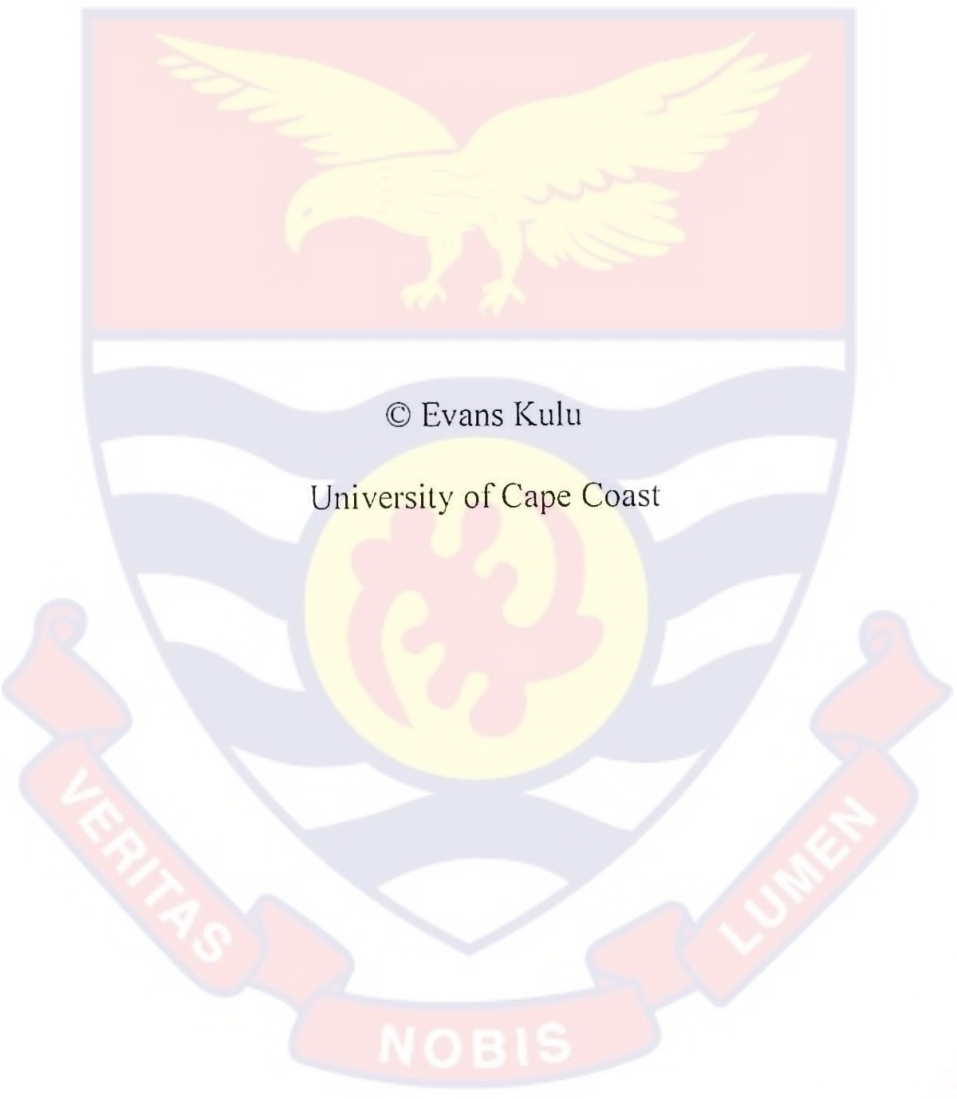

UNIVERSITY OF CAPE COAST

GOVERNMENT DOMESTIC DEBT ARREARS, PRIVATE INVESTMENT AND FINANCIAL STABILITY GAP IN SUB-SAHARAN AFRICA

BY

EVANS KULU

Thesis submitted to the Department of Economic Studies of the School of Economics, College of Humanities and Legal Studies, University of Cape Coast, in partial fulfilment of the requirements for the Award of Doctor of Philosophy Degree in Economics

DECEMBER, 2022

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my original research and that no part of it has been presented for another degree in this University or elsewhere.

Candidate's Signature: ..... Date...20/12/22...

Name: Evans Kulu

Supervisors' Declaration

We hereby declare that the preparation and presentation of this thesis were supervised in accordance with the guidelines on supervision of thesis as laid down by the University of Cape Coast.

Principal Supervisor's Signature..... Date...20/12/2022...

Name: Prof. William G. Brafu-Insaidoo

Co- Supervisor's Signature..... Date...20/12/22...

Name: Dr. Eric Amoo Bondzie

ABSTRACT

The relevance of the private sector in the overall growth of economies in sub-Saharan Africa (SSA) draws attention to the elements that aid its growth. Provision of credit is of much interest to the government and the private sector since their investment activities mostly depend on the quantity available. As more credit is given to one of the sectors less will be available to the other. Therefore, defaults on the side of one sector is likely to influence activities in the other sector as well as the operations of the financial institutions from which the credits are sourced. This explains the fact that there exists a competition for the credits provided by domestic financial institutions. Considering the contributions of financial institutions and the activities of the private sector in achieving overall economic growth as a basic macroeconomic objective, the relationships between the aforementioned variables are worth investigating. This thesis, addresses three main themes: (a) examining the effect of government domestic debt arrears on private investment; (b) estimating and explaining the gap in financial stability in SSA; and (c) determining the effect of financial stability gap on private investment. These were achieved using the system General Methods of Moments, Impulse Response Functions, the Stochastic Frontier Analysis and the Fixed and Random Effect estimation techniques. The study revealed that government domestic debt arrears negatively affect private investment in SSA and the sub-regional communities. The estimated gaps indicate that there are differences in financial stability gaps among SSA countries. Further, financial stability gap beyond a threshold of 109.9 percent is found to be detrimental to private investment in SSA.

KEYWORDS

Credit

Financial Stability

Government Domestic Debt Arrears

Private Investment

Sub-Saharan Africa

ACKNOWLEDGEMENT

I will like to express my sincere gratitude to all individuals, who contributed greatly in diverse ways in making this thesis and my entire period of the PhD programme a success.

My heartfelt gratitude goes to my supervisors, Prof. William G. Brafu-Insaidoo and Dr. Eric Amoo Bondzie for their guidance and useful contributions in making this work better. In addition, I sincerely appreciate the support of Prof. James Atta Peprah during the whole journey. Indeed, all other senior members of the School of Economics, University of Cape Coast have been very supportive in varied ways.

I am also thankful to my colleagues especially Mr. Samuel Mensah for assisting in proofreading this thesis. To Grace Appiah Kubi, Emmanuel Gbolonyo, and Emmanuel Attobrah, I thank you for your immense contribution towards the completion of this thesis.

DEDICATION

To the Kulu family

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS/ACRONYMS

ARDL	Auto Regressive Distributive lag
CEMAC	Central African Economic and Monetary Community
CLRM	Classical Linear Regression Models
CPI	Consumer Price Index
EAC	East African Community
ECCAS	Economic Community of Central African States
ECM	Error Correction Model
ECOWAS	Economic Community of West African States
FDI	Foreign Direct Investment
FE	Fixed Effects
FGLS	Feasible Generalized Least Square
FMOLS	Fully Modified Ordinary Least Squares
FSAP	Financial Sector Assessment Program
GDP	Gross Domestic Product
GFD	Global Financial Development
GMM	General Method of Moments
HIPC	Heavily Indebted Poor Countries
ILO	International Labour Organisation
IMF	International Monetary Fund
IRFs	Impulse Response Functions
LM	Lagrange Multiplier
LSDV	Least square dummy variable
MLE	Maximum Likelihood Estimation
MSE	Small Mean Errors

NPLs	Non-Performing Loans
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Square
OPEC	Organisation of the Petroleum Exporting Countries
PFM	Public Financial Management
PRSP	Poverty Reduction Strategy Paper
PVAR	Panel Vector Auto-Regressive
RE	Random Effect
SADC	Southern African Development Community
SFA	Stochastic Frontier Analysis
SFM	Stochastic Frontier Models
SFPF	Stochastic Frontier Production Function
SMEs	Small and Medium-sized Enterprises
SRMSE	Square Root of Mean Square Errors
SSA	Sub-Saharan Africa
SSE	Sum of Square Errors
VECM	Vector Error Correction Model
VIF	Variance Inflation Factor
WDI	World Development Indicators
WGI	Worldwide Governance Indicators

CHAPTER ONE

INTRODUCTION

The overall economic growth of countries in SSA makes the activities of the private sector relevant. Hence, the means of its (private sector) growth is also of importance to researchers and policy makers. The readiness of credit is important to the government and the private sector as their investment activities mostly depend on the quantity available. As more credit is given to one of the sectors, less will be available to the other. Therefore, defaults on the side of one sector are likely to influence activities in the other sector as well as the operations of the financial institutions from which the credits are taken. This explains the fact that there exists competition for the credits provided by domestic financial institutions. Considering the contributions of the financial system and the activities of the private sector in achieving overall growth as a basic macroeconomic objective, and the relationships between the aforementioned variables are worth investigating.

Do defaults by the government in a form of domestic debt arrears crowd in or crowd out private investment? Given the rise in government debt arrears, what is the status of stability (in terms of the difference between the actual and potential values of stability) in the financial institutions within sub-Saharan Africa (SSA)? And does the possible financial stability gap have implications for private investment? Providing answers to these critical questions is the basis of this study.

Background to the Study

Economic growth as a macroeconomic policy goal remains a target for almost all countries across the globe. The challenges associated with this goal may differ from across countries or regions. A variety of mechanisms have been introduced by a number of countries in recent times as means to curtail the obstructions to growth and development (Kulu & Appiah-Kubi, 2021). The natural resource-rich countries are making considerable efforts to get the most out of their endowment. In most SSA countries, the private sector has been found to be the engine of growth. Increasing roles of the private sector is observed as a sign of economic growth and development (Anyanwu, Gan & Hu, 2018). It is also proven empirically that economic growth led by the private sector is stronger than public sector-led growth.

This is partly because relatively, the private sector operates more efficiently than the public segment (Coutinho & Gallo, 1991; Frimpong & Marbuah, 2010). Investing in the former sector is a major prerequisite for economic growth because it makes way for entrepreneurial involvement, hence, setting economic activities in motion by gathering resources for producing goods and services (Frimpong & Marbuah, 2010). Sustained economic growth is enabled by a virtuous cycle such that higher productivity is promoted by investment and entrepreneurship. Entrepreneurship or private sector involvement mostly leads to job creation and the introduction of new technologies, specifically through international trade and linkages in investment (Frimpong & Marbuah, 2010).

Markets that are well functioning and competitive are important due to the role they play in the promotion and rewarding innovation and

diversification, and fostering entry and exit of firms, thus helping to ensure that actors in the private sector find a conducive platform to operate. It is, therefore, important to note that achieving success in mobilising private investment is a progressive effort for the creation of employment, increasing growth rates and causing a reduction in the level of poverty (Coutinho & Gallo, 1991). The numerous events of the sector and other sectors functioning within the economy are powered by credits. They are perceived as the oil that greases activities of the private sector.

Because as additional credit is provided to the private sector, there is a reflection of more opportunities for growth and development in the private sector (Anyanwu et al., 2018). Also, the higher the credit, the larger the share to the private sector and the more the economy improves in terms of growth and development. In the Keynesian model, investment is explained to be equal to savings, implying that savings is also crucial for investment activities. Following the debt overhung effect, a huge external debt does not provide a good ground for private investment, so are factors such as inflation and weaknesses in institutional qualities (Anyanwu et al., 2018; Frimpong & Marbuah, 2010; Lidiema, 2018; Were, 2001). It is easy to grasp the tangible way through which credit growth boosts overall growth in the economy.

Consumers are able to borrow and make more spending, just as enterprises can borrow and make more investments when credit grows. The increase in the level of investment and consumption creates jobs and enhances growth in both the income and profits of agents. Furthermore, the different forms of economic expansion influenced by credits get to an end when one or more of the significant sectors in the economy are unable to service their debt

(Banu, 2013). According to Armeanu, Pascal, Poanta and Doia (2015) credits that are granted to legal entities affect a number of components of the GDP and this influence has been identified to be extensive. In investment activities, it is imperative to note that both the private sector and the government mostly rely on borrowing. Usually, foreign lenders, citizens and financial institutions within the economy are the main sources from which governments in SSA have their loans.

When the current revenue of the government falls short of public expenditure, it results in a rise in public debt (Lidiema, 2018). Thus, there exists competition between the private sector and the government in domestic credit acquisition. In competing for credits, governments tend to succeed in most cases owing to the fact that it is perceived to be relatively less risk when lending to the government than the private sector. This implies that comparatively, the private sector will have access to a limited amount of credit for investment purposes. Thus, Anyanwu et al. (2018) explain that there has been consistent talk in circles of policy and the media persistently attributing the low size of funds to the private sector to increasing government borrowing since governments, especially in SSA, depend on the banking system in the financing of budget deficits. Because governments are able to borrow huge amounts of money, this move serves as a source of one of the popular forms of crowding-out effects.

Potentially, a large government borrowing substantially affects real interest rates, suffocates the lending capacity of the economy and hinders the engagements of businesses in capital projects (Anyanwu et al., 2018). Thus, private sector investments fueled through credits are halted as governments are

now in possession of the funds. The relevance of private investments to economic well-being has attracted the interest of most researchers to investigate its relationship with government borrowing. Figure 1 presents the trend in domestic debt and private investment as a share of GDP.

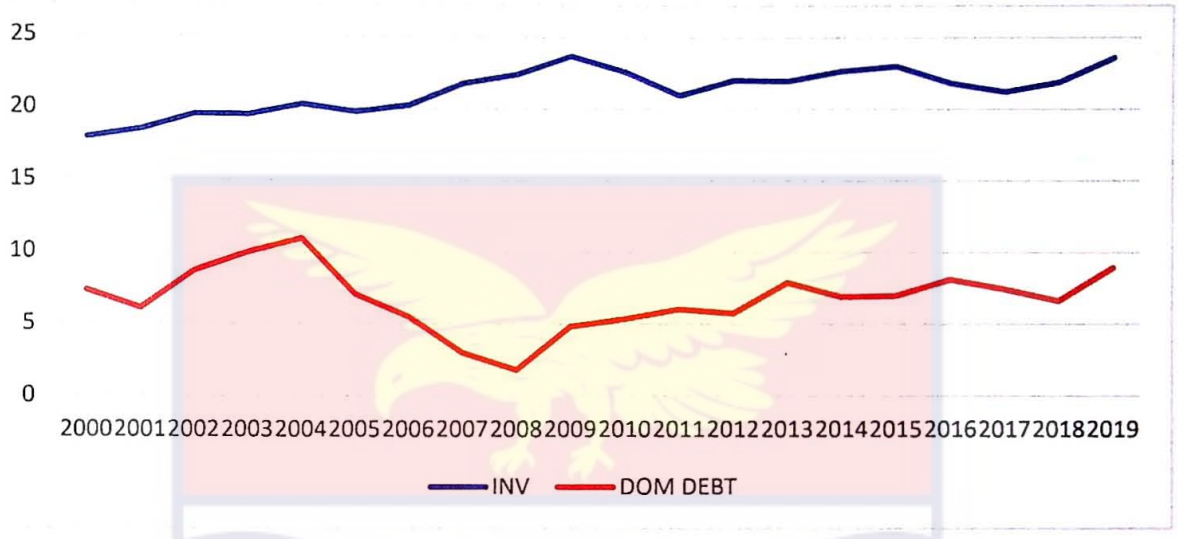

Figure 1: Domestic Debt and Private Investment in SSA
Source: Kulu (2022)

From Figure 1 and in line with the existing literature (Akomolafe et al., 2015; Anyanwu et al., 2018; Lidiema, 2018), the exact connection cannot be deduced. The effect government borrowing has on private investments has been inconclusive as a number of studies argue that the effect is dependent on the purpose of government borrowing. In other words, a clear conclusion has not been made on this debate as other studies argue that government domestic borrowing induces private investments through government's crucial involvements in significant infrastructural projects. Government excessive borrowing from domestic sources in SSA has introduced an important driver of economic and financial instability. Thus, government domestic debt arrears which are a form of loan default are widespread in SSA, and have been an economic policy challenge (IMF, 2019).

Checherita-Westphal, Klemm and Viefers (2016), refer arrears to the compensation to a bill which is not done at the due date. This was identified to be equivalent to a government making use of its unrestricted power to facilitate borrowing from sources such as the wage earners, pensioners, contractors, energy companies and the likes when their consent is not sought (Ramos, 1998). It is possible for a government to have larger amounts of bills that are unpaid but not necessarily leading to arrears accumulation. However, successive gathering of unpaid bills will possibly lead to arrears accumulation. Again, there is the likelihood of countries having stock of arrears termed as "unrecognized" when they are not recorded officially. These come in the form of arrears that fiscal authorities have not recorded yet or potential claims that are waiting to undergo auditing.

It is noted that unrecognised arrears significantly add to the stock of debt of countries, hence, increasing the debt vulnerabilities (IMF, 2019). In recent years, the increase in government expenditure arrears, thus signifying suspensions in payments government makes to either its creditors, has been recognized as a critical fiscal issue (Diamond & Schiller, 1993). Studies sometimes associate arrears to weaknesses in Public Financial Management (PFM) and the absence of commitment in the political system (Khemani & Radev, 2009; Pattanayak, 2016). For oil-exporting countries, government domestic arrears are mostly high (about 8.5 percent of GDP). This also applies to countries with fixed exchange rate regimes (about 4.4 percent of GDP) as well as countries that are fragile (about 4.1 percent of GDP). Available data for 35 SSA countries from 2007 to 2018 indicate that just 18 countries recorded arrears below 2 percent of GDP.

A total of 9 countries recorded arrears falling between 2 to 5 percent of GDP, whereas 8 recorded figures which are at least 5 percent of GDP. Thus, 4 countries in SSA for the period, 2007 to 2018, had arrears greater than 10 percent of their GDP. With just 18 countries having arrears below 2 percent of GDP, this implies that more than half of the countries in SSA do have domestic debt arrears above 2 percent of their GDP. This highlights the intensity of domestic debt arrears among countries in SSA and the rate at which it is bound to increase, given the increment in domestic borrowing (Lidiema, 2018). Figure 2 shows how the stock of arrears is distributed among countries in SSA.

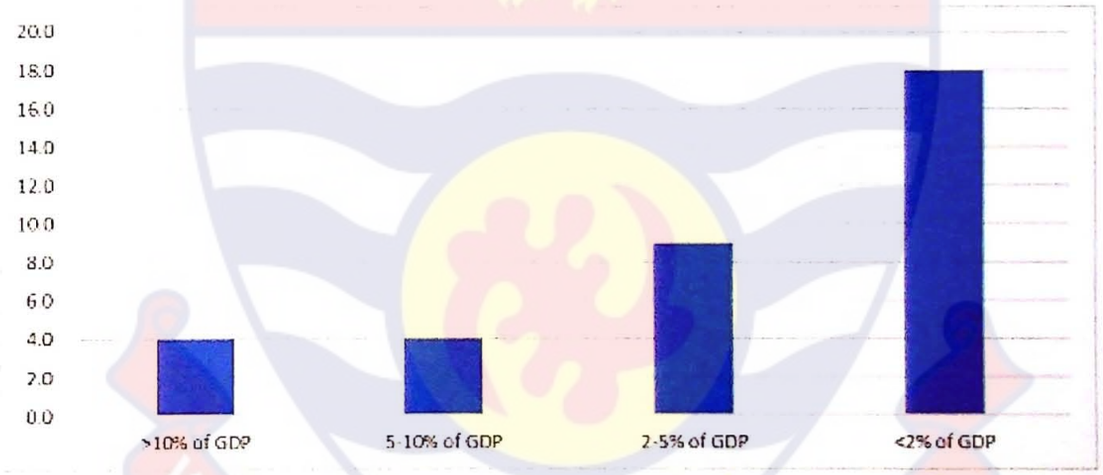

Figure 2: Distribution of the stock of domestic arrears across countries in SSA
Source: IMF (2019)

Again, the recent data on arrears show that their impact is multifaceted and can be substantive. Arrears give the government discretionary and non-transparent financing, hence, enabling the diversion of resources by government from the private sector which is more constrained with cash.

Private sector investments are likely to be curtailed as government fails in servicing debts at the stipulated dates for reuse by the private sector. Thus, delays in government debt payments possibly increase non-performing

loans of financial institutions, affecting credits to the private sector for investment activities. This is likely to reduce private investment. However, the effect on private investment can be favourable when the arrears influence economic growth positively. When delays in government servicing of debt are for the purpose of undertaking growth-enhancing projects such as constructing roads, providing reliable electricity, water, and any other type of investment that would crowd in private sector investment. Thus, government domestic debt arrears accompanying economic growth may give way for private investment.

Again, arrears have the possibility of increasing vulnerabilities in the financial sector. Financial stability is generally understood as a consistent state of the robust running of the various components of the financial system (Chauhan & Ramesha, 2016). These components include the market, infrastructure and institutions. It is very significant to endow the system so that it can withstand or endure any financial shock with a little impact that is disruptive.

When governments, private companies and State-Owned Enterprises are unable to service their loans adequately, the banking sector has the possibility of suffering deterioration in terms of assets quality and record increases in nonperforming loans (NPLs). The IMF (2019) reports also explain that the accumulation of arrears could weigh on credit supply and cause reduced investment in the economy, therefore, contributing to shortfalls in fiscal revenue and deteriorating economic activity. Loan defaults and domestic public debt restructuring are mostly common as compared to those of external public debt (Reinhart & Rogoff, 2009). This implies that relatively, more

attention needs to be given to issues related to domestic debt. Again, it is worthy to identify that the severity of the indirect leakages is dependent on the size of the arrears and, more importantly, the soundness and stability of the financial sector.

According to Mlachila and Yabara (2013), stability in the financial sector has been moderate in SSA, probably reflecting the low financial integration in the region. Compared with a decade ago, key measures of financial soundness such as capital adequacy ratio, non-performing loans (NPLs) and quality of assets have improved. However, IMF (2019) reports that these financial soundness indicators have somewhat deteriorated in the past five years. Thus, the capital adequacy ratio remains constant at best and NPLs increase continuously, confirming the sign of overheating in some countries within the region. Indeed, financial stability is characterized mainly by the liquidity status of the financial institutions. Hence, this can be significantly influenced when borrowed funds are not paid on time.

The transmission channel of domestic debt arrears buildup in the economy has different roots. It can be channeled through the real sector, financial sector and social sector (IMF, 2019). The effects and their severity are identified to be dependent on the characteristics of the country or region in question (Connell, 2014). The establishment of sub-regional communities within SSA presents unique ways of tackling economic and social problems. Thus, members of each sub-regional community may have distinct internal characteristics that may affect the impact of macroeconomic shocks and also how they respond to them. On this note, it is always appropriate to undertake regional specific analysis so that recommendations may not be misleading.

This, therefore, motivates analyses of sub-regional communities in the current study. Thus, aside from the investigation on SSA, this study further analyses how sub-regional communities like the EAC, ECCAS, and the ECOWAS are affected. This will help inform decisions and policymaking at the sub-regional level.

Statement of the Problem

Government domestic borrowing has been on a rise in SSA. According to Lidiema (2018), in most cases, resources generated from debt do not undergo effective use. For instance, both internal and international loan financed projects are unable to generate enough resources in servicing the borrowed debt because of a lack of a realistic plan. Governments in SSA spend large sums of money on repayments of loans. Hence, socio-economic development is compromised. At worst, repayments of the borrowed funds run into arrears. A report from IMF (2019) indicates that available data shows 24 SSA countries out of 30 recorded arrears by the end of 2018, with a mean stock for the period being 3.3 percent and the highest of 18 percent.

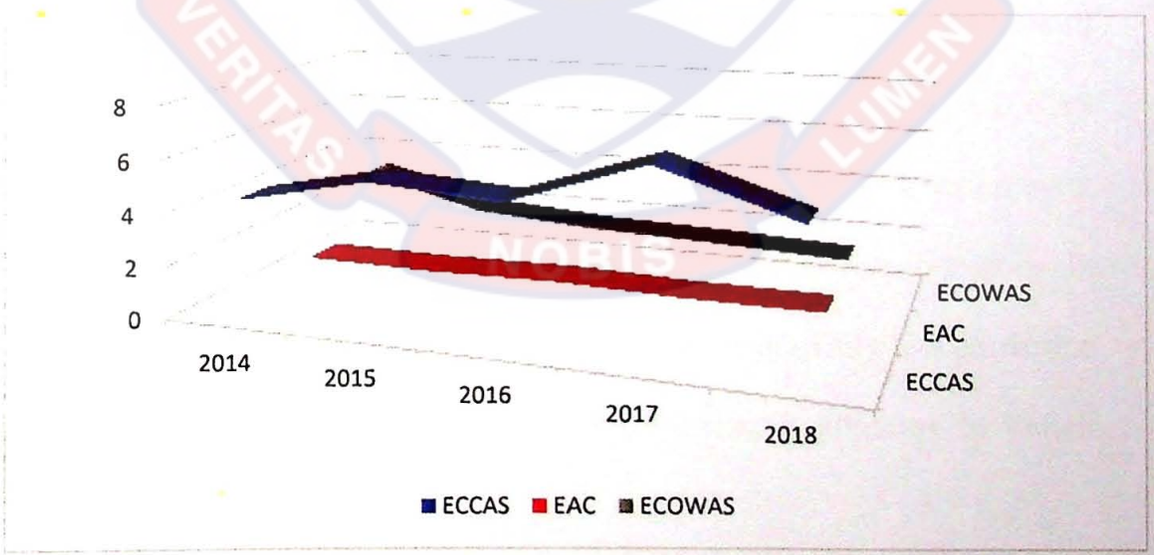

Figure 3: Trend of Government Domestic Debt Arrears across sub-regional communities
Source: Kulu (2022)

Debt arrears differ across sub-regional communities in SSA. Table 1 indicates that the average figure for the ECCA countries is approximately 5 percent, which is higher than the regional value of 3.2 percent.

Table 1: Average Government Domestic Debt Arrears in SSA and sub-Regional Communities (2007 to 2018)

Region and Sub-Regional communities	Mean of Arrears (Percentage of GDP)
Sub-Saharan Africa (SSA)	3.219717
Economic Community of Central Africa States (ECCAS)	4.536165
Eastern Africa Community (EAC)	0.7005913
Economic Community of West Africa States (ECOWAS)	3.916411

Source: Kulu (2022)

This is in line with the IMF (2019) reports that in Central Africa, vast fiscal shocks have contributed to the significant buildup of arrears within five oil-exporting nations (Chad, Republic of Congo, Gabon, Equatorial Guinea and Cameroon). The EAC Countries recorded the lowest average value. This indicates that relatively, there is low debt arrears among the EAC countries. The trend of government domestic debt arrears presented in Figure 3 as well shows that government debt arrears are high in the ECCAS and the ECOWAS as compared to the EAC. This as well implies that within the SSA region even, varied impacts may be experienced by respective countries or sub-regions. In several African countries, private sector credit is comparatively low partly due to the reliance of the government on the banking institutions in deficit financing (Anyanwu et al., 2018).

A suggestion from economic theory indicates that loanable funds obtainable for private investments are reduced when governments borrow to

finance their investments. The relationship identified between government borrowing and investment by the private sector is uncertain. As argued by Keynesians, if the positive side of an increased government investment dominates the harmful effect of the decreased private investment, there is the likelihood of experiencing overall growth in the economy. Is this the case for SSA? The role of government debt repayment arrears on private investments has not been considered in empirical studies in SSA. Closest to this relationship investigated in the existing literature is the effect of government borrowing on investment made by the private sector. This also has, however, not been conclusive (Akomolafe et al., 2015; Anyanwu et al., 2018; Lidiema, 2018). There is, therefore, the indication that government borrowing may not always directly affect private investment.

The purpose of borrowing and the time of repayment are of much importance regarding the response by private investments. Given a region that is determined to grow through the involvement of the private sector, and the prevalence of high domestic debt as well as the rising government domestic debt arrears, investigating this relationship which is absent in the literature is crucial. Importantly, the strength of the financial sector determines how it can withstand both internal and external shocks. According to Connell (2014), the impact of government debt arrears on the economy is complicated and it depends on the characteristics (such as quality of institutions) of the economy or region in question. Again, malfunctioning credit markets fuel financial sector vulnerability (Diamond & Schiller, 1993).

What is lacking in the literature is how the rising government domestic debt arrears have impacted the credit related activities in financial institutions,

what the gap in financial stability is and what is driving it. Thus, delays in servicing of government debt potentially reduce the liquidity status of financial institutions, hence, their ability to function effectively. According to monetarists, financial stability concerns the liquidity status of financial institutions. Hence, there is a gap in stability when it is distorted. Thus, the financial stability gap conceptualises the difference between the actual values of stability and the potential values. It is important to note that the activities of most sectors of the economy as well as other economic agents are dependent on the strength and activities of the financial sector.

Furthermore, activities of any sector or economic agent which is likely to influence the stability and desired performance of the financial system is worthy of investigation. Given that the financial sector is the main provider of credits for investment purposes (to both the private investor and sometimes the government), there is the need to analyse this, especially across sub-regional groups so that appropriate and respective policies can be recommended. This will also help reveal ways of strengthening the financial system to ensure effective functioning for the overall growth of the economy.

General Objective

Generally, the study examines the relationship between government domestic debt arrears, private investment and financial stability gap in SSA.

Specific Objectives

The specific objectives are to:

1. determine the effect of government debt arrears on private investment in SSA and selected sub-regional economic communities;
2. estimate and explain financial stability gap in SSA;

3. determine the effect of financial stability gap on private investment in SSA.

Research Questions

From the objectives, the research questions are stated accordingly.

1. What is the effect of government domestic debt arrears on private investments in SSA and its sub-regional communities?
2. What is the financial stability gap and its determinants in SSA?
3. What is the effect of financial stability gap on private investments in SSA?

Significance of the Study

Studying the effect of government domestic debt repayment arrears will unearth hidden implications on critical variables in the economy. Businesses and governments will be exposed to some consequences of their actions. The study will be useful to financial policymakers as well as international bodies such as the IMF in their decision making for countries and sub-regional communities, especially in SSA. More importantly, policy recommendations of this study will go a long way to affect varied decisions on credit which aims at achieving economic growth to enhance repayment or avoiding the accumulation of arrears and their possible effects. Although other empirical studies such as Wai and Wong (1982), Ouattara (2004), Hassan and Salim (2011), Lidiema (2018), Ghura and Goodwin (2000), Ndikumana (2000) and Easterly (1999) have studied the drivers of private investments for some specific countries and regions.

This study also reveals some significant drivers of investments by the private sector in SSA and some sub-regional communities which serve as a

complement or validation of what has been found already. Thus, finding the determinants of private sector investments will be significant in formulating possible policy interventions that will help in stimulating and sustaining private investments for overall growth in the economy. Furthermore, there are very few or no studies in SSA and its sub-regional communities investigating the impacts of government domestic debt arrears. This study will, therefore, serve as existing literature or a guide to other researchers who may be interested in this area.

Organisation of the Study

Broadly, the thesis is divided into three empirical chapters. In the first empirical chapter, analyses were done for both the SSA and some sub-regional communities, with the remaining focusing on only SSA as a region. In particular, it is divided into seven major chapters. In the next chapter, a review of both theoretical and empirical literature relevant to the study is made. Particularly, critical theories on debts, investments and financial stability as well as empirical studies related to drivers of private investment and financial stability are the main focus. In the third chapter, methodological issues are discussed, with a focus on panel estimation techniques like the system General Methods of Moments (GMM), Fixed and Random Effects, PVAR with Impulse response functions (IRF) and the Stochastic Frontier Analysis (SFA) are some other econometric techniques delved into. The fourth chapter focuses on how government domestic debt arrears affects private investment.

The findings of the estimation of the financial stability gap and its drivers are presented in Chapter Five while Chapter Six presents the findings of the effect of the financial stability gap on private investments. In the

concluding chapter, the summary, conclusions and recommendations based on the findings are presented.

Chapter Summary

The study was introduced in this section. The background to the study, the statement of the problem, the study's objectives, the relevant research questions, as well as the study's importance are all discussed. It also covered the study's organisations.

CHAPTER TWO

LITERATURE REVIEW

Introduction

This chapter examines the existing literature that relate to the three main focus of this study. Broadly, this chapter is sub-divided into different sections. There is the focus on theoretical literature that supports the study. These include investment theories, financial stability theories and theories on debt. The second section examines empirical studies that relate to the issues under investigation.

Theoretical Review

The General Theory of Public Debt

Generally, there are two major thoughts in the recent theory of debt. Sacrifices in private production are the real cost associated with government spending. Aside from the cost of the transfer, debt financing has no corresponding real cost in the future (Sharp, 1959). Noticing the unproductiveness associated with public spending, the classicists reasonably agreed that sacrificing the private capital formation is the real cost of an increase in public spending. This is known to be motivated by their basic interest in stimulating formation of capital in the private sector (Seymour, 1947). This argument was reasonable owing to the increasing wasteful spending by governments as well as the insufficiency of private capital.

With capital to the private sector becoming increasingly available as well as government spending beginning to be taken as productive, the view of the earlier classical economists was, however, altered. Consideration was given to the relative productivity of both private and public investments.

Nonetheless, in the most current debt theory, it is an unquestionable fact that the sacrifices in private production or investment are the real cost of government spending, as it was then. When government spending is made through debt creation, sacrifices in private production happen to be the real cost to society. After servicing the debt, is there another real cost? This point was significantly highlighted by Ricardo (1951) who argued that, when the debt is created, the substantial cost of government spending that is financed through loans is felt. Mill (1894) expressed concerns on the cost in the form of interest payments that are made at a later date and not only on the cost that arises after transferring resources to the government. Thus, given that government activities cause a growth in the rate of interest, the future cost of servicing the debt becomes significant.

