients with the same illness may react differently to treatment, a debt one country can shrug off easily can bring another to heels. (Grosz, 1982). The fundamental lessons learned from debt crises worldwide include the necessity of detecting root causes, identifying risk factors that could trigger them, and subsequently creating plans to address potential financial crises. Regulators or policymakers can develop “to the point” solutions to the problem and isolate their consequences if we can accurately and promptly identify the primary triggers (Türker, 2015).

CHAPTER FOUR: METHODOLOGY AND DATA

4.0 Introduction

In this chapter, we present the theoretical and empirical framework of our study. We use a model that links external debt to some key macroeconomic variables, such as real GDP growth, inflation, budget balance, current account balance, money growth and interest rate. We employ two estimation techniques to analyze the data. The first is the autoregressive distributed lag (ARDL) model, which allows us to test the existence and direction of both long-run and short-run relationships between external debt and the macroeconomic variables. The second one is a forecast analysis based on autoregressive integrated moving average (ARIMA) and autoregressive integrated moving average with exogenous variables (ARIMAX) models, which enable us to project the future path of external debt in Ghana for the period 2021-2030 under different scenarios. We also explain the sources and definitions of the variables and introduce some diagnostic tests to check the validity and reliability of our results.

4.1 The Model

In this section, we employ a modified version of the methodology of Mensah et al. (2016) to establish a theoretical relationship between external debt and some macroeconomic variables. To establish these relationships, we provide some insights into the drivers of external debt accumulation. These macroeconomic variables will also aid in forecasting external debt.

A government runs a budget deficit when its expenditure exceeds its revenue. Thus, a budget deficit is given by:

$$DCT = EXP - REV \tag{1}$$

where DCT is budget deficit, EXP is expenditure and REV is revenue.

Total government expenditure is made up of government spending on investment and consumption and interest payment on its debt stock. Therefore:

$$EXP = XPN + (R \times D) \quad (2)$$

Where XPN is government spending on investment and consumption and $(R \times D)$ is interest payment on debt.

Substituting (2) into (1) gives

$$DCT = XPN + (R \times D) - REV \quad (3)$$

Now, assuming the government will finance its budget deficit by borrowing and printing more money:

$$REV + \Delta D + \Delta M = XPN + (R \times D) \quad (4)$$

Where ΔD is change in total debt stock and ΔM is change in money stock.

Total debt stock can be divided into external debt (ED) and domestic debt (DD). Also, interest rate on external debt is R^{ED} and interest rate on domestic debt is R^{DD} .

Therefore, (4) becomes:

$$REV + \Delta ED + \Delta DD + \Delta M = XPN + R^{ED}ED + R^{DD}DD \quad (5)$$

Dividing (5) by nominal GDP ($P \times RGDP$, where P is price and $RGDP$ is real GDP) yields:

$$\frac{REV}{P \times RGDP} + \frac{\Delta ED}{P \times RGDP} + \frac{\Delta DD}{P \times RGDP} + \frac{\Delta M}{P \times RGDP} = \frac{XPN}{P \times RGDP} + \frac{R^{ED}ED}{P \times RGDP} + \frac{R^{DD}DD}{P \times RGDP} \quad (6)$$

Expressing the variables in (6) as income shares by their lower-case letters yields:

$$rev + \frac{\Delta ED}{P \times RGDP} + \frac{\Delta DD}{P \times RGDP} + \frac{\Delta M}{P \times RGDP} = xpn + r^{ed}ed + r^{dd}dd \quad (7)$$

Where $rev = \frac{REV}{P \times RGDP}$, $xpn = \frac{XPN}{P \times RGDP}$, $r^{ed} ed = \frac{R^{ED} ED}{P \times RGDP}$, $r_d dd = \frac{R^{DD} DD}{P \times RGDP}$

The evolution of external debt can be derived in this manner. Given that:

$$\frac{ED}{P \times RGDP} = ed \quad (8)$$

$$ED = ed \times P \times RGDP \quad (9)$$

Given that all variables in Equation (9) are functions of time, we differentiate with respect to time.

This gives:

$$\frac{\partial(ED)}{\partial t} = P \times RGDP \times \frac{\partial(ed)}{\partial t} + ed \times RGDP \times \frac{\partial(P)}{\partial t} + ed \times P \times \frac{\partial(RGDP)}{\partial t} \quad (10)$$

$$\dot{ED} = (P \times RGDP \times \dot{ed}) + (ed \times RGDP \times \dot{P}) + (ed \times P \times \dot{RGDP}) \quad (11)$$

Dividing through (11) by nominal GDP (P×RGDP) gives:

$$\frac{\dot{ED}}{P \times RGDP} = \frac{(P \times RGDP \times \dot{ed})}{P \times RGDP} + \frac{(ed \times RGDP \times \dot{P})}{P \times RGDP} + \frac{(ed \times P \times \dot{RGDP})}{P \times RGDP} \quad (12)$$

Cancelling out common items in (12) results in:

$$\frac{\dot{ED}}{P \times RGDP} = \dot{ed} + (ed \times p) + (ed \times rgdp) \quad (13)$$

The evolution of domestic debt is derived in a similar manner. Given that:

$$\frac{DD}{P \times RGDP} = dd \quad (14)$$

$$DD = dd \times P \times RGDP \quad (15)$$

Differentiating (15) with respect to time yields:

$$\dot{DD} = (P \times RGDP \times \dot{dd}) + (dd \times RGDP \times \dot{P}) + (dd \times P \times RGDP) \quad (16)$$

Dividing through (16) by nominal GDP ($P \times RGDP$) gives:

$$\frac{\dot{DD}}{P \times RGDP} = \frac{(P \times RGDP \times \dot{dd})}{P \times RGDP} + \frac{(dd \times RGDP \times \dot{P})}{P \times RGDP} + \frac{(dd \times P \times RGDP)}{P \times RGDP} \quad (17)$$

Cancelling out common items in (17) results in:

$$\frac{\dot{DD}}{P \times RGDP} = \dot{dd} + (dd \times p) + (dd \times rgdp) \quad (18)$$

From (7), we can rewrite $\frac{\Delta M}{P \times RGDP}$ as:

$$\frac{\Delta M}{P \times RGDP} = \frac{M}{P \times RGDP} \times \frac{\Delta M}{M} \quad (19)$$

$$\frac{\Delta M}{P \times RGDP} = m\emptyset \quad (20)$$

$$\text{Where } \emptyset = \frac{\Delta M}{M}$$

Substituting (13), (18) and (20) into (17) yields:

$$\begin{aligned} rev + \dot{ed} + (ed \times p) + (ed \times rgdp) + \dot{dd} + (dd \times p) + (dd \times rgdp) + m\emptyset = \\ xpn + r^{ed}ed + r^{dd}dd \end{aligned} \quad (21)$$

Making ed the subject becomes:

$$\begin{aligned} \dot{ed} = xpn + r^{ed}ed + r^{dd}dd - (ed \times p) - (ed \times rgdp) - \dot{dd} - (dd \times p) - \\ (dd \times rgdp) - m\emptyset - rev \end{aligned} \quad (22)$$

Dividing through by ed yields:

$$\frac{ed}{ed} = \frac{xpn}{\frac{ed}{m\phi} - \frac{rev}{ed}} + \frac{r^{ed} ed}{ed} + \frac{r^{dd} dd}{ed} - \frac{p \times ed}{ed} - \frac{p \times dd}{ed} - \frac{rgdp \times ed}{ed} - \frac{rgdp \times dd}{ed} - \frac{dd}{ed} - \frac{dd}{ed} \quad (23)$$

$$\frac{ed}{ed} = \frac{xpn}{\frac{ed}{rev}} + r^{ed} + \frac{r^{dd} dd}{ed} - p - \frac{p \times dd}{ed} - rgdp - \frac{rgdp \times dd}{ed} - \frac{dd}{ed} - \frac{m\phi}{ed} - \quad (24)$$

Equation (24) is our equation of interest. It reveals the determinants of external debt.

