

**DRIVERS AND IMPACT OF FINANCIAL DEVELOPMENT ON EXCHANGE
RATE VOLATILITY IN SUB-SAHARAN AFRICA**

KNUST

BY

MOSES DUMAYIRI

(PG6263716)

**THIS DISSERTATION IS SUBMITTED TO THE DEPARTMENT OF ECONOMICS,
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DECLARATION

I, **Moses Dumayiri** with the student number 20477874 do hereby, declare that this research report is the outcome of my own work, except as shown in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the award of Master of Science degree in Economics (Money, Banking and Finance) at the Department of Economics, Kwame Nkrumah University of Science and Technology. I also wish to state that, it has not been submitted for the award of another degree in this university or elsewhere.

Moses Dumayiri
(PG6263716)

.....

Signature

.....

Date

Certified By:

Dr. Yussif Hadrat
(Supervisor)

.....

Signature

.....

Date

Certified By:

Dr. Osei-Fosu Anthony Kofi
(Head of Department)

.....

Signature

.....

Date

DEDICATION
To my family

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By God's grace, I have come to the end of my M.Sc. Journey. I am extremely grateful to the Almighty God for making this possible. On this journey, I would not have reached my destination but for the countless assistance and sacrifices of many wonderful people whose efforts I wish to pay tributes to. My first thanks go to my supervisor Dr. Yussif Hadrat, Senior Lecturer, Department of Economics, KNUST for his intellectual guidance, encouragement and constructive comments which have made this work special.

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LIST OF ACRONYMS



Coefficient of Variation	CV
Control of Corruption	CC
Domestic Credit Provided by the Financial Sector	DCPFS
Economic Recovery Programme	ERP
Foreign Direct Investment	FDI
Generalized Autoregressive Conditional Heteroscedasticity	GARCH
Generalized Methods of Moments	GMM
Government Effectiveness	GE
Gross Domestic Product	GDP
International Monetary Fund	IMF
Political Stability	PS
Private Credit Provided by Banks	PCPB
Private Credit	PC
Real Effective Exchange Rate	REER
Real Effective Exchange Rate Volatility	RERV
Regulatory Quality	RQ
Rule of Law	RL
Structural Adjustment Programme	SAP
Sub-Saharan Africa	SSA
Voice and Accountability	VA
World Bank	WB
World Development Indicators	WDI
World Governance Indicators	WGI

ABSTRACT

The role of financial development in promoting economic growth is well known among economists. Thus, it is not surprising that financial market development has engaged the attention of researchers and policymakers. While policymakers continue to depend on researchers for ideas to deepen the financial market, much of the studies on this area tend to be dominated by the impact of financial development on other variables with less on its drivers in sub-Saharan Africa. Other scholars also recognized the fact that, literature is inconclusive on the drivers of real exchange rate uncertainty. Therefore, the goal of this study is to investigate the drivers and impact of financial development on exchange rate volatility in SSA. Two sets of panel data were compiled for the study. The first panel comprises 17 SSA countries over the period 1996 – 2015. The second panel covers 14 SSA countries for the period 1980 – 