Ricardo's Theory of Public Debt

Conveniently, Ricardo's theory of public debt is considered under three sub-topics: public debt, sinking funds and capital levy.

Public Debt: Ricardo, in his ideologies, introduced the treatment of public debts by making a statement that the expenditures (ordinary and extra-ordinary) of the state were mainly payments that are made in sustaining labourers that are not productive. Again, he explained that savings made from government expenses would be either added to the income or the contributor's capital. On the wastefulness of public spending, Ricardo was so convinced that he exhibited a great concern in his letter to McCulloch in the year 1816, encouraging ministers to be generous in the public spending. In clarifying his opinion that taxation should be at a minimum, Ricardo further wrote one passage. Public loans, according to Ricardo's theory, stressed the fact that the

extravagant nature of public spending is the cause of the basic community burden but not from the financing method of the expenditure. His opinion on the issue of public spending financing was that the funds required eventually need to be taken from the community's resources and that regarding the economy, whether the required funds were derived by taxes or loans, no great difference would be made.

Sinking Funds: With the existence of pure theory, Ricardo believed that a satisfactory method of debt-redemption could be provided by sinking funds as applied fairly. Ricardo reduced the objections that were made to sinking funds to two problems that are likely to be experienced later after years of its operation. He firstly explained that there will be the return of capital in a quick manner into the hands of the stockholder without necessarily getting any revenue from it. Secondly, the cutback of existing taxes will greatly affect the prices of some particular goods, hence, very pernicious to the wellbeing of the dealers or manufacturers of such goods. The first objection was answered in a demonstration that the commissioners of the sinking fund have no capital, as they only receive taxpayer's money and disperse them in payment for the stock redeemed.

He believed that the stockholder must employ as capital, all money that has been received in return for his stock, otherwise, the revenue on which he regularly depended, will be deprived of him. Also, Ricardo replied to the objection that through means of the sinking fund, suddenly reducing taxes due to public debt repayment will lead to a decrease in prices of goods. This fall in prices will consequently affect dealers negatively and show that the dealers' stock was determined and liable to such tax just as the period of tax

imposition. Hence, the stock in hand has the possibility of being ascertained during the tax withdrawal and thereon being refunded to the stockholder.

Capital Levy: A high "tax on property" currently termed as the capital levy is the plan of debt-redemption which was particularly favoured by Ricardo. To Ricardo, the objections to the capital levy are similar to the others that have made attempts already to provide an answer in speaking of war taxes. A bigger volume of liquid funds will be available to the stockholders seeking investments when being paid off. In meeting their respective shares of the levy, the industrialists and landowners, on the other hand, will be in desperate need of such funds. Among each other, these two parties would not fail in making an arrangement whereby a party would make use of their money while the others raise it.

In Ricardo's view, a more credible objection was that from taxation, the levy would relieve all individuals whose incomes are gotten from wages and salaries such as professionals. In his article (Encyclopedia), he referred back to an argument where he dealt with this same objection concerning the war on high tax, and where he exhibited that by an unavoidable tendency of the economy in creating a new equilibrium level for itself, an extra number of people will have the enticement to join the professionals, hence, making the competition lower the corresponding pay. He was very much aware that his scheme of the capital levy would not be operationalized. Thus, in his letter to McCulloch in February 1820, Ricardo had a certain feeling that in getting the debt out of existence, implementing the capital levy will not be the best approach.

Domestic and External Public Loans

An essential difference exists between domestic and external public debt, according to modern debt theory. Real income is not affected when servicing domestically generated public debt while there is an associated loss of real income with servicing an externally generated debt. Buchanan (1958) explains that given a 20 percent borrowing in New York and a 5 percent borrowing rate in London, the United States government would be better off borrowing from the domestic source with the 20 percent rate. In deciding between domestic and external borrowing as a means to finance expenditure by the government, the main variable to be considered should be the rate of interest, ignoring difficulties in transfer. With the same rates of borrowing for both domestic and external debt, the net interest and the future private income stream will not differ.

There is no reduction in private capital when borrowing is made from external sources since foreign savings are used, however for domestic borrowing, there is a corresponding reduction in private capital formation since domestic savings are used. There will be a greater movement of the private income stream when external borrowing is made however when the debt is served, there will be real claims in the future against the income. On the other hand, private income stream flow will be less when borrowing is made from domestic sources, and against this income stream, there will not be any future net claims. For this reasoning, the implication on the public policy is that given the "equal ease of transfer" when the rate of borrowing from internal sources is low, the government should borrow from the internal sources, and also resort to the external sources when the contrary is true.

Given that resources are not employed, a case may be made for borrowing to finance government spending, however, a strong case may be made when government spending is financed from money that is created. The real cost of debt financing in future remains unchanged given the fact the marginal productivity associated with public investment may exceed the marginal productivity associated with private investment under conditions of unemployment. The act of creating money to finance spending by the government is the only method of financing which allows the government to make use of unemployed resources at a minimum real cost (Sharp, 1959).

The Dual Gap Theory

Owing to the savings' inherent nature which is not able to give financial assistance to both the private and public sectors, underdeveloped economies are faced with low and weak rates of growth (Hunt, 2007). This also means that economic growth is sustained by investment and savings. According to Chowdhury (1998), unless the capital level gets to a certain point or threshold, growth in the economy cannot be sustained. There will be stimulation of economic growth originating from a rise in savings over time when there is growth in investment and capital boosted by loans from foreign sources. This concept refers to the dual gap theory. The concept makes borrowing from external sources a necessity. It highlights that signing up for foreign debt is better when the cost of investing the funds is below the returns that will be generated. The concept of the dual-gap highlights the function of foreign capital in the development process.

According to McKinnon (1964), foreign capital works by allowing developing countries to make more investment above what has been

domestically saved. Again, Were (2001), explained that in underdeveloped economies, the limited income promotes a minimal difference between income and consumption which overall, results in a low level of savings. In this circumstance, there is the need to supplement capital with external funds to improve the investment level and potentially help enhance economic growth. Importantly, the externally generated funds need to be invested efficiently utilized in a profitable manner. This will help in boosting the growth rate in the economies. Thus, in developing countries, insufficient inflow of foreign exchange from external sources as a means to supplement domestic savings is the reason for the nonstop lack of capital (Ajab & Audu, 2006).

The Financing Gap Theory

This refers to the difference that exists between the domestically available funds and the entire funds required for investment; therefore, a major means of ensuring that this gap is closed is through borrowing from external sources (Abdullahi, Bakar & Hassan, 2016). Developing countries have been infested by the knowledge of financing gap, thereby encouraging foreign borrowing. This concept is rooted in a publication by Domar (1946) where it was hypothesized that there will be the existence of a proportionate association between spending on investment and the GDP growth. In the work of Rostow (1960), the concept of the financing gap reemerged; claiming that there is the need for a country to go through a series of stages or events as a means to originate from a less developed status to developed status.

Rostow (1960) reasoned that increasing investment from 5 percent to 10 percent of profits is the necessary condition, meaning if the domestic resources available to a developing country are insufficient for investment the

gap must be occupied with foreign aid or debt from foreign sources. The Harrod-Domar gap model was augmented by Chenery and Strout (1966), providing an understanding of the importance of having internally funded savings. In circumstances where there is a shortfall between the ability to invest and savings temporally, foreign aid can be used in supplementing national savings. If a country's marginal savings rate is high, it will have the capability to undergo self-financing; thus, will be able to provide finances from savings for its investment. It has been observed by some scholars that the financial gap theory has testified to be one of those employed generally in the explanation of the phenomenon of growth in economics and as well employed in meeting all the requirements of financial decisions by the International Finance Institutions (Efendi, 2001; Easterly, 1999).

The Debt Overhang Theory

The body of literature on external borrowing and economic growth is filled with the perception of the indirect association between investment and external debt which results in limited capital formation. The negative relationship is explained by Krugman (1988) as "debt overhang", thus, the potentials associated with the repayment of the unpaid facilities are less than the value signed. Krugman gives a straightforward definition to the debt overhung problem as the current value anticipated of any possible allocation of resource that is less than its associated outstanding loan. Studies such as Chowdhury (1998) have supported the theoretical case for debt overhung. Debt overhang is noted to be the main cause of economic growth for economies associated with high indebtedness (Bullow & Rogoff, 1990).

Thus, countries experience a loss in their pull-on private investors, which results in a slowdown in economic growth. Chowdhury (1998) highlight that the revenue of the indebted country is consumed so much through servicing of debts to the extent that the possibility of restoring the paths of growth is shortened. They further advise that these countries' general economic performance can be negatively affected even if the government introduces structural adjustment programs. However, it is important to note that we do not encounter debt overhang only when there is an accumulation of excess debt. It can also occur when there is a change in the country's situations, making it tough in the management and discharge of its debt stock. Poor economic policies may cause such conditions to emerge. Also, loan portfolios of creditors will encounter heavier risks under such unfavourable circumstances. As a result, there will be panic between creditors, hence, a rush to claim their cash as well as loss of interest from likely new credits.

The Crowding Out Effects Theory

Crowding out typically occurs as a result of extreme charges of interest rates under worsened terms of trade for a country that is overly indebted whereas there is no longer availability of foreign credits. The fall in a country's assets available for investment, the financing of investment and other macroeconomic activities cause the decline in the level of investment (Claessen et al., 1996). According to Claessen et al., (1996), when there is a fall in the ability of a country in preserving its debt that arises from the crowding-out effect, it makes efforts to meet some of its tasks, reserving a minimal capital for investments domestically. For the crowding-out effects, its concepts suggest that debts by the government consume a bigger part of the

national savings which is supposed to be invested due to the upsurge in the demand for savings whereas there is a constant supply, therefore a rise in the cost of money.

This concept also comes in at a point in which the government, as well as its agencies, can secure borrowing owing to high charges of interest rates. The private individual or entrepreneurs remain crowded out of the market due to their inability to compete. The incapability of the economies to raise enough capital for investment purposes affects the growth of the economy. Further, Clements et al. (2003) made a confirmation of the earlier adverse reviews and the impacts of extreme borrowing were validated further. Taylor (1993) concluded that restraints in liquidity are caused by debt is the outcome of a decline in spending by the government due to the unceasing servicing of sock of debt outstanding beyond what the economy is capable of containing.

Developing countries have much interest in the association between the foreign loan and the development of an economy because debt overhang affects the investment level and growth in the economy (Karagol, 2004). As there is increasing servicing of debt, there is the withdrawal of earnings accrued from investment by foreign creditors from the domestic economy. Clements et al. (2005) explains that the removal of accrued earnings from the local economy also discourages new or potential foreign investments. According to Metwally and Tamaschke (1994), servicing of debt consequentially introduces wealth transfer to the international arena from domestic sources, hence, creating a particular accelerator effect that decreases the ability of the economy to develop while at the same time promoting its reliance on debts from external sources.

It is important to note that no identified theory directly link the relationship between government domestic debt arrears and private investment. The debt related theories reviewed in this section however, justifies the presence of some variables in the investment model (to be estimated in with respect to the first objective) and also explains why some SSA countries are in their current debt positions. For instance, the dual gap and financing gap provide the basis for the introduction of external bank in the private investment model. Thus, the dual gap theory highlights that signing up for foreign debt is better when the cost of investing the funds is below the returns that will be generated. The financing gap theory explains the need for external debt when domestically available funds are less than the funds needed for domestic investment. Again, the debt overhung theory cautions countries on the possible adverse impact of excessive domestic borrowing on the economy.

Theories of Investment

The basic traditional theories of investment that are covered are the accelerator theory, neoclassical, the profit and Tobin's Q model.

The Accelerator Theory of Investment

As associated with Keynes (1936a), the accelerator principle posits that a proportionate growth in capital stock is needed for a rise in the output of a firm. The capital stock in question is the optimum or the desired capital stock, given as K. Given that the capital-output ratio is constant and fixed at say v while the capital stock at optimum is a fixed proportion of output such that at any time t,

$$K_t = vY_t, \quad (1)$$

where K_t refers to the optimum capital stock at period t, Y represents the output in the period and v known as the accelerator is constant and positive. This implies that a change in output will trigger a variation in the stock of capital. The capital stock needs to be increased in line with a new level of output once there is the anticipation of an increase in output.

Clark (1917), therefore, explains that the sum of the difference existing between desired and existing stock of capital as well as the replacement that is needed in substituting the depreciation of the existing stock determines the level of investment. The assumption of fixed technical coefficients of production governs the proportionality of the desired capital stock to output in the simple accelerator principle. Thus, the optimal capital stock of a firm must be increased two-fold if the firm desires to double its output. It is shown that the simple accelerator becomes constant under the assumption that the returns to scale is unchanged, given that the factor price ratios stay unchanged.

The Flexible Accelerator Theory

One main flaw of the principle of simple accelerator is that the stock of capital is adjusted optimally with no lag in time. The theory works by removing this weakness. Between the output level and the level of capital stock, the flexible accelerator allows for lags in the adjustment process. Thus, according to this model, the optimal rise in capital does not transpire suddenly. Various factors (such as the capacity of utilization) do account for the adjustment speed. In the initial model, this is introduced by adding the distributed lags to cater for the interruption in adjustment (Koyck, 1954). Again, in this model, the basic concept is that, the wider the gap that exists

between the desired and existing capital stock, the higher the investment by the firm (Ghura & Goodwin, 2000).

Given that the demand for the output increases, this can be met by the firm first making use of its inventories and then making intensive utilization of its capital stock. Suppose there is a large increase in demand for output which persists for some time, by the response, the firm will demand more of its capital stock. This refers to the decision-making lag. In ordering the capital also, there may be an administrative lag. In raising finance to capital, there is a financial lag, because easily availability of capital and its abundance in the financial market are absent. Again, between the ordering of capital and its delivery, there exists a delivery lag. Given that varied decision and delivery, lags are available to different firms. In total, the impact of a rise in the demand on the stock of capital is distributed over time. Therefore, the stock of capital (K) at a particular time (t) will depend on all the levels of output (Y) in the previous years. Thus,

$$K_t = f(Y_t, Y_{t-1} \dots \dots, Y_{t-n}) \quad (2)$$

In the context of the flexible accelerator model, variables such as external financing cost, internal funds and output might be introduced as the drivers of K.

The Neoclassical Theory of Investment

As introduced by Jorgenson (1971), the neoclassical approach appears to be a form of the flexible accelerator model. For this approach of investment, the optimal or desired stock of capital is proportionate to output and capital cost. It is important to note that the cost of capital to users also is dependent on the real rate of interest, price of goods, the structure of the tax as well as

depreciation rate. Chirinko (1993), therefore, explains that the existing gap between the optimum and the actual capital stocks results in an investment equation. According to the neoclassical theory, the rule of the marginalist of maximizing profit is followed by firms during decisions of investment. It suggests that the capital's marginal product and the user cost of are the two factors that determine the fixed investment of businesses.

Factors such as the good's price, depreciation rate and the rate of interest in turn influence the user cost of capital. According to the theory, a firm will find new investments in fixed capital profitable, so long as the MP_k exceeds the user cost of capital. However, because of the law of diminishing returns, in the production process, the MP_k reduces as more and more capital is employed. A firm, therefore, has profit maximization at a point when it can acquire and make use of capital stock whereby MP_k is equal to the user cost of capital. It is said that the existing stock of capital has reached the optimum or the desired level when a firm can maximize its profit.

The Profits Theory of Investment

There are several variants to the study of the relationship existing between profit and investment. A major one is that the amount of retained profits, current profits as well as variables like price, sales and outputs affect the level of investment (Chirinko, 1993). According to the profit theory, higher gross profits will lead to a greater level of internally generated funds, hence, leading to a higher rate of investment (Zebib & Muoghalu, 1998). Thus, according to this theory, there is a relationship between profits, the level of current profits as well as the recent past. Firm-retained earnings are high when the total income and total profits are increased. For small and large

firms, retained earnings are very significant when there is an imperfect capital market since it costs less to use them.

High profits go with high retained earnings. The cost of getting capital is limited and the stock of capital at optimum is large. Thus, that accounts for why instead of storing in the banks to purchase securities or to provide shareholders with dividends, firms prefer to make reinvestments of their extra profit for investing. On the other hand, their investment projects are reduced when there are falls in their profits. This is known to be the liquidity version of the profit theory of investment.

Tobin's Q Theory of Investment

Tobin (1969) proposed the "Q" theory linking the investment decisions of a firm to changes in the stock market. When the shares of a firm are issued in the stock market to financing capital for investment, the prices of the shares reflect the firm's investment decisions. According to Chirinko (1993) and Ghura and Goodwin (2000), in this theory, the major force that influences investment is the proportion of the market value of capital stock existing to its cost of replacement (also known as the Q ration). This implies that if the rise in the value of the market of an additional unit is higher as compared to the replacement cost, enterprises will like to invest. As argued by Tobin, Q would be different from one (1) due to the delivery lags and the rising marginal cost of investment.

Thus, Tobin's Q, on which investment decisions of the firm depend, is calculated as follows:

$$Q = \frac{Market\ value\ of\ Capital\ Stock}{Replacement\ Cost\ of\ Capital} \quad (3)$$

The numerator refers to the capital value as determined by the stock market while the denominator refers to the actual or the real cost of the capital stock existing, given that it is purchased at today's price. The theory, thus, explains that net investment is dependent on whether "Q" is greater than $(Q > 1)$ or less than $(Q < 1)$ 1. The market value of the firm's share in the stock market is greater than the cost of replacement of its real capital and machinery if $Q > 1$. Additional shares and more capital can be bought by the firm in the stock market. Thus, more profits can be earned by the firm for the financing of new investment through the sales of new shares. On the other hand, given that $Q < 1$, the replacement cost will be greater than the market value of its shares, hence capital (machinery) cannot be replaced by the firm during the time of its worn out.

The discussion on the theories of investment indicate that private investment is extensively influenced by Keynesian, neoclassical as well as uncertainty variables. In the Keynesian model, some traditional variables that are included are internal funds, growth in GDP and capacity use. Tobin's Q, rate of interest, public investment and user cost of capital are the neoclassical drivers of private investment (Mlambo & Oshikoya, 2001). Variables such as rate of inflation, debt-to-GDP ratio and user cost of capital comprise the uncertainty variables. The current study derives the basis for the inclusion of inflation, government investment and GDP growth respectively in the private investment model from uncertainty model, Keynesian model and the Tobin's Q model.

The Interest Rate Channel

Two variations of crowding out are identified by Blinder and Solow (1973). These are the real and financial. Real crowding out, also known as direct crowding out, referring to the situation in which a rise in public investment results in a reduction in private capital formation. With direct crowding out, a substitution relationship exists between spending made by the public and private sector. This does not occur via variation in prices, the rate of returns required in the public sector and interest rates. However, it occurs through the consumption from the public sector and investment. Alternately, there is an indirect crowding out when the economy's private capital formation partially loses owing to the rise in interest rates resulting from the anticipation of the government's financial resources via bond-financing of fiscal deficit.

The outcomes of public actions affect the behaviour of private individuals either by changing the constraints on the budget or by persuading the prices faced by private agents via the rate of interest. To understand the possible effect of variations in borrowing by the government on interest rates, the standard benchmark is based on aggregate production function model for the economy whereby the debt of the government crowds out the productive physical capital. In the model, the rate of interest (r) obtained by the marginal product of capital (MPK), would rise if capital (K) was reduced, or was crowded out, by government debt (D). The Cobb Douglas production is provided as

$$Y = AK^{\sigma}L^{(1-\sigma)} \qquad (4)$$

where L represents labor units, and A represents the multifactor productivity coefficient. In the economy, the total return to capital is found as $(MPK * K)$, as a share of (Y) is equal to $(MPK * K)/Y$.

We derive the interest rate by

$$r = MPK = \sigma * \left(\frac{Y}{K}\right) = \sigma * A * \left(\frac{L}{K}\right)^{1-\sigma} \quad (5)$$

If crowding out occurs because of government, so that $\frac{\partial K}{\partial L} = -1$, then an exogenous rise in government debts will cause the interest rate to rise.

$$\frac{\partial r}{\partial D} = \left(\frac{\partial r}{\partial K}\right)\left(\frac{\partial K}{\partial D}\right) = \sigma * (1 - \sigma) * (Y/K^2) > 0 \quad (6)$$

(Because, $0 < \sigma < 1, Y, K > 0$)

The level of government debts as well as the capital stock determines the level of the interest rate. A change in the rate of interest is influenced by variations in government debts.

The Credit Channel

Government borrowing, in principle, influences private investment via the lending rate, in economies that are financially repressed. However, mostly in several countries, the interest rate at equilibrium can be slightly unresponsive to market perceptions. Government debt could significantly influence private credit but could have no significant impact on interest rates owing to government interventions like administrative controls that are forced on the rate of interest, direct intervention on credit allocation being in existence, high legal reserve ratio, government ownership of financial institutions, the existence of barriers that prevent other institutions from entering the market (Reinhart & Rogoff, 2009). According to Williamson (1987), the introduction of the 'artificial' constraints makes financial

institutions unwilling to take risks since a higher rate of interest is unchanged, leading to several high-yielding projects encountering credit rationing.

Private credit, therefore, will not be assigned based on the returns anticipated on the projects but based on the size of the loan, quality of the collateral, political pressure as well as the loan officer's covert benefits (King & Levine, 1993). Weaknesses in the legal institutions in enforcing contracts could lead to the credit rationing behaviour of banks. In this regard, changes in interest rates will either not correlate or have a weak correlation with government borrowing. This implies that if the channel of interest rate is feeble, the effects of government borrowing are captured by the quality channel.

Introduction and Definition of Financial Stability

In the efficient operation of the market economy, monetary and financial stability are critical. They serve as the foundation for rational decision-making regarding allocating real resources over time, thereby improving the saving and investment climate. Furthermore, their absence generates destructive uncertainties, which can promote misallocation of resource and a refusal to go into contracts that are intertemporal. Disruptions in the financial sector can have serious consequences for activities in the economy and political structures in extreme cases. The primary goal of financial authorities is, thus, to preserve stability. As a result, the incidence of periodic events of financial disorder has typically been credited to shocks from external sources or different forms of abnormal behaviour (Kindleberger, et al., 1978; Minsky, 1982). Gertler (1988) explains that the growing literature

on finance has only recently begun to be given more solid foundations of microeconomic for the phenomena of financial instability observed.

Also, to ensure the system's overall stability, expansion and integration of global financial markets have improved the relevance of actions. There is no widely recognized definition of financial stability as of yet. It can, therefore, be considered to be the existence of stability in the financial system. It can also be defined as a situation where there are no fluctuations in financial asset prices.

Sources of Financial Instability

For many years, the most common explanations for periods of financial distress were "cyclical" and "monetarist." The various forces contributing to cyclical excess have been studied by Minsky (1982) and Kindleberger et al., (1978). When a favorable occurrence causes asset prices to rise, the process that leads to a crash is frequently launched. If a long time has gone by since the last crisis and the incentive of greed has become stronger than the drive of fear, such a bid-up is more likely to occur. Price rises attract more buying in the hopes that the present price trend will continue, and paper profits make it easier for speculators to fund extra purchases on margin. Prices ultimately fall when they get to overvalued levels or when some external event pierces confidence, with terrible implications for investors, especially financial intermediaries, whose portfolios were financed with borrowed funds.

Monetarists think that financial instability will not start or become serious unless the money supply is disrupted (Friedman & Schwartz, 1986). They argue that monetary policy is the basis of financial instability. Mistakes in monetary policy can result in financial instability or modest interruptions

that have far-reaching implications. "Pseudo-financial crises," according to Schwartz (1986), are disorders that are followed by a major fall in the quantity of money.

The monetarist viewpoint is more theoretically self-contained, but it is somewhat limited in that it precludes the likelihood of instabilities originating from non-monetarist causes. This is a significant omission, given the importance of intermediaries in the financial system in enhancing the efficiency of intertemporal trade (Gertler, 1988). Recently, more satisfactory explanations have been provided by the insights from decision-making economics and game theory amidst uncertainties on the reason behind the act of agents in ways that can cause instabilities in financial institutions (Greenwald & Stiglitz, 1991). Improved understanding of the varied process whereby markets converge to equilibrium after a preliminary disturbance has aided in explaining certain categories of asset-price volatility.

Fragility in Financial Institutions

Financial intermediation's role: In recent years, there has been a substantial gain in understanding the importance of asymmetric information in shaping both the character of financial intermediation and the vulnerability of financial intermediaries to a rapid loss of confidence. Information asymmetry leads to problems with adverse selection as well as moral hazard, both of which the insurance industry has long been aware of. At a higher risk, individuals will insure, given that the price of insurance against a specific contingency is fixed regardless of the characteristics of the insured (adverse selection). Furthermore, once a contract is active, there is an incentive for insured agents to alter their behaviour in ways that harm the insurer's interests.

According to Akerlof (1970), the analysis is applicable to any market in which imperfect information exists regarding the quality of the goods traded. The example of Akerlof is the used-car market. However, a like phenomenon can be demonstrated to operate in the loan market. Borrowers know more about the features of risk-return of the projects where they want to invest than most savers. The interest rate would be too low for projects with high risks compared to return and too high for those with low risks relative to return if loan market prices were uniform, reflecting some average risk-return combination. An adverse selection would result in an unequal number of "bad" projects being presented for funding, while good projects would be self-financed.

When issues of adverse selection and moral hazard are severe, there can be a significant shrinkage in the market. Alternatively, there may be no price at which buyers and sellers are prepared to meet due to uncertainties regarding the quality of the goods or services being transferred. Naturally, a situation like this motivates institutional mechanisms to conquer the information asymmetry which causes moral hazards as well as adverse selection issues. When resources are pooled by ultimate lenders pool in an intermediary, they effectively hire an agent who agrees to discriminate between different borrowers and price loans based on the relative riskiness of the loans (Diamond, 1984). As a result, adverse selections are significantly reduced.

In addition, Stiglitz and Weiss (1983) explain that the intermediary is in a better position to monitor and influence a borrower's behaviour after the loan is signed, reducing moral hazards. Given that the intermediary is a commercial bank, depositors can be offered additional agency services. Illiquid loans,

which could only be realised previously at a discount on short notice, can now be bundled together as collateral for claims that, due to the law of large numbers, are not likely to undergo liquidation concurrently. A commercial bank can, thus, be observed as adding value through improved information and liquidity. As long as both lenders and borrowers have faith in the capacity of the bank in meeting its contractual obligations, market equilibrium improves. However, problems come up when the premise of the borrowers' continued trust in the bank is no longer valid.

"Runs" on financial intermediaries: It has long been understood that an absence of confidence in a bank can lead to a "run." However, the mechanisms of this phenomenon have only recently been rigorously described (Diamond & Dybvig, 1983). Liquid liabilities interaction that can be repaid on demand at par as well as illiquid assets that can be realised only on short notice through the acceptance of a discount on book value causes banks' vulnerability. When depositor withdrawals are over time random and assets are held to term, a commercial bank's portfolio is stable. A commercial bank that has a deposit base that is stable can hold adequate liquidity so that normal withdrawals can be met (plus a safety margin to account for fluctuations) and invest the remainder of its assets in limited liquid but assets that are higher yielding. Return on these assets allows the bank to have competition in the deposit market by contributing a liquidity package that is appealing, interest return and in-kind services. As long as bank depositors have faith in the solvency of the bank and in the readiness of other depositors to minimise their withdrawals, there will be stability in the situation.

If the rate of deposit withdrawals increases, however, it becomes reasonable for all depositors to attempt to withdraw their funds. They are all aware that if the withdrawals continue, the bank will be compelled to liquidate illiquid assets, resulting in losses and diminishing capital. Even if a depositor feels the bank is totally solvent under normal withdrawal conditions, and even if all depositors agree that keeping their savings would be in their best interests, they have the option to withdraw them. Because the bank's value is subject to numerous equilibria, this is the case (Diamond & Dybvig, 1983).

Asset quality problems: If advances in finance theory have improved our understanding of the dynamics of financial runs, what about the factors that trigger episodes of financial instability? Fears of liquidity loss sustain and intensify runs, but what causes confidence to erode in the first place? Banks typically fail as a result of declining asset quality. They make loans to fund operations that make a lot of money in good times but become vulnerable when the economy turns around. The discovery that a bank's poor loan portfolio is rising is usually the source of initial alarms. Why do banks continue to make bad credit judgments? Without a doubt, fading recollections of previous bad experiences contribute to the explanation (Kindleberger, et al., 1978). Other catastrophe-related phenomena such as disaster myopia, perverse incentives, the principal-agent issue and negative externalities have recently been discovered to have a systematic impact. Despite the fact that all of these characteristics of conduct have some element of simple irrationality, they are inherently more complex. Furthermore, they can all emerge without the help of any government-imposed skewed incentive (such as deposit insurance).

Expecting the authorities to protect financial players from the repercussions of their blunders can compound the situation.

When lenders' assessments of the potential distribution of economic outcomes (subjective probabilities) differ from reality, disaster myopia occurs. A variety of factors can cause disaster myopia, including a lack of foresight. Tragic outcomes, for example, may occur so infrequently that assigning a meaningful actuarial probability to their occurrence in the future is impossible. *Contagion*: Another explanation for the financial industry's perceived vulnerability to systemic instability is the assumption of failure contagion among institutions. The financial industry is regarded to be more susceptible to contagion than other businesses. This is true for two reasons in particular. First, the interbank market, over-the-counter derivatives transactions, and the payment and settlement system are all connected by a web of claims and liabilities (Schoenmaker, 1996). These have grown in importance and complexity in recent years as national and international capital markets have become increasingly linked. Second, information asymmetry makes it more difficult for creditors to determine the strength of a financial institution based on publicly available information than in other industries. Creditors may be inclined to see problems at one company as a hint of weakness at other companies that have a similar corporate structure.

The literature on bank failure contagion reveals that the particular conditions that banks encounter can lead to a variety of outcomes. It is thought to: (a) occur more quickly, (b) spread more widely, (c) result in a higher number of failures, (d) result in higher losses to creditors, and (e) inflict more harm to the economy as a whole. The empirical research does not support

these claims (Kaufman, 1986), but as explained by Schoenmaker (1996), counterfactuals from a period when official policies were intentionally geared toward avoiding contagion are difficult to draw. The risk of contagion lies at the heart of the justification for government interventions in the regulation of the financial industry, in some form or another.

Due to their key function in the mechanism of payments and their role in producing (rather than simply intermediating) credits, banks have traditionally been singled out for special attention. It was widely considered that non-bank intermediary concerns were less likely to cause systemic problems. The monetarist tradition supported this stance. However, there is a growing trend to include a larger variety of financial intermediaries, whether or not they participate directly in the payment system and whether or not they are banks, as a possible pathway for the transmission of systemic troubles (Davis, 1996).

The Framework of Financial Stability

A relatively sound financial stability framework can improve people's understanding of financial stability policies and the enforcement of financial regulations. Many international scholars and organisations have debated and analysed the framework of financial stability without reaching a unified conclusion. Furthermore, most debates are limited to academics and have not been applied to real-world policies. Many scholars use the "shock-reaction" model, which is a traditional method of analysis. They typically examine financial stability policies through the lens of a financial system's reaction to an external shock and the ensuing financial crisis (Krugman, 1979; Mishkin, 2000). External shocks, including the international and domestic

environments, as well as the banking system, are transmitted through interbank risks and debts, resulting in financial instability, according to the National Bank of Belgium.

Houben et al. (2004) attempted to conduct an overall assessment of microeconomics, currency, financial markets and regulatory costs, using financial stability as one scheme in analysing possible risks and fragility. They were of the view that the framework for financial stability should comprise analysis, appraisal and three policies that are realistic. Furthermore, some scholars and organisations believe that, in addition to the information revolution, globalization and financial innovation, an emergency response mechanism as well as competition is required to maintain financial stability. A timely check and elimination of the time lag in the payment and clearing system is required to constructively use market forces in the prevention of the emergence and spread of any financial crisis.

The IMF and World Bank's Financial Sector Assessment Program (FSAP), published in May 1999, expresses a grave concern about the systematic risks and fragility of member countries' financial sectors. It aims to determine the benefits and drawbacks of the member countries' financial systems through an assessment of their financial organisations, financial markets, payment systems, regulations and legal systems, to control its major source of danger and devise a response method. The FSAP emphasises that financial stability is evaluated based on 28 factors, including risks in interest rate, exchange rate, credit, liquidity, share and house prices. However, the evaluation is often subjective.

Western Macrotheory Analysis of Financial Stability

Financial stability in the business cycle theory

Analyses of bank crises are frequently supported by business cycle theory in Western traditional macroeconomic theories, as seen in the hypothesis about the insecurity inherent in the banking system (proposed by Veblen in 1904) and the cumulative expansion caused by a market interest rate l (proposed by Wicksell in 1898). The emphasis on anticipation and uncertainty placed by Keynes (1936a) is a significant contribution to the discussion of financial insecurity in economic cyclicality. He attributes the economy's cyclical fluctuations to the MEC. According to him, a crisis is precipitated not only by overinvestment as a practice but also by an investment environment that fails to meet the expectations of investors. In other words, rather than rising interest rates, a falling MEC is usually to blame.

In times of prosperity, widespread optimism about investment returns leads to the proliferation of capital goods, and returns on new investments are unlikely to fall dramatically as long as the economic boom continues. However, a reversal of the market trend can cast doubts on profits such a speculation will circulate rapidly, causing a dramatic drop in MEC and, eventually, a recession. Borio and Lowe (2001) explained the financial system's inherent cyclicality, pointing out both the perception of risks and the willingness to take risks change in response to economic fluctuations. Deposit/loan surplus, prices of asset, rating of bank risk as well as measures of expected losses in accounting (such as loan loss reserves) are all pro-cyclical, which means that their interaction with the real economy can magnify the effects of economic fluctuations.