External debt increases with government spending and interest rate while it decreases with inflation rate and real GDP, domestic debt, government revenue and money growth. When the government spends more than it generates through revenue, there is usually the need to borrow to finance the excess government spending. External debt increases as the government either secures loans from foreign lenders or issues bonds to international investors, thereby increasing the nation's external debt burden. Moreover, the government faces a higher cost of debt servicing when interest rates are high. This means that a larger share of its budget goes to paying interest on its external debt, which can lead to a rise in external debt if it keeps borrowing to finance its budget deficit.

Increased inflation levels lead to a reduced real value of foreign debt. Also, a higher inflation level results in a lower level of foreign debt in the long run due to the reduced output level in the economy (Assibey-Yeboah & Mohsin, 2014). Real GDP growth enhances the country's income and tax generation capacity, which can facilitate the servicing and repayment of its external debt. Hence, there exist a negative relationship between real GDP and external debt. Furthermore, Domestic borrowing enables the government to reduce its dependence on external borrowing. Domestic debt levels inversely affect external debt levels as the government taps less into international creditors.

Growth in money could lead to high inflation rates, and thereby reducing external debt levels. Finally, when the government can raise more revenue through taxes and other income sources, it is able to cover its expenses and debt obligation. As such, there is no need for more external loans.

4.2 Model Specification

From the model above, we identified seven key variables that affect external debt levels. The variables are government spending, interest rate on external debt, tax revenue, domestic debt, inflation rate, money growth and real GDP. In empirical studies, however, some additional variables are identified as possible drivers of growth in external debt. Current account balance (or trade balance) is a significant factor influencing external debt growth negatively and widely employed in empirical research (Waheed, 2017; Forslund et al., 2011; Sezgin, 2004; Colombo & Longoni, 2009). Additionally, the budget balance is often used to replace both government spending and tax revenue in empirical studies (Waheed, 2017; Awan et al., 2011; Bader & Magableh, 2009). Finally, interest rate on domestic debt will be used as a proxy for domestic debt. These variables will be included in our analysis.

Therefore, our model is specified as:

$$\ln ED_t = \beta_0 + \beta_1 \ln RED_t + \beta_2 \ln RDD_t + \beta_3 \ln BB_t + \beta_4 \ln INF_t + \beta_5 \ln RGDP_t + \beta_6 \ln MG_t + \beta_7 \ln CAB_t + \varepsilon_t \quad (25)$$

ED_t represents total external debt stock in period t , RED_t represents interest rate on external debt in period t , RDD_t represents interest rate on domestic debt in period t , BB_t represents budget balance in period t , INF_t represents inflation rate in period t , $RGDP_t$ represents real GDP in period t , MG_t represents money growth in period t , CAB_t represents current account balance in period t , ε_t is the error term in period t .

4.3 Data Source and Description

The estimation is based on annual time series data of eight macroeconomic variables from 1970 to 2020. These variables are external debt stock, GDP, current account balance, domestic debt, budget deficit, FDI, inflation and exchange rate. Table 2 below shows the sources and description of these data.

Table 2: Data Source and Description

Variable	Description	Source
External Debt (ED)	Total debt owed to nonresidents and paid back in foreign currency	World Development Indicators (WDI)
Budget Balance (BB)	Total government revenue less government tax expenditure	International Financial Statistics (IFS)
Interest Rate on Domestic Debt (RDD)	Monetary policy rate (as a proxy for interest rate on domestic debt)	Bank of Ghana
Interest Rate on External Debt (EDD)	Lending rate of the United States of America	International Financial Statistics (IFS)
Inflation Rate (INF)	Annual inflation rate; measured by Consumer Price Index	World Development Indicators (WDI)
Real Gross Domestic Product (RGDP)	Annual GDP at market prices based on constant local currency	World Development Indicators (WDI)
Current Account Balance (CAB)	Sum of net exports of goods and services, net primary, and secondary income	World Development Indicators (WDI)
Money Growth (MG)	Annual broad money growth	International Financial Statistics (IFS)

4.4 Methodological Framework

4.4.1 Unit Root Tests

One of the assumptions of time series analysis is stationarity, which means that the stochastic process generating the data has constant mean and variance over time and that the covariance between any two observations depends only on their temporal distance and not on their absolute location in time (Gujarati, 1995). To test this assumption, this study employs two unit root tests: the Augmented Dickey-Fuller (ADF) test and the Phillips–Perron (PP) test.

Augmented Dickey-Fuller (ADF) Test

The ADF test examines whether a variable contains a unit root, which implies non-stationarity, by testing the null hypothesis of a unit root against the alternative hypothesis of stationarity. The ADF specification to test for a unit root is given as:

$$\Delta Y_t = \alpha + \beta Y_{t-1} + D_t + \sum_{i=1}^k \theta_i \Delta Y_{t-i} + \mu_t \quad (26)$$

Y is the variable of interest. The parameter α is the drift term that reflects the constant change in the level of the time series. The parameter β measures the degree of stationarity of the time series. The term D_t is a deterministic trend variable. The operator Δ denotes the first difference of the time series. The variable μ_t is the white noise process that captures the random shocks in the model and t is the time index.

The ADF test inserts the lag of the difference terms to remove any autocorrelation in the error term that may bias the test. The optimal lag order is determined by the Akaike Information Criterion (AIC). The key parameter in the ADF test is β . The null hypothesis of the ADF test is that $\beta = 0$, which implies that the time series has a unit root and is non-stationary. The alternative hypothesis is that $\beta < 0$, which implies that the time series has no unit root and is stationary. The test statistic

for the ADF test is the t-ratio of β , which is compared to the critical values from Dickey and Fuller (1979).

Phillips–Perron (PP) Test.

The PP test is similar to the ADF test. It has the same null and alternative hypotheses to the ADF test. The PP test is useful to confirm the results from the ADF test because the ADF test has some limitations. One limitation of the ADF test is that it tends to assume non-stationarity for variables whose coefficients are closer to one.

4.4.2 Cointegration Analysis

Having established the stationarity of the variables using the ADF and the PP test, the cointegration test is employed to determine whether there exist any long-term relationships between the variables. Cointegration analysis helps to explore how variables are related in equilibrium and how they adjust to deviation from it. The Johansen test will be used to test the cointegration among the variables. It involves applying a vector autoregression model to the variables and then examining the rank of the error correction matrix using eigenvalue or trace measures. The rank of the matrix shows how many cointegrating vectors exist among the variables.

4.5 Estimation Techniques

To analyze the relationship between external debt and its determinants, we use the autoregressive distributed lag (ARDL) model. The ARDL model captures both the short-run and the long-run dynamics of the variables. We also use the ARIMA and ARIMAX models to forecast the external debt of Ghana for the period 2021-2030.

4.5.1 Autoregressive Distributed Lag Model (ARDL)

The ARDL model is used when there is different order of integrations (stationary or non-stationary). ARDL model has advantages over other cointegration techniques. It can estimate both the short-run and the long-run coefficients of the explanatory variables with a simple linear transformation that combines the error correction model (ECM) and the distributed lag model. It can also allow for different lag structures for each variable and select the optimal lag order based on criteria such as the Akaike information criterion (AIC) or the Schwarz Bayesian criterion (SBC) (Cho et al., 2021).

The ARDL model is given as:

$$\begin{aligned} \ln ED_t = & \alpha_0 + \sum_{i=1}^p a_i \ln ED_{t-i} + \sum_{i=0}^q \beta_{1i} \ln RED_{t-i} + \sum_{i=0}^q \beta_{2i} \ln RDD_{t-i} + \\ & \sum_{i=0}^q \beta_{3i} \ln BB_{t-i} + \sum_{i=0}^q \beta_{4i} \ln INF_{t-i} + \\ & \sum_{i=0}^q \beta_{5i} \ln RGDP_{t-i} + \sum_{i=0}^q \beta_{6i} \ln CAB_{t-i} + \sum_{i=0}^q \beta_{7i} \ln MG_{t-i} + \varepsilon_t \end{aligned} \quad (27)$$

Where the parameters “ $a_i, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$ ” represent the relationship among the dependent variable and the explanatory variables.

The ARDL model can be expressed in an Error Correction Model (ECM) format to separate the short-run dynamic relationships from the long-run relationship. This is given as:

$$\begin{aligned} \Delta \ln ED_t = & \alpha_0 + \sum_{i=1}^{p-1} \pi_i \Delta \ln ED_{t-i} + \sum_{i=0}^{q-1} \theta_{1i} \Delta \ln RED_{t-i} + \\ & \sum_{i=0}^{q-1} \theta_{2i} \Delta \ln RDD_{t-i} + \sum_{i=0}^{q-1} \theta_{3i} \Delta \ln BB_{t-i} + \sum_{i=0}^{q-1} \theta_{4i} \Delta \ln INF_{t-i} + \sum_{i=1}^{q-1} \theta_{5i} \Delta \ln RGDP_{t-i} + \\ & \sum_{i=0}^{q-1} \theta_{6i} \Delta \ln CAB_{t-i} + \sum_{i=0}^{q-1} \theta_{7i} \Delta \ln MG_{t-i} + \varphi (\ln ED_{t-1} - \lambda_0 \ln RED_{t-1} - \\ & \lambda_2 \ln RDD_{t-1} - \lambda_3 \ln BB_{t-1} - \lambda_4 \ln INF_{t-1} - \lambda_5 \ln RGDP_{t-1} - \lambda_6 \ln CAB_{t-1} - \lambda_7 \ln MG_{t-1}) + \varepsilon_t \end{aligned} \quad (28)$$

where Δ is the difference operator, p and q represent the number of lags. φ is the error correction coefficient that shows the speed of adjustment to the long-run equilibrium after a shock. The term in parentheses represents the lagged error term, that measures the deviation from the equilibrium long-run relationship.

4.5.2 Autoregressive Integrated Moving Average Model (ARIMA)

ARIMA model is a statistical model that is used to forecast and analyze time series data. The model uses past values of the series and past error terms to forecast future values. ARIMA is a combination of Autoregression (AR) process, Moving Average (MA) process and Autoregression and Moving Average (ARMA) process. If a time series is not stationary and so we have to difference it to make it stationary, then the original time series is *ARIMA* ($p.d.q$) time series; where p is the number of autoregressive terms, d denotes the number of times the series must be differenced before becoming stationary, and where q is the number of moving average terms (Gujarati & Porter, 2009). ARIMA model is suitable for small data sets. It has gained popularity due to its accurate and consistent forecasts (Chen et al., 2008; Guha & Bandyopadhyay, 2016).

ARIMA model can be written as:

$$ED_t = \lambda + \sum_{i=0}^p \varphi_i ED_{t-i} + \sum_{i=0}^q \delta_i \varepsilon_{t-i} \quad (29)$$

Where λ is the constant, φ_i represents the autocorrelation coefficients at lag 1, 2, ..., p, δ_i are weights applied to the error term's current and lagged values. $\varphi_i \neq 0$, $\delta_i \neq 0$

4.5.3 Autoregressive Integrated Moving Average Model with Exogenous Variables (ARIMAX) Models

ARIMAX model combines the characteristics of an ARIMA model and a regression model. While a regression model uses one or more exogenous variables to describe the variation in the dependent variable, the ARIMAX model incorporates both aspects by including AR, MA, and exogenous variables in its equation (Smarten, 2020). ARIMAX model is useful for forecasting a time series

that is influenced by exogenous variables. The model can accommodate both stationary and non-stationary data, as well as various data patterns. ARIMAX model has also gained popularity due to its success in prediction and reliability (Dragan et al., 2021; Intihar et al., 2017; Ali & Mohamed, 2022).

ARIMAX model can be written as:

$$\Delta \ln ED_t = c + \phi_1 \Delta \ln ED_{t-1} + \delta_1 \Delta \ln RED_t + \delta_2 \Delta \ln RDD_t + \delta_3 \Delta \ln BB_t + \delta_4 \Delta \ln INF_t + \delta_5 \Delta \ln RGDP_t + \delta_6 \Delta \ln CAB_t + \delta_7 \Delta \ln MG_t + r_1 \varepsilon_{t-1} + \varepsilon_t \quad (30)$$

Where c is the constant, ϕ_1 is the coefficient of the AR term (which measures how much ED depends on its previous values), r_1 is the coefficient of the MA term (which measures how much ED depends on the previous error term), $\delta_1 - \delta_9$ represents the coefficients of the exogenous variables, the other variables are the same as in previous equations.

4.6 Diagnostic Tests

To check for the stability of the model, autocorrelation, heteroscedasticity, and normality, various diagnostic tests will be performed. The Breusch-Godfrey LM test will be applied to examine the presence of autocorrelation among the error terms. The Breusch-Pagan-Godfrey test will be employed to check the assumption of homoscedasticity of the error variance. The Jarque-Bera test will be used to check whether the residuals were normally distributed or not. Finally, the CUSUM and CUSUM of squares tests, which are based on the cumulative sum and the cumulative sum of squares of the recursive residuals, respectively are used to test for the stability of the model.

CHAPTER FIVE: ESTIMATIONS AND DISCUSSION OF RESULTS

5.0 Introduction

This chapter presents the results of the empirical analysis of the relationship between macroeconomic policies and external debt in Ghana. The main objective of this study is to examine how the macroeconomic policies influence external debt in Ghana. To achieve this objective, we use a variety of econometric methods and data sources. The data covers the period from 1970 to 2020. This chapter is organized as follows: The first section of this chapter provides a descriptive analysis of the data used in the study. The variables include external debt, budget balance, interest rates on external and domestic debt, inflation, real GDP, broad money growth, and current account balance. The second section of this chapter conducts a cointegration analysis of the relationship between the macroeconomic variables and external debt in Ghana. We use the autoregressive distributed lag (ARDL) model to estimate the long-run and short-run coefficients of the ARDL model and perform various diagnostic tests to check for the validity and robustness of the results. We also draw some lessons from the Latin America (Mexico, Argentina, and Mexico) debt crisis. The third section of this chapter performs a forecasting analysis of the external debt of Ghana for the next decade (2021-2030), using two different models: the autoregressive integrated moving average (ARIMA) model and the autoregressive integrated moving average with exogenous variables (ARIMAX) model. The ARIMA model uses only the historical values of external debt to forecast its future values, while the ARIMAX model incorporates other explanatory variables that have a statistically significant long-run relationship with external debt in the ARDL model. We compare the forecasted values of external debt from both models and discuss their implications for Ghana's debt sustainability.