Financial Instability Hypothesis

Minsky (1982), proposed the "financial instability hypothesis," a theory that has significantly impacted the history of financial crises. He believed that the characteristics of lenders (represented by commercial banks) and borrowers endowed the financial system with inherent insecurity. There are three types of finance in the real economy: "hedge finance," "speculative finance," and "Ponzi finance." The process of economic cyclical changes will see "hedge finance" replaced by "speculative finance," and then "speculative finance" replaced by "Ponzi finance." Widespread "replacement" will raise asset prices for the assumed beneficiaries, resulting in overheating and overinvestment, which will be quickly followed by increased speculation and bubbles throughout the economy. Worry about the future takes hold during this stage, which will develop into a panic before a market meltdown if bank loan payments are not kept up.

This demonstrates that the behavioural characteristics of lenders and borrowers determine financial fragility. Minsky (1991) identified two culprits, in addition to the "long waves" of capitalist development, to shed light on the recurrence of financial crises: (a) "generational ignorance," which refers to the fact that the pain of previous financial crises no longer preys on the minds of lenders today, when cyclical bonanzas present a new rosy picture, keep expected asset prices rising, and fuel credit expansion; and (b) "rivalry pressure," which refers to lenders' fear that fierce competition will deprive them of customers and market shares.

Monetarists Viewpoint on Financial Stability

Monetarists such as Friedman and Schwartz (1986) emphasized the financial system's stabilising effects of currency. They held that currency demand is a steady function, that money quantity is a determinant of prices and output, and that its growth and changes are a serious factor in the emergence of financial crises. The monetarists define financial instability as the "illiquidity of the money market". The monetarists' focus is on the quick rise and fall of liquidity, which leads to an irregular and inconsistent monetary policy undertaken without regard for the probable trade-off between inflation and economic growth (Vo et al., 2019). Financial and economic instability in the long run, according to the monetarists, is caused by the excessive intervention by the government through excess expansionary monetary policies, which are later followed by reversals of policies and rapid withdrawals by the central bank.

This can be in the form of a drop in the interest rate or increasing the provisions in liquidity which become inflationary (possibly because of the surge in aggregate demand as compared to aggregate supply). Central bank's counter-response to the outcome of inflation from the policy implementation, in turn, reduces the liquidity existing in the money market and within financial institutions which could lead to panic in banks and bank runs, hence, worsening the illiquidity in the money market (Borio & Drehmann, 2011; Vo et al., 2019).

Within the US and the UK's monetary trends, it was discovered that banking or currency was somehow responsible for four of the six bouts of the United States' financial tailspin and economic recession that occurred from 1867 to

1960. Brulmer and Meltzer, two American monetarists, discovered a link between the rate of (volatile) money stock growth and bank crises.

The rate of growth of money stock has a significant impact on the emergence of financial crises. Even in times of economic equilibrium, severe deflation caused by the central bank's mismanagement of the money supply will force banks to sell assets in order to keep the reserve currency they require. Due to the resulting drop in asset prices, interest rates will rise, undermining bank solvency and depositor confidence. Banks will fail if they become insolvent or illiquid. This, in turn, will reduce the money supply even further, causing problems for banks and eventually triggering a financial crisis. According to the monetarists, instability in the financial system can be solved by implementing monetary policies that can support economic growth. Therefore, they advocate the steady expansion or contraction of monetary aggregate in the promotion of economic growth.

Relations among Financial Stability, Economic Growth and Development

In general, Western researchers believe that the relationship existing among financial security, economic development and growth in the economy is both mutually restrictive and beneficial. On the one hand, sound financial intermediaries and a stable financial market are beneficial to economic development and growth; on the other hand, financial instability or even crisis is detrimental to economic development and growth, even causing regression (Goldsmith, 1969; King & Levine, 1993). Furthermore, the rate, quality and structure of economic growth can all have an impact on financial stability (Mishkin, 1999). In relation to economic growth, financial development can be underdeveloped, overdeveloped or well suited. However, in each of these

three scenarios, financial insecurity can cast a pall over economic development and growth.

At the moment, we are witnessing a flood of financial innovation, a continuous update of technology, and a rise in the number and variety of financial institutions, goods and services. As a result, financial institutions have overlapping business operations, higher efficiency and greater scale advantage, while financial regulation must broaden its control in order to address a more looming financial instability.

Western Microtheory Analysis of Financial Stability

Many economists have begun to investigate financial stability and crises, a macroeconomic phenomenon, from a micro perspective since the 1980s. They have made significant advances in this field by developing doctrines, theories and analytical models like information economics, principal-agent theory and game theory.

Diamond and Dybvig (1983): The Bank-Run model

The bank-run model was derived from Kindleberger's sunspot theory, which attributed banking instability to uncertainties about depositors' liquidity requirements and lower liquidity of bank assets in relation to bank liabilities. Diamond and Dybvig (1983) used the game theory and the argument about information asymmetry to explain the origins and consequences of bank runs. They claimed that bank runs are caused by a lack of confidence and come at a high cost. Bank failure has a two-pronged negative impact: it halts productive investment and destroys optimal risk-sharing among depositors. Bank runs can result in the monetary system collapsing and other economic problems. Governmental deposit insurance can be used as a hedge or antidote to bank

runs, but only if the government collects optimal tax; otherwise, the tax distortion and cost problems caused by using this remedy can reduce social welfare.

The bank-run model was then supplemented and refined by Chari and Jagannathan (1988). Gorton (1985, 1988) developed an information-based model in which depositors' lack of knowledge about banks leads to incorrect predictions about future deposit returns and bank solvency. Stated differently, because banks' private information is available, depositors tend to make poorer decisions based on "investment noise" than they would in a fully informed environment. As a result, the problem of stability is not inherent in the banking system but can be completely controlled by banks themselves. Chari and Jagannathan (1988) divided depositors into those with more information and those with less information, with the latter acting based on what others do. Bank runs, in this sense, are the irrational result of rational actions on the part of some individuals. Jacklin and Bhattacharya (1988) discussed the impact of uncertainties about the return rate on investment on the banking system and identified several contributors to bank runs, viewing bank runs as "systematic" incidents triggered by changes in relevant economic indicators. Gorton (1985) expanded on the research, concluding that if banks have enough capital, there will be no public fear of capital loss, and thus no bank runs. However, there has been no corroborating research evidence as to how to define such "sufficiency" in terms of how much capital a bank must have until now.

Theories of Financial Stability/Instability

Theoretically, explanations for stability/instability in the financial sector include the monetarists' view represented by Friedman and Schwartz (1986) and the post-Keynesian financial instability hypothesis provided by Minsky (1982) and Borio and Drehmann (2011).

The Post-Keynesian Hypothesis

According to the post Keynesians, financial instability is the situation whereby the financial system cannot withstand shocks, is unable to continue performing its key role of channelling funds from the surplus spending units to others having productive investment opportunities, and also manifests distortions in the financial system. Thus, occasionally, the build-up of financial imbalances tends to slow down, resulting in repeated successions (Mishkin, 1999). Emphasis is placed by the post Keynesians, including Minsky (1991), on "uncontrolled or expansion of excessive credit" which is later followed by the "rush" of debtors in liquidating their assets in a bid to pay off debts that are outstanding at the time of contraction in the economy, following the instability and speculative behaviour of actors in the market.

The post Keynesians argue that lenders and borrowers have a high expectation that prices of assets will continuously increase beyond their real values. Hence, when prices of real assets are unable to increase, actors quickly realise that their cash inflows do not make it possible to honor their debt repayment obligations, resulting in bursts and financial bubbles. Attempts are made by all borrowing agents in liquidating their real assets as efforts to meet their obligations of debt servicing, which results to a reduced confidence and collapse of credit also leading to illiquidity in the financial institutions, hence,

unable to meet the demand for cash. Thus, according to the post-Keynesians instability hypothesis, instability in the financial system is a result of the "excess optimism on the part of both borrowers and lenders which is motivated by prosperity in a capitalist system" and hence provides the suggestion that stability in the economy in itself leads to instability.

In conclusion, no identified specific theory explains financial stability gap and its drivers. The current study therefore aligns itself with the monetarists view on financial stability. Thus, according to the monetarists, financial stability is mainly concerned with the liquidity status of financial institutions; highly liquid implies financial stability while highly illiquid status means means instability in the financial system. From this theoretical view, this study is built on the premise that factors that reduce liquidity increases the gap in financial stability and vice versa.

Empirical Review

Determinants of Private Investment

The factors that influence private investment have been the subject of a large number of empirical research. Frimpong and Marbuah (2010), for example, used the error correction technique inside the Autoregressive Distributive Lag framework to analyse the determinants of investment in the Ghanaian private sector. During the short term, inflation and government investment affect private investment; in the long run, external debt, openness, real interest rate and real output all have a substantial impact on private investment. In a similar study by Asante (2000), the Ordinary Least Squared estimation technique was used in modeling the behaviour of private investment in Ghana, with data dated 1970 to 1992. The findings revealed that

government investment, a real credit to the private sector and the rate of growth have a direct effect on private investment. The study further found corruption and over-valued exchange rate to be detrimental to private investment.

Again, observing the fall in Botswana's private investment for the period, 1976 to 2003, the drivers of private investment became an area of concern. Lesotlho (2006) evaluated the macroeconomic drivers of investment in Botswana's private sector using the co-integration and the ECM. The econometric findings reveal that there is dynamic adjustment in the short run and the long-run association between private investment and macroeconomic variables such as interest rate, private sector credit from banks, GDP growth, and public investment. Also, Ghura and Goodwin (2000) studied the drivers of investment by the private sector for the period, 1975 to 1992, for 31 countries within Asia, Latin America and SSA. The results which chose the random effect estimation technique ahead of other options indicated that an increase in GDP growth, financial intermediation and government investment improves developing countries' private investment. Reduction in the world interest rate and credit to government increases private investment. However, the study failed to confirm the detrimental effect of external debts on private investment. Further, it was argued that the full sample results are not true across the regions used. Thus, the GDP growth effect was insignificant in SSA while the positive effect of government investment is only felt in SSA.

Badawi (2005) examined the impact of macroeconomic policies on private investment in Sudan using annual data from 1969 to 1998. To assess the coefficients, the cointegration technique was combined with vector

autoregressive (VAR) and error correction estimating techniques. Interest rates, lending, public investment, and devaluation were among the macroeconomic variables examined. According to the study's conclusions, public investment discourages private investment in Sudan. Private loans and interest rates had a beneficial and negative impact on private investment in Sudan. Sudanese devaluation policies, according to the findings, hinder private-sector capital expansion.

Using a panel data model, Anyanwu et al. (2018), evaluated the crowding-out effect of 28 oil-dependent nations from 1990 to 2012. Both fixed effect estimators and the generalised method of moment estimators showed that increasing government borrowing from home banks decreases private sector credit. Banks lending to the private sector, on the other hand, has minimal bearing. Controlling for interest rate, GDP growth, and public debt, the Johansen approach and the Engle-granger cointegration method were used. Kingwára (2014) revealed a significant inverse relationship between government debt and private sector investment using data from 1967 to 2007.

Also, in the case of Egypt, the effect of government borrowing was investigated by Fayed (2013). The cointegration test introduced by Johansen (1991) as well as Johansen and Juselius (1990) was employed in determining the long-run association. Further, in finding out the speed of adjustment, the VECM was employed. The findings showed that there is the possibility of government borrowing crowding out bank's credit to the private sector. Thus, government borrowing and investment by the private sector are inversely related to the Egyptian economy. Further, it is reechoed that government should assist in providing guarantees to banks so that they will not be

discouraged in their provision of credits to the private investors, more especially those operating on small-scale enterprises and enterprises that are export-oriented. There should be a more establishment of investment banks to provide a complementary role in credit provision or provision of support to the private sector.

Lidiema (2018) investigated the short and long-run co-integration connection between debt from domestic sources and Gross fixed capital creation using the Auto Regressive Distributive lag (ARDL) model once more. Domestic debt has an inverse association with gross fixed capital creation, according to data on the Kenyan economy from 1975 to 2014. The study also discovered that development in the financial sector encourages the formation of gross domestic capital. As a result, the findings demonstrate that the government's excessive borrowing is harmful to Kenya's economy.

Using Nigeria as the case study, Okorie (2013) studied how private sector influences investment in the domestic economy. The study, which made use of the ECM, showed that a rise in credit for the private sector has the potential of increasing domestic investment by the private sector though this relationship was not statistically significant. Thus, domestic private investment in Nigeria increased by 6 percent as a response to a 10 percent upsurge in private sector credit. The study concludes that though there is a non-statistical significance relationship, private investment in Nigeria needs to be improved through the provision of credit.

For the case of Ghana, Akpalu (2002) studied the drivers of private investment by employing an annual data covering the years 1970 to 1994. The variables used include private investment, consumer price index (CPI), credit,

per capita GDP and lending rate. The study made use of the Engle-Granger Two-Step procedure and Johansen multivariate test. It was revealed that in the short run, private investment is more responsive to the availability of credit, growth in real per capita income and government investment. Specifically, the findings showed that in Ghana, government investment reduces investment by the private sector. In both the short run and long run, a negative and significant association was found between capital cost and private investment. The CPI was determined to be statistically insignificant in both eras. The study also discovered that there is a statistically significant association between private investment and real GDP in both periods. In the short run, however, this link is not substantial. The study's findings support the accelerator principle's validity in the Ghanaian context.

Again, in a study by the World Bank, the association between investment by the private sector on one side and real government investment, private sector credit, corporate tax revenues, dummy for 1976 and real public investment was empirically tested by Islam and Wetzel (1991). In 1976, there was a large and unexplained drop in private sector investment, hence influencing the inclusion of such a dummy in the model. The OLS method was used in this study. An inverse relationship was found between the government investment and the private sector investment. This, therefore, contrasts the result of Asante (2000) but confirms that of Akpalu (2002). Again, the findings established a direct association between the flow of private sector credit and corporate tax revenue. However, though the expected negative effect was found, the real interest rate had no significant effect on private investment.

Finally, Alzahrani (2018) investigated the impact of government debts on macroeconomic variables such as investment and well-being indicators using both countries in the G7 and Asia. As a result, the study looked at how government debts affect investments made by indigenes and foreigners, as well as the per capital GDP and human development index for the sampled areas. The FE and RE estimate methodologies were employed on annual data from 1995 to 2015. The data revealed that whereas government debt favors macroeconomic indicators in the G7 countries, it adversely affects macroeconomic indicators in the ASEAN countries. Thus, the amount of investment is directly affected by government debt, which expands the economy's modernization and encourages its development, according to numerous parameters. From the above evidence (and most likely, others that were not captured), it can be argued that the role government domestic arrears play in variations in private investment has not been considered by most empirical studies. However, few studies have looked at the economic consequences of arrears in certain parts of the world (Checherita-Westphal et al., 2016; Ramos, 1998). With the increase in SSA arrears, the importance of private investment in the progress of SSA nations, and the scarcity (if not complete lack) of empirical research addressing this apparent link, it is critical to objectively uncover the influence of government arrears on investment made by the private sector.

Determinants of Financial Stability and the Gap

A large number of empirical research have looked into the factors that influence financial stability. Ozili (2018) as well as the IMF (2019) for African countries are notable in the existing literature. For the period, 1996 to

2015, Ozili investigated the primary factors of financial stability in 48 African countries. Banking instability was measured using four varied indicators: loan loss coverage ratio, risk of insolvency (using the Z-score), ratio of NPLs to gross loans as well as the standard deviation of development in the financial system. The study found that the main drivers of financial stability include banking efficiency, banking concentration, government effectiveness, presence of foreign banks, political stability, investor protection, quality of regulations, control of corruption and the levels of unemployment. More importantly, the study highlights the relevance of the quality of institutions in determining the stability in the African financial system.

Another study by Vo et al. (2019) examined the variables that influence instability in the financial system in developing countries. Using the period of 2000 to 2017, panel data for 17 developing countries was created. In ensuring robustness, estimation procedures like the FE and RE as well as the pooled OLS were employed. Using the growth in credit as a proxy for financial instability, the empirical findings indicated that inflation rate, growth in GDP, changes in the reserves of foreign exchange, growth in the rate of the monetary base, the ratio of the banking sector's return on equity, returns in the stock market as well as the lending rate are the main drivers of financial instability. Particularly for developing markets, the findings appear to be in line with the post-Keynesians relating to the mechanisms that lead to instability in the financial system. Also, in applying individual variables in the detection of the evidence of instability in the financial system of a forthcoming financial crisis, both the post-Keynesian and the monetarists observe a collection of indicators that is a representation of their views.

Empirical evidence was provided by Navayas and Thegeya (2013), invalidating such financial indicators for the period 2005 to 2012 using 80 countries. Quality of assets were proxied by NPLs while the return on equity ratio was also used as a proxy for the profitability of the bank. The results indicated that the lagged variables of the two proxies have a positive effect on the occurrence of distress in the banking sector. Commercial and co-operative banks both represent credit institutions that make use of varied approaches in their operations of core processes.

Identifying the limited attention given to the analyses on co-operative banks in the financial literature, Diaconu and Oanea (2014) studied the major drivers of stability banks and analysed whether there exist differences between co-operative banks and commercial banks. The models that made of the Z-score as a measure of financial stability were fitted in terms of co-operative banks only while insignificant factors were identified for the commercial banks. The study found growth in GDP and offering rate of interbank for 3 months as the statistically significant variables inducing the stability of cooperative banks.

Recently, Van Duuren, Haan and Van Kerhoff (2020) studied whether the connection between financial stability and financial stability transparency index is dependent on the quality of institutions. The study used the fixed effect estimation technique to analyse annual data for the period, 2000 to 2011. Financial stability was proxied by NPLs. The findings approve previous results that transparency in financial stability enhances the rate of stability in the financial system of a country. The findings, however, suggest that

transparency in financial stability is statistically significant and relates indirectly with NPLs of banks that have minimal institutional quality.

Similarly, Klomp and de Haan (2014) studied the impact of regulations and supervision by banks on bank risks. For the period, 2002 to 2008, 371 banks sampled from non-industrial countries were used. It was found that bank risks are minimised by strict bank regulations and supervision. The strength of this relationship is found to be highly dependent on the institutional quality in the country. The findings also revealed that regulations on capital and supervisory controls reduce the riskiness of banks while regulations of liquidity and restrictions on activities lead to a reduction in banking risks solely when there is the existence of a high institutional quality level.

Again, Jokipii and Monnin (2013) examined the effects of economic factors like growth in real output and inflation on stability in the banking sector. They employed quarterly data for 18 countries from the OECD for the period of 1980 to 2008. Estimations from the VAR model showed that growth in real output directly affects stability in the banking sector. The study, however, found no association between the rate of inflation and stability in the banking sector. Also focusing on economic factors, Segoviano and Goodhart (2009) confirmed that unexpected fluctuations in the cycles of the economy, as well as the effect of the booms and recessions, can hurt the stability in the banking system. The study, however, concluded that the identified relationship is different from country to country. A bank's performance and unemployment level have been argued to have a relationship.

While controlling for unemployment, Heffernan and Fu (2008) analysed the drivers of bank performance using 96 banks in China for the

period, 1999 to 2006. They made a prediction that increasing unemployment can decrease aggregate demand and cause a rise in the default rate on loans, therefore, introducing an inverse relationship between unemployment level and performance of banks. Performance of banks being a crucial driver of bank stability, unemployment is then predicted to directly influence stability in the banking system. The analysis, therefore, showed that an indirect relationship exists between unemployment level and bank performance.

Also, on the performance of banks, Boateng et al. (2015) examined how ownership of banks in China affects bank performance. They used data for the period 2000 to 2002 for 111 banks in China. The study found that commercial banks with foreign ownership have limited non-performing loans and the general performance, though there are reduced profits as compared to domestically owned commercial banks. The findings also showed that banks owned by the state make more profits and have a better liquidity status as compared to the domestic and foreign-owned banks. Also, at bank levels, the results showed that the ration of equity/liability significantly affect the performance of banks while on the economic factors, growth in GDP, per capita GDP, unemployment and inflation have a significant impact on the performance of banks.

Drivers of financial stability can either be internal or external to the financial institution under consideration (Githinji, 2016). This conclusion was made when strategies used in improving the financial stability of Kenyan's commercial banks were determined. Thus, drivers of financial stability categorized to be internal and external were established in this study. For this analysis, the random sampling method was adopted in selecting respondents

within the top managers of the Kenyan commercial banks. Descriptive statistics and regressions were used for the analysis of the data from the 82 respondents. The results showed that financial stability is affected by the commercial banks' operating costs, size of the board, size of the bank, productive employees, size of capital and sound interest rate policy. From the model summary results, it is indicated that 26 percent and 29.1 percent of the variations in financial stability are accounted for by the internal factors of the bank and external factors respectively. Thus, the external factors found to impact stability in the financial system of commercial banks include exchange rate, interest rate spread, inflation rates, interest rate and growth in GDP. The results further indicated that in enhancing financial stability in Kenya, commercial banks use bank policy, financial innovations, income diversification and supervision.

Also, with 33 commercial banks in Kenya as the sample, Munyasya (2013) aimed at analysing the effects macroeconomic variables have on internet banking. The RE model was used to analyse data from the years 2002 to 2012. It was found that economic growth and inflation rates, as well as some bank-specific factors like asset-based banking, have an impact on internet banking. Non-performing loans, profit of the bank and interest rate, however, were found not to be determinants of internet banking. The effect of interest rate was investigated on the financial stability of commercial banks. According to Podder (2012), there is an apparent relationship between the said variables for smaller banks as compared to larger banks. The findings indicated that in a time of recession, a fall in interest rates leads to slower growth in loans provided by banks while causing a rise in NPLs at the same

time, hence a rise in loan losses. Podder (2012) indicates that when the market rates are witnessing a falling trend, the smaller commercial banks might experience many difficulties in keeping their financial performance.

Das et al. (2010) examined the association between public debt management and stability in the financial system as well as the medium through which the two variables are interrelated. The paper concludes that improper management of debt and debt structures can highly prevent the ability of a ruler in ensuring financial stability. This is because the risk perception of investors on the country is affected, intensifying pressures, at the initial stages on the financial institution's capital reserves, incomes, and eventually on the balance sheet of the sovereign, therefore increasing sovereign risk. The association existing between sovereign risk and stability in the financial system can work through a feedback circle. Thus, inappropriate management of debt has the possibility of worsening the stability in the financial system, which in turn intensifies sovereign risks (Das et al., 2010). It is further concluded that an appropriate debt management can help guarantee financial stability through the creation of a structure of liability for public debt that ensures the sustenance of low levels of refinancing risks.

Financial inclusion has recently become a major technique to promote financial and economic development. Motivated by the limited attention in this area, Amatus and Alireza (2015) examined the association between financial stability and financial inclusion, using panel data for 35 SSA countries. They controlled for other macroeconomic variables, and used the z-score of banks for measuring financial stability and commercial banks' outstanding loans as a financial inclusion. The analysis showed that financial

stability is inversely affected by the outstanding deposits with commercial banks. This indicates that in SSA, there are less diversified deposit accounts held with the commercial banks. Loans outstanding do have a direct role in financial stability.

On the control variables, the study further showed that financial crisis, private sector credit and inflation reduce financial stability while per capita GDP affects financial stability positively. In a related study, the association between inclusion and stability in financial system was analysed empirically by Morgan and Pontines (2014). They investigated whether the said variables are either complements or substitutes, given the inclusive argument in the literature. Thus, the effect of a number of procedures for inclusion estimated on stability proxied with the NPLs as well as bank's z-score. The findings show that a rise in the portion of lending to SMEs increases stability in the financial system, largely through the reduction of NPLs and the likelihood of financial institutions having a default. This, therefore, confirms the direct association from inclusion to stability via the lending of funds to medium-sized enterprises.

In the quest to obtain the status of an emergent country over a considerable period, a good number of African countries are adopting improved economic reforms in their monetary systems. Piabuo (2015) states that Cameroon is making efforts to be emergent by the year 2035. The study sought to detect both the short-run and long-run effects of development in the financial sector on economic growth and verify the gap existing in the financial sector development that differentiates Cameroon and South Africa as an emergent country. Using the VEC model, the long-run association existing

between development in the financial system and growth in the economy was identified in Cameroon while the short-run association between growth and bank deposit was noticed for the South African economy.

In South Africa, the variables were found to be correlated in the long run. After economic shocks, the findings indicate that the movement of the economy towards equilibrium in the long-run is faster in South Africa due to the improved financial system. A gap of 0.26 was found, implying that the Cameroonian economy can become emergent if the long-run speed adjustment is increased by 0.26.

Almarzoqi, Naceur and Kotak (2015) identified the policies that affect the development of financial institutions according to the measurement across three dimensions namely, efficiency, stability and depth. Making use of the concept of financial possibility frontier that was respectively developed and formalised by Beck and Feyen (2013), and Barajas, Thorsten, Era and Seyed (2013), the study identified the major policy variables that influence the gap existing between actual development levels and the predicted benchmarks by the structural variables. Estimations from the dynamic panel reveal that key variables such as trade openness, quality of institutions, crises in banking and inflation significantly affect financial development, hence, the gap. The analysis further enables the identification of possible trade-offs and complementarities for policymakers according to the policy variables for the diverse phases of financial development.

An examination of the financial inclusion and development in the Central African Economic and Monetary Community (CEMAC) was made by Alter and Yontcheva (2015). Through the use of a benchmarking exercise, the

study explored the level of inclusion in the financial system in the CEMAC. A measure of the gap in financial development was created and its determinants were identified. The panel regression analysis showed that income and inflation explain the majority of the level of financial development while governance of the finance sector as well as stronger economic governance has a direct connection with the development of the financial sector. It was concluded that gaps in financial development do exist for both richer and poorer countries.

Using extensive firm and country-level data sets, Allen, Carletti, Cull, Qian, Senet and Valenzuala (2016) argue that most SSA countries' financial sectors are significantly underdeveloped by other developing countries' standards. In comparison to other regions, the study reveals that Africa's population density is substantially more important for the banking sector. The study used Kenya as an example of a country that has lately been reasonably successful in financial inclusion and banking sector development to understand better how countries might overcome the increased costs of creating viable banking sectors separate of large metropolitan areas. The findings revealed that Equity Bank has a direct and considerable impact on financial access, particularly for low-income families. According to the study, the business model of the Equity Bank offers services to a segment of the populace that has been apparently sidelined by the traditional commercial banks and hence in the process, generating sustainable profits.

In a similar study, Allen, Carletti, Cull, Qian, Senbet and Valenzuela (2014) analysed the financial development in Africa and gaps in financial inclusion in relation to other peer countries that are developing. A set of

variables having a relationship with financial development and inclusion were used. The gaps that exist between African and other developing countries having the same rate of economic development were estimated. The drivers of financial development, as well as inclusion, were further explored. The findings revealed that population is a key driver of financial development and inclusion in Africa as equated to other developing countries. The analysis also provides evidence that innovation in the financial services in Africa such as mobile banking has aided in overcoming problems related to infrastructure and enhanced financial access. With the discussion on the financial stability gap, Fahr and Fell (2017) argued that macroprudential policies are needed for closing the gap in financial stability while monetary policies are needed for the stabilization of prices.

According to a critical evaluation of the literature, a substantial number of research have looked into financial system stability, financial development, and financial inclusion, notably in Africa. Though only a few studies have attempted to uncover the gaps that exist between actual financial system development and the projected benchmark of financial development, it is right to mention that studies on gaps in financial stability specifically have not been made especially in the SSA sub-region. Indeed, Fahr and Fell (2017) identified the existence of financial stability gap in their study and suggested the best means of addressing it but they provided no quantitative estimation for it. Also, drivers of the financial stability gap have not been covered by the literature. Indeed, the reviewed studies present closer analyses, by focusing on the factors that influence stability in the financial system (using varied measures of financial stability) in some specific countries, and regions as

drivers of the gaps in financial development (Almarzoqi et al., 2015; Alter & Yontcheva, 2015). The current study, therefore, seeks to estimate the gap in financial stability in SSA and derive the factors that determine the financial stability gap in SSA and its sub-regional communities.

Effects of Financial Stability on Investment

The main focus of this section is to explore the literature on the relationship between financial stability gap and private investment. The existing literature investigates this relationship in diverse ways including the influence of financial stability, financial instability, or financial development on indicators such as GDP growth, per capita GDP, private or public investment, and other important macroeconomic indicators. For instance, a study by Boateng, Amposah and Annor (2017) analysed the joint effect of FDI and financial development on domestic investments in 16 sampled countries. The study employed yearly data for the period 1980 to 2014 and also made use of the FMOLS, OLS and the FE estimation techniques. The empirical finding showed that inflows of FDI are complemented by financial development to enhance investment domestically in SSA. Also, the results showed that the direct effect of variables like growth in real GDP, trade openness, domestic savings and financial sector development promotes investment while domestic investment is hindered by variables such as inflation and lending rate. Thus, the paper concludes that strengthening the financial sector requires much attention because it serves as a significant channel through which investments from domestic sources can be impacted by FDI.

The financial system is argued to be providing a complementary role to the economy's real sector. In this regard, the role of the financial system has

been of keen interest to researchers and policymakers. Aghaei, Kouhbor and Ahmadinejad (2018) investigated the association between stability in the financial system and economic performance in OPEC countries. The paper used a dynamic panel model on annual data spanning the period between 2000 to 2006. Thus, controlling for the impact of countries' financial deepening levels, the system GMM estimator was used. Different measures of stability such as institutional indicators, author-introduced indicators, as well as micro and macro indicators were used. For economic performance, indicators such as growth in household per capita consumption, growth in per capita GDP as well as growth in investment were used. The findings indicated that financial stability has a directly significant effect on the OPEC countries' economic performance. Precisely, stability in the financial system enhances growth in per capita GDP, per capita consumption of households and investment of the OPEC countries.

In a similar study, Creel, Huber and Labondance (2015) established the link between financial stability, financial depth and economic performance of countries in the European Union. These relationships were studied using annual data from 1998 to 2011 and the standard framework, employing both econometric method and variables. The findings suggest that in the European Union countries, the traditional results explaining that financial depth directly influences economic performance is not confirmed. Also, using diverse measures of financial instability such as institutional index and author's statistical index calculated from the principal component analysis, it was found that instability in the financial system adversely affect the performance

in the economy. Thus, financial instability negatively affects disposal incomes, consumption and investment of the economies under study.

Crises in the financial system, especially those that have happened in recent years, have had huge consequences on the victim economies (Inklaar, Guevara & Maudos, 2012). This conclusion was drawn after analysing the effect of financial development and the financial integration in Europe and economic performance. The study found that in recent years, there has been no reverse of the growth profits of development in the financial system and integration. It was also found that after the crisis which led to financial instability, there was a corresponding fall in investment in most of the countries, with a corresponding higher degree of uncertain aversion, which may serve as information for the evaluation of post-crisis performance.

Desbordes and Wei (2014) investigate the relationship existing between financial development and investment in Turkey. Using data for the period 1960 to 2008, an illustration of how development in the financial system influences decisions on investment in a model of the firm under financial frictions is provided. Three diverse measures of financial development were used in creating a composite index for development in the financial system. The study used the bound test approach in testing for the existence of the long-run association. The ARDL findings indicate that financial development, total credit given to the private sector as well as budget balance all directly affect investment.

In a similar approach, the autoregressive distributive lag model was used by Ang (2009) in examining the role policies in the financial system play in explaining private sector investment in both the Malaysia and Indian

economies. Real output, real public investment, the real user cost of capital, reserve, liquidity requirement, interest rate restraints and direct programs were included. The findings provide the suggestion that programs that are significantly directed and favour certain priority sectors have the potential of dampening investment or private capital formation in both India and Malaysia. Private investment is positively impacted by interest rate controls. This effect is found to be more obvious in the case of Malaysia. Again, private investment is negatively impacted by high reserves and requirements of liquidity in India. However, this effect is positive for Malaysia.

In their study, Dutta and Roy (2009) explained that the responsiveness of investment in an economy to the development or the happenings in the financial sector is dependent on already in the place investment climate. A developed and well-functioning financial system is needed most for countries experiencing minimal levels of investment. Thus, for countries with a high level of investment, the need for financial sector development is relative to less need. The study adopted the method of quantile regression within a dynamic panel set up in testing the hypothesis. It was indicated that the findings are on a basis of a extensive sample of both developed and developing countries for a 24-year period. In the first and second quintile, the study showed that domestic investment is directly impacted by the aggregate index of financial development, deposit bank asset, liabilities and credit. After controlling for variables such as interest rate, trade, per capita GDP and inflation, however, the behaviour of the aggregate index of financial development, deposit bank asset, liabilities and private sector credit changed in the third quintile. The development of the financial sector is a step to make

it stable. This means that the role financial development plays in private investment is more or less similar to that of financial stability.

Using 18 African countries, Misati and Nyamongo (2011) studied the connection between development in the financial sector and private investment. The FE and RE estimation techniques were used on the panel data for the period, 1991 to 2004. The findings show that interest rates negatively influence private investment, giving a signal of a large rate of interest spread across economies in Africa. Also, the ratio of turnover and credit to the private sector was found to have a statistically significant relationship with private investment. The indicator of the stock market was found to be statistically insignificant; this, therefore, provides a reflection of the low stage of development of the stock market in most of the African economies. The results further indicate that institutional variables play an important role as a driver of private investment in Africa, and the fact that there is a large informal sector in Africa positively affects private sector investment.

Similarly, Brima and Brima (2017) studied the impact of monetary policy on the behaviour of private investments in Sierra Leone. Adopting the ECM, it was found that gross domestic savings, as well as the supply of money in Sierra Leone, enhance investment activities. The rate on treasury bills, gross domestic debt and inflation hurt private investment.

The reviewed studies empirically examined the effects of financial stability, financial development or monetary policy on investment. Importantly, the literature is very silent on the impact of the financial stability gap on private investment. The closest to the gap existing in the literature is what has been reviewed. In connection with the third objective, this study

seeks to fill the existing gap in the literature by empirically examining the effect of the financial stability gap on investment by the private sector in SSA.

Conceptual Framework

The theoretical literature reviewed indicates that no single theory provides a direct or clear link between the key variables: government domestic debt arrears, private investment and financial stability gap. The current study, therefore, developed a conceptual framework that attempts to provide the link between the said key variables as well as some other significant variables used in the study. Thus, the framework establishes the relationships between the variables based on the theoretical and empirical literature reviewed.

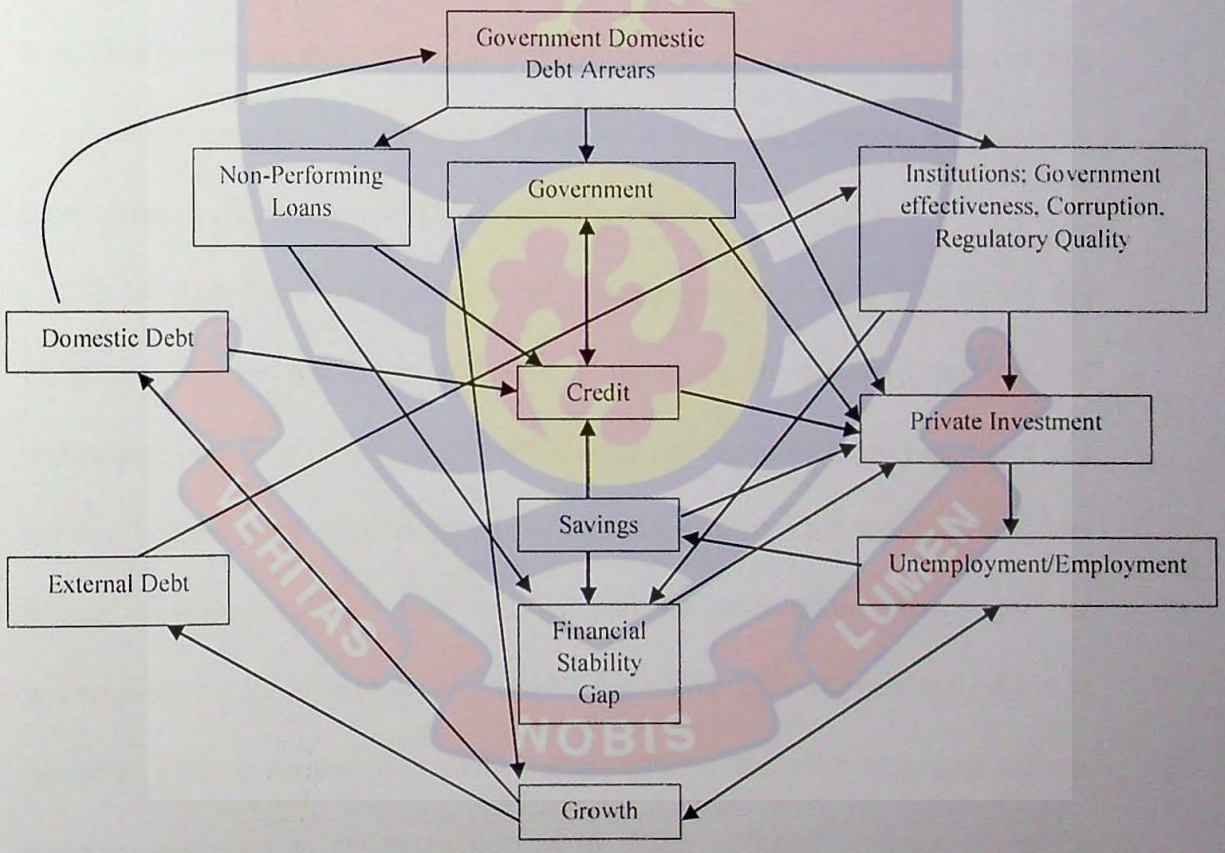

Figure 4: Transmission Channel of Government Domestic Debt Arrears

Source: Kulu (2022)

The framework presented in Figure 4 indicates that an increase in government domestic debt arrears has implications for institutions. People begin to lose trust in institutions, and, thus their perception of the government's effectiveness, level of corruption and regulatory quality points in a negative direction. Private investment will witness when there is a loss of confidence in the government and the economy at large. Similarly, the increased government domestic debt arrears will increase NPLs of domestic financial institutions, hence, a fall in the volume of the credit needed for investment purposes (especially by the private sector). In a region where credit availability is essential for private sector investment, the limited credit available (owing to the rise in government domestic arrears) will cause a fall in private investment. Economies witnessing a fall in investment are likely to have a rise in unemployment (fall in employment).

Further, there is a possibility of experiencing declining growth via the existence of idle resources and also a decrease in domestic savings as unemployment rises. To propel growth through investment activities, there is a need to borrow from either domestic or external sources. Indeed, the only way through which an investment activity can be undertaken (either by the government or the private sector) amidst the unavailable domestic funds is to resort to external borrowing. Thus, according to the financing gap theory, there is the need to resort to borrowing from external sources when the domestically available funds are less than the funds domestically needed for investment purposes. It can also be argued that a possible reason for delays in government debt repayment is government investments in long-term projects.

Such a move by the government has the possibility of affecting private sector activities positively as well as the overall growth of the economy.

Again, with a fall in domestic savings and a rise in non-performing loans, the stability status of financial institutions is at risk. The monetarists' ideology on financial stability concerns more on their liquidity status. There is, therefore, the possibility of a fall in financial stability (a rise in the financial stability gap) when financial institutions continuously become illiquid as argued by Vo et al. (2019) and Borio and Drehmann (2011). Linked to this, when institutions are not well regulated and corruption is not well controlled, the performance of the financial system will not be at its best. Thus, there is the possibility that institutions with weak liquidity status will be made to operate, hence, widening up the financial stability gap.

Noting that the role of the financial system is essential for private sector activities or investments, any anomaly in the financial system will adversely affect the private sector, especially in their investment activities. In other words, a fall in financial stability or an increase in the financial stability gap will be detrimental to private investment.

Chapter Summary

This chapter of the study has provided a review of both the theoretical and empirical elements that relate to the study. The theoretical elements were geared towards the following concepts: general theory of public debt, Ricardo's theory of public debt, debt overhung theory, crowding out effect theory, investment theories, theory of financial stability, monetarist viewpoint on financial stability and post-Keynesian hypothesis on financial stability. On the empirical studies, the chapter reviewed studies related to the drivers of

private investment, determinants of financial stability and the effect of financial stability on private investment. Direct literature linked to the objectives of this study is significantly absent from the existing literature. Therefore, the empirical studies were done concerning studies that are as close as possible to the objectives of the present study.

CHAPTER THREE

RESEARCH METHODS

Introduction

The procedures used for the study are presented in this chapter. The chapter is organised in a series of presentations. The research design employed in this study is presented in the next section. This is followed by the theoretical and empirical specifications of models, estimation techniques as well as the measurements, justifications, data sources and the expected signs of all the variables employed in the respective empirical chapters of the thesis. Each estimation procedure is also followed by the respective post-estimation diagnostics.

Research Design

Based on the study's objectives, the study adopts the philosophy of the positivist found within the Keynesian economics framework. According to Levin (1988), the positivist holds the belief that there is a stable social reality which can be described from an objective point of view devoid of any form of external interferences with the phenomena under study. The positivist philosophy, thus, allows researchers to have social and economic processes studied on an objective basis and also explain the relationships that exist between variables. Indeed, economists are associated with a lasting history of investigating economic phenomena basically from the positivist perspective (Schumpeter, 1933).

Again, using the quantitative approaches to research such as the case of this thesis is accepted by the positivist philosophy. Developing mathematical models in establishing relationships existing between quantitative

measurements is appropriate when employing the positivist philosophy. Thus, the quantitative method is employed based on the positivist philosophy. The main objective of this study and the specific objectives of the individual empirical chapters make the quantitative research approach suitable. This research approach makes it possible for researchers to situate the economic and social world into a causality structure and hence nullify the distortions from human effect by making use of quantitative instruments.

Precisely, given that the objectives of this study come in an explanatory nature, explanatory research as a component of the quantitative research approach is adopted. The explanatory design gives an opportunity to the researcher to detect the magnitude or the size as well as the nature of the relationship between the cause and effect. Thus, this research design mainly is used in examining how existing processes are affected by specific changes. Therefore, judging from the study's general objective, the best approach of analysis is the explanatory research design.

Government Domestic Debt Arrears and Private Investment in SSA

The first empirical chapter focused on the effect of government domestic arrears on private investment in SSA. This analysis was done using an annual (2007 to 2018) dataset for 33 countries from SSA (Appendix G provides the list of the countries used) and the sub-regional communities (Appendix H provides the list of countries in the sub-regional communities) using the system General Methods of Moments complemented by Impulse Response Functions (IRFs) to observe how private investment response to shocks in government domestic debt arrears. A panel estimation technique is used in this study owing to its accuracy in terms of controlling individual

heterogeneity. It again provides more information and data that are efficient as well as the freedom in the ability to have a mixture of both time-series and cross-sectional observations. The panel data technique is finally chosen because it allows studying dynamic changes.

Theoretical Model Specification

Relevant details on the drivers of private investment are provided by formal investment models that have their grounds from the developed world. Chrinko (1993) explains the insights into the different procedures of the theoretical models. Generally, there are four ways through which investment can be modelled: the accelerator model, the expected profit, the neoclassical and Tobin's Q model (Ghura & Goodwin, 2000). According to Keynes (1936b), the flexible accelerator model describes that the wider the gap between the desired capital and the actual capital stock, the greater the level of investment. Thus, the theoretical ground of private investment is based on the hypothesis that at every period, a firm tries to minimise the gap existing between the actual stock of capital (K) and the desired stock of capital (K^*). Private investment is modeled in equation (7) as:

$$I = \delta(K^* - K) \tag{7}$$

where I represents the net investment, $K^* - K$ measures the gap in capital and δ is the partial adjustment coefficient.

According to the neoclassical theory, desirable capital stock is proportional to production and capital cost. The tax structure, real interest rate and price of capital goods are all factors that influence investment. The level of investment is driven once again by the ratio of the market value of existing capital stock to replacement cost (often referred to as the Q ratio) (Tobin,

1969). As a result, if the market value of a new unit exceeds the cost of replacement, businesses will desire to invest. The profit theory further highlights that there will be a rise in the funds generated internally when the gross profits increase, hence leading to investment (Zebib & Muoghalu, 1998). It can, therefore, be concluded from the discussion that private sector investment is highly driven by Keynesian, neoclassical and uncertainty indicators. Some basic variables identified in the Keynesian models include growth in GDP, capacity use and internal funds. For Tobin's Q model, variables such as public investment and interest rate are identified while the user cost of capital is considered in the neoclassical model. The uncertainty variables include the inflation rate, debt-to-GDP ratio and user cost of capital (Mlambo & Oshikoya, 2001).

Empirical Model Specification

Basically, there is no specific theory explaining the link between government domestic debt arrears and private investment. In explaining this relationship however, a combination of variables from the various theoretical investment models were used as control variables. Thus, the model explaining the relationship is presented as:

$$Pvt\ inv_{it} = \propto + \varphi Arrears_{it} + \delta X_{it} + \varepsilon_{it} \quad (8)$$

where $Pvt\ inv$ represents the private investment, $\propto$ is the constant term, $Arrears$ represents the government domestic debt arrears, X represents the control variables selected from the various investment theories (Keynesian, neoclassical and uncertainty variables) and ε is the error term. The subscript $i\ (= 1, \ldots n)$ represents the SSA country and $t\ (1, \ldots T)$ represents the time indices. These variables include public investment, inflation rate, credit to the

private sector, savings, growth in GDP as well as external debt. Thus, from equation (8), expanding X to incorporate the control variables gives equations (9) as;

$$Pvt\ inv =$$

$$f\ (Arrears, Gov\ inv, Inflation\ , Credit, Savings, Growth, Ext\ Debt) \quad (9)$$

Expressing econometrically gives

$$Pvt\ inv_{it} = \delta_0 + \delta_1 Arrears_{it} + \delta_2 Gov\ inv_{it} + \delta_3 Inflation_{it} + \delta_4 Credit_{it} + \delta_5 Savings_{it} + \delta_6 Growth_{it} + + \delta_7 Ext\ Debt_{it} + \varepsilon_{it} \quad (10)$$

where $Gov\ inv, inflation, Credit, Savings, Growth, Ext\ Debt$ respectively represent public investment, inflation rate, credit, savings, growth in GDP and external debt.

Measurement of Variables, Justification, Expected Signs and Sources

Private Investment ($Pvt\ inv$)

This is calculated as a percentage of GDP for the private sector's gross fixed capital formation. It tracks gross outlays on fixed assets in the United States by the private sector (which includes private nonprofit organizations). In this empirical chapter, this variable is used as the dependent variable. The World Bank's World Development Indicators provided the data on private investment (WDI).

Government Domestic Debt Arrears

This refers to the change in the stock of government domestic debt arrears. This is measured as a percent of GDP. Arrears accumulate when an obligatory payment is not made according to the date due for payment. Checherita-Westphal et al. (2016) explain that true arrears occur only if a bill is paid not by the date due, whether it is the basis of a contractual agreement,

custom or commercial law, for instance, 60 days after the date of invoice. This is used in the current study as the main independent variable. In accessing credits for investment and other purposes, there exists competition between the private sector and the government (Anyanwu et al., 2018). This, therefore, justifies that delays in government debt servicing are expected to reduce private investment. Thus, a negative relationship is expected owing to the rise in government domestic debt arrears in SSA in recent times ($\delta_1 < 0$). This variable is sourced from the IMF AFR Desk Survey.

Government Investment

The difference between total and private investment is used to determine government investment. Private investment is defined as explained above, but total investment refers to gross fixed capital creation (formerly known as gross domestic fixed investment) which includes land improvements, machinery, plants and equipment purchases as well as road constructions, railways, the building of schools, hospitals, offices and industrial buildings. The inclusion of this variable in the model is important because investment made by the government is crucial for private sector development. Theoretically, Tobin's Q model (Tobin, 1969) supports government investment as a driver of private sector investment. Government investment is expected to increase ("crowd in") private investment though other studies find government investment to be damaging ("crowd out") to private investment (Asante, 2000; Frimpong & Marbuah, 2010; Lesotlho, 2006). Thus, $\delta_2 > 0$. Just as the private investment, the total investment is also obtained from the World Bank's WDI.

Inflation

This is quantified by the consumer price index, which reflects the annual percentage change in the cost to the average consumer for receiving a basket of goods and services that can be set or altered at regular intervals, such as annually. In most cases, the Laspeyres formula is applied. The private investor makes purchases if not anything, of raw materials in production activity. Hence, the persistent increment in the general price levels is of great concern. Inflation, therefore, is expected to reduce private investment. However, this relationship may be dependent on the investment activity under consideration (Akpalu, 2002; Frimpong & Marbuah, 2010). Thus, $\delta_3 < 0$. The inflation variable is sourced from WDI.

Domestic Credit to the Private Sector

This refers to the financial resources made available to the private sector by financial corporations, such as through non-equity securities purchases, loans and trade credit, as well as other accounts that are received where a claim for repayment has been established. Monetary authorities and banks that accept deposit money and also financial corporations where there are available data (which includes corporations where transferable deposits are not accepted but incur liabilities in the form of savings and time deposits) are the financial corporations under description. Other examples are finance and leasing companies, pension funds, foreign exchange companies, money lenders and insurance corporations. Private sector credit is essential for investment purposes, hence, its inclusion in the model. As used by studies such as Okorie (2013) and Anyanwu et al. (2018), it is, therefore, expected to

improve private investment ($\delta_4 > 0$). In the current study, credit to the private sector is measured as a percentage of GDP and sourced from WDI.

Savings

This refers to the savings made domestically. It is calculated as GDP minus expenditure made on the final consumption (thus, total consumption). Gross domestic saving is derived as a percentage of GDP. An increase in domestic savings is expected to improve the liquidity status of financial institutions, hence, an improvement in the rate at which they lend to individuals. It is, therefore, expected that as savings increase, the rate of investment will increase ($\delta_5 > 0$). The WDI is the source of this variable.

GDP Growth

This is the annual rate of growth based on constant local currency pricing at market prices. The aggregates are calculated using 2015 constant prices expressed in US dollars. GDP is computed by deducting any subsidies not included in the product's value from the gross value added by all resident producers in the economy. The assessment was made without taking into account fabricated asset depreciation or natural resource degradation. Introducing GDP growth as a driver of investment is justified by the Keynesian model. Thus, growth in economic activities paves way for private sector investment (Keynes, 1936b). GDP growth is, therefore, expected to positively influence private sector investment ($\delta_6 > 0$). The GDP growth is derived from WDI.

External Debt

External debt refers to the debt that is owed to individuals and organisations that are non-residents of the domestic country and are repayable

in goods and services or currency. It is measured as total external debt as a percentage of the gross national income. Borrowing from external sources implies injecting funds (from foreign sources) into the domestic economy. On a theoretical basis, the financing gap explains the difference that exists between the domestically available funds and the total funds required for investment. Abdullahi et al. (2016) argue that a major means of ensuring that this gap is closed is through borrowing from external sources. The usage of external debt is of much importance as it drives the impact of the debt (Frimpong & Marbuah, 2010). This variable is, therefore, expected to affect private investment positively ($\delta_7 > 0$). External debt stock is sourced from WDI.

Estimation Procedure

Blundell-Bond System GMM Estimator

The dynamic relationship that exists between variables is characterised by the inclusion of a lagged explained variable among the explanatory variables in a model such as the lagged value of the private investment. The previous year's private investment is to correlate with the present value. According to Baltagi (2008), this model has one or more explained variables and makes it possible to model for a mechanism of a partial adjustment. Thus, the dynamic panel model is given as:

$$y_{it} = \delta y_{i,t-1} + x'_{it}\beta + \varepsilon_{it} \qquad (11)$$

with $\varepsilon_{it} = \mu_i + \nu_{it}$, $\quad i = 1, \ldots, N; \; t = 1, \ldots, T$

Also δ represent a scalar, y_{it} refers to the sequence of dependent variables across individuals, x'_{it} *is a* $1 \times K$ *matrix* of strictly exogenous regressors and ε_{it} is the error term, ν_{it} represents the idiosyncratic error term and μ_i

refers to the unobserved individual-specific effect that is time-invariant. Also, β *is a* $K \times 1$ matrix.

As a crucial assumption for this model, both the disturbance term and the unobserved individual-specific time-invariant effect are expected to be identically and independently distributed between each other. Therefore $\mu_i \sim IID(0, \sigma_\mu^2)$ and $v_{it} \sim IID(0, \sigma_v^2)$. Again, there is the assumption that the number of individual observations ($N = 33$) must exceed the number of time ($T = 12$) under study, thus ($N > T$). Including the lagged value of the explained variable as an explanatory variable in the model introduces some basic challenges violating the Classical Linear Regression Models (CLRM) assumption, hence rendering the estimators such as the fixed and random effect and the Ordinary Least Square (OLS) inconsistent. As an assumption in the CLRM, there should be a serial correlation in the disturbance term (v_{it}). The dependent variable (y_{it}) being a function of μ_i follows that the explanatory variable $y_{i,t-1}$ also depends on μ_i. This, therefore, makes the OLS inconsistent as the regressor $y_{i,t-1}$ positively affects the error term ε_{it}, owing to the presence of individual effects that are unobserved (μ_i).

On the fixed effect estimator, the source of inconsistency is eliminated by the within-group estimator, through the transformation of the model to remove the μ_i. The error term that has been transformed now becomes $v_{it} - \frac{1}{T-1}(v_{i2} + \cdots + v_{i,t-1} + \cdots + v_{iT})$ while the lagged dependent variable in the model which has transformed now is converted to $y_{i,t-1} - \frac{1}{T-1}(y_{i1} + \cdots + y_{it} + \cdots + y_{i,T-1})$. The v_{it} correlates with the component $\frac{-y_{it}}{T-1}$ existing in the dependent variable that has been transformed. Again, in the

error term, the component $\frac{-v_{i,t-1}}{T-1}$ correlates with $y_{i,t-1}$. According to Bond (2002), this correlation still exists when there is an increase in the number of individual observations, therefore, making the fixed effect estimator inconsistent. Again, because of the correlation between $(y_{i,t-1} - \theta\bar{y}_{i.,-1})$ and $(\varepsilon_{i,t-1} - \theta\bar{\varepsilon}_{i.,-1})$, the RE estimator is biased in the dynamic panel model after using the GLS method (Baltagi, 2008).

Indeed, in this study, there is the expectation of the presence of endogeneity, for instance, originating from the bi-causality between investment by the private sector and growth in GDP. In providing a solution to the problem of endogeneity in panel estimators, the GMM estimator is proposed by Arellano and Bond (1991). This is known to give consistent estimates. Roodman (2006) explains that often, the estimator is known as the "Difference" GMM estimator since it takes the difference of the data and also makes use of the lagged values of the endogenous variables as instruments. Hence, the model after the dynamic panel model has been transformed and the individual unobserved effect is removed becomes:

$$\Delta y_{it} = \delta\Delta y_{i,t-1} + \Delta x'_{it}\beta + \Delta v_{it} \quad (12)$$

Where $\Delta y_{it} = y_{it} - y_{i,t-1}$, $\Delta y_{i,t-1} = y_{i,t-1} - y_{i,t-2}$, $\Delta x'_{it} = x'_{it} - x'_{i,t-1}$, and $\Delta v_{it} = v_{it} - v_{i,t-1}$

Arellano and Bover (1995) and Blundell and Bond (1998) found a potential weakness with the difference GMM estimator regardless of its consistency feature. It was explained that for variables in their first difference, the lagged level were poor instruments, particularly, in a case where the variables are closer to a random walk. Again, for a panel dataset that is not balanced, gaps existing in the dataset are magnified by way of growing the

missing observations in the data when the transformation is made. The "System" GMM estimator was then proposed by Blundell and Bond (1998) as an extra efficient estimator. The dynamic panel model is transformed by this estimator making use of the first difference of all the exogenous variables as instruments as well as the lagged values of the endogenous variables in generating instruments that are GMM type. Also, for the level equation, the estimator makes use of the lagged difference of the endogenous variable as an instrument.

The problem of poor instruments is reduced by the estimator of system GMM, by the use of conditions of extra moment which make restrictions of the initial conditions of the process that generate the dependent variable. Again, though the system GMM estimator makes use of more instruments as compared to the difference GMM estimator, it has a small finite sample bias and provides precise estimates. As a result of the efficiency and consistency features associated with the Blundell-Bond System GMM estimator, it is adopted by this study to estimate the effect of government domestic debt arrears on private investment in SSA.

During the estimate, it is assumed that there is no autocorrelation in the idiosyncratic error component and that the instruments employed in the model are legitimate. As a result, the study employs the Arellano-Bond autocorrelation test and the validity of the instruments to produce an autocorrelation test. As a result, the Hansen J over-identification restriction test is applied. Again, the robust standard errors are used in controlling for autocorrelation and all forms of heteroscedasticity in the model. From equation (10), the GMM estimation is modelled by incorporating the lagged

value of the dependent variable as

$$Pvt\ inv_{it} = \delta_0 + \delta_1 Pvt\ inv_{it-1} + \delta_2 Arrears_{it} + \delta_3 Gov\ inv_{it} + \delta_4 Inflation_{it} + \delta_5 Credit_{it} + \delta_6 Savings_{it} + \delta_7 Growth_{it} + + \delta_8 Ext\ Debt_{it} + \varepsilon_{it} \quad (13)$$

Where δ_0 is the constant term and $Pvt\ inv_{t-1}$ represents the lag f the private investment at time t. the estimations were done for SSA and some sub-regional communiyies under SSA, such that $i\ (= 1, \dots n)$ will also represents the sub-regional communities (ECCAS, ECOWAS and EAC) under study.

Test for Autocorrelation

Arellano and Bond (1991) developed the autocorrelation test as a diagnostic on the basis of the assumption that there is a serial independence in the idiosyncratic error term ν_{it} of the difference equation. Some lags are declared not to be valid as instruments by the test. For example, the difference error term $\Delta\varepsilon_{it} = \nu_{it} - \nu_{i,t-1}$ becomes invalid potentially when the dependent variable's second lag $(y_{i,t-2})$ is endogenous to $\nu_{i,t-1}$ and if the idiosyncratic error term ν_{it} is serially correlated with the first order. Roodman (2006) explains that the Arellano-Bond test is an application to the difference in the error term and there is a confirmation of validity for any GMM estimation using a panel dataset.

The autocorrelation test works on the null hypothesis that no autocorrelation exists. Hence, a significant probability value rejects it and confirms the existence of autocorrelation. The study, therefore, presents the test for autocorrelation for both the order (1) and order (2) differences.

Hansen J test of over-identification

In the GMM estimator, an essential assumption is that the instruments employed in the model are exogenous. There will be no detection of the valid instrument when there is exact identification of the model, even when the instrument and the error term $E[z\varepsilon] \neq 0$ correlate, because a unique estimate $\hat{\beta}$ is produced by the estimator so that $E[z\varepsilon] = 0$ is satisfied. There is, therefore, a possibility for instruments used in a model not to be valid. If there is over-identification in a model, however, multiple solutions are produced and there is a natural fall of the joint validity of moment conditions $E[z\varepsilon] = 0$ out of the framework of GMM, thus, being distributed around zero.

The null hypothesis for testing the joint validity of the moments conditions is that the model contains a joint validity instrument, and hence the instruments are exogenous. When there is a substantial probability value, the null hypothesis is rejected, and the conclusion is that the instrument's joint validity is faulty. As a result, an acceptance of the null hypothesis is essential. In this study, the Hansen J test for instrument validity is applied.

Estimating and Explaining Financial Stability Gap in SSA

The second empirical chapter focuses on estimating the financial stability gap in SSA as well as determining its drivers. In detail, potential, efficiency and the gap in financial stability (average for the period under study) were estimated for the countries and the sub-regional communities under study, followed by analysing the factors that influence the financial stability gap. This is made possible by using the stochastic frontier model and the FE and RE estimations.

Theoretical Model Specification

Stochastic Frontier Models

In the literature on productivity and efficiency, the Stochastic Frontier Production Function (SFPF) created by Aigner, Lovell, and Schmidt (1977) and Meeusen and Van den Broeck (1977) has proved particularly valuable. The highest output from a specific point of input, as well as a level of technological sophistication in the structural aspect of the production function, as well as the disturbance term that has been decomposed, define the SFPF. The traditional Gravity Model blends with the SFPF model to form the Stochastic Frontier Model as a means to cater for the weaknesses introduced by the traditional gravity trade model and also in estimating the potential of flows in trade among countries. This is written as:

$$y_{it} = f(x_{it}; \beta) + v_{it} - u_{it}\,, i = 1,2 \ldots\ldots n; t = 1, \ldots\ldots, T_i \qquad (14)$$

where, y_{it} is the log of the output of firm i at time t.

The vector of log of firm i inputs at time t is represented by x_{it}. The unknown parameters are measured by β, $f(.)$ represents a production function that is known (for instance, Cobb-Douglas). v_{it} is a two-sided symmetric random disturbance term that represents the factors above the control of the firms such as topography, machine performance, etc. The technical inefficiency is represented by a one-sided disturbance term $u_{it} \geq 0$. There is the assumption that $v_{it} \sim$ i. i. d $N(0, {\sigma_v}^2)$, $u_{it} \sim i.i.d\ N^+(0, {\sigma_u}^2)$, such that $N^+(\ldots)$ represents a half-normal distribution. v_{it} *and* u_{it} are finally assumed to be independent of x_{it}. When u_{it} is zero, there is an indication that the firm is completely efficient, hence, no inefficiencies. A positive value of u_{it}, however, shows that the firm is operating less than the frontier; hence, there is

the existence of productive inefficiency in the process of production.

Empirical Model Specification

In estimating the financial stability gap and the drivers of the inefficiencies in financial stability, the study employed the stochastic frontier model of Armstrong (2007). According to Armstrong, there are two phases of the model specification. The frontier estimate is made first and secondly, the drivers of the unilateral error term that explain the variation are estimated. Thus, this study follows a study like Mamo et al. (2018) who used the SFM to measure the gap in yield of smallholder wheat producers in Ethiopia. The model is employed in determining the financial stability gap as well as the drivers of the financial stability inefficiencies. Following the theoretical specification of the model, the empirical model for this study is specified as

$$FS_{it} = \propto + \gamma X_{it} - \mu_{it} + v_{it} \quad (15)$$

where FS represents financial stability and X represents drivers of financial stability. μ_{it} is a single-sided error, specific to each country, and creates the difference between actual and potential financial stability. From equation (15), X is expanded to capture the drivers of financial stability. This gives

$$LnFS_{it} = \beta_o + \beta_1 Credit_{it} + \beta_2 Unemployment_{it} + \beta_3 Econ\ Fred_{it} + \beta_4 Inflation_{it} + \beta_5 Domestic\ Debt_{it} - u_{ij} + v_{ij} \quad (16)$$

where $LnFS$ is the logged value of financial stability of the SSA countries at time t, $Credit$ is credit given to the private sector, $Unemployment$ is the rate of unemployment, $Econ\ Fred$ represents economic freedom, $Inflation$ represents inflation rate and $Domestic\ Debt$ is government domestic debt.

Measurement of Variables, Justification, Expected Signs and Sources

Financial Stability

At the country level, the Z-score is used to measure this variable. As a result, the Z-score, which is determined by dividing the return on asset plus the capital-asset ratio by the standard deviation of asset return, is a measure of bank insolvency risk. The greater the Z-score, the more stable the banks, and thus the smaller the probability of insolvency (Lepetit & Strobel, 2013). In this chapter of the study, this variable serves as the dependent variable and is also used in the calculation of the efficiency, potential and gap in financial stability. The measure for the financial stability variable is obtained from the World Bank's Global Financial Development (GFD).

Domestic Credit to the Private Sector

This refers to the financial resources made available to the private sector by financial firms, such as through non-equity securities purchases, loans and trade credit, as well as other accounts receivable where a claim for repayment has been formed. Financial institutions such as monetary authorities and banks that accept deposits, as well as other financial institutions where data are accessible (which includes corporations where transferable deposits are not accepted but incur liabilities in the form of savings and time deposits), are the financial corporations under description. Other examples are finance and leasing companies, pension funds, foreign exchange companies, money lenders and insurance corporations. Credit being lent to the private sector is expected to yield some interest to the lender. This is expected to positively impact their liquidity status, hence, the level of

stability. This variable is sourced from the WDI. It is, therefore, expected that credit enhances financial stability ($\beta_1 > 0$).

Unemployment

This is defined as the percentage of the workforce that is unemployed yet available and looking for work. As a result, it is total unemployment as a percentage of the total labour force. This study made use of the International Labour Organisation (ILO) estimates. A high rate of unemployment signifies lower income and lower savings with financial institutions. Thus, as people are laid off from their work or as people searching for jobs are not finding jobs, the rate at which they save will reduce. This, therefore, affects the liquidity status of financial institutions, hence the level of stability. Unemployment is, therefore, expected to affect financial stability positively ($\beta_2 > 0$). The data for unemployment is sourced from WDI.

Economic Freedom

This variable is an index that is created using 12 unique measures of institution. Property rights, judicial efficacy, government integrity, tax burden, government expenditure, fiscal health, business freedom, labor freedom, monetary freedom, trade freedom, investment freedom and financial freedom are among the factors taken into consideration. With quality institutions, it is expected that all aspects of the economy that relate to the financial sector will be operating as expected for overall progress. A direct relationship is, therefore, expected between economic freedom and financial stability ($\beta_3 > 0$). The heritage foundation is the source of this dataset.

Inflation

This is quantified by the consumer price index, which reflects the annual percentage change in the cost to the average consumer of receiving a basket of goods and services that can be set or altered at regular intervals, such as annually. In most cases, the Laspeyres formula is applied. Increases in the general price levels correspond with a high cost of living and cost of doing business. Lenders tend to lose with increasing inflation as the value of the credit lent to people reduce with time. Inflation, therefore, is expected to reduce financial stability ($\beta_4 < 0$).

Domestic Debt

Domestic debt refers to the total amount of all the domestic borrowings made by the government. This variable is measured in billions of United States Dollars for all countries used for the study. Borrowing by the government from domestic sources takes relatively a longer period for servicing as compared to borrowing by the private sector (Anyanwu et al., 2018). The delays to some extent reduce the credit available with the financial institutions, hence their stability. Domestic debt is, therefore, expected to have an inverse relationship with financial stability ($\beta_5 < 0$). Again, the domestic debt data were sourced from the IMF World Economic Outlook.

Measurement of Financial Stability Potential, Efficiency and Gap

The potential financial stability or the potential value of financial stability refers to the highest level of stability that can be achieved by financial institutions or in the financial market. This point is the goal of most financial institutions and financial policy analysts. The level of stability achieved (actual financial stability) and the potential level, to a large extent, describes

the level of efficiency. This also is essential in finding the gap that exists. An estimation of the stochastic frontier model provides estimates of the efficiency values (Eff) which are subsequently used to determine the potential financial stability (PFS). This is, thus, derived using the formula:

$$PSF = \frac{Actual\ FS}{Eff} \tag{17}$$

The gap in financial stability is also derived as the difference between actual and potential financial stability. Thus, using equation (18) as

$$FSG = Actual\ FS - PFS \tag{18}$$

From equation 18, a large FSG implies that the actual financial stability is far from the potential while a small FSG means the actual and closer to the potential financial stability gap. A smaller FSG is however desirable since it indicates that the financial system is well-performing and getting closer to its potential.