5.1 Descriptive Statistics

The descriptive statistics of the variables used for the study are shown in Table 3. The mean value of the external debt stock is US\$7.09 billion, with a range of US\$540 million to US\$31.9 billion. This suggests that Ghana's external debt level was consistently high during the period under analysis. The interest rate on domestic debt was consistently higher than the interest rate on external debt throughout the period, with an average 21.28 percent and 7.44 percent respectively. The current account balance has a mean value of a deficit of US\$1.1 billion, with the highest deficit of US\$5.7 billion and the highest surplus of US\$120 million. This indicates that the current account balance was predominantly in deficit during the period of the study. Real GDP has an average of US\$ 23.19 billion. The average value of the inflation rate is 29.1 percent, and that of money growth is 35.29 percent. All the variables exhibited variability below their mean values.

5.2 Unit Root Test Result

To test the null hypothesis of a unit root (non-stationarity) in the time series data, the Augmented Dickey-Fuller test and Phillips-Perron test were used. Table 4 presents the results of these tests. If the test statistic is larger than the critical values at various significance levels, we reject the null hypothesis of non-stationarity. From Table 4, Budget Balance, Inflation, Money growth and Current account balance exhibit stationarity at level $I(0)$, whereas External debt, Interest rate on external debt, interest rate on domestic debt and Real GDP are only stationary at first difference. Given that the test results indicate that the variables have different orders of integration or mixed stationarity, the ARDL model is an appropriate method for the estimation.

Table 3: Summary statistics

Variables	Mean	Standard Deviation	Minimum	Maximum
External debt	7.09	7.51	0.54	31.9
Interest rate on external debt	7.44	3.54	3.25	18.87
Interest rate on domestic debt	21.28	9.67	6.67	45.0
Budget Balance	-0.88	2.05	-11.2	0.54
Inflation rate	29.1	27.6	3.03	123
Real GDP	23.19	16.03	9.12	62.79
Money Growth	35.29	13.85	12.44	68.53
Current account balance	-1.10	1.43	-5.70	0.12

Source: Computed with Gretl

5.3 Co-Integration Analysis Result

To examine the existence of a long-run relationship among the variables in the model, the study uses a Johansen co-integration test. The results (see Table 5 and 6) show that there is a long-run equilibrium relationship among the variables. Both the trace test and the max-eigenvalue test reject the null hypothesis of no cointegration at the 5% level. The trace test suggests that there are 6 cointegration equations, while the max-eigenvalue test suggests that there are 7 cointegration equations.

Table 4: Unit root results

Variables	Augmented Dickey-Fuller (ADF)		Phillips-Perron (PP)		Order of Integration I(d)
	Level	First difference	Level	First difference	
<i>ED</i>	5.4035	-0.8213***	4.1859	-0.2755***	I(1)
<i>RED</i>	-2.5023	-5.1363***	-1.6586	-4.9381***	I(1)
<i>RDD</i>	-1.6148	-6.7008***	-1.7247	-6.7003***	I(1)
<i>BB</i>	-1.2613***		-1.5896***		I(0)
<i>INF</i>	-2.6702***		-2.5923***		I(0)
<i>RGDP</i>	2.0671	-2.7969***	5.9881	-2.5890***	I(1)
<i>MG</i>	-5.2185***		-5.2647***		I(0)
<i>CAB</i>	-1.4241***		-1.4241***		I(0)

Source: Computed with Eviews 12. *** denotes the rejection of the null hypothesis (of a unit root) at 1% level of significance

Table 5: Johansen co-integration test results (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob
None*	0.9983	658.3014	175.1715	0.0000
At most 1*	0.9727	389.7339	139.2753	0.0000
At most 2*	0.8657	238.4759	107.3466	0.0000
At most 3*	0.7476	154.1598	79.3414	0.0000
At most 4*	0.6548	96.3442	55.2457	0.0000
At most 5*	0.5491	51.6713	35.0109	0.0004
At most 6	0.3488	18.2222	18.3971	0.0529
At most 7	0.0048	0.2040	3.8414	0.6515

Source: Computed with Eviews 12 * denotes rejection of the hypothesis at the 0.05 level. Trace test indicates 6 cointegration equations at the 0.05 level.

Table 6: Johansen co-integration test results (Max-Eigen)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistics	0.05 Critical Value	Prob
None*	0.9983	268.5675	55.7282	0.0000
At most 1*	0.9727	151.2580	49.5863	0.0000
At most 2*	0.8657	84.3161	43.4197	0.0000
At most 3*	0.7476	57.8156	37.1636	0.0001
At most 4*	0.6548	44.6729	30.8151	0.0006
At most 5*	0.5491	33.4489	24.2520	0.0023
At most 6*	0.3488	18.0182	17.1477	0.0373
At most 7	0.0048	0.2040	3.8414	0.6515

Source: Computed with Eviews 12 * denotes rejection of the hypothesis at the 0.05 level. The max-eigenvalue test indicates 7 cointegration equations at the 0.05 level.

5.4 ARDL Results

The ARDL error correction results show the short-run relationships in the model. This is presented in Table 7. The variable (CointEq (-1)) shows the coefficient value of the error correction term which is -0.638107 and statistically significant at one percent level of significance. This indicates that there is a short-run equilibrium relationship between external debt, budget balance, current account balance, inflation, broad money growth, interest rate on external debt, interest rate on domestic debt and real GDP. The error correction term measures the speed of adjustment of the model toward its long-run equilibrium. The negative sign shows that the model is convergent toward equilibrium, restoring the equilibrium. Thus, the error correction coefficient of -0.638107 implies that the model converges towards long-run equilibrium at a speed of 63.81% per year, in

the event of a disequilibrium in the short run. The coefficients of the other variables are interpreted below. The lag length selection is based on Akaike Information Criteria (AIC).

The budget balance with no lag revealed a negative effect on external debt, while budget balance with one lag shows a positive relationship. This implies that holding all other variables constant, a unit increase in budget balance (that is, an improved budget balance) will result in a decreased external debt by 0.69 units at one percent significance level. In the case of budget balance with one lag, a unit increase will increase external debt by 0.64 units at a five percent level of significance. However, the effect of budget balance with two lags is not significant.

The results for the current account balance indicate that the coefficients of the current account balance and its first lag are not statistically significant, as their p-values are 0.3135 and 0.1808 respectively. This suggests that the external debt is not influenced by current account balance and its first lag. On the other hand, the coefficient of current account balance with two lags is positively related and statistically significant at a one percent significance level. This implies that a unit increase in current account balance increases external debt by 1.20 units, holding other variables constant.