Estimation Technique

This study employed the Maximum Likelihood Estimation (MLE) adopted by Aigner et al. (1977) in evaluating the effect of "behind the border" limits on potential exports using the stochastic frontier model. Given the objective of this empirical chapter, the MLE technique used in estimating the stochastic frontier model is best preferred owing to its relative strength compared to the other models. The MLE is able to estimate the upper limits, which the stochastic frontier model is relatively appropriate as opposed to the Ordinary Least Square (OLS) technique. Again, Coelli, Rao and Battese (1998) argue that the MLE is highly preferred over the Corrected Ordinary Least Square (COLS), in instances where the inefficiency effect contribution of the total variance is high.

Empirical Model Specification

Also, in the second empirical chapter, the drivers of the estimated financial stability gap were determined. Thus, the drivers of the financial stability gap are modelled in equation (19) as

$$FS\ Gap_{it} = \propto + \varphi X_{it} + \varepsilon_{it} \quad (19)$$

where $FS\ Gap$ represents the financial stability gap and X represents its determinants. In expanding X, variables such as non-performing loans, control of corruption, political stability, exchange rate (real effective exchange rate) and inflation were used. This gives equation (20) as

$$FS\ Gap_{it} = \varphi_0 + \varphi_1 NPLs_{it} + \varphi_2 Cont\ corruption_{it} + \varphi_3 Reg\ Quality_{it} + \varphi_4 Pol\ Stability_{it} + \varphi_5 Exchange\ Rate_{it} + \varphi_6 Inflation_{it} + \varepsilon_{it} \quad (20)$$

where $NPLs$ represents non-performing loans, $Cont\ Corruption$ represents control of corruption, $Reg\ Quality$ represents regulatory quality, $Pol\ Stability$ represents political stability, $Exchange\ Rate$ represents exchange rate and $Inflation$ represents inflation.

Measurement of the Variables

Non-Performing Loans

These refer to loans whose payments have been delayed for more than 90 days. It is measured or calculated by summing the loans that have accrued for more than 90 days (and are still in the process of accruing) to the loans that are nonaccrual and having that total divided by the total amount of loans that exist in the portfolio. It is, thus, calculated as a percentage of all bank loans. A record of high non-performing loans indicates that a high volume of funds is found with the borrowers whereby due dates for payments are exhausted. Regular activities of financial institutions are distorted as a result. This has the

possibility of increasing the financial stability gap. Therefore, a positive relationship is expected ($\varphi_1 > 0$). Data for non-performing loans are obtained from the World Bank's GFD.

Control of Corruption

This measures the perception of people on the degree to which private individuals use public power for their own benefit. It also covers small-scale and large-scale corruption, as well as the capture of states by elites and private interests. This gives the country's score on the aggregate indicator, which ranges from -2.5 to 2.5 in standard normal distribution units. Thus, the higher the observation, the better the measure. Controlling corruption is expected to have a high implication for all phases of the economy. The financial sector will not be exempted when corruption is controlled. A negative effect is, therefore, expected between the control of corruption and the financial stability gap ($\varphi_2 < 0$). Data for control of corruption are sourced from the World Bank's Worldwide Governance Indicators (WGI).

Regulatory Quality

Regulatory quality is a governance indicator, measured by considering the perceptions of people on the government's capacity to formulate and enforce solid rules and regulations that allow and support private sector development. Indeed, regulations that aim at the promotion and development of the private sector, to a large extent, improve the financial sector's performance through the protection of their assets. Quality in the regulatory system is, therefore, expected to reduce the gap in financial stability ($\varphi_3 < 0$).

Political Stability

This is measured by how people assess the likelihood of political instability and/or politically motivated violence, as well as terrorism. The political stability variable comes from the World Bank's Worldwide Governance Indicators (WGI), which have data ranging from -2.5 to 2.5. Stability in the political system and the absence of violence enhance the performance of all sectors of the economy. Thus, since there are no interferences, regular activities can be performed and monitored for the growth of the organisations. Political stability is, therefore, expected to reduce the gap in financial stability ($\varphi_4 < 0$).

Exchange Rate

The nominal effective exchange rate (which is computed as the value of a local currency against a weighted average of the number of foreign currencies) is divided by a cost index or a price deflator to get the real effective exchange rate. In this measure of the exchange rate, an increase in the percentage indicates that the local currency has appreciated, while a reduction indicates that the local currency has depreciated. The local currency becomes stronger against the foreign currencies when it appreciates. Private investors that are operating with borrowed funds are then able to meet their financial obligations. The liquidity status of financial institutions, all other things being equal, improves, hence, a reduction in the gap. The real effective exchange rate is sourced from the World Bank's World Development Indicators (WDI), and expected to have an inverse relationship with the financial stability gap ($\varphi_5 < 0$).

Inflation

This is quantified by the consumer price index, which reflects the annual percentage change in the cost to the average consumer of receiving a basket of goods and services that can be set or altered at regular intervals, such as annually. In most cases, the Laspeyres formula is applied. Increases in the general price levels correspond with a high cost of living and cost of doing business. Lenders tend to lose with increasing inflation as the value of the credit lent to people reduce with time. Inflation, therefore, is expected to reduce financial stability, hence, an increase in the gap ($\varphi_6 > 0$).

Estimation Procedure

Under the assumptions that underline country-specific effects (η_i), the second part of the second empirical chapter presents the fixed and random effects estimations. Further, a Hausman test is performed in making a decision between the estimates from the fixed effects and the random effects.

Fixed and Random Effects Models

This is analysed for time or individual effects using a model of panel data. Mostly, the core difference between the two estimations is the role of a dummy variable. Considering the FE model, a parameter of a dummy variable is included as part of the intercept as well as a component of error in the random variable. However, in both models, there are constant slopes across the groups or periods. Equations (21) and (22) respectively present the functional form of the FE and RE models as:

$$y_{it} = (a + \mu_i) + X'_{it}\beta + v_{it} \quad (21)$$

Random Effect Model

$$y_{it} = a + X'_{it}\beta + (\mu_i + v_{it}) \quad (22)$$

where μ_i represents a fixed or random effect that is specific to the individual or the period excluded in the regression. Also, the errors are independently and identically distributed, $v_{it} \sim IID(0, \delta_v^2)$. Based on the assumption of the same groups and constant variance across individuals, the differences found in the individuals within the intercept are examined by fixed group models. Because an individual effect does not change with time and is considered as well to be part of the intercept, μ_i, is made to correlate with other explanatory variables, defining the OLS exogeneity assumption. The least square dummy variable (LSDV) regression is used in estimating the fixed effect model as well as within effect estimation techniques.

For the RE model, there exists the assumption of no correlation between the individual effect and the independent variables. This implies that μ_i is a random heterogeneity that is specific to a part of the error term. Across individuals, there is the same intercept as well as the slope of the regressors. The differences can be seen in specific errors among the individuals but not in their intercept. When a covariance structure of individual i, $\sum$ (sigma) is not known, the random estimation is done using GLS. In a random effect model, there is a fall in the number of parameters to be estimated resulting in estimates that are inconsistent, given that there is the individual-specific random effect and the explanatory variables correlate (Greene & Hensher, 2008). According to Breusch and Pagan (1980), the FE are tested by the F-test while RE are estimated using the Lagrange Multiplier (LM).

The Hausman test is, thus, used when making a comparison between the two tests. A null hypothesis of no correlation between the independent and the individual effect is tested. If this is rejected, the RE is chosen over the FE.

In a situation where one time-series or cross-sectional variable is used, there is a single-way fixed or random effect model. However, where there is a dummy variable for an individual or time variable, there is a two-way effect model and therefore there are issues in estimations and interpretation.

Estimating the Fixed Effect Model

The FE model is estimated in several ways. The LSDV makes use of dummy variables while this is not done in the "within" estimation. These strategies produce equal parameter estimates. A model that makes use of the individual or time means of the dependent and the explanatory variables without using dummies fits by the estimation of the "between". Because of its easy estimation and interpretation, the LSDV is widely used with a dummy dropped from a set of dummies. When there are a lot of individuals in a panel, it is, however, challenging. Contrary to the LSDV, the "within" estimation has no requirement for dummy variables. Rather, it makes use of group mean deviations. For "within" estimation, therefore, variables within each individual are used. Equation (23) presents the "within" estimation as

$$(y_{it} - \bar{y}_i) = (x_{it} - \bar{x}_i)'\beta + (\varepsilon_{it} - \bar{\varepsilon}_{i.}) \quad (23)$$

where $\bar{y}_i$ is the mean of dependent variables (DV) of the individual (or group), $\bar{x}_i$ represents the mean of independent variables (IVs) of group i, while ε_i represents the mean of errors of group i.

In the "within" estimation, the problem of incidental parameter is not recognized. There are identical parameter estimates of the regressors in the LSDV and the "within" estimation. The "within" estimation correctly reports the sum of square errors (SSE). A lot of weaknesses are, however, found in this method. Again, in the "within" estimation, data transformation wipes out

all variables that are time-invariant and do not change within an entity. It looks not possible in estimating coefficients of such variables in the "within" estimation because the deviations of such variables from their means are all zero. LSDV is, therefore, needed to be fitted in the situation when a model has independent variables that are time-invariant. Also, "within" estimations are associated with statistics that are not correct. A large degree of freedom for errors exists, when reporting Small Mean Errors (MSE), Square Root of Mean Square Errors (SRMSE) or SSE and smaller standard of parameters because there is no use of a dummy. There is, therefore, the need to adjust the incorrect standard errors using equation (24) as:

$$se_k^* = Se_k\sqrt{\frac{df_{error}^{within}}{df_{error}^{LSDV}}} = Se_k\sqrt{\frac{nT-k}{nT-n-k}} \quad (24)$$

Since the intercept is suppressed, the R^2 of the "within" is incorrect. The "within" estimation does not report the dummy coefficients, hence, the need for comparisons in equation (24) as:

$$d_i^* = \bar{y}_i - \bar{x}_i'\beta \quad (25)$$

Variables between individual entities are used by the "between groups". Group means of the explained and the unexplained variables are significantly calculated, hence, a reduction in the number of observations to n. These transformed aggregated data are, therefore used in running an OLS model as:

$$\bar{y}_i = a + \bar{x}_i + \varepsilon_i \quad (26)$$

From the empirical model specified as equation (20), the fixed effect model (equation 27) is stated as

$$FS\ Gap_{it} =$$

$$\varphi_0 + a_i + \varphi_1 NPLs_{it} + \varphi_2 Cont\ Corruption_{it} + \varphi_3 Reg\ Quality_{it} + \varphi_4 Pol\ Stability_{it} + \varphi_5 Exchange\ Rate_{it} + \varphi_6 Inflation_{it} + \varepsilon_{ijt} \quad (27)$$

where a_i represents the country pairs common to all years and captures country heterogeneity.

Estimating the Random Effect Model

There is the incorporation of a complete error term into the one-way RE model:

$$w_{it} = \mu_{it} + v_{it} \quad (28)$$

The μ_i is assumed to be independent of the traditional error term v_{it} and regressors X_{it}, which also do not depend on each other for all i and t. However, this assumption is not needed in the FE model. This model is:

$$y_{it} = a + X'_{it}\beta + \mu_i + v_{it} \quad (29)$$

Where $\mu_i \sim IID\ (0, \delta_v^2)$ and $v_{it} \sim IID\ (0, \delta_v^2)$.

The elements of covariance of $Cov\ (w_{it}, w_{js}) = (w_{it}w'_{js})$ are $\delta_v^2 + \delta_v^2$ if $i = j$ and $t = s$ and δ_u^2 if $i = j$ and $t \neq s$. Hence, the structure of covariance of the composite error $\sum (w_i w'_i)$ for individuals i as well as the variance-covariance matrix of whole disturbance (error) V are:

$$\sum_{T\times T} \begin{bmatrix} \delta_u^2 + \delta_v^2 & \delta_u^2 & \delta_u^2 \\ \delta_u^2 & \delta_u^2 + \delta_v^2 & \delta_u^2 \\ \delta_u^2 & \delta_u^2 & \delta_u^2 + \delta_v^2 \end{bmatrix}$$

$$\text{And } V_{nT\times nT} = I_n \otimes \sum = \begin{bmatrix} \sum & 0 \cdots & 0 \\ 0 & \sum \cdots & \cdots \\ \cdots & \cdots \cdots & \cdots \\ 0 & 0 \cdots & \sum \end{bmatrix} \quad (30)$$

The GLS is used in estimating the RE when the covariance structure is known. Also, the Feasible Generalized Least Square (FGLS) is employed when the structure of covariance of the composite errors is unknown. Again,

from the empirical model specified as equation (20), the random effect model is given

$$FSGap_{it} = \varphi_0 + \varphi_1 NPLs_{it} + \varphi_2 Cont\ Corrupt + \varphi_3 Reg\ Quality_{it} + \varphi_4 Pol\ Stability_{it} + \varphi_5 Exchange\ Rate_{it} + \varphi_6 Inflation_{it} + \mu_i \quad (31)$$

where $\mu_i = a_i + \varepsilon_{ijt}$

Post Estimation Technique

The post estimation tests are done to ensure that regressions produce estimates that are consistent and robust. Post estimation tests are also performed in testing the fitness of the estimated model.

Hausman Test

This test is done in deciding between the fixed and random effects:

$$LM = (b_{LSDV} - b_{random})' \widehat{W}^{-1} (b_{LSDV} - b_{random}) \sim X^2(k) \quad (32)$$

$$Var[\, b_{LSDV} - b_{random}] = \mathrm{Var}(\, b_{LSDV}) - Var(\, b_{random}) \quad (33)$$

$\widehat{W}$ represents the difference in the GLS (efficient model) and estimated covariance matrices of LSDV (robust model). This, however, follows the k-degrees-of-freedom chi-square distribution. A Hausman test examines whether there is a substantial difference between random effects estimates and unbiased FE estimates, according to the formula. If the null hypothesis indicating the absence of correlation is rejected, it is concluded that the individual effects μ_i correlate significantly with at least one of the explanatory variables. This, therefore, means that the RE is not preferred. The FE is chosen over the random effect. Thus, when choosing between the FE and RE models, the hypothesis for the Hausman test is stated as:

H_0: The preferred model is the random effect

H_1: The preferred model is the fixed effect

Diagnostic Tests

Heteroscedasticity

Panel data analysis is mostly associated with the problem of a possible association between the different periods and the error terms. This violates the assumption of the error term having a constant variance (thus Var $(\varepsilon ijt) \neq \delta 2$). This is, thus, known as heteroscedasticity. In determining the efficiency of the estimates, the test of this assumption was performed. The modified Wald test was employed in testing for the heteroscedasticity in the model.

Autocorrelation

Autocorrelation exists when there exists a correlation between the current values of a variable and its past values. There is the possibility of causing problems in conventional analyses which work with the assumption of independent observations. Against the null hypothesis of no first-order autocorrelation, the Woodridge test for autocorrelation in the panel was also used to test for the serial or autocorrelation. It is important to note that the robust command was used to correct all issues of heteroskedasticity and serial or autocorrelation.

Multicollinearity

This occurs when the independent variables in the model correlate such that one regressor in a regression model can be explained using the others with a high level of accuracy. The correlation matrix was used in this study in detecting the presence of multicollinearity among the explanatory variables. Following Anderson's (2001) rule of thumb explaining that a correlation coefficient that exceeds 0.70 shows a potential problem of multicollinearity, it

is concluded that the variables used in this study do not suffer the problem of multicollinearity.

Post Estimation Technique

Making use of the joint density functions of u_{ij} and v_{ij}, the MLE will be employed in estimating the coefficients, alongside the total variance and the parameter γ, which is measured as the ratio of the variance, as presented in equation (34):

$$\gamma = \frac{\sigma_u{}^2}{(\sigma_u{}^2+\sigma_v{}^2)} \quad (34)$$

The coefficient of the gamma makes it possible to understand the form of changes in potential financial stability. It, thus, measures the total variation in financial stability resulting from influence originating from socio-political and institutional factors. Again, as a robustness test, Kumbhakar, Wang and Horncastle (2015) argue that in addition to the gamma, there is the need to conduct a likelihood test whereby we estimate two models $L(H_0)$ and $L(H_1)$. $L(H_0)$ shows the unrestricted model while $L(H_1)$ represents the restricted model. The distribution of the random variables associated with technical inefficiency, as well as the residual error term, is determined using a variety of formal hypothesis tests. The tests are carried out by imposing limits on the model and determining the significance of the restriction using generalised likelihood-ratio statistics (λ). The generalised likelihood ratio statistics is defined in equation (33) as

$$\lambda = -2\{ln[L(H_o)] - ln[L(H_1)]\} \quad (35)$$

where $L(H_0)$ represents the restricted model that is calculated from OLS while $L(H_1)$ is the unrestricted model computed from the stochastic frontier. Both $L(H_0)$ and $L(H_1)$ are the log-likelihood values under the null and

alternative hypotheses. Thus, the null hypothesis (H_0) indicates that no technical inefficiencies exist while the alternative (H_1) states that there are technical inefficiencies. According to Kodde and Palm (1986), the value of lambda (λ) calculated is then compared with the obtained mixed distribution of critical values. If the null hypothesis involves $\gamma = 0$, which indicates that there is no technical inefficiency effect in the model, then, λ has mixed chi-square distribution with the number of degrees of freedom given by the number of restrictions imposed since $\gamma = 0$ is a value on the boundary of the space of parameter for γ (Battese & Coelli, 1992).

Financial Stability Gap and Private Investment in sub-Saharan Africa

The third and final empirical chapter analysed the effect of the financial stability gap on private investment in SSA. As a sensitivity investigation, the threshold analysis was done to determine the point at which financial stability gap becomes detrimental to the investment made by the private sector.

Theoretical and Empirical Model Specifications

Following the theoretical and the empirical model specification employed in the first chapter of the study, the empirical model estimated in this chapter of the study is specified as

$$Pvt\ inv_{it} = \propto + \varphi FS\ Gap_{it} + \gamma X_{it} + \varepsilon_{it} \quad (36)$$

where $Pvt\ inv$ represents private investment, $\propto$ is the constant, $FS\ Gap$ represents the financial stability gap and X represents other drivers of private investment. Again, following the first empirical chapter, the system GMM estimation technique is employed in this chapter as a means to correct the the possibility of endogeneity through the use of instruments. Thus, the

endogeneity problem is expected to originate from the relationship between variables such as private investment and employment or government investment (bi-causality as a source of the endogeneity) Thus, the GMM model is specified as:

$$Pvt\ inv_{it} = \gamma_0 + \gamma_1 Pvt\ inv_{t-1} + \gamma_2 FS\ Gap_{it} + \gamma_3 FS\ Gap^2{}_{it} + \gamma_4 Gov\ inv_{it} + \gamma_5 Gov\ eff_{it} + \gamma_6 Savings_{it} + \gamma_7 Employment_{it} + \gamma_8 Ext\ Debt_{it} + \varepsilon_{it} \quad (37)$$

where γ_0 is the constant term and $Pvt\ inv_{t-1}$ is the previous year's private investment at time t. $FS\ Gap$ is the gap in financial stability and $FS\ Gap^2$ is the square of the financial stability gap. This is introduced to measure the severity of the gap in financial stability. Thus, an effort to analyze the effect of the financial stability gap at different levels owing to the argument that the impact of the gap differs at different levels (Fahr & Fell, 2017). This is also done to aid the calculation of the threshold at which the direction of the impact changes Again, it is expected to aid easy decision-making regarding policy recommendations on financial stability since the effect is identified at different levels or dimensions. $Gov\ inv$ is public or government investment, $Gov\ eff$ is government effectiveness, $Savings$ represents domestic savings, $Employment$ is employment, and $Ext\ Debt$ represents external debt. Again, the subscript $i\ (= 1, \dots n)$ signifies the country and $t\ (1, \dots T)$ denotes the time indices.

Also, the estimation procedure in this empirical chapter follows the procedure presented in the first empirical chapter. Further, private investment is disaggregated into domestic and foreign investments. Thus, this is done to ascertain the effect of the financial stability gap separately in investment made

by domestic private investors and foreign investors (measured as foreign direct investment). The GMM model for domestic investment is presented as;

$$Dom\ inv_{it} = \gamma_0 + \gamma_1 Dom\ inv_{t-1} + \gamma_2 FS\ Gap_{it} + \gamma_3 FS\ Gap^2{}_{it} + \gamma_4 Gov\ inv_{it} + \gamma_5 Gov\ eff_{it} + \gamma_6 Savings_{it} + \gamma_7 Employment_{it} + \gamma_8 Ext\ Debt_{it} + \varepsilon_{it} \quad (38)$$

Where Dom inv represents domestic investment. Also, the GMM model for foreign investment is presented as;

$$FDI_{it} = \gamma_0 + \gamma_1 FDI_{t-1} + \gamma_2 FS\ Gap_{it} + \gamma_3 FS\ Gap^2{}_{it} + \gamma_4 Gov\ inv_{it} + \gamma_5 Gov\ eff_{it} + \gamma_6 Savings_{it} + \gamma_7 Employment_{it} + \gamma_8 Ext\ Debt_{it} + \varepsilon_{it} \quad (39)$$

Measurement of Variables, Justification, Expected Signs and Sources

Importantly, some variables used in the first empirical chapter as drivers of private investment are also present in the first estimation of this chapter. This implies that their measurement, justifications, expected signs and sources have been already explained. These variables include private investment, government investment, savings and external debt. This part will then focus on the newly introduced drivers of private investment.

Foreign Direct Investment

This is measured as the net inflows of investment to acquire a long-term management interest (10 percent or more of voting stock) in an enterprise operating in an economy different from the investor's home economy. FDI is also measured as a percentage of GDP.

Domestic Investment

This refers to private investment by the citizens of the home country. This is an author's self-generated variable. It was computed as the total investment made in a country less the foreign direct investment. Thus,

domestic investment is generated in an effort to disaggregate private investment as a dependent variable.

Financial Stability Gap

This measures the difference between the actual financial stability gap and the potential value. The Z-scores as explained in the second empirical chapter are used as the actual financial stability score. The potential as explained in the second empirical chapter represents the actual values divided by the efficiency scores. When determining the severity of the financial stability gap, the squared values of the gap were deduced. This method has been employed by other studies in measuring the severity of variables or phenomena (Peprah et al., 2019). As an objective, it is worthy to investigate the effect of the financial stability gap at different levels so that the true relationship can be found. Indeed, at a minimal level, a positive effect is expected while a negative effect is expected when squared. Thus, $\gamma_2 > 0$ and $\gamma_3 < 0$.

Government Effectiveness

This is a governance indicator capturing how people perceive the quality of both public and civil service as well as the level at which they are independent of political sources. It also captures how quality policies are formulated and implemented as well as how credible the governments are to the policies introduced. It gives the country's score on the aggregate indicator, which ranges from -2.5 to 2.5 in standard normal distribution units. Thus, effective governments, through the formulation of quality policies, drive private sector growth as they become fertile grounds for investment activities. A positive effect is, therefore, expected ($\gamma_5 > 0$).

Employment

The employment variable refers to the share of a country that is in active employment. Thus, employment is defined as persons who have the working-age and, during a particular period of reference, have been engaged in any activity that aims at producing goods and providing services for pay or profit. This measure captures people aged 15 years and above (since this generally defines the age of the working population) and is measured as a fraction of the total population. Investment is a function of income that also depends on employment. It can, therefore, be concluded that a rise in the level of employment will induce investment. Thus, employment should positively affect private investment ($\gamma_7 > 0$).

Computation of the Threshold

The threshold was calculated to determine the point or the extent to which the financial stability gap becomes damaging to private investment. The computation, therefore, follows as:

$$Pvt\ inv = \gamma_0 + \gamma_2 Gap + -\gamma_3 Gap^2$$

$$\frac{d(Pinv)}{d(Gap)} = \gamma_2 - 2(\gamma_3)Gap$$

$$2(\gamma_3)Gap = \gamma_2$$

$$Gap = \frac{\gamma_2}{2(\gamma_3)}$$

$$Gap = 100 * \frac{\gamma_2}{2(\gamma_3)}$$

$$Gap = (100 * \frac{\gamma_2}{2(\gamma_3)})\%$$

It is, therefore, concluded that an increase in financial stability gap beyond $\left(100 * \frac{\gamma_2}{2(\gamma_3)}\right)$ percent is detrimental to private investment.

Chapter Summary

The methodological measures used in the thesis are illustrated in this chapter. In this chapter, the choice of the quantitative approaches for the various empirical sections was adequately justified. The various measures of the variables used and their sources as well as the choice of the estimation techniques are explained. Thus, while the stochastic frontier model was employed, the system GMM, as well as the FE and FE estimation techniques, was also used in establishing the causal relationships among the variables of interest.

CHAPTER FOUR

GOVERNMENT DOMESTIC DEBT ARREARS AND PRIVATE INVESTMENT IN SUB-SAHARAN AFRICA

Introduction

This chapter provides the empirical analysis of the government debt arrears and investment by the private sector. It tests the hypothesis that government debt arrears affect private investment. Analyses in this chapter are done for SSA as a region as well as the sub-regional communities within the region namely the ECCAS, the EAC and the ECOWAS. In this chapter, regression analysis and Impulse Response Functions (IRFs) are used in analysing how private investment responds to sudden changes in government debt arrears.

Table 2: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Arrears	265	3.22	4.142	0	19.401
Growth	396	4.784	4.355	-36.392	20.716
Pvt inv	240	17.499	8.354	2.962	72.164
Gov inv	376	11.487	8.81	.064	52.418
Inflation	364	118.985	36.201	57.154	337.45
Credit	380	21.17	15.308	-17.128	84.422
Savings	376	11.347	21.891	-141.974	62.536
Ext Debt	388	36.728	28.443	4.909	309.974

Source: Kulu (2022)

Descriptive Statistics

Table 2 provides the descriptive statistics of the variables used in the analyses. The variables are examined at their levels. The differences in the number of observations is as a result of the non-availability of data for some

countries. One possible cause of the differences in the observations is the fact that the variables are obtained from different sources.

Inflation recorded the maximum standard deviation for the period under study, which explains the disparity in increases in general price levels across the countries under consideration. Most of the countries used are of different economic sizes and vary in terms of many macroeconomic indicators. The mean value of the arrears for the period is approximately 3 percent, which confirms IMF (2019) reports. For the period 2007 to 2018, SSA countries recorded average arrears of 3.22 percent of GDP.

Again, in the period under consideration, some countries recorded no domestic debt arrears. This is evident in the value of the minimum values. On average, private investment for the period is about 17.5 percent of GDP as against government investment of about 11.5 percent of GDP. The standard deviation of the government investment (8.81 percent) being higher than the private investment (8.3 percent) indicates that there are disparities among the countries in terms of government investment as compared to private investment. It is, therefore, deduced from the mean, the maximum as well as the minimum values of the private and public investment that, private investment in the SSA countries is above the investment made by the government for the period studied. Thus, the mean values indicate that on average, private investment in SSA for the period exceeds government investment by about 6 percent.

Table 3: Correlation Matrix

Variables	*Pvt inv*	*Arrears*	*Growth*	*Gov inv*	*Inflation*	*Credit*	*Savings*	*Ext Debt*
Pvt inv	1.000							
Arrears	−0.075	1.000						
Growth	0.086	-0.294^{a}	1.000					
Gov inv	0.318^{a}	-0.209^{a}	0.192^{a}	1.000				
Inflation	0.009	−0.071	-0.097^{c}	0.239^{a}	1.000			
Credit	-0.121^{c}	0.039	-0.130^{b}	−0.032	0.180^{a}	1.000		
Savings	0.430^{a}	0.000	0.022	−0.047	0.029	−0.029	1.000	
Ext Debt	-0.055	0.133^{b}	-0.111^{b}	0.014	−0.007	0.079	-0.335^{a}	1.000

Note: the superscripts a, b, c indicate statistically significant at 1%, 5%, 10% level respectively

Source: Kulu (2022)

Test for Multicollinearity

Multicollinearity arises when there is a co-movement of two or more regressors in such a way that one can perfectly explain the other. Table 3 presents the correlation matrix of the variables used in the analyses. This is done to check for the presence of multicollinearity which has the possibility of reducing the precision of the estimated coefficients and also decreasing the statistical power of the regression model. The correlation coefficients presented show the magnitude of correlation among the regressors (Table 3). It is observed that none of the coefficients is above 0.5. This, therefore, explains that there is a minimal level of correlation among explanatory variables. Thus, multicollinearity is not present in the regression model. Also, in the Variance Inflation Factor (VIF) test presented in Appendix I, there is evidence of no multicollinearity since all the VIF values are less than 10.

Table 4: Effect of Government Domestic Debt Arrears on Private Investment in SSA, ECCAS, EAC and ECOWAS

Dependent Variable: log (*Pvt inv*)				
Independent Variables	**Sub-Saharan Africa (SSA)**	**Central Africa (ECCAS)**	**Eastern Africa (EAC)**	**West Africa (ECOWAS)**
(1)	**(2)**	**(3)**	**(4)**	**(5)**
Pvt inv (-1)	0.443^{a}	0.620^{a}	-0.463^{a}	0.475^{a}
	(0.066)	(0.119)	(0.111)	(0.088)
Arrears	-1.023^{a}	-2.141^{a}	0.816	-0.575^{a}
	(0.186)	(0.384)	(0.981)	(0.159)
Gov inv	0.520^{b}	0.976^{b}	0.199	−0.037
	(0.224)	(0.444)	(0.235)	(0.136)

Table 4, Continued

Independent Variables (1)	SSA (2)	ECCAS (3)	EAC (4)	ECOWAS (5)
Inflation	-0.055^{a}	0.054	0.008	-0.079^{a}
	(0.015)	(0.174)	(0.018)	(0.017)
Credit	0.509^{a}	0.751^{a}	0.620^{a}	0.095^{b}
	(0.076)	(0.225)	(0.135)	(0.041)
Savings	0.210^{a}	0.308^{a}	0.506^{a}	0.044^{b}
	(0.058)	(0.158)	(0.065)	(0.021)
Ext Debt	0.083^{a}	0.148^{c}	-0.193^{b}	0.018
	(0.031)	(0.088)	(0.072)	(0.012)
Growth	1.090^{a}	1.453^{a}	-0.144^{b}	0.418^{a}
	(0.206)	(0.533)	(0.225)	(0.089)
*Arrears * Growth*	0.174^{a}	0.345^{a}	0.253^{b}	0.062^{a}
	(0.036)	(0.095)	(0.134)	(0.023)
Constant	3.384	−13.895	14.974^{a}	16.981^{a}
	(3.688)	(17.087)	(2.411)	(2.881)
No. of Instrument	25	12	11	13
AR(1)	Pr =0.046	Pr =0.012	Pr=0.512	Pr =0.611
AR(2)	Pr = 0.117	Pr = 0.648	Pr = 0.793	Pr = 0.142
Sargan test of overid. restrictions: chi2(37) = 76.99 Prob > chi2 = 0.511				
Hansen test of overid. restrictions: chi2(37) = 83.00 Prob > chi2 = 0.447				

Note: the superscripts a, b, c indicate statistically significant at 1%, 5%, 10% level respectively. Robust Standard errors presented in brackets.
Source: Kulu (2022)

Estimates for the Sub-Saharan Region

The estimates of the impact of government debt arrears on investment by the private sector in the SSA and its sub-regional communities (ECCAS, EAC and ECOWAS) are shown in Table 4. Column 2 shows the results for SSA. In the

estimates for the SSA region, it is found that in the first lag of the Arellano-Bond tests, there is evidence of autocorrelation but zero autocorrelation exists in the second lag. The probability value of the Sargan test indicates that the instruments used are validly exogenous. Also, with the null hypothesis that overidentified model is correctly specified, the probability value (0.447) of the Hansen test indicates that the model is correctly specified since the null hypothesis cannot be rejected

The coefficient of the previous year's private investment is significant at 5 percent and also positive. The coefficient depicts that the current years' private investment increases by about 0.44 units, given a unit increase in the previous year's level of private investment, all other variables held constant. Thus, private investment in the previous year has a direct effect on the current year's private sector investment. This means that in SSA, past investment plays the role of the investment climate which provides a good signal and a positive indicator for decisions regarding current investment. This confirms the findings of Anyanwu et al. (2018).

Investment made by governments in SSA is found to induce private investment. At 5%, this association is statistically significant. Holding all other variables fixed, a unit rise in government investment results in a 0.52 unit rise in private sector investment in the SSA region. This indicates that investments by the governments "crowd-in" private investment in SSA. Even though this study did not decompose the government investment into infrastructural and non-infrastructural types, there is evidence that investment by the government has a

positive externality for investment by the private sector. Frimpong and Marbuah (2010) concluded that a positive coefficient of government investment implies that the government's efforts in providing infrastructure such as telecommunications, energy, roads, and transportation act as a complement to private sector investment.

Inflation is negative and significant at 1 percent. Its coefficient shows that holding all other variables constant, a unit rise in the general price levels leads to about 0.06 units decrease in private sector investment. Most especially, increasing inflation is associated with the poor performance of assets with fixed and long-term cash flows. Thus, the purchasing power of investors is reduced when the general price levels of goods and services continuously increase. This confirms the findings by Frimpong and Marbuah (2010).

Again, credit given to the private sector is positive. This relationship is statistically significant at 1 percent. Holding all other variables constant, a unit increase in private sector credit improves private investment by about 0.51 units. With increased credit, private investors can increase their investment levels or even diversify their investment activities. This is seen as capital for business startups or the expansion of businesses. More capital is preferred by the private investor as the survival of most businesses is dependent on their capability to compete with other businesses in the respective industries.

This, then, means that credit is key to the expansion and diversification of products. Thus, credit provided to the private sector is identified to perform a key role in private investment, since credit availability is a major factor that boosts

investment by the private sector (Akpalu, 2002; Anyanwu et al., 2018; Asante, 2000; Badawi, 2005). The study finds savings as a booster of private investment in SSA. The coefficients indicate that private investment will increase by about 0.21 units when savings in SSA increase by a unit, holding other variables constant. As the level of savings in the economy increases, banks or financial institutions are expected to have more credits at their disposal for lending purposes and other investment activities. In other words, if more savings are made by individuals, banks can lend more to firms for investment purposes. With low savings in an economy, it is an indication that short-term consumption is being chosen over investment in the long-term. This result confirms the findings of Lidiema (2018).

In the SSA region, the findings indicate that government borrowing from external sources boosts private investment domestically. This relationship is statistically significant at 1 percent. All other variables held constant, a unit increase in external debts leads to about 0.1unit increase in private investment. Borrowing from external sources helps improve private investment, especially when the borrowed funds are used in building infrastructural and other investment enhancing projects (Frimpong & Marbuah, 2010).

Again, this finding confirms the implementation of the tenets of the financing gap theory in SSA. The theory highlights the fact that borrowing from external sources is desirable for improvement in investment when there exists a gap in domestically available funds and the total funds required for investment purposes. Thus, the most appropriate means of closing this gap is the reliance on

external debt (Abdullahi et al., 2016). However, excessive borrowing either from external or domestic sources may be detrimental to private investment. Thus, the dual gap theory also highlights that signing up for debt from an external source is appropriate when the cost of investing the funds is less than the associated returns that will be generated. Mabula and Mutasa (2019) explain that external debts constitute the greater portion of public debt (over 70 percent) and also find that external debt enhances private investment in Tanzania. However, external debt beyond 40.89 percent of GDP is harmful to private sector investment. The crowding-out theory explains that public debt will constitute a harmful impact if its increment leads to a decreasing level of private investment.

Again, the estimations for SSA find that at 1 percent level of significance, there is a direct and statistically significant association between economic growth and investment by the private sector. The coefficient indicates that a unit increase in growth in the economy will lead to about 1.1 units increase in private investment, holding all other variables constant. When private investors observe improvements in economic forecasts, there is the possibility of increasing their investment levels by way of meeting the demand for the future. Growth in the economy, to some extent, implies improvement in aggregate demand and output. This provides a positive signal for private investors to invest.

The introduction of growth in GDP in the model is to capture the accelerator effect by Keynes. Thus, the accelerator theory of investment explains that changes in output trigger a change in the capital stock. This implies that there should be a rise in capital stock in accordance with the new level of output once

an increase in output is anticipated. This direct relationship found between growth and private investment confirms other findings by Lesotlho (2006), Anyanwu et al. (2018), Ghura and Goodwin (2000), and Lidiema, (2018). It is important to note that investment is also argued to be a major determinant of economic growth. Thus, a bi-causal association between economic growth and private investment has been confirmed by other studies.

Estimates for the Economic Community of Central Africa States

In Table 4, results for the ECCAS are provided in column 3. As shown in the Arellano-Bond tests, autocorrelation is present in the first lag but this is absent in the second lag. The lagged private investment is positive and significant at 5 percent. This indicates that in the ECCAS, the level of investment in the previous positively and statistically influences the current year's level. Thus, holding all other variables constant, a unit increase in previous years' level of investment increases current year's investment by about 0.6 units. There is, therefore, evidence that positive investment climates enhance future investments. Government or public investment in the ECCAS is also found to be positive. This relationship is statistically significant at 1 percent level. Private investment will increase by about 0.98 units if government investment increases by a unit, all other variables held constant. The results confirm the crowding-in effect of government investment on private sector investment.

Furthermore, credit given to the private sector is positive and has a statistically significant effect on private sector investment in the ECCAS at the 1% level of significance. With all other variables held constant, an increase in

private sector credit of one unit boosts private investment by around 0.8 units. Credit granted to the private sector within the ECCAS sub-region stimulates private investment (Akpalu, 2002; Anyanwu et al., 2018; Asante, 2000; Badawi, 2005; Lesotlho, 2006). (Akpalu, 2002; Anyanwu et al., 2018; Asante, 2000; Badawi, 2005; Lesotlho, 2006). Domestic savings are found to be favorable and have a statistically significant impact on private investment in the ECCAS sub-regional community.

The coefficient of savings indicates that a unit increase in domestic savings leads to about 0.31 units increase in private investment, all other variables held constant. Thus, the positive effect of domestic savings on private sector investment is true for the ECCAS sub-regional community. Debt from external sources is found to be positive and also statistically significant. This relationship is significant at 10 percent level. Thus, holding all other variables constant, a unit increase in external borrowing or debt leads to about 0.15 unit increase in private investment in the ECCAS sub-regional community. This also indicates the confirmation of the financial gap theory in the ECCAS sub-regional community. Just as in the case of the estimates in SSA, growth in GDP for the ECCAS sub-region is found to have a direct effect on private investment. This relationship is significant at 1 percent level. Thus, a unit increase in GDP growth leads to about 1.5 units growth in private investment in the ECCAS sub-regional community. In the ECCAS sub-regional community, the rate of inflation is found to be positive but statistically insignificant.

Estimates for Eastern Africa Community

The results for the EAC sub-regional community is presented in Table 4 in column 4. It is indicated that no autocorrelation exists in both the first and second lags of the Arellano-Bond tests. Variables like government investment and the rate of inflation have no statistically significant impact on private investment in the analysis of the EAC sub-regional community. Surprisingly, the lagged value of private investment in the EAC sub-regional community was negative at 1 percent significant level. Thus, it is found that the previous year's investment level rather reduces investment in the subsequent year. This, however, confirms the findings of Roch (2019) who found an inverse relationship between the previous year and the current year's private investment in Rwanda, a country within the EAC.

As expected, credit provided to the private sector is determined to be a booster of private investment in the sub-regional community. This relationship is, thus, statistically significant at 1 percent. It is indicated from the coefficient that all other variables held constant, a unit increase in credit provided to the private sector will lead to about 0.62 units increase in private investment in the EAC sub-regional community.

Again, domestic savings in the EAC are positive and significant at 1 percent as expected. Holding all other variables constant, a unit increase in domestic savings leads to about 0.51 units increase in private investment. Thus, as more people within the EAC sub-regional community save, private investment

improves through the credits that will be available with the financial institutions for investment purposes.

For external debt, an inverse relationship was found. This is also statistically significant at 1 percent. The estimate indicates that private investment is reduced by about 0.2 units when external debt increases by 1 unit, all other variables held constant. The indirect relationship found between external debt and private investment confirms the findings of Roch (2019). According to Roch (2019), external debt and its servicing in Eastern Africa, specifically in Rwanda, are unsustainable. Therefore, investment by the private sector will be low and inefficient without a reduction in debt servicing. It was argued that debt workouts such as the creditors of the Paris club deviate from giving a lasting solution to the problem of debt overhang in the country. The HIPC initiative is argued to potentially enhance investment.

However, despite the efforts to lessen the debt burden, there is a very low private investment in Rwanda, a major country within the EAC sub-regional community. Roch (2019) associates two reasons to the low level of investment. Firstly, there is the allocation of the limited financial domestic resources to servicing of government debt-obligations, and spending on infrastructure, emphasising more on foreign transfers. Secondly, qualifying for the HIPC initiative, among other things, depends on the commitment of a country to poverty reduction which needs to be shown in the preparation of the Poverty Reduction Strategy Paper (PRSP). The PRSP needs to be endorsed by the World Bank and the IMF before declaring a country to be at the decision point for receiving part of

the package of the debt relief. After declaring a country as eligible, there is the requirement to use two-third of the released resources on projects within the society, with 40 percent on education and 25 percent on health care within the economy. Certainly, the conditions introduced reduce the benefits of the initiative to business.

Also, against the expectation, growth in GDP was negative and significant at 1 percent. Thus, the estimate for the EAC sub-regional community shows that a unit rise in GDP growth lessens investment by the private sector by about 0.1 percent, all other variables remaining constant.

Estimates for the Economic Community of West Africa States

Estimates for the ECOWAS sub-regional community are presented in column 5 of Table 4. It is indicated that there is no autocorrelation in both the first and second lags of the Arellano-Bond tests. With the expected signs, government investment and external debt were statistically insignificant in the analysis for the ECOWAS sub-regional community. Similar to the case of the SSA region and ECCAS sub-regional community, the lagged private investment is statistically significant at 1 percent. Holding all other variables constant, an increase in the previous year's investment increases current year's investment by about 0.5 units. This suggests that investment in the current period influences private investors in their decision on investing in the subsequent period and that a high level of investment today induces their choice of investing tomorrow.

Similar to the case of the SSA, the rate of inflation in West Africa is estimated to be negative and statistically significant at 1 percent. A unit increase

in the rate of inflation leads to about 0.1unit decrease in private investment, holding all other variables constant. Thus, unlike the case of ECCAS and EAC, private investors in ECOWAS are discouraged by consistent increases in general price levels of goods and services. Credit given to the private sector and domestic savings are also positive and statistically significant at 1 percent. The estimates show that all other variables remaining constant, private investment is increased by about 0.04 units when domestic savings increase by a unit. Also, a unit rise in credit given to the private sector induces private sector investment by about 0.1 units.

As found in the case for the SSA, ECCAS and the EAC, when domestic savings increases, more credits will be available to the financial institutions for lending, which will increase the level of investment. This is because most private investors rely on credits from financial institutions for their investment activities. GDP growth in the ECOWAS has a direct effect on private investment. This relationship is statistically significant at 1 percent. The estimated coefficient indicates that a unit increase in GDP growth leads to about 0.42 units increase in private investment in the ECOWAS sub-regional community. Thus, just as in the case of the SSA region and the ECCAS sub-regional community, GDP growth induces private investment.

Effects of Government Domestic Debt Arrears on Private Investment

Government domestic debt arrears as the variable of interest was found to be negative and significant at 1 percent in the SSA region, ECCAS and the ECOWAS sub-regional communities. It is positive but statistically insignificant in

the EAC sub-regional community. In the SSA region, a unit increase in government domestic debt arrears leads to about 1.02 units reduction in private investment, all other variables held constant. A unit increase in government domestic debt arrears leads to about 2.14 units decrease in private investment in the ECCAS sub-regional community. Again, private investment in the ECOWAS sub-regional community is reduced by about 0.6 units when government domestic debt arrears increase by 1 unit, all other variables held constant.

The government domestic debt arrears in the EAC sub-regional community having no statistically significant effect on private investment confirms its lowest average value (about 0.7) among the other sub-regional communities under study (Table 1). The estimates show that the ECCAS has the highest coefficient (-2.141), indicating the magnitude of impact within the sub-region. This supports the IMF (2019) staff reports of high shocks of government arrears in the Central Africa sub-region. It is again not surprising that the ECCAS has the highest average (about 4.54) figure in the sub-regional descriptive statistics, which is above the regional mean value (about 3.22).

According to Anyanwu et al. (2018), private investors in SSA are noted to contest with the government for credits. Consequently, the more lenders give credit to the governments, the lesser funds available for private investment. It is argued again that relatively, lending to the government is less risky, so government tends to get most of the credits in this competition for funds. When the required dates for repayment are surpassed, arrears arise. In this case, the

private investors are deprived of funds for their investment activities leading to a reduction in the level of private investments.

Empirically, government debt which may or may not hurt private investment (Anyanwu et al., 2018; Kingwára, 2014; Lidiema, 2018). It is important to note that when there are delays in payment of government debt and the funds are used for infrastructure or projects that enhance growth in the economy, there is the likelihood of recording an increase in private investment. Further, this is tested by determining the joint effect of the government domestic debt arrears and economic growth on investment by the private sector. With changes in the arrears amidst growth, the joint effect is still negative. Thus, given that there is economic growth and government domestic debt arrears keeps increasing, the effect on private investment will reduce. The net effect calculated indicates that the fall in private investment are about 0.2 percent, 0.5 percent and 0.3 percent for SSA, ECCAS and ECOWAS respectively (Appendix A). Thus, the calculation for EAC was exempted because arrears had no statistically significant on private investment.

However, a positive effect joint effect on private investment will be observed when economic growth increases amidst government domestic debt arrears. Thus, if government accumulates arrears and undertake growth enhancing projects (causing economic growth to increase), private investment will improve. The calculated net effects indicate that the joint effect on private investment is about 2 percent for the SSA region, 3 percent for the ECCAS and about 0.7 percent for the ECOWAS sub-regional community (Appendix J). There is, therefore, the

confirmation that if government domestically borrows funds that are not paid on time, it will positively affect investment by the private sector if the funds are used for projects that induce growth within the various economies.

Response of Private Investment to Shocks in Government Domestic Debt Arrears

Impulse Response Functions from the standard VAR model are used to determine the response of private investment to shocks in government domestic debt arrears. These results are used in complementing the findings from the panel estimations. Figures 5 shows the IRFs for SSA, ECCAS, EAC and the ECOWAS sub-regional communities. For the ECCAS (Panel A), it is observed that a standard deviation shock will contribute to a fall in private investment just after period 1. The reduction in private investment in response to the shocks in the government debt arrears for the SSA and EAC start in the 2nd period. For the ECOWAS sub-regional community, however, a standard deviation shock in government domestic arrears increases private investment initially but after the 8th period, private investment begins to fall. It indicates that private investment provides a negative response to shock or impulse in government domestic debt arrears. However, this is relatively slow in the ECOWAS sub-regional community. Indeed, the results of the panel estimations also show that the coefficient of government domestic debt arrears in the ECOWAS is the least (-0.575) among the sub-regional communities considered in the study.

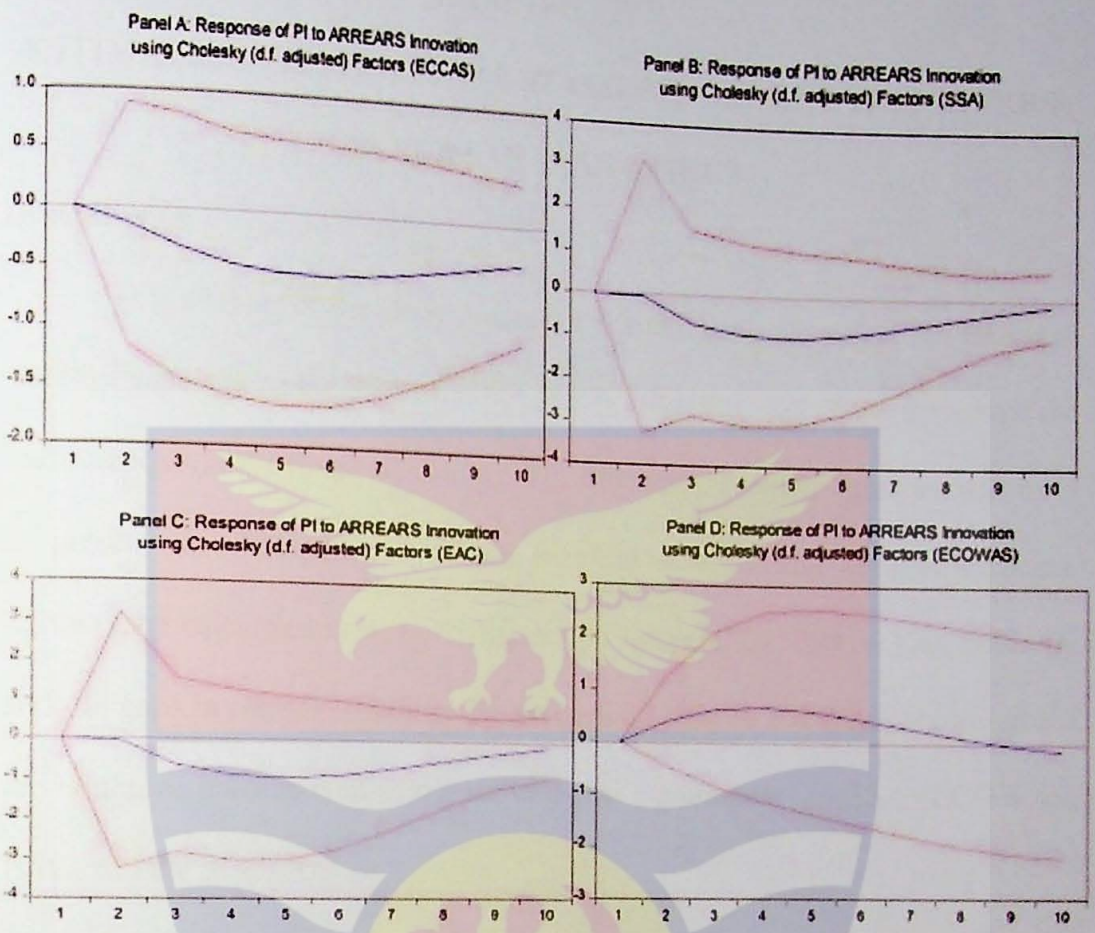

Figure 5: Response of Private Investment to Shocks in Arrears
Source: Kulu (2022)

Chapter Summary

This chapter has presented the empirical findings and discussions on the effect of government domestic debt arrears on private investment in SSA, the ECCAS, EAC and the ECOWAS sub-regional communities. In achieving this, the system GMM estimation technique was employed on the panel data. The chapter also presented the Impulse Response Functions (IRFs) showing how private investment reacts to shocks in government domestic debt arrears. These analyses were also done for the regional (SSA) and sub-regional community (ECCAS, EAC and ECOWAS) levels. The latter technique was employed as a complement to the findings from the panel estimations.

CHAPTER FIVE

ESTIMATING THE FINANCIAL STABILITY GAP AND ITS DRIVERS IN SUB-SAHARAN AFRICA

Introduction

This chapter of the study provides the empirical analysis on the financial stability gaps among the SSA countries and its drivers as well as the drivers of the inefficiencies in the financial stability. The Stochastic Frontier Analysis was used to present the determinants of both financial stability and its inefficiencies. Further, the calculated means of efficiency in financial stability, actual, potential and the gaps in financial stability for the period (2007 to 2018) are presented for the countries used as well as the sub-regional communities in SSA (ECOWAS, EAC, and the ECCAS).

Table 5: Descriptive Statistics

Variable	Observation	Mean	Std. Dev.	Min	Max
Fin Stability	360	9.302	4.419	2.204	21.544
Credit	380	19.306	24.264	2.267	160.125
Unemployment	396	6.346	6.357	0.317	28.551
In Quality	388	53.214	6.887	21.4	69.1
Inflation	364	118.985	36.201	57.154	337.45
Domestic Debt	300	15.304	55.965	0.005	405.35
Employment	396	65.142	12.199	39.37	87.82
Arrears	265	3.22	4.142	0	19.401
Gov eff	363	-0.865	0.483	-1.848	0.509
Reg Quality	363	-0.714	0.48	-2.156	0.499

Source: Kulu (2022)

Descriptive Statistics

The descriptive statistics of the variables used for the analysis in this chapter are presented in Table 5. There are differences in the number of observations, signifying that there are some missing observations for some of the variables in certain years for some of the countries used. This, thus, implies that unbalanced panel data was used for the analysis. For the variables used and the period under study (2007 to 2018), government domestic debt records the highest standard deviation. This means that there is a wide disparity among the countries under study in terms of government domestic borrowing for the period used. This is also evident in the maximum and minimum values of the domestic debt which are 0.005 billion and 405.35 billion US dollars. This situation is also true for the government's domestic debt arrears.

Again, credit provided to the private sector has a higher standard deviation of 24.264 which is above the mean value of 19.306. As evident from the minimum and maximum values (2.267 and 160.125) as well, there are disparities in the credit provided to the private sector within the SSA region. Government effectiveness and regulatory quality respectively have mean values -0.865 and -0.714, which indicate that the effectiveness of the government and the quality of regulations in SSA has been low.

Table 6: Stochastic Frontier Estimates

Dependent (Log of Financial Stability)

Independent Variables	Coefficient	Standard Error	P-value
Credit	0.006^a	0.001	0.000
Unemployment	-0.022^a	0.006	0.001
Eco Fred	-0.014	0.009	0.103
Inflation	0.011^a	0.001	0.008
Domestic Debt	-0.001	0.001	0.519
Constant	3.181^a	0.534	0.000

Note: Note: the superscripts a, b, c indicate statistically significant at 1%, 5%, 10% level respectively.
Source: Kulu (2022)

Results of the Stochastic Frontier Analysis

With reference to the stochastic frontier production function using the Maximum Likelihood Estimation (MLE), the stochastic frontier model is presented in Table 6. Though some variables were not statistically significant, all the variables used had the expected signs. Thus, the quality of institutions and domestic debt have their apriori signs but were not statistically significant. Credit provided to the private sector is found to be statistically significant at 1 percent. Given the log of financial stability as the explained variable, the coefficient shows that a unit rise in credit provided to the private sector leads to about 0.6 units increase in financial stability, all other variables held constant. This implies that as more credits are provided to the private sector for their activities, financial stability is boosted.

It is argued that this act increases investment made by the private sector, hence, improvement in savings with the financial institutions. Improvement in

investment motivated by the credit provided is accompanied by a positive spillover effect. Thus, other linked businesses experience a positive impact while individuals have the avenue to increase their income volumes for further savings. Stability in the financial system is enhanced through improvement in the level of savings within the economy. Studies by Van Duuren et al. (2020), and Amatus and Alireza (2015) found credit to the private sector to be a statistically significant but negative variable in determining financial stability. Van Duuren et al. (2020), however, conclude that the direction of the relationship differs from one country to the other.

Unemployment is negative and also statistically significant at 1 percent. The coefficient indicates that a unit rise in the unemployment level will lead to about 2.2 units decrease in financial stability, holding all other variables constant. An increase in the unemployment rate reduces the income level or blocks some sources of income of individuals. This implies that there will be relatively little funds available for consumption as well as savings with financial institutions. Thus, reduced savings limit deposits with financial institutions, hence reducing their liquidity strength. It is also argued that a rise in unemployment can decrease aggregate demand, hence, causing an increase in loan default rates. This, therefore, introduces an inverse relationship between the unemployment level and the performance of banks (Heffernan & Fu, 2008). The relationship found confirms the findings of studies by Heffernan and Fu (2008), Ozili (2018), and Segoviano and Goodhart Segoviano and Goodhart (2009). Again, in line with Segoviano and Goodhart

(2009), no statistically significant relationship was found between inflation and financial stability.

Consistent with Vo et al. (2019), the results showed that the rate of inflation exerts a positive impact on stability in the financial system. When the rate of inflation increases, borrowers pay lenders with money which is worth below the amount borrowed originally, hence, benefitting the borrowers. Therefore, with increases in prices, the demand for credit also increases, causing a rise in interest rates. Lenders, mostly financial institutions, benefit from the high interest rate charged on borrowed funds.

Table 7: Drivers of Inefficiencies in Financial Stability

Dependent (Inefficiency in Financial Stability)			
Independent Variables	**Coefficient**	**Standard Error**	**P-value**
Employment	-0.044^{a}	0.013	0.001
Savings	-0.011^{b}	0.004	0.014
Arrears	0.035^{a}	0.0105	0.001
Gov eff	-0.405	0.256	0.113
Req Quality	-1.154^{a}	0.319	0.000
Constant	1.818^{a}	0.602	0.003
sigma − square (σ^2)	-2.199^{a}		
Gamma $= \gamma = \frac{\sigma_u{}^2}{\sigma_u{}^2+\sigma_v{}^2}$	0.475		
LR test of one-sided error	208.2681^{a}		
Wald chi2(5)	23.20		

Note: the superscripts a, b, c indicate statistically significant at 1%, 5%, 10% level respectively.
Source: Kulu (2022)

Results of the Technical Inefficiency Model

Two methods are used to estimate inefficiency models. It can be completed in one or two steps. The Stochastic Frontier, for starters, provides estimates for the two-step procedure and technological efficiency. The variables are then regressed on a set of inefficiency characteristics that are thought to affect financial stability efficiency. The incoherence in the assumptions of inefficiency distribution is a problem linked with the two-stage technique. The assumption that inefficiencies are distributed independently and identically is used to evaluate their worth in the first stage. The estimated inefficiencies are supposed to be a function of a number of country-specific factors that are not uniformly distributed unless all of the factor coefficients are equal to zero at the same time in the second stage (Coelli, Rao & Battese, 1998). The conditional mean approach is used to estimate all of the parameters in one step to overcome discrepancies (Battese & Coelli, 1992). Inefficiency's impacts are defined as being influenced by country-specific factors (as in the two-stage approach). They are, however, immediately included in the MLE. Table 7 shows the findings on the determinants of inefficiency in financial stability.

All the variables used for the estimations have their expected signs. Employment was found to have a negative and statistically significant relationship with the inefficiencies in financial stability. From the estimated coefficient, it is indicated that holding all other variables constant, a unit increase in the employment level will lead to about 0.04 units reduction in the inefficiencies in the financial stability. A rise in the level of employment, to a large extent, depicts

either increase in the level of income or an increase in the sources of income. The employed individuals, all other things being equal, will now have relatively higher sums of money (income) to make decisions on consumption and savings. Also, investment can be propelled, which may have a positive spillover or multiplier effect in the economy. Thus, relevant sectors of the economy such as the financial sector are directly or indirectly affected, hence, reducing the inefficiencies in the financial stability.

Domestic savings in SSA is negative and statistically significant at 5 percent. A unit increase in domestic savings leads to about 0.01 units decrease in the inefficiencies in financial stability in SSA, holding all other variables constant. Improved domestic savings (specifically with financial institutions) increase the volume of deposits of financial institutions, hence, their liquidity stance. The monetarists are of the view that financial instability is all about financial institutions being illiquid. Vo et al. (2019), and Borio and Drehmann (2011), for instance, explain that a counter-response by the central bank to the outcome of inflation from the policy implementation, in turn, decreases liquidity that exists in the money market as well as within the financial institutions which could lead to panic in banks and bank run, hence, worsening the illiquidity in the money market. Therefore, the more liquid financial institutions are, the more stable and efficient they become. At 1 percent level of significance, the government domestic debt arrears were found to be positive and statistically significant.

The coefficient indicates that all other variables held constant, a unit increase in government domestic debt arrears increases the inefficiencies in financial stability by about 0.04 percent. The government, together with private investors, borrows from domestic sources in financing its projects. These borrowed funds, when paid (with or without interest), are used in financing other loans and activities of the financial institutions, thereby keeping that particular institution in business. Any significant delays in the payment of borrowed funds, especially on the side of the government (in which relatively larger sums are given), distort the regular activities of the financial institutions, hence increasing their vulnerability to being inefficient. This confirms the findings of the IMF (2019) staff reports that the accumulation of government domestic arrears is reflected in the non-performing loans to total gross loans ratio estimated in the range of 0.3 percent point in SSA. The report further indicates that the intensity of the linkage is dependent on the initial soundness of the financial sector and also the volume and the pace of the arrears that have been accumulated.

Again, regulatory quality was found to be negative and significant at one percent. Thus, all other variables held constant, a unit increase in regulatory quality leads to a reduction in financial stability inefficiencies by about 1.2 units. The indirect relationship found between the quality of regulations and inefficiencies in financial stability explains that the formulation and implementation of sound policies, as well as the regulations that enhance the development of the private sector, help in reducing the inefficiencies in financial stability. Quality regulations, to a large extent, guide the behaviour and activities

of players in the market. Thus, in the financial market, lending and borrowing activities are well controlled when there exists a regulatory quality. There is, therefore, the possibility of a reduction in actions that will compromise the efficiency of the financial institutions. The indirect relationship found between regulatory quality and the inefficiencies in financial stability in this study is in line with the study by Ozili (2018) who argued that the quality of regulations directly influences the efficiencies in financial stability. Government effectiveness in this study had the expected negative sign but was estimated to be statistically insignificant.

Efficiency, Potential, Actual and Gap in Financial Stability for SSA countries

The mean values of the efficiency of financial stability, the potential financial stability and the gap in financial stability were calculated and presented together with the actual values of financial stability (measured as the z-score) and presented in Table 8. Firstly, the presentation is done at the country level to reveal, to some extent, the state of financial stability within the countries in SSA. Thus, this is an effort to trigger appropriate country-specific problem-solving. Importantly, the study covers 33 SSA countries. In this analysis, however, 32 countries were used. This is because actual financial stability observations needed for the computation of the other related variables were missing for a country (Comoros) for the period, 2007 to 2018.

Table 8: Mean of Efficiency, Potential, Actual and Gap in Financial Stability in SSA Countries (2007 to 2018).

Countries	Mean of Efficiency in FS	Mean of Potential FS	Mean of Actual FS	Mean of FS GAP
Angola	0.561989	19.73929	11.09326	8.646033
Benin	0.754502	18.89189	14.25397	4.637924
Burkina Faso	0.486848	13.84085	7.350968	7.102466
Cameroon	0.515125	18.48344	9.521286	8.962155
Central Africa republic	0.347195	17.31191	6.557026	11.3013
Chad	0.553654	17.14375	9.491699	7.652054
Congo, dem rep.	0.486848	8.922951	4.344118	4.578833
Congo, rep.	0.235421	18.45257	4.344118	14.10845
Cote d'Ivoire	0.909438	18.48674	16.81254	1.674202
Ethiopia	0.707865	13.82646	9.787265	4.039198
Gabon	0.486848	28.30386	13.77967	14.52419
Gambia, The	0.492644	18.8428	9.282794	9.560009
Ghana	0.377375	20.10002	7.585245	12.51477
Guinea	0.299483	17.64511	5.764818	12.3607
Guinea-Bissau	0.267327	20.92591	5.594049	15.33186
Kenya	0.938129	19.4919	18.28592	1.205986
Lesotho	0.517306	17.42691	9.015045	8.411868
Liberia	0.545587	14.06795	7.675286	6.392661
Madagascar	0.486848	11.28242	5.99217	5.789602
Mali	0.486683	17.02638	9.039756	8.73993
Mozambique	0.486848	8.028599	4.264042	4.119894
Niger	0.840898	16.67001	15.29212	2.652231
Nigeria	0.486848	30.99722	16.46283	15.90629
Rwanda	0.439232	17.60207	8.434237	9.870687
Sao tome and Principe	0.486848	3.797011	3.697132	1.948445
Sierra Leone	0.228097	17.71078	4.407028	13.671
South Africa	0.703184	18.18082	13.94667	5.396366
Tanzania	0.59004	17.55724	11.30125	7.197762
Togo	0.218771	18.19236	4.341776	14.21239
Uganda	0.680613	17.49234	12.98784	5.58682
Zambia	0.469202	17.3019	8.856086	9.183821
Zimbabwe	0.486848	5.309395	3.446489	2.724528

Source: Kulu (2022)

In highlighting what is presented in Table 8 better, Figures 6, and 7 also present bar graphs of the mean of the efficiencies in financial stability gap as well as the mean of the financial stability gap of the countries used for the period.

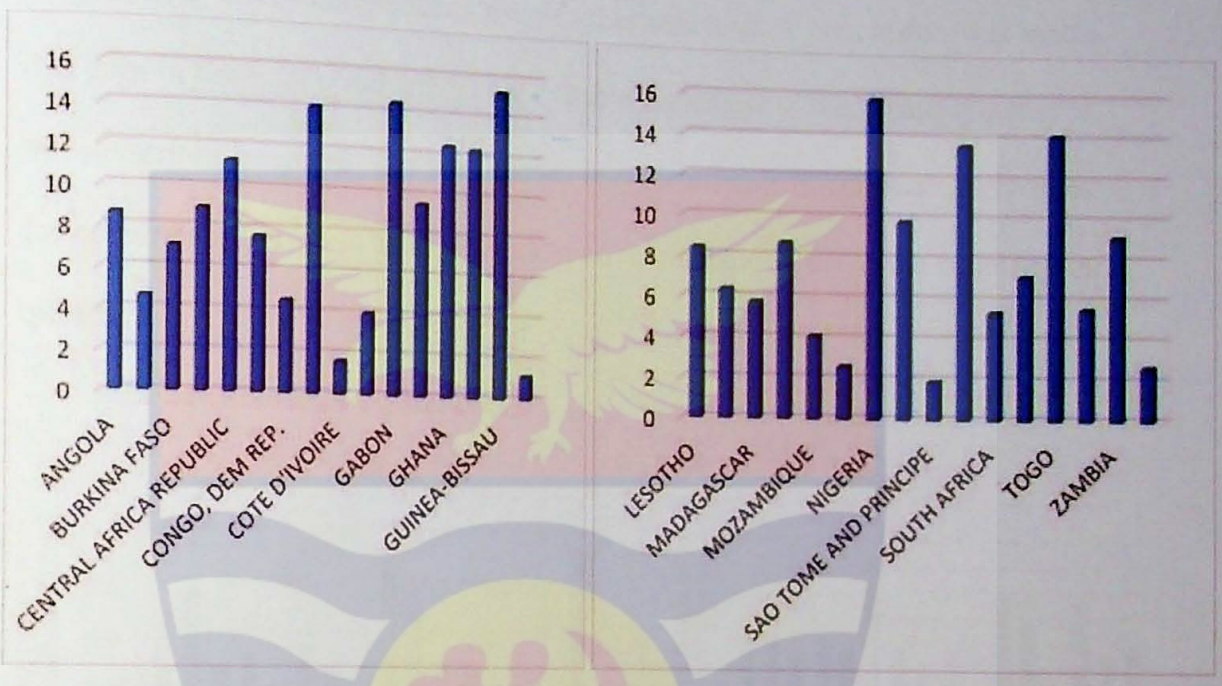

Figure 6: Average Financial Stability Gaps Among some SSA countries

Source: Kulu (2022)

It is observed that from Table 8 as well as Figures 6, Kenya, Cote d'Ivoire, Sao Tome and Principe, Niger and Zimbabwe have the least mean values of financial stability gap for the period under consideration while Nigeria, Guinea Bissau, Gabon, Togo and the Republic of Congo recorded the highest mean values of financial stability gap. The least financial stability gaps imply that the countries are closer to their potential in terms of financial stability. Thus, the differences between their actual stability in the financial system (achieved financial stability) and the potential are minimal.