Inflation has only a contemporaneous effect on external debt but no lag effects. This is evidenced by the fact that all the lags of inflation have no significant effect on external debt. Holding other variables constant, a unit increase in inflation increase external debt by a smaller magnitude of 0.016450 unit. The positive effect of inflation on external debt is in line with the Argentine experience. Argentina's external debt problem was further exacerbated by rising inflation. A key lesson from Argentina is how it managed to reduce inflation. The country implemented strict monetary policies to decrease the supply of money, among which was eliminating the influence of the government on the central bank with regards to printing money.

Another factor that affects external debt is broad money growth. Broad money growth has only a lag effect on external debt at a ten percent level of significance. The coefficient of -0.021948 means that a unit increase in the lag of broad money growth decreases external debt by 0.021948 , holding other variables constant. The interest rate on domestic debt variable which serves as a proxy for domestic debt yielded no statistically significant results at the short-run period. On the other hand, there is a negative lag effect of interest rate on external debt on external debt.

Finally, the second lag of real GDP indicates a positive and significant effect on external debt at a one percent level of significance. The coefficient of 1.383858 implies that holding other variables constant, a unit increase in real GDP increases external debt by 1.383858 units. This positive effect, however, is not consistent with theoretical expectations. A possible explanation for this result is by Darku (2023), who found that the Ghanaian government tends to exhibit fiscal indiscipline during economic upturns, leading to large fiscal deficits and consequently, higher borrowing requirements. This explanation is supported by the observed data, as the periods of sustained GDP growth correlate with large fiscal deficits and increased external indebtedness. Moreover, this finding is consistent with the experience of Mexico, which attained its highest level of economic growth in 1981 but also faced a dramatic increase in its foreign debt. However, the case of Argentina differs from Mexico, as it was able to recover quickly from its crisis due to its increased economic growth. Economic growth can enhance the capacity of countries to repay their external debt, as they may generate more income and revenue from increased economic activity. However, economic growth may also entail higher government expenditure, which may require additional borrowing from external sources.

Having discussed the short-run dynamics of the ARDL model, we now turn our attention to the long-run effects of the explanatory variables on the dependent variable. Table 8 shows the long-

run relationship between external debt and its determinants. The results indicate that budget balance has a negative and significant impact on external debt at a ten percent level of significance. This implies that an improvement in budget balance reduces external debt by a larger magnitude of 3.321600 units in the long run. This result is consistent with Adane et al. (2018) and Awan et al. (2015). This result also mirrors the experience of Mexico during the Latin American external debt crisis where the country's expansionary fiscal contributed significantly to the crisis. To improve its budget balance, Mexico implemented several measures, such as fiscal austerity, privatization of state-owned companies, and strict monetary policy. Moreover, the tax system was reformed to reinforce the penalties for tax evasion. These strict enforcements resulted in a significant reduction of the budget deficit from 17.6% in 1982 to 8.9% in 1983 and a decrease in external debt growth rate. (Brinke, 2013).

Current account balance has a positive and significant effect on external debt at the 5% level of significance. This suggests that a higher current account balance leads to a higher level of external debt in the long run. This means that when the current account is improving, the level of external debt is increasing. This result differs from Alam and Taib (2013) and Hermann and Jochem (2005) who found a negative relationship between current account balance and external debt.

Even though interest rate on domestic debt has no significant relationship with external debt in the short run, its long-run coefficient is positive and statistically significant at a one percent level of significance. This is because external debt is usually contracted for long terms and thus interest rate on domestic debt could not cause any impact on it in the short run. The long-run coefficient means that an increase in interest rate on domestic debt will increase external debt by 0.217099 in the long run. This long-run positive relationship is also confirmed by Mensah et al. (2016) who studied external debt among highly indebted poor countries (HIPC)s in Africa. The Latin American

debt crisis underscores the importance of implementing policies that bolster domestic savings to ensure domestic borrowing. In a world of high capital mobility and volatile, changes in terms of trade and interest rates, policies that foster domestic savings are essential to prevent an economic growth collapse when external financing is disrupted (Kaminsky & Pereira, 1996).

The study indicates that inflation has no significant long-run relationship with external debt. However, El Aboudi and Khanchaoui (2021) found a negative relationship between inflation and external debt. Again, a positive inflation shock (either due to money supply growth or exchange rate depreciation) generates a negative output gap and a reduction in consumption, as inflation acts as a distortionary tax on the labor-leisure trade-off. Consequently, the real value of domestic debt decreases as inflation erodes the purchasing power of money (Assibey-Yeboah et al., 2016).

The other variables, namely broad money growth, interest rate on external debt, and real GDP are not significant in the long run. This indicates that they do not have a significant long-run relationship with external debt. In the case of real GDP and external debt, Kasidi and Said (2013) and Ogunmuyiwa (2011) confirmed that there is no long-run relationship or, at best, weak and insignificant. Malik et al. (2010) and Kharusi and Ada (2018), on the other hand, found a negative and significant relationship between real GDP and external debt in the long run. Mensah et al. (2016) demonstrate that the negative relationship between real GDP and external debt is only evident in the medium term, and not in the long term.

The study also examined the impact of two structural breaks on the model by using dummy variables. The first structural break is the financial liberalization that occurred in 1988, captured by dummy 1. The financial liberalization is the financial reform that allowed entry of public or private sector financial institutions into the financial market. This reform also resulted in the establishment of the Ghana Stock Exchange in 1990 (Adams & Agbemade, 2012). The second

structural break is the financial sector clean-up that took place in 2017, which is represented by dummy 2. This clean-up involved increasing the minimum capital requirement for banks, dissolving insolvent financial institutions and facilitating the consolidation and recapitalization of some banks in Ghana (Affum, 2020). After conducting the analysis, we found that the structural breaks do not have significant effect on the model outcomes, and the coefficients of the dummy variables are not statistically significant.

Furthermore, the study examined the influence of COVID-19 on Ghana's external debt growth. The analysis revealed that after the COVID-19 pandemic in 2019, there was no significant increase in external debt accrued in 2020. This could be due to the decline in global economic activities and the inflow of relief funds from international organizations to Ghana to deal with the COVID-19 shock. Therefore, this study excludes the impact of COVID-19 from its analysis.

Table 7: ARDL Short-run Results

Variable	Coefficient	Standard Error	t-Statistics	Prob
C	-6.0786	0.95276	-6.379988	0.0001
<i>d</i> (ED(-1))	-0.06195	0.16451	-0.376561	0.7137
<i>d</i> (ED(-2))	0.585704	0.167358	3.499704	0.0050***
<i>d</i> (BB)	-0.69642	0.185525	-3.753765	0.0032***
<i>d</i> (BB(-1))	0.646205	0.226732	2.850083	0.0158**
<i>d</i> (BB(-2))	-0.08814	0.219242	-0.401999	0.6954
<i>d</i> (CAB)	0.347039	0.328562	1.256236	0.3135
<i>d</i> (CAB(-1))	-0.53613	0.375174	-1.429023	0.1808
<i>d</i> (CAB(-2))	1.199748	0.333526	3.597169	0.0042***
<i>d</i> (INF)	0.01645	0.0059	2.788294	0.0176**
<i>d</i> (INF(-1))	0.003087	0.005864	0.526464	0.609
<i>d</i> (INF(-2))	0.003923	0.004557	0.960726	0.4078
<i>d</i> (MG)	0.01433	0.011137	1.286725	0.2246
<i>d</i> (MG(-1))	-0.02195	0.010963	-2.00204	0.0706*
<i>d</i> (MG(-2))	-0.01142	0.010037	-1.137447	0.2795
<i>d</i> (RDD)	0.050381	0.030629	1.644905	0.1282
<i>d</i> (RDD(-1))	-0.050[355	0.02876	-1.750853	0.1078
<i>d</i> (RDD(-2))	-0.0558	0.034376	-1.62306	0.1329
<i>d</i> (RED)	-0.09391	0.07607	-1.234574	0.2427
<i>d</i> (RED(-1))	-0.16888	0.081257	-2.078384	0.0619*
<i>d</i> (RED(-2))	-0.1337	0.087885	-1.521279	0.1564
<i>d</i> (RGDP)	0.004944	0.236134	0.020936	0.9837
<i>d</i> (RGDP(-1))	0.449203	0.258103	1.740399	0.1097
<i>d</i> (RGDP(-2))	1.383858	0.232183	5.960193	0.0001***
CointEq(-1)*	-0.63811	0.10297	-6.19703	0.0001***
R-squared	0.911412		Mean dependent var	0.716383
Adjusted R-squared	0.793294		S.D. dependent var	1.33689
S.E. of regression	0.605451		Akaike info criterion	2.126277
Sum squared resid	6.598284		Schwarz criterion	3.150231
Log likelihood	-20.7496		Hannan-Quinn criter.	2.50388
F-statistic	7.71614		Durbin-Watson stat	2.570772