For countries with higher gaps, there is an indication of a wider difference. This implies that more efforts need to be made. In a study by Alter and Yontcheva (2015), a measure of the financial development gap was created for countries in the CEMAC and its determinants were further analysed. A conclusion was made that gaps in financial development are evitable regardless of the financial status of the country in question. This then means that identifying financial stability gaps for countries is likely not to be dependent on the income status of the countries in question.

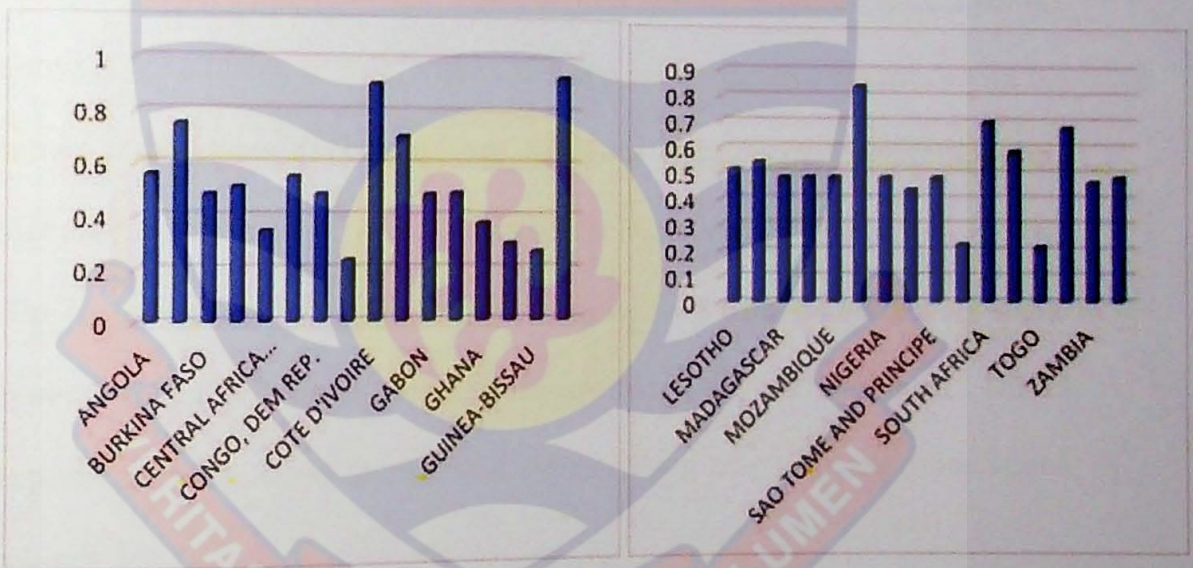

Figure 7: Average Efficiency in Financial Stability Among some SSA countries
Source: Kulu (2022)

Also, as shown in Figures 7, Kenya, Cote d'Ivoire, Niger, Benin and Ethiopia are the top five countries with the highest mean values of efficiencies in financial stability. The top five countries with the least mean values of efficiencies in financial stability include Togo, Sierra Leone, Republic of Congo, Guinea Bissau

and Guinea. The financial markets in some countries also have the potential of being stable. Thus, there is the possibility for the mechanisms of the economy regarding pricing, allocating and financial risks such as liquidity, credit market and the likes to function well enough to improve on the overall performance of the economy. The findings show that Nigeria, Gabon, Guinea Bissau, Ghana and Angola are the top five countries with the highest potential financial stability, while Sao Tome Principe, Zimbabwe, Mozambique, Democratic Republic of Congo and Madagascar are the top five countries with the least mean values of potential financial stability for the period under study.

For the actual financial stability or the financial stability achieved for the period, Kenya, Cote d'Ivoire, Nigeria, Niger and Benin are the top five countries with the highest mean values. Zimbabwe, Togo, Sao Tome and Principe, Mozambique and Sierra Leone are the top five countries with the least mean values.

The high mean values imply that such countries have witnessed relatively stable systems in their financial sector while countries with the least mean values experience instability in the financial system which may originate from varied sources.

Table 9: Mean of Efficiency, Potential, Actual and Gap in Financial Stability in Among Sub Regional Communities in SSA (2007 to 2018).

Sub Regions	Mean of Efficiency in FS	Mean of Potential FS	Mean of Actual FS	Mean of FS GAP
Central Africa (ECCAS)	0.444563	16.05936	7.689361	9.010775
Eastern Africa (EAC)	0.671176	17.194	12.22517	5.58009
West Africa (ECOWAS)	0.491885	18.72292	9.555025	9.59665

Source: Kulu (2022)

The mean values of the efficiencies, the potential, the actual and the gap in financial stability were estimated for the sub-regional communities in SSA. The results as presented in Table 9 and Figure 8 cover estimates for ECCAS, EAC and ECOWAS. The Southern Africa (SADC) was omitted because a number of countries belonging to the Central and Eastern Africa regions also are members of the community in Southern Africa. Thus, the countries which overlap include Angola, the Democratic Republic of Congo and Tanzania. The estimates show that the Eastern Africa Community has the highest mean efficiency, with the ECCAS having the least. The ECOWAS has the highest mean potential while the ECCAS has the least. For the actual financial stability values, the EAC recorded the highest again, with the ECCAS having the least. Finally, with respect to the gap in financial stability, measuring how the achieved stability in the financial system within the sub-regional communities differs from the potential stability, the estimates indicate that the Economic Community of West Africa States has the highest while the Eastern Africa Community has the least mean value for the period.

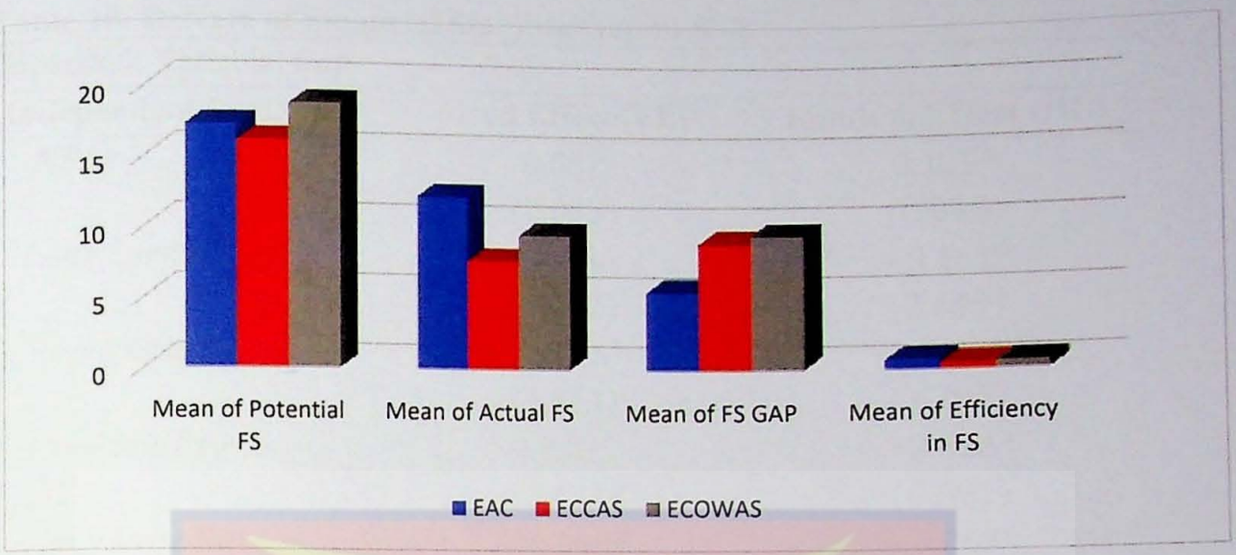

Figure 8: Means of Efficiency), Potential, Actual and Gaps in Financial Stability Among Sub-Regional Communities in SSA

Source: Kulu (2022)

The IMF (2019) reports that massive fiscal shocks have contributed to a substantial arrears accumulation among five oil-exporting countries in Central Africa. Thus, this study shows that accumulation of arrears promotes inefficiencies in financial stability. Hence, it is not surprising that the Central Africa region has the least mean values for efficiency and actual financial stability. This study indeed confirms the IMF (2019) staff reports.

Table 10: Drivers of Financial Stability Gap in SSA

Dependent Variable: *Gap*

Independent Variables	Fixed Effect (FE)	Random Effect (RE)
NPLs	0.082	0.125^{b}
	(0.055)	(0.048)
Cont Corrupt	−2.556	-5.151^{b}
	(3.252)	(2.649)
Reg Quality	-6.716^{b}	-11.161^{a}
	(1.561)	(2.292)
Pol Stability	−0.095	-2.636^{a}
	(3.434)	(0.591)
Exchange Rate	-0.048^{b}	-0.063^{c}
	(0.017)	(0.035)
Inflation	−0.016	0.001
	(0.010)	(0.016)
Constant	12.540^{a}	14.166^{a}
	(1.801)	(1.890)
Hausman (χ^2) =8.84		
Prob>Chi2 = 0.1830		

Note: the superscripts a, b, c indicate statistically significant at 1%, 5%, 10% level respectively. Robust Standard Errors are presented in brackets.
Source: Kulu (2022)

Drivers of Financial Stability Gap in SSA

Knowing the effect of the financial stability gap on private investment, it is essential to find the drivers of the gap to aid policy directions. FE and RE estimation techniques were employed in determining the drivers of financial stability gap in SSA. The probability value of the Hausman test is 0.1830, implying that we fail to reject the null hypothesis of no association between the independent variables and the individual heterogeneity, thus, choosing the RE estimates over the FE (Appendix C). In the RE estimations variables such as non-performing loans, regulatory quality, control of corruption, political stability and exchange rate are statistically significant at the various levels. Inflation, however,

is found to be statistically insignificant both in the FE and RE estimations. Though a study by Githinji (2016) found that inflation is an important driver, the current study is in line with the findings of Jokipii and Monnin (2013) who argued that the rate of inflation has no significant effect on financial stability. Thus, the current study argues that variables that affect financial stability, to some extent, will influence the gap that exists. Also, contrary to this finding, Almarzorgi et al. (2015) showed that inflation is a key factor influencing development in the financial system, hence, the gap between the actual and predicted financial development. The findings show that at a 5 percent level of significance, NPLs positively influence the financial stability gap in SSA. Holding all other variables constant, a unit rise in the non-performing loans leads to about 0.13 units increase in the financial stability gap.

NPLs are loans that are associated with late payment or are not likely to be repaid in full by the debtor. As NPLs increase, the liquidity status of the financial institutions worsens. Thus, as more borrowers default, the lending institutions will have limited credit to finance their activities. The more financial institutions become illiquid, the more vulnerable they become, hence, widening the gap in financial stability. Linked to this argument, Navajas and Thegeya (2013) contend that increases in NPLs enhance the occurrence of distress in the banking sector. The effect of NPLs found in this study as well confirms the findings of Van Duuren et al. (2020).

Again, control of corruption is found to affect the gap in financial stability. Thus, at a 5 percent significance level, a negative relationship is found. A unit rise

in the control of corruption leads to about 5.2 units decrease in the financial stability gap, holding all other variables constant. A significant control of the degree to which people exercise public power for private gain including other petty and grand forms of corruption will have people act or work as expected of them. This is likely to minimise all anomalies and unprofessional behaviours in the various offices including the financial institutions, for instance, the approval of loans by a banker in return for a favour or on the grounds of family, political or any other affiliations. Control of corruption significantly affects financial sector stability in Africa (Ozili, 2018).

The RE estimates also indicate that an increase in regulatory quality leads to about 11.6 units reduction in the financial stability gap. This relationship is statistically significant at 1 percent. Regulatory quality is characterised by the formulation and implementation of policies by the government which are aimed at promoting private sector growth. A section of these policies can guide the activities of lenders and borrowers which will help minimise defaults for the betterment of the financial sector. Importantly, quality regulations will ensure that new financial institutions go through the appropriate procedures of registration and are made to operate only when all requirements are met.

According to Ozili (2018), this is an issue of concern in Africa since the stability of the financial sector is dependent on it. This finding is also in line with Almarzorgi et al. (2015) who measured quality regulations with institutional quality and concluded that quality in institutions significantly reduces the gap between the predicted financial development and actual financial development.

Another governance indicator found to significantly affect the gap in financial stability is political stability. This relationship is statistically significant at 1 percent. The estimate reveals that holding all other variables constant, the financial stability gap is reduced by about 3 units when political stability increases by a unit. With the absence of terrorism and other politically-motivated violence, all organisations including financial institutions are able to perform effectively and efficiently. Thus, the appropriate mechanisms to follow-up on defaulters and other activities that can improve on their liquid status can be relatively done easily and peacefully.

It is important to note that with violence and terrorism, borrowers or even stakeholders in the financial sector may be displaced or lose their lives. This can go a long way to negatively affect the performance of the financial institutions, hence, widening the gap in financial stability. As argued by Ozili (2018), political stability is a key driver of financial stability in Africa. The exchange rate in the model is negative and statistically significant at 10 percent. In the current study, the rate of exchange is measured using the real effective exchange rate.

The real effective exchange rate is a measure of the value of a domestic currency that is against a weighted average of a number of foreign currencies. A rise in the real effective exchange rate indicates an appreciation of the local while a fall indicates local currency depreciation. The coefficient of this variable shows that a unit increase (appreciation) in the local currency will cause about 0.1 unit fall in the financial stability gap. Appreciation of the local currency makes it competitive in the international market. This implies that people can relatively

exchange it for more items, all other things being equal. Indeed, businessmen and women who financed their activities through credits borrowed from financial institutions will have a higher chance of paying back when the currency appreciates. The liquidity status of both the borrowers and the lenders will, therefore, be enhanced. This is in line with the findings of Githinji (2016) that exchange is a key external factor that influences liquidity and financial stability.

Diagnostic Tests

In determining the appropriateness of the estimation technique used for the analysis, the necessary diagnostic tests are performed. These include a cross-sectional dependence test, heteroscedasticity test, as well as an autocorrelation test or serial correlation. It is important to have these tests conducted so that the necessary corrective measures can be undertaken. Firstly, in macro panels datasets that have long time series, there is the possibility of having cross-sectional dependence as compared to micro panels (Hoechle, 2007). This study employed the Pesaran CD test in analysing whether there is a correlation between the residuals across the entities. According to Hoechle (2007), this test is important because a cross-sectional dependence can result in biases in the results against the null hypothesis of no correlation between the residuals.

The probability value obtained in the test indicates that there is no cross-sectional dependence (Appendix D). There should be an equal and constant variance among the error terms so that the regression estimates become efficient (Stock & Watson, 2012). As shown in Appendix E, the Modified Wald test for GroupWise heteroskedasticity is used in testing the null hypothesis of having a

constant variance. The test indicates a rejection of the null hypothesis, hence, confirming the presence of heteroskedasticity. Importantly, this problem is corrected by using the robust option. Again, in ensuring that parameter estimates are consistent, the assumption that there is no correlation between the regressors and the error term is very important. Thus, the R-squared becomes higher and standard errors of the coefficients become smaller than expected when there is the problem of serial correlation (Baltagi, 2008).

In testing for serial correlation, the Wooldridge test was used. As presented in Appendix F, the results confirm that there is the problem of serial correlation in the panel model. This is also rightly corrected using the robust option in the estimations.

Chapter Summary

The empirical findings and discussions on the estimate of the financial stability gap as well as its drivers are presented in this chapter. It also presents the estimated mean values of the efficiencies in financial stability, the potential, the actual as well as the financial stability gaps. The estimations which were aided by the Stochastic Frontier Analysis were presented at the countries level as well as the sub-regional community level. Thus, the latter analyses were presented to aid easy comparisons among countries and sub-regional communities.

CHAPTER SIX

FINANCIAL STABILITY GAP AND PRIVATE INVESTMENT IN SUB-SAHARAN AFRICA

Introduction

In this chapter, two empirical analyses were made. The first analysis, which made use of the system General Method of Moments, investigated the effect of the financial stability gap on private investment. This analysis as well captured how private investment in SSA relates to a severe financial stability gap. As a way of sensitivity analysis, a threshold analysis is performed in determining the level of financial stability gap which becomes hurting to private investment in SSA.

Table 11: Descriptive Statistics

Variable	Observation	Mean	Std. Dev.	Min	Max
FS Gap	396	7.879	5.129	0	21.154
Gov inv	376	11.487	8.81	0.064	52.418
Gov Eff	363	-0.865	0.483	-1.85	0.509
Savings	376	11.347	21.891	-141.97	62.536
Employment	396	65.142	12.199	39.37	87.82
Ext Debt	388	36.728	28.443	4.909	309.97
NPLs	74	8.337	7.381	1.4	37.3
Reg Quality	363	-0.714	0.48	-2.16	0.499
Pol Stability	363	-0.684	0.717	-2.70	0.626
Exchange Rate	168	98.545	12.678	64.63	142.61
Inflation	364	118.99	36.201	57.15	337.45

Source: Kulu (2022)

Descriptive Statistics

Table 11 presents the descriptive statistics of the variables used for the analysis in this chapter. There are differences in the observations for the variables. This is because there were missing observations for some variables in some

countries for some years. It is, therefore, worthy to note that the analyses in this chapter are performed with unbalanced panel data. Non-performing loans recorded the least number of observations (74) among the variables used. External debt is the variable with the highest standard deviation of (28.443). In the variables used, control of corruption, political stability, government effectiveness, regulatory quality, and savings all have their respective standard deviations greater than their mean values. This implies that the said variables differ significantly among the SSA countries under study.

Indeed, the maximum values of the governance indicators used in the study were low. Thus, government effectiveness, control of corruption, regulatory quality and political stability respectively recorded maximum values of 0.509, 0.762, 0.499 and 0.626, all out of the highest score of 2.5. This implies that governance among the SSA countries has been ranked low. This is also evident in the mean values of the governance indicators. Thus, on average, the governance scores for the SSA countries are all negative.

Table 12: Correlation Matrix

Variables	*Pvt inv*	*FS Gap*	*Gov inv*	*Gov eff*	*Savings*	*Employment*	*Ext Debt*
Pvt inv	1.000						
FS Gap	0.182^{a}	1.000					
Gov inv	0.318^{a}	0.141^{a}	1.000				
Gov eff	0.226^{a}	-0.103^{b}	0.300^{a}	1.000			
Savings	0.430^{a}	0.171^{a}	-0.047	0.131^{b}	1.000		
Employment	0.130^{b}	-0.131^{a}	0.025	0.026	-0.097^{c}	1.000	
Ext Debt	-0.055	-0.143^{a}	0.014	-0.110^{b}	-0.335^{a}	0.019	1.000

Note: the superscripts a, b, c indicate statistically significant at 1%, 5%, 10% level respectively.

Source: Kulu (2022)

Prior to the analysis of the effect of the financial stability gap on private investment in SSA, a correlation is constructed to determine the degree of correlation among the explanatory variables employed. This is done to detect multicollinearity among regressor variables. Thus, the presence of multicollinearity in the model will affect the estimates of the regression, hence, the need for its detection for the necessary correction. It is observed that the correlation coefficients presented in Table 12 are minimal (thus, below 0.5). This explains that there is a limited correlation among the explanatory variables used for the regression. It is, therefore, concluded that the problem of multicollinearity cannot be encountered, determining the effect of financial stability gap on private investment in SSA.

Table 13: Effect of Financial Stability Gap on Private Investment in SSA using GMM

Dependent variable: *Pinv*			
Independent Variables	**Coefficients**	**Robust Standard Errors**	**P-value**
$Pvt\ inv_{t-1}$	0.679^{a}	0.063	0.000
$FS\ Gap$	1.543^{c}	0.858	0.072
$FS\ Gap^{2}$	-0.702^{c}	0.037	0.057
$Gov\ inv$	0.559^{b}	0.243	0.021
$Gov\ eff$	7.971^{b}	3.676	0.030
$Savings$	0.029	0.070	0.682
$Employment$	−0.121	0.082	0.142
$Ext\ Debt$	0.070	0.067	0.293
$Constant$	8.921	6.927	0.198
Number of Instruments: 26			
Wald chi2(8) = 4213.32		Prob > chi2 = 0.000	
Arellano-Bond test for AR (1) in first differences: z = -3.17 Pr > z = 0.001			
Arellano-Bond test for AR (2) in first differences: z = -0.59 Pr > z = 0.555			
Sargan test of overid. restrictions: chi2(47) = 244.73 Prob > chi2 = 0.140			
Hansen test of overid. restrictions: chi2(47) = 150.00 Prob > chi2 = 0.230			

Note: the superscripts a, b, c indicate statistically significant at 1%, 5%, 10% level respectively.
Source: Kulu (2022)

Effect of Financial Stability Gap on Private Investment in SSA

Findings of the effects of financial stability gap using the system GMM are presented in Table 13. It is observed that there is evidence of autocorrelation in the first lag of the Arellano-Bond test. However, in the second lag, the test shows that there is an absence of autocorrelation. Also, the robust version of the analysis was estimated to correct all possible autocorrelation and heteroscedasticity that may arise. The control variables employed in the analysis include government investment, government effectiveness, savings, employment and external debt. In addition to the financial stability gap, government investment and government effectiveness were statistically significant at various levels. The other control variables, though most of them had the expected sign, were statistically insignificant. As expected, the lag value of the private investment is positive and statistically significant at 1 percent.

The estimate indicates that a unit increase in the previous year's level of private investment increases private investment in the current year by about 0.7 units, all other variables held constant. This indicates that increased investment in previous years serves as a positive climate or sends a positive signal for investment decisions in the current year. Thus, private investors, to some extent, are convinced of getting positive returns based on the investment climate provided in the previous year. This finding is in line with Anyanwu et al. (2018).

The investment made by the government in SSA is found to positively influence private sector investment. This relationship is statistically significant at 5 percent. Thus, holding all other factors constant, private investment is induced by about 0.6 units when the government or public investment in SSA increases by

a unit. Theoretically, this supports the conclusion that public investment "crowds in" investment made by the private sector. The investment made by the government sometimes provides fertile grounds for private investment. For instance, when government invests in the economy by constructing roads and creating jobs through the building of factories, it sets the pace for the private sector in their activities. Thus, people can also invest in producing consumer goods or even financial institutions since there are now good road networks to transport products. Again, the employment created through the public investment will mean that all other things being equal, aggregate demand, as well as savings, will increase. This finding and argument are also supported by Frimpong and Marbuah (2010).

Government effectiveness as a government indicator is also found to have a direct effect on private sector investment. This relationship is also statistically significant at 5 percent. The coefficient indicates that a unit increase in government effectiveness leads to about 8 units increase in private investment, all other variables held constant. The measurement for government effectiveness is centered around government providing quality public and civil service as well as the degree of independence from pressures originating from political sources. It also focuses on quality policy formulation and implementation as well as the credibility of government's commitment to policies. Indeed, quality governance through the description provided is likely to boost private sector investment. This is because the private investor will relatively go through the process of business registration as well as receive the necessary support from the environment as the

existing government is performing as everyone expects. This confirms the findings of Misati and Nyamongo (2011) that institutional variables significantly influence private sector investment.

The financial stability gap being the variable of interest is statistically significant at 10 percent. It is important to note that the effect of the severity of the financial stability gap (the square of gap) on private investment is also tested and this as well is statistically significant at 10 percent. This is done to enable the calculation of the threshold or the level at which the financial stability gap will become detrimental to private sector investment. The findings show that the financial stability gap increases private investment in SSA. When the gap becomes severe, the effect, therefore, becomes detrimental to private sector investment. When there is a gap in financial stability, the implication is that the level of stability that can be achieved (potential level) is greater than the level of stability already achieved (actual stability). Therefore, there is room for improvement. A limited stability level could also mean illiquidity in financial institutions (Borio & Drehmann, 2011; Vo et al., 2019).

At this point, financial institutions have limited credit for their activities. Such funds (which have possibly exhausted the due dates for payments) being with the borrowers (private sector or government) can be used for investment purposes, hence an increase in private investment. Indeed, when the gap becomes severe, implying that the illiquidity status has worsened, private sector investment is negatively affected. This is because, over time, other investors will not have access to credit to finance their activities. Thus, an increase in the level of stability

in the financial system is needed for growth in private investment and the overall economy (Desbordes & Wei, 2014; Dutta & Roy, 2009; Inklaar et al., 2012). Coupled with that, the survival of the financial institutions cannot also be guaranteed. It is, therefore, important to determine the threshold at which the financial stability gap becomes injurious to investment by the private sector. thus, there is a need to identify the point at which the gap in financial stability reduces private sector investment.

The threshold analysis shows that the financial stability gap of 109.9 percent leads to a reduction in private investment (Appendix B). Peprah et al. (2019) also employed this technique and found that financial sector development beyond 70 percent becomes detrimental to growth in the economy.

Table 14: Effect of Financial Stability Gap on Domestic Investment in SSA

Dependent variable: *Dom Inv*			
Independent Variables	**Coefficients**	**Robust Standard Errors**	**P-value**
$Dom\ Inv_{t-1}$	0.732^{a}	0.103	0.000
$FS\ Gap$	2.890^{b}	1.244	0.020
$FS\ Gap^2$	-0.122^{b}	0.052	0.019
$Gov\ inv$	0.051	0.358	0.886
$Gov\ eff$	15.471^{a}	5.230	0.003
$Savings$	-0.096	0.102	0.348
$Employment$	-0.171	0.111	0.124
$Ext\ Debt$	0.021	0.105	0.843
$Constant$	17.321^{c}	9.470	0.067
Number of Instruments 26			
Wald chi2(8) = 1017.31			
Prob > chi2 = 0.000			
Arellano-Bond test for AR (1) in first differences: z = -1.02 Pr > z = 0.310			
Arellano-Bond test for AR (2) in first differences: z = -0.59 Pr > z = 0.162			
Sargan test of overid. restrictions: chi2(47) = 46.27 Prob > chi2 = 0.141			
Hansen test of overid. restrictions: chi2(47) = 43.00 Prob > chi2 = 0.105			

Note: the superscripts a, b, c indicate statistically significant at 1%, 5%, 10% level respectively.
Source: Kulu (2022)

The private investment comprises investments made by both domestic and foreign private investors. Thus, to analyse the effect of the financial stability gap on the domestic and foreign investors separately, private investment is disaggregated into domestic investment and foreign direct investment. Table 14 presents the results for the effect of the financial stability gap on domestic investment while Table 15 presents the effects of financial stability on foreign direct investment. It is observed that on Table 14, there is no evidence of autocorrelation in both the first and second lag of the Arellano-Bond test while there is autocorrelation in the first lag for Table 15 but absent in the second lag. Again, against the null hypothesis that the instruments as a group are exogenous, the probability values for the Sargan tests in both Tables 14 and 15 a failure to reject the null hypothesis hence the instruments are validly exogenous. Also, with a probability value of 0.105 and 0.345 for the Hansen tests in Table 14 and 15 respectively, there is an indication of correctly specified models.

From Table 14, it is observed that the financial stability gap at its natural level increases domestic investment while the severe form of financial stability gap reduces the level of investment made by the private indigenes. From Table 15 however, the financial stability gap at its natural level or its severe level has no statistically significant effect on foreign direct investment. Disaggregating private investment reveals the gap in financial stability significantly affects domestic private investors while foreign investors are not affected significantly. Indeed, this explains that foreign do not necessarily rely on credits from the domestic financial system for their investment activities hence stability in the system does not affect

their decisions significantly. Thus, most foreign investors in SSA have financial backing from their respective home countries.

Table 15: Effect of Financial Stability Gap on Foreign Direct Investment in SSA

Dependent variable: *FDI*			
Independent Variables	**Coefficients**	**Robust Standard Errors**	**P-value**
$Pvt\ inv_{t-1}$	0.432^{a}	0.108	0.000
$FS\ Gap$	-0.171	1.447	0.906
$FS\ Gap^{2}$	0.007	0.060	0.904
$Gov\ inv$	0.420^{b}	0.199	0.059
$Gov\ eff$	10.568^{c}	5.700	0.064
$Savings$	0.031	0.108	0.771
$Employment$	-0.071	0.137	0.608
$Ext\ Debt$	-0.041	0.109	0.705
$Constant$	-4.281	10.575	0.686

Number of Instruments 26
Wald chi2(8) = 286.30
Prob > chi2 = 0.000
Arellano-Bond test for AR (1) in first differences: z = -3.23 Pr > z = 0.001
Arellano-Bond test for AR (2) in first differences: z = -1.03 Pr > z = 0.303
Sargan test of overid. restrictions: chi2(47) = 57.60 Prob > chi2 = 0.138
Hansen test of overid. restrictions: chi2(47) = 12.14 Prob > chi2 = 0.345

Note: the superscripts a, b, c indicate statistically significant at 1%, 5%, 10% level respectively.
Source: Kulu (2022)

Chapter Summary

The chapter analysed the effect of the financial stability gap on private investment in SSA. It examined the effect of the square of the financial stability gap which made it possible to undertake a threshold analysis. Thus, as a way of sensitivity analysis, the threshold was done to determine the percentage of the financial stability gap that will become detrimental to private investment in SSA. A commentary was further made on the various diagnostic tests to conclude the chapter.

CHAPTER SEVEN

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

The relevance of private sector activities in the growth and development of countries continues to make credit provision to the private sector a desirable effort. Competition for credit between the private sector and the government also makes the effort identified somewhat challenging. The implications do not end with the private sector when the government has access to the credit and is not able to pay at the due date. The financial sector will have its share of the impact. In this chapter, a summary of the findings, conclusions and recommendations as well as suggestions for future studies are provided. Thus, in the next section, a summary of the study is provided. The conclusions made follow while the recommendations originating from the findings end the chapter.

Summary

The study analyses the association between government domestic debt arrears, private investment and the financial stability gap in SSA. It has the aim of contributing to the existing literature and providing useful recommendations that will help promote private sector investment and ensure the stability of the financial sector in SSA. This is premised on the fact that the private sector has been identified as the engine of growth in most SSA economies. Also, the financial sector provides an essential role in the overall growth of the economies. Thus, the progress of most sectors in the economy, to some extent, depends on the success of the financial sector. Three main research objectives were considered by

this study. The quantitative research approach was adopted and the study made use of a country level panel dataset covering the period 2007 to 2018.

In the first empirical chapter, the effect of government domestic debt arrears on private investment was analysed. In this analysis, three broad objectives were considered: a) to determine the effect of government domestic debt arrears on private investment in the SSA region, b) to determine the effect of government domestic debt arrears on private investment in the sub-regional communities in the SSA region and c) to determine how private investment respond to shocks in government domestic debt arrears in SSA and its sub-regional communities. For the first two objectives, the study made use of the system GMM estimation technique while the impulse response function from the standard VAR was employed to achieve the third objective.

With respect to the objectives, the key findings that emerged from this empirical chapter are that government domestic debt arrears negatively influence private investment in SSA, the ECCAS and the ECOWAS. Thus, no statistically significant relationship was found between the said variables within the EAC. Again, the findings showed that government domestic debt arrears and growth in GDP jointly have a positive effect on private investment in SSA, the ECCAS and the ECOWAS. Further, the impulse response functions revealed that private investment in SSA reduces in the first period in response to shocks in government debt arrears. Private investment reduces in the second period in response to shocks in government domestic debt arrears in the ECAAS and the EAC.

However, in the ECOWAS sub-regional community, the fall in private investment is felt after the eighth period.

The second empirical chapter estimated the financial stability gap and its drivers in SSA. The main objectives that guided this empirical chapter were a) to estimate the efficiency levels in financial stability and the financial stability gaps among SSA countries, b) to estimate the efficiency levels in financial stability and the financial stability gap among sub-regional communities in SSA, and lastly c) to examine the drivers of the inefficiencies as well as the financial stability gaps in SSA. Using the same dataset as in the first empirical chapter, the Stochastic Analysis Frontiers analysis was employed. This technique aided in arriving at the efficiency and potential values which are also used in calculating the gap values. The drivers of the gap obtained are further derived using the FE and RE estimation techniques.

In the second empirical chapter, the key findings are that Kenya, Cote d'Ivoire, Niger, Benin and Ethiopia are the top five SSA countries with the highest average efficiency in financial stability for the period considered. For the financial stability gap, Nigeria, Guinea Bissau, Gabon, Togo and the Republic of Congo are the top five countries that recorded the highest average values for the period, with Kenya, Cote d'Ivoire, Sao Tome Principe, Niger and Zimbabwe being the top five countries having the least average values for the period. Again, it was found that Nigeria, Gabon, Guinea Bissau, Ghana and Angola recorded the highest average potential financial stability values for the period. For the sub-regional communities, the EAC has the highest mean efficiency, with ECOWAS

having the least. The ECOWAS has the highest average potential, with ECCAS having the least. For the average financial stability gap for the period, the ECOWAS recorded the highest while the EAC recorded the least average for the period. The technical inefficiency model indicated that employment, savings, government effectiveness and regulatory quality reduce the inefficiencies in financial stability in SSA while government debt arrears increase it. Further, on the last objective of this empirical chapter, it was found that the financial stability gap is reduced by regulatory quality, control of corruption, political stability and appreciation of the local currency. Non-performing loans, however, are found to be a key factor promoting the financial stability gap.

The third empirical chapter investigated the effect of the financial stability gap on private investment in SSA and also considered two main objectives. The first objective investigated the effect of the financial stability gap and its severe case on private investment. Secondly, the threshold at which the financial stability gap becomes unfavourable to private investment was determined. The threshold point was manually computed after the estimation with the system GMM in achieving the first objective.