Prob(F-statistic) 0.000023

Source: Computation from Eviews version 12. *** significant at 1%; ** significant at 5%; * significant at 10%.

Table 8: ARDL Long Run Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BB	-3.321600	1.758376	-1.889016	0.0855*
CAB	1.523670	0.590085	2.582120	0.0255**
INF	0.028131	0.029941	0.939536	0.3676
MG	0.071457	0.067459	1.059254	0.3122
RDD	0.217099	0.065033	3.338276	0.0066***
RED	0.146688	0.242165	0.605734	0.5570
RGDP	0.175326	0.234553	0.747491	0.4704

Source: Computation from Eviews version 12. *** significant at 1%; ** significant at 5%; * significant at 10%.

5.5 Model Diagnostic Tests

To ensure the reliability and efficiency of the ARDL results, this study performs some diagnostic tests on the estimated models. These tests include checking for stability of the model, autocorrelation, heteroscedasticity, and normality. The results are summarized in Table 9.

For the stability of the model, we used the CUSUM and CUSUM of squares tests, which are based on the cumulative sum and the cumulative sum of squares of the recursive residuals, respectively. The results of the tests are shown in Figure 5 and 6, where the plots of the CUSUM and CUSUM of squares statistics are within the 5% significance bounds. This indicates that there is no evidence of structural break or coefficient variation in the model, and thus the model is stable and reliable. To check for autocorrelation, the Breusch-Godfrey LM Test is used. The null hypothesis of no

autocorrelation is not rejected since the p-value (0.1377) was greater than 5 percent level of significance. We conclude that the residuals were not serially correlated.

The Breusch-Pagan-Godfrey test was applied to test for heteroskedasticity in the ARDL model. With a p-value of 0.2688, we fail to reject the null hypothesis of homoskedasticity and conclude that there is no heteroskedasticity in the model. The Jarque-Bera test was used to check whether the residuals were normally distributed or not. The test statistics of 0.1198, p-value of 0.9418, skewness of -0.1292 and kurtosis of 2.9921 jointly confirm that the residuals are normally distributed.

Table 9: Summary of Diagnostic Tests

Test	Null Hypothesis	F-Stat Prob.	Decision
Autocorrelation	No autocorrelation	0.1377	Fail to reject
Heteroskedasticity	Homoskedasticity	0.2688	Fail to reject
Normality (of residuals)	Normally distributed	0.9418	Fail to reject
Stability (of residuals)	Unstable	Not Applicable	Reject the null

Source: Computed with Eviews12

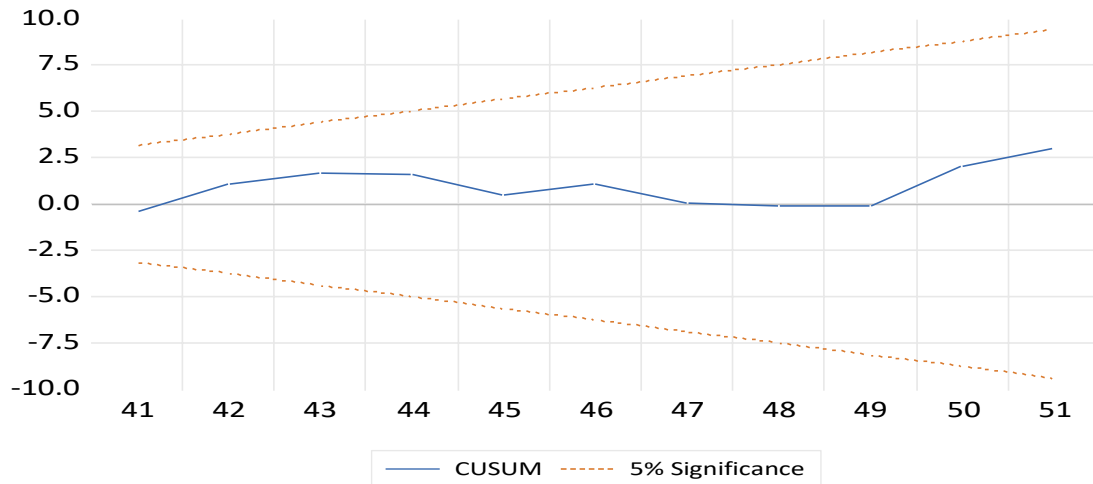


Figure 5: CUSUM of Residuals for ARDL Model

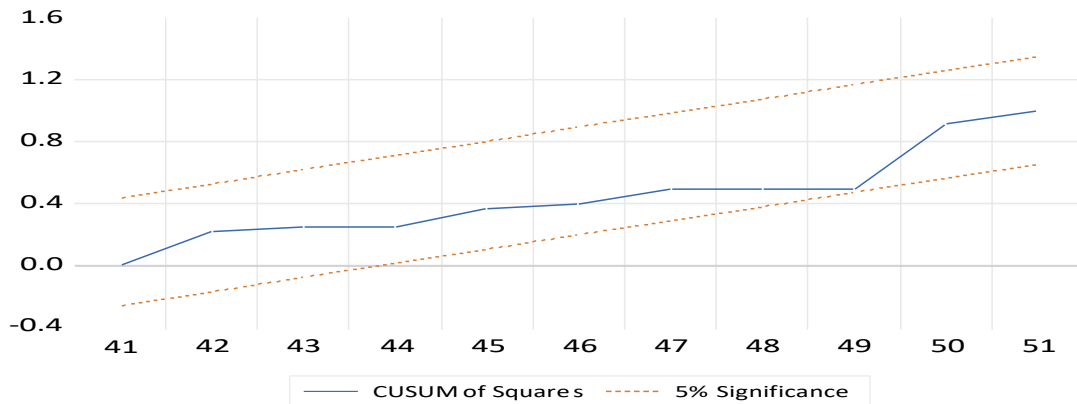


Figure 6: CUSUM of Squares of Residuals for ARDL Model

5.6 ARIMA and ARIMAX Model

The ARIMA model is employed to forecast the external debt of Ghana for the next decade (2021-2030). This model uses only the historical values of Ghana’s external debt in its forecasting. The results of the ARIMA model are reported in Table 11 and depicted in Figure 8. The ARIMA model predicts a continuous and substantial increase in external debt throughout the forecast period. By 2030, Ghana’s external debt is projected to reach US\$75.45 billion.

We also used the ARIMAX model to forecast the external debt of Ghana, based on the ARDL relationships established in the previous section. To forecast the external debt using the ARIMAX model, we first applied the ARIMA model to the explanatory variables and obtained their forecasted values. Then, we used these forecasted values as the exogenous inputs for the ARIMAX model and generated the forecast for the external debt. Table 10 presents the results from the ARIMAX model, and Figure 7 illustrates the forecasted values of external debt. The forecast shows that external debt is expected to increase steadily from US\$32.89 billion in 2021 to US\$39.74 billion in 2026, before declining slightly to US\$38.69 billion in 2027. However, the downward trend is reversed in 2028, when external debt rises to US\$41.32 billion and continues to grow until it reached US\$42.63 in 2030. To measure the accuracy of the forecast, we use the mean absolute error (MAE), the mean absolute percentage error (MAPE), the bias proportion, and the covariance proportion. The MAE of 0.64 and the MAPE of 11.89% show that the forecast errors are relatively small in both absolute and relative terms. The bias proportion of 0.0009 indicates that the forecast errors show no systematic bias, and the covariance proportion of 0.99 indicates that the forecasted values are highly correlated with the actual values. Therefore, we conclude that the forecasted values of Ghana's external debt have minimum errors.

Table 10: ARIMAX forecast

YEAR	EXTERNAL DEBT (In billion US\$)
2021	32.89
2022	33.04
2023	34.87
2024	36.34
2025	38.49
2026	39.74
2027	38.69
2028	41.32
2029	41.39
2030	42.63

Source: Computed with R Studio

Table 11: ARIMA forecast

YEAR	EXTERNAL DEBT (In billion US\$)
2021	36.04
2022	40.50
2023	44.83
2024	49.22
2025	53.58
2026	57.96
2027	62.33
2028	66.70

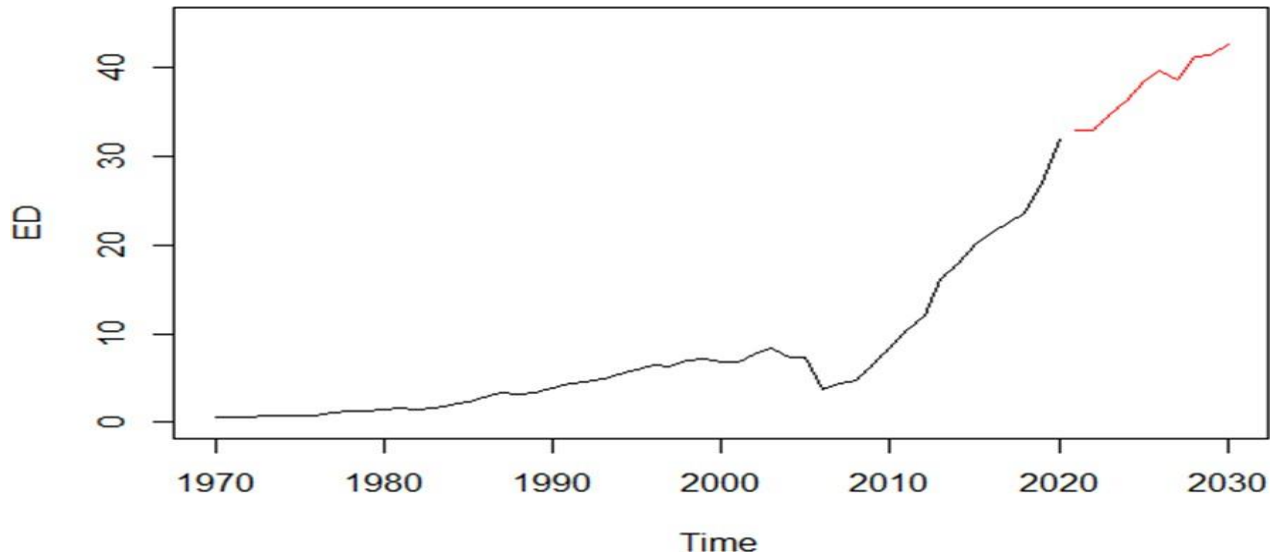
2029

71.07

2030

75.45

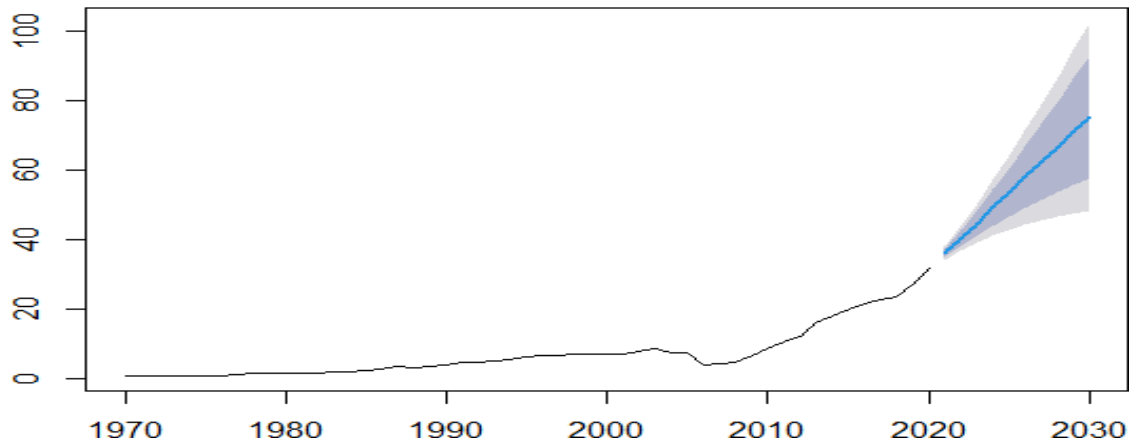
Source: Computed with R Studio



Source: Forecasted with R Studio

Figure 7: ARIMAX Forecast

Forecasts from ARIMA(1,2,0)



Source: Forecasted with R Studio

Figure 8: ARIMAX Forecast

Table 12: Percentage Change in External Debt

YEARS	EXTERNAL DEBT (In billion US\$)	PERCENTAGE CHANGE
1971-1980	0.54 – 1.39	157.81
1981-1990	1.54 – 3.88	152.19
1991-2000	4.38 – 6.74	53.95
2001-2010	6.86 – 8.37	21.92
2011-2020	10.41 – 31.87	206.11

Source: Author’s computation with data from International Debt Statistics

5.7 Discussion of the Forecast Analysis

The ARIMA model assumes that external debt is an autoregressive process, which means that it depends only on its own past values and a random error term, and thus it does not consider the

effects of other macroeconomic variables on external debt. The ARIMAX model, on the other hand, captures the dynamic interactions between external debt and other macroeconomic policies . This makes the ARIMAX model seem more realistic and policy-relevant for forecasting external debt. However, a historical analysis of the percentage change in external debt over the past five decades reveals some anomalies that challenge the validity of the ARIMAX model.