In the third and final empirical chapter, three key findings emerged. Thus, the financial stability gap at a minimal level promotes private investment while private investment is reduced when the financial stability gap becomes severe. Linked to that, at a threshold of 110 percent of the financial stability gap, private investment is negatively affected.

Conclusions

The following specific conclusions are made based on the major findings from the various empirical chapters.

The conclusions made from the findings of the first empirical chapter are that private investment is negatively affected by government domestic debt arrears. However, when the delays in government payment of debts are accompanied by growth in the economy, private investments tend to increase. The relationship found appears true for all sub-regional communities analysed but the magnitude of effect or the time with which private investment reacts to variations in government domestic debt arrears is what varies. In the second empirical chapter, the conclusions made are that efficiencies in financial stability, potential as well as financial stability gap vary among SSA countries and the sub-regional communities. Also, non-performing loans increase the gap while control of corruption, regulatory quality, political stability and appreciation of the local currency reduce the gap in financial stability. In the third empirical chapter, it is concluded that the financial stability gap increases private investment in SSA but at a threshold of about 110 percent, the financial stability gap becomes detrimental to private investment.

Recommendations

The following policy recommendations are made based on the findings and conclusions of the study.

1. In the quest to prevent excess arrears, especially from the government, borrowing from domestic sources should be approved when the purpose of

the borrowing has a good economic rate of return. This will ensure servicing of such loans on time. The financial institutions in question will, therefore, be able to operate as planned since liquidity problems will be minimised, hence, increasing the possibility of reducing the gap in financial stability.

2. Financial institutions ought to reduce credit made available to the government in financing their budget deficit and increase the effort of lending to private investors after making the requisite appraisals. This will be a conscious effort to control arrears accumulation (reducing the size of NPLs) and also to minimise the existing competition for credit between the private sector and the government.
3. In efforts to increase the liquidity status of financial institutions, governments in SSA should decrease taxes on savings or possibly make savings tax-exempt in order to encourage savings habits. Thus, improved savings will make financial institutions more liquid and hence have funds available to lend to the private sector for its investment activities.
4. Significant efforts should be made to improve the governance indicators (regulatory quality, government effectiveness, political stability and control of corruption) in SSA. Specifically, anti-corruption agencies and appropriate authorities in charge of regulations as well as other checks and balances should be instituted, well-equipped and made to work without any political or government interference. When government becomes effective and institutions are well-regulated, inefficiencies and anomalies

in the financial sector such as collapse due to liquidity crises (originating from high non-performing loans and lack of operational capital) are more likely to be reduced. For instance, in Ghana, the existence of the Economic and Organized Crime Office (EOCO) office is responsible for preventing money laundering, cyber activity, tax fraud and corruption. There is also the introduction of the Special Prosecutor. These institutions should be well-resourced and made to function as an effort to guide behaviour and ensure efficiency in the financial sector of the economy.

Delimitations of the Study

The study focused on government debt arrears, financial stability gap and private investment. The effect of government domestic debt arrears on private investment was investigated in SSA, ECCAS, the EAC and the ECOWAS. The gap in financial stability and its drivers in SSA were further estimated. The study further analysed the effect of the financial stability gap on private investment. Overall, the study made use of data covering 11 years period (that is, 2007 to 2018).

Limitations of the Study

The study investigates the relationships between government domestic debt arrears, private investment and financial stability in SSA. Regardless of its relevance to academic discourse and formulation of policy, the methodological selections regarding the research design and the data used are not void of limitations which the researcher was unable to address in the course of the study. The major issues are noted.

Sub-Saharan Africa is made up of about 46 countries. This study, however, made use of data on 33 countries because of the unavailability of data especially for the main independent variable (government domestic debt arrears). This means more than 15 countries were not considered for the analyses. Linked to this point, even for the 33 countries used, the data spanned from 2007 to 2018. Thus, more recent data (2019 and beyond) were not available for analyses. However, amidst the limitations identified, the study is still valid and can contribute to the body of knowledge as intended.

Suggestions for Further Research

Financial stability can be measured by considering the financial institutions, the market as a whole as well as the infrastructure. The current study made use of the z-score which measures stability in financial institutions. Future research may consider another measure of financial stability, either using the market or infrastructure present.

REFERENCES

Abdullahi, M. M., Bakar, A., & Hassan, S. (2016). Debt overhang versus crowding out effects: Understanding the impact of external debts on capital formation in theory. *International Journal of Economics and Financial Issues*, *6*(1), 271-278.

Aghaei, M., Kouhbor, M. A., & Ahmadinejad, H. (2018). Financial stability and economic performance: The case of OPEC countries. *Journal of Economics and Modeling*, *9*(2), 29-65.

Aigner, D., Lovell, C. K., & Schmidt, P. (1977). Formulation and estimation of stochastic frontier production function models. *Journal of Econometrics*, *6*(1), 21–37

Ajab, A.A., & Audu, I. (2006), External debt, investment and economic growth: Evidence from Nigeria. *Economic and Financial Review*, *44* (1), 81-113.

Akerlof, G., (1970). The market for lemons: Quality uncertainty and the market mechanism. *Quarterly Journal of Economics*, *8*(4), 488–500.

Akomolafe, K. J., Bosede, O., Emmanuel, O., & Mark, A. (2015). Public debt and private investment in Nigeria. *American Journal of Economics*, *5*(5), 501-507.

Akpalu, W., (2002). Modelling private investment in Ghana: An empirical time series econometrics investigation (1970-1994). *The Oguaa Journal of Social Sciences*, *4*(7), 212-231.

Allen, F., Carletti, E., Cull, R., Qian, J. Q., Senbet, L., & Valenzuela, P. (2014). The African financial development and financial inclusion gaps. *Journal of African Economies*, *23*(5), 614-642.

Allen, F., Carletti, E., Cull, R., Qian, J., Senbet, L., & Valenzuela, P. (2016). *Resolving the African Financial Development Gap: Cross-Country Comparisons and a Within-Country Study of Kenya.* Chicago, USA: University of Chicago Press.

Almarzoqi, R., Naceur, M. S. B., & Kotak, A. (2015). *What matters for financial development and stability?* Washington DC, USA: International Monetary Fund

Alter, A., & Yontcheva, B. (2015). *Financial inclusion and development in the CEMAC*. Washington DC, USA: International Monetary Fund.

Alzahrani, A. A. (2018). *The Impact of government debt on macroeconomic indicators: Evidence from G7 and ASEAN countries*. Master's Thesis. Eastern Illinois University.

Amatus, H., & Alireza, N. (2015). Financial inclusion and financial stability in Sub-Saharan Africa (SSA), *International Journal of Social Sciences*, *36*(1), 2305-4557.

Anderson, M. J. (2001). A new method for non-parametric multivariate analysis of variance. *Austral Ecology*, *26*(1), 32–46.

Ang, J. B. (2009). Private investment and financial sector policies in India and Malaysia. *World Development*, *37*(7), 1261-1273.

Anyanwu, A., Gan, C., & Hu, B. (2018). Government domestic debt, private sector credit, and crowding out effect in oil-dependent countries. *Journal of Economic Research*. *22*(2017), 127-151

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*, *58*(2), 277-297.

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error components models. *Journal of Econometrics*, 68(1), 29-51.

Armeanu, D., Pascal, C., Poanta, D., & Doia, C. A. (2015). The credit impact on the economic growth. *Theoretical & Applied Economics*. *1*(602), 5-14

Armstrong, S. P. (2007). Measuring trade and trade potential: A survey. *Asia Pacific Economic Paper*, *2007*(368), 1-26.

Asante, Y. (2000). *Determinants of private investment behaviour*. AERC Research Paper 100. Africa Economic Research Consortium

Badawi, A (2005). *Private capital formation and macroeconomic policies in Sudan: An application of a simple co-integrated vector autoregressive model.* Institute for Development Policy and Management, University of Manchester

Baltagi, B. H. (2008). *Econometric analysis of panel data* (Vol. 4). Chichester: Hoboken, NJ: John Wiley & Sons.

Banu, I. M. (2013). The impact of credit on economic growth in the global crisis context. *Procedia Economics and Finance*. *6*(20), 25-30.

Barajas, A., Thorsten B., Era D, & Seyed R. Y. (2013). *Too cold, too hot, or just right? Assessing financial sector development across the globe.* Washington DC, USA: International Monetary Fund.

Battese, G. E., & Coelli, T. J. (1992). Frontier production functions, technical efficiency and panel data: With application to paddy farmers in India. *Journal of Productivity Analysis*, *3*(12), 153–169.

Beck, T., & Erik F. (2013). Benchmarking financial systems: Introducing the financial possibility frontier. *World Bank Policy Research Working Paper* 6615.

Blinder, A. S., & Solow, R. M. (1973). Does fiscal policy matter?. *Journal of public economics*, *2*(4), 319-337.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, *87*(1), 115-143.

Boateng, A., Huang, W. & Kufuor, N.K. (2015). Commercial bank ownership and performance in China. *Applied Economics*, *47*(9), 5320-5336.

Boateng, E., Amponsah, M., & Annor Baah, C. (2017). Complementarity effect of financial development and FDI on investment in sub-Saharan Africa: A panel data analysis. *African Development Review*, *29*(2), 305-318.

Bond, S. R. (2002). Dynamic panel data models: a guide to micro data methods and practice. *Portuguese Economic Journal*, *1*(2), 141-162.

Borio, C., & Lowe, P. (2001). To provision or not to provision. *BIS Quarterly Review*, *9*(3), 36-48.

Borio, C., & Drehmann, M. (2011). Financial Instability and Macroeconomics: Bridging the Gulf. *The International Financial Crisis, 24*(11), 237–268..

Breusch, T. S., & Pagan, A. R. (1980). The lagrange multiplier test and its applications to model specification in econometrics. *The Review of Economic Studies, 47*(1), 239-253

Brima, S., & Brima. A.S. (2017). Monetary policy effect on private sector investment: Evidence from Sierra Leone. *International Journal of Economics and Financial Issues*. 7(8), 476–88.

Buchanan, J. M. (1958). *Public principles of public debt,* Homewood: Richard D. Irwin, Inc.

Bullow, J., Rogoff, K. (1990). Cleaning up third-world debt without getting taken to the cleaners. *Journal of Economic Perspectives*, *4*(22), 31-42.

Chari, V. V., & Jagannathan, R. (1988). Banking panics, information, and rational expectations equilibrium. *The Journal of Finance*, *43*(3), 749-761.

Chauhan, G. S., & K. Ramesha (2016). Macroeconomic determinants of financial stability in a business cycle: Evidence from India. *The Indian Economic Journal, 63*(4), 703-724.

Checherita-Westphal, C., Klemm, M. A. D., & Viefers, P. (2016). *Governments' payment discipline: the macroeconomic impact of public payment delays and arrears*. Washington DC, USA: International Monetary Fund

Chenery, H.B., Strout, A. (1966). Foreign assistance and economic development. *American Economic Review*, *56*(4), 678-733.

Chirinko, R. S. (1993). Business fixed investment spending: Modeling strategies, empirical results, and policy implications. *Journal of Economic literature*, *31*(4), 1875-1911.

Chowdhury, K. (1998). *Handbook on globalization of the world economy*. Cheltenham, UK: Edward Elgar Publishing Limited.

Claessen, S., Detragiache, E., Kanbur, R., Wickham, P. (1996). *Analytical aspects of the debt problems of heavily indebted poor countries.* Washington DC, USA: World Bank, World Bank Policy Research Working Paper No. 1618,

Clark, J. M. (1917). Business acceleration and the law of demand: A technical factor in economic cycles. *Journal of political economy, 25*(3), 217-235.

Clements, B., Gupta, S., Inchauste, G. (2003). Fiscal policy for economic development: An overview. Available from: http://www.imf.org/ external/ pubs/nft/2004/hcd/ch01.pdf.

Clements, B., Bhattacharya, R., Nguyen, T. (2005). *Can debt relief boost growth in poor countries?* Washington, DC: International Monetary Fund.

Coelli, T., Rao, D. P., & Battese, G. E. (1998). *An Introduction to Efficiency and Productivity Analysis*. Boston, USA: Kluwer Academic Publishers.

Connell, W. (2014). *The economic impact of late payments*. European Commission, Economic Papers No. 531

Coutinho, R., & Gallo, G. (1991). *Do public and private investment stand in each other's way.* WDR Background Paper, Washington DC, USA: World Bank.

Creel, J., Hubert, P., & Labondance, F. (2015). Financial stability and economic performance. *Economic Modelling*, *4*(8), 25-40.

Das, M. U. S., Surti, J., Ahmed, M. F., Papaioannou, M. M. G., & Pedras, M. G. (2010). *Managing public debt and its financial stability implications*. Washington DC, USA: International Monetary Fund.

Davis, E. P. (1996). *Debt, Financial Fragility and Systemic Risk*, revised and expanded ed., Oxford, UK: Oxford University Press.

Desbordes, R., & Wei, S. J. (2014). The effects of financial development on foreign direct investment. *World Bank Policy Research Working Paper*, No. 7065.

Diaconu, R. I., & Oanea, D. C. (2014). The main determinants of bank's stability. Evidence from Romanian banking sector. *Procedia Economics and Finance*, *1*(6), 329-335.

Diamond, D. W., (1984). Financial intermediation and delegated monitoring, *Review of Economic Studies*, *51*(23), 393- 414.

Diamond, D. W., & Dybvig, P. (1983). Bank runs, deposit insurance and liquidity. *Journal of Political Economy*, 9(1), 401- 419.

Diamond, J., & Schiller, C. (1993). Government arrears in fiscal adjustment programs. How to measure the fiscal deficit. *Analytical and Methodological Issues*, *12*(23), 113-143.

Domar, E. (1946). Capital expansion, rate of growth, and employment. *Econometrica, 1*(4), 137-147.

Dutta, N., & Roy, S. (2009). The impact of financial development on domestic investment: a quantile regression approach. *India macroeconomics annual*, *11*(34), 111-134.

Easterly, W. (1999). The ghost of financing gap: Testing the growth model used in the international financial institutions. *Journal of Development Economics*, *60*(2), 423-438.

Efendi, N. (2001), *External debt and growth of developing countries.* PhD Thesis. University of Oklahoma.

Fahr, S., & Fell, J. (2017). Macroprudential policy–closing the financial stability gap. *Journal of Financial Regulation and Compliance*, *25*(4), 334–359.

Fayed, M. E. (2013). Crowding out effect of public borrowing: The case of Egypt. *International Research Journal of Finance and Economics*, *107*(1), 28-38.

Friedman, M., & Schwartz, A. J. (1986). Has government any role in money? *Journal of Monetary Economics*, *17*(1), 37-62.

Frimpong, J. M., & Marbuah, G. (2010). The determinants of private sector investment in Ghana: An ARDL approach. *European Journal of Social Sciences*, *15*(2), 250-261

Gertler, M., (1988). Financial Structure and Aggregate Economic Activity: An Overview, *Journal of Money, Credit and Banking*, *20*(4), 559–588.

Ghura, D., and Goodwin, B. (2000). Determinants of private investment: a cross-regional empirical investigation. *Applied Economics*, *32*(14), 1819-1829.

Githinji, E. (2016). *Determinants of financial stability among commercial banks in Kenya.* PhD Thesis. United States International University-Africa

Greene, W.H., & Hensher, D.A (2008). *Modeling ordered choices: A primer and recent developments.* Retrieved from https://papers.ssrn.com.

Greenwald, B., and Stiglitz, J. (1991). Information, finance and markets: The architecture of allocative mechanisms, *National Bureau of Economic Research*, Working Paper No. 3652.

Goldsmith, R.W. (1969). *Financial structure and development.* New Haven, USA: Yale University Press.

Gorton, G. (1988). Banking panics and business cycles. *Oxford Economic Papers*, *40*(4), 751-781.

Gorton, G. (1985). Bank suspension of convertibility. *Journal of Monetary Economics*, *15*(2), 177-193.

Hassan, A. K., & Salim, R. A. (2011). Determinants of private investment: time series evidence from Bangladesh. *The Journal of Developing Areas*, *11*(23), 229-249.

Heffernan, S., & Fu, M. (2008). *The determinants of bank performance in China*, available at: https://ssrn.com/abstract=1247713 http://dx.doi.org/10.2139/ssrn.1247713.

Houben, A. G., Kakes, J., & Schinasi, G. J. (2004). Toward a framework for safeguarding financial stability. *IMF Working Papers*, 2004(101).

Hoechle, D. (2007). Robust standard errors for panel regressions with cross-sectional dependence. *The Stata Journal*, *7*(3), 281-312.

Hunt, S.D. (2007). Economic growth: Should policy focus on investment or dynamic competition? *European Business Review*, *19*(4), 279-291.

Inklaar, R., de Guevara, J. F., & Maudos, J. (2012). The impact of the financial crisis on financial integration, growth and investment. *National Institute Economic Review*, 2(20), 29-35.

International Monetary Fund (IMF). (2019). *Staff Report; Debt sustainability analysis, and Statement by the executive director for The Republic of Congo.*, IMF Country Report 19/244, Washington DC, USA: IMF

Islam, R., & Wetzel, D. L. (1991). *The macroeconomics of public sector deficits: The case of Ghana* (No. 672). World Bank Publications.

Jacklin, C. J., & Bhattacharya, S. (1988). Distinguishing panics and information-based bank runs: Welfare and policy implications. *Journal of Political Economy*, *96*(3), 568-592.

Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. Econometrica: *Journal of the Econometric Society*, *43*(12), 1551-1580.

Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration with applications to the demand for money. *Oxford Bulletin of Economics and statistics*, *52*(2), 169-210.

Jokipii, T., & Monnin, P. (2013). The impact of banking sector stability on the real economy. *Journal of International Money and Finance*, *3*(2), 1-16.

Jorgenson, D. W. (1971). Econometric studies of investment behavior: A survey. *Journal of Economic literature*, *9*(4), 1111-1147.

Karagol, E. (2004). *External debt and economic growth relationship using simultaneous equations*. Turkey: University of Balikesir.

Kaufman, H. (1986). Debt: The threat to economic and financial stability. *Economic Review, 19*(86), 3–11.

Khemani, P., & Radev. D (2009). *Commitment controls*. IMF Technical Notes and Manuals, Washington, DC., International Monetary Fund

Keynes, J.M. (1936a). *The general theory of employment, interest and money*. New York: Harcourt Brace.

Keynes, J. M. (1936b). The supply of gold. *The Economic Journal*, *46* (183), 412-418.

Kindleberger, C. P., Manias, P., & Crashes (1978). *A history of financial crises*. New York, Basic Books,

King, R. G., & Levine, R. (1993). Finance and growth: Schumpeter might be right. *The quarterly journal of economics, 108*(3), 717-737.

Kingwára, R. (2014). The impact of domestic public debt on private investment in Kenya, *Journal of Country Studies, 4*(22), 88-96.

Klomp, J. & de Haan, J. (2014). Bank regulation, the quality of institutions, and banking risk in emerging and developing countries: an empirical analysis, *Emerging Markets Finance and Trade,* 50(6), 19-40.

Kodde, D. A., & Palm, F. C. (1986). Wald criteria for jointly testing equality and inequality restrictions. Econometrica: *Journal of the Econometric Society, 23*(12), 1243–1248.

Krugman, P. (1988). Financing vs. forgiving a debt overhang: Some analytical notes. *Journal of Development Economics,* 2(9), 253-268.

Krugman, P., (1979). A model of balance-of-payments crises. *Journal of Money, Credit and Banking*, *11*(3), 311-325.

Kulu, E., & Appiah-Kubi, G. D. (2021). The Relationship Between Market Share and Profitability of Ghanaian Banks. *International Journal of Business*, *8*(4), 257-269

Kumbhakar, S. C., Wang, H.-J., & Horncastle, A. P. (2015). *A practitioner's guide to stochastic frontier analysis using Stata.* Cambridge, UK: Cambridge University Press.

Lepetit, L., & Strobel, F. (2013). Bank insolvency risk and time-varying Z-score measures, *Journal of International Financial Markets, Institutions and Money*, 2(5), 73-87.

Levin, M. (1988). Science: Caring new world: Feminism and science. *The American Scholar*, *57*(1), 100-106.

Lesotlho, P. (2006). *An investigation of the determinants of private investment: the case of Botswana*, PhD Thesis. University of the Western Cape.

Lidiema, C. (2018). Effects of government borrowing on private investments in Kenya. *Journal of Finance and Economics*, *6*(2), 49-59.

Mabula, S., & Mutasa, F. (2019). The effect of public debt on private investment in Tanzania. *African Journal of Economic Review*, *7*(1), 109-135.

Mamo, T., Getahun, W., Chebil, A., Tesfaye, A., Debele, T., Assefa, S., & Solomon, T. (2018). Technical efficiency and yield gap of smallholder wheat producers in Ethiopia: A Stochastic Frontier Analysis. *African Journal of Agricultural Research*, *13*(28), 1407-1418.

Meeusen, W., & van Den Broeck, J. (1977). Efficiency estimation from Cobb-Douglas production functions with composed error. *International Economic Review*, *32*(13), 435–444.

Metwally, M., Tamaschke, R. (1994). The interaction among foreign debt, capital flows and growth; case studies. *Journal of Policy Modeling*, *16*(6), 597-608.

McKinnon, R. (1964). Foreign exchange constraints in economic development and efficient aid allocation. *The Economic Journal*, *74*(294), 388-409.

Mill, J. S. (1894). *Principles of political economy*, New York: D. Appleton and Company.

Mishkin, F. S. (1999). International experiences with different monetary policy regimes. *Journal of monetary economics, 43*(3), 579-605.

Mishkin, F. S. (2000). *Financial stability and the Macroeconomy*. Central Bank of Iceland, Economics Department.

Minsky, H. P., (1982). *A Theory of Systemic Fragility*, New York, Wiley,138–152.

Minsky, H. P. (1991). *Financial crises: Systemic or idiosyncratic*. Working Paper No. 51,Available at SSRN: https://ssrn.com/abstract=171533

Misati, R. N., & Nyamongo, E. M. (2011). Financial development and private investment in sub-Saharan Africa. *Journal of Economics and Business*, *63*(2), 139-151.

Mlachila, M. M. & Yabara. M.M. (2013). *Banking in Sub-Saharan Africa: The Macroeconomic Context*. IMF African Departmental Paper 13/03, Washington DC, USA: International Monetary Fund

Mlambo, K., & Oshikoya, W. (2001). Macroeconomic factors and investment in Africa. *Journal of African Economics, 10*(2), 12-47.

Morgan, P., & Pontines, V. (2014). *Financial stability and financial inclusion*. ADBI Working Paper 488. Tokyo: Asian Development Bank Institute.

Munyasya, C. K., (2013). *Effect of macroeconomic factors on internet banking by commercial banks in Kenya*, PhD Thesis. University of Nairobi

Navajas, M. C., & Thegeya, A. (2013). *Financial soundness indicators and banking crises*. Washington DC, USA: International Monetary Fund.

Ndikumana, L. (2000). Financial determinants of domestic investment in Sub-Saharan Africa: Evidence from panel data. *World development, 28*(2), 381-400.

Okorie, G. C. (2013). An Error Correction Model of the Impact of Private Sector Credit on Private Domestic Investment in Nigeria. *Journal of Economics and Sustainable Development*, *4*(11), 12-17.

Ouattara, B. (2004). *Modelling the long run determinants of private investment in Senegal. Credit Research Paper*. The University of Nottingham, Centre for Research in Economic Development and International Trade (CREDIT), Nottingham.

Ozili, P.K. (2018). Banking stability determinants in Africa. *International Journal of Managerial Finance*, *14*(4), 462-483.

Pattanayak, S. (2016). *Expenditure Control: Key Features, Stages, and Actors*. IMF Technical Notes and Manuals, Washington, DC: IMF

Peprah, J. A., Kwesi Ofori, I., & Asomani, A. N. (2019). Financial development, remittances and economic growth: A threshold analysis. *Cogent Economics & Finance*, *7*(1), 107-125.

Piabuo, S. (2015). *The impact of financial sector development on economic growth: Analysis of the financial development gap between Cameroon and South Africa*. PhD Thesis. University Library of Munich

Podder, B. (2012). *Determinants of profitability of private commercial banks in Bangladesh: An empirical study*. Master's Thesis. Asian Institute of Technology

Ramos, A. (1998). *Government expenditure arrears: Securitization and other solutions*. IMF working paper. Washington, DC, USA: IMF

Reinhart, C. M, and Rogoff, K. S. (2009). *This Time Is Different: Eight Centuries of Financial Folly*. Princeton, New Jersey: Princeton University Press.

Ricardo, D. (1951). *Principles of Political Economy and Taxation, The Works and Correspondence of David Ricardo,* Vol. I, Piero Straffa, ed., Cambridge, England, University Press, p. 244.

Roch, N. Y. M. (2019). Effect of external debt on economic growth of Rwanda. *International Journal of Social and Economic Research, 9*(1), 1-47.

Roodman, D. (2006). *How to do xtabond2: An introduction to difference and system GMM in Stata (Working Paper No. 103)*. Washington, DC, USA:

Center for Global Development. Retrieved from http://dx.doi.org/10.2139 /ssrn.982943.

Rostow, W.W. (1960). *The Stages of Economic Growth: A Non- Communist Manifesto*. 3rd ed. New York: United State of America.

Sachs, J. (1989). *Developing Country Debt and the World Economy*. National Bureau of Economic Research. The University of Chicago. United State of America.

Schoenmaker, D. (1996). *Contagion risk in banking*. London: LSE Financial Markets Group.

Schumpeter, J. (1933). The common sense of econometrics. *Journal of the Econometric Society, 3*(8), 5–12.

Schwartz, A. J. (1986). Real and Pseudo-Financial Crises, in Forrest Capie and Geoffrey E. Wood, eds., *Financial Crises and the World Banking System*, Basingstoke, Macmillan, 11–31.

Segoviano, M.A., & Goodhart, C.A.E. (2009). *Banking stability measures*, No. IMF Working Paper No. 04, International Monetary Fund

Seymour, E. H, (1947). *The National Debt and the New Economics,* New York, McGraw-Hill Book Company, Inc.

Sharp, A. M. (1959). A general theory of public debt. *America Journal of Economics and Sociology*. *2*(11), 99-111

Stiglitz, J., & Weiss, A. (1983). Credit Rationing in Markets with Imperfect Information," *American Economic Review*, *71*(81), 393–410.

Stock, J. H., & Watson, M. W. (2012). *Introduction to econometrics*. New York: Pearson.

Tobin, J. (1969). A General Equilibrium Approach to Monetary Theory. *Journal of Money, Credit and Banking*. *1*(4), 15-29.

Taylor, L. (1993). *The rocky road to reform: Adjustment, income distribution and growth in the developing world*. London: MIT Press.

Van Duuren, T., de Haan, J., & van Kerkhoff, H. (2020). Does institutional quality condition the impact of financial stability transparency on financial stability? *Applied Economics Letters, 27*(20), 1635-1638.

Veblen T. B. (1904). The *Theory of Business Enterprise*. New York : Charles Scribner's Sons.

Vo, D. H., Nguyen, V. M., Quang-Ton Le, P. H. A. T., & Pham, T. N. (2019). The determinants of financial instability in emerging countries. *Annals of Financial Economics*, *14*(2), 19-50

Wai, U. T., & Wong, C. H. (1982). Determinants of private investment in developing countries. *The Journal of Development Studies*, *19*(1), 19-36.

Were, M. (2001). The impact of external debt on economic growth and private, investments in Kenya: An empirical assessment. *Wider Development Conference on Debt Relief*. 17-18 August 2001, Helsinki.

Wicksell, K. (1898). The influence of the rate of interest on commodity prices. *Economic Journal*, *1*(7), 213-20.

Williamson, S. (1987). Costly Monitoring, Loan Contracts and Equilibrium Credit Rationing, *Quarterly Journal of Economics*, *10*(2), 135–145.

Zebib, M., & Muoghalu, M. (1998). Dynamic nature of private investment and its determinants in developing countries. *Studies in Economics and Finance*. *18*(2), 100-110.

APPENDICES

A. Calculation of the Net Effects (Changes in Arrears)

For Sub-Saharan Africa (SSA)

$$Pvt\ inv = -1.023Arrears + 1.090Growth + 0.174Arrears * Growth$$

$$\frac{dPvt\ inv}{dArrears} = -1.023 + 1.090Growth$$

$$-1.023 + 0.174(4.784)$$

$$-1.023 + 0.832 = -0.191\%$$

For Economic Community of Central Africa countries (ECCAS)

$$Pvt\ inv = -2.141Arrears + 1.453Growth + 0.345Arrears * Growth$$

$$\frac{dPvt\ inv}{dArrear} = -2.141 + 1.651Growth$$

$$-2.141 + 1.651(4.784)$$

$$-2.141 + 1.651 = -0.49\%$$

For Economic Community of West Africa States (ECOWAS)

$$vt\ inv = -0.575Arrears + 0.418Growth + 0.062Arrears * Growth$$

$$\frac{dPvt\ inv}{dArrears} = -0.575 + 0.062Growth$$

$$-0.575 + 0.062(4.784)$$

$$-0.575 + 0.297 = -0.278\%$$

B. Calculation of Threshold from Table 12

$$Pvt\ inv = \beta_0 + 1.543Gap + -0.702Gap^2$$

$$\frac{d(Pvt\ inv)}{d(Gap)} = 1.543 - 2(0.702)Gap$$

$$= 1.543 - 1.404Gap$$

$$1.404Gap = 1.543$$

$$Gap = \frac{1.543}{1.404}$$

$$Gap = 1.099$$

$$Gap = 100 * 1.099$$

$$Gap = 109.9\%$$

C. Hausman Test

	Coefficients			
	(b) Fixed	(B) Random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E
NPLs	.081571	.1245923	-.0430213	-
Cont Corrpt	-2.556172	5.151307	2.595135	2.722592
Reg Quality	-6.716027	-11.16108	4.445054	2.648243
Pol Stability	-.0947876	-2.635925	2.541137	2.248881
Exchange Rate	-.0482376	-.0632288	.0149912	-
Inflation	-.0159159	-.0005422	-.0153737	-

chi2(6) = 8.84

Prob>chi2 = 0.1830

(V_b-V_B is not positive definite)

Source: Kulu (2022)

D. Cross Sectional Dependence Test

Pesaran's test of cross-sectional independence = -1.202, Pr = 1.7708

Average absolute value of the off-diagonal elements = 0.270

Source: Kulu (2022)

E. Modified Wald test for groupwise heteroskedasticity in Fixed Effect regression model

H0: sigma(i)^2 = sigma^2 for all i

Chi2 (5) = 313.46

Prob >chi2 = 0.0000

Source: Kulu (2022)

F. Wooldridge test for Autocorrelation in panel data

H0: no first-order autocorrelation	
F(1, 4) =	5.134
Prob > F =	0.0861

Source: Kulu (2022)

G: List of SSA countries considered for the study

Angola	Comoros	The Gambia	Liberia	Rwanda	Uganda
Benin	Congo, D.R.	Ghana	Madagascar	Sao Tome and Principe	Zambia
Burkina Faso	Congo, Rep.	Guinea	Mali	Sierra Leone	Zimbabwe
Cameroon	Cote d'Ivoire	Guinea Bissau	Mozambique	South Africa	
Central Africa Republic	Ethiopia	Kenya	Niger	Tanzania	
Chad	Gabon	Lesotho	Nigeria	Togo	

Source: Kulu (2022)

H: List of countries in the Sub-regional Communities under study

ECCAS	**EAS**	**ECOWAS**
Angola*	Ethiopia	Benin
Cameroon	Kenya	Burkina Faso
Central Africa Republic	Rwanda	Cote d'Ivoire
Chad	Tanzania*	Gambia
Congo, D.R*	Uganda	Ghana
Congo, Rep.		Guinea
Gabon		Guinea Bissau
Sao Tome and Principe		Liberia
		Mali
		Niger
		Nigeria
		Sierra Leone
		Togo

Note: Countries with asterisk (*) are also members of SADC
Source: Kulu (2022).

I: Variance inflation factor Test for Multicollinearity

Variables	VIF	1/VIF
$Growth$	4.27	0.234
$Arrears * Growth$	3.41	0.293
$Arrears$	1.60	0.625
$Savings$	1.24	0.804
$Gov\ Inv$	1.20	0.835
$Ext\ Debt$	1.19	0.838
$Credit$	1.19	0.843
$Inflation$	1.11	0.901
Mean VIF	1.90	

Source: Kulu (2022).

J: Net Effect Calculation (Changes in Growth)

For Sub-Saharan Africa (SSA)

$$Pvt\ inv = -1.023(Arrears) + 1.090(Growth) + 0.174(Arrears * Growth)$$

$$\frac{dPvt\ inv}{dGrowth} = 1.090 + 0.174(Arrears)$$

$$= 1.090 + 0.174(3.220)$$

$$= 1.090 + 0.56028$$

$$= 1.650\%$$

For Economic Community of Central Africa countries (ECCAS)

$$Pvt\ inv = -2.141(Arrears) + 1.453(Growth) + 0.345(Arrears * Growth)$$

$$\frac{dPvt\ inv}{dGrowth} = 1.453 + 0.345(Arrears)$$

$$= 1.453 + 0.345(4.536)$$

$$= 1.453 + 1.56492$$

$$= 3.018\%$$

For Economic Community of West Africa States (ECOWAS)

$$Pvt\ inv = -0.575(Arrears) + 0.418(Growth) + 0.062(Arrears * Growth)$$

$$\frac{dPvt\ inv}{dGrowth} = 0.418 + 0.062(Arrears)$$

$$= 0.418 + 0.062(3.916)$$

$$= 0.418 + 0.242792$$

$$= 0.661\%$$