Table 12 shows that the percentage change in external debt in the first decade (1971-1980) was 157.81%, followed by a decline in the subsequent decades until the fourth decade (2001-2010), where it reached its lowest point at 21.92%. This sharp drop was due to the debt relief that Ghana received under the HIPC and MDRI initiatives. Without the debt relief, the percentage change in external debt for that period would have been 74.9%. The percentage change then increased again in the fifth decade (2011-2020) to 206.11%, which was the highest. The range of the percentage change over the five decades was 184.19% and the average was 118.4%. In contrast, the ARIMAX model forecasted a percentage change of only 18.26% for the period 2021-2030, while the ARIMA model forecasted a percentage change of 109.35%. This suggests that the ARIMA model is more consistent with the historical trend of external debt and provides a more feasible forecast than the ARIMAX model.

The results from the forecast indicate that external debt could pose serious challenges for fiscal sustainability and macroeconomic stability. This is similar to the experiences of the Latin American countries that eventually led to their external debt crisis and default. As such, there is a need for Ghana to take urgent actions to prevent a recurrence of history. Ghana should learn from the lessons of the Latin American debt crisis and implement sound macroeconomic policies and structural reforms to restore fiscal balance and current account balance and improve overall economic health and status.

CHAPTER SIX: SUMMARY AND CONCLUSION, POLICY RECOMMENDATIONS AND LIMITATIONS OF THE STUDY

6.0 Introduction

External debt crisis is a major issue for many developing countries, as it affects their economic growth, fiscal sustainability, and balance of payments. Though macroeconomic policy management is intended to prevent external debt crises, it is also the case that it can create external debt problems. As such, it is imperative to understand the impact of macroeconomic policy variables on external debt accumulation to help design effective macroeconomic policies that can promote external debt sustainability.

Upon scrutiny and historical analysis of Ghana's external debt situation, it becomes evident that the nation has accumulated substantial amounts of external debt. This accumulation is further compounded by the heavy burden of servicing these debts. Presently, Ghana finds itself in a precarious situation, with its external debt surging to alarming levels. To make matters worse, the country is unable to meet its loan repayment obligations, compelling it to seek assistance from the International Monetary Fund (IMF) in 2022. The lack of proficient and effective management of economic policies and the increased burden of external loans have rendered the country susceptible to various shocks, affecting Ghana's macroeconomic stability.

In this study, we examined the short-run and long-run relationships between macroeconomic policy variables and external debt in Ghana from 1970 to 2020 using the ARDL model. The ARDL model can accommodate the different orders of integration among the variables and distinguish between the explanatory variables' long-run and short-run effects on the dependent variable. The macroeconomic policy variables employed in the study include real gross domestic product (GDP), current account balance, inflation, budget balance, money growth, interest rate on external debt, and interest rate on domestic debt. In addition, this study also provided some lessons from the Latin

American external debt crisis, which offers some insights and implications for Ghana's debt situation. Furthermore, this study also forecasts Ghana's external debt scenario for the next ten years, using ARIMA and ARIMAX models.

6.1 Summary and Conclusion

The study analyzed the relationship between Ghana's macroeconomic variables and external debt. After confirming the stationarity of the variables using the ADF and PP tests, we used the Johansen cointegration test to investigate the availability of long-run relationships among the variables. At a 5% significance level, the trace test suggests six cointegration equations, while the max-eigenvalue test suggests seven cointegration equations among the variables.

Using the ARDL model, we establish both the short-run and long-run relationship among the variables. The short-run results reveal that budget balance has a mixed effect on external debt, depending on the lag length. An improvement in budget balance reduces external debt in the current period but increases it in the next period. This may reflect the time lag between fiscal policy implementation and its impact on external debt. Current account balance with two lags has a positive effect on external debt. Inflation rate has a positive impact on external debt in the current period. Broad money growth with one lag has a negative impact on external debt. Interest rate on external debt with one lag has a negative impact on external debt, consistent with the law of demand. A higher interest rate on external debt discourages borrowing and encourages repayment. Real GDP with two lags has a positive effect on external debt.

In the long run, budget balance negatively and significantly impacts external debt, meaning that an improvement in budget balance leads to lower external debt in the long run. Current account balance positively affects external debt, implying that an improved current account balance

increases external debt in the long run. This may reflect the accumulation of foreign assets as a buffer against external shocks, that is, the precautionary motive of holding foreign reserves. Interest rate on domestic debt has a positive and statistically significant relationship with external debt in the long run, even though it has no significant relationship in the short run. The stability of the model was verified by the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests. Also, the diagnostic test results indicated the absence of serial correlation, heteroskedasticity, and non-normality.

The study also forecasts Ghana's external debt for the next decade using the ARIMA and ARIMAX models. The ARIMA model uses only the historical values of external debt to forecast its future values. In contrast, the ARIMAX model uses the historical values of external debt and the variables that have a long-run impact on external debt. The ARIMA model predicts that Ghana's external debt will reach a high of US\$ 75.45 billion in 2030, while the ARIMAX model predicts a lower value of US\$ 42.63 billion in 2030. The study concludes that the forecast by the ARIMA model is more realistic since it follows a trend consistent with the observed data.

6.2 Policy Recommendations

The study has revealed some significant insights and implications. The following recommendations are offered based on the analysis and discussion of the key findings. To maintain appreciable levels of external debt, it is essential to implement policies that foster fiscal discipline. These policies include expenditure control, revenue enhancement, and a transparent budgeting process. Expenditure control entails regularly reviewing public expenditures, identifying inefficiencies, and eliminating unnecessary or wasteful expenses. Revenue enhancement can be achieved through tax reforms that broaden the tax base, close loopholes, and combat tax evasion. Moreover, providing

clear and accessible information about government expenditures, revenues, and fiscal policies will ensure transparency in the budgeting process and make governments accountable.

Ghana's inflation-targeting policies should be extended to capture other structural causes of inflation in the country.

Furthermore, Ghana should implement structural reforms to boost the economy's potential growth rate while lowering the fiscal deficit as a share of GDP.

Finally, Ghana should avoid excessive monetary financing of fiscal deficit.

6.3 Limitations of the Study

One of the limitations of this study pertains to its inability to incorporate the potential impact of Ghana's recent lithium discovery on its future projections for external debt. This is due to the fact that the information was unavailable during the data collection phase. Moreover, the economic consequence of lithium extraction in Ghana remains unclear, which adds another layer of complexity to Ghana's external debt analysis. Therefore, this study suggests that there is a need for further research on how Ghana's debt management is influenced by its natural resource discoveries.

Secondly, this study also drew lessons from the debt challenges and policy responses of some Latin American countries (Mexico, Argentina, and Brazil) in the 1980s and 1990s. Nevertheless, the unique structural and institutional systems of Ghana may constrain the relevance of these insights. For example, unlike Mexico, which has benefited from the North American Free Trade Agreement (NAFTA) with two developed countries (Canada and USA), Ghana lacks a comparable trade agreement with developed countries.

Thirdly, a potential drawback of this study is the use of the domestic debt interest rate as a proxy for domestic debt. This assumes that the domestic debt interest rate is a reliable indicator of the domestic debt level and trend, which may not always be the case, as the link between the interest rate on domestic debt and domestic debt may be complex and nonlinear.

Finally, The ARIMAX forecast uses the forecasted values of the explanatory variables to forecast Ghana's external debt (dependent variable). As a result, the forecasting error of the explanatory variables may affect the accuracy of the external debt forecast.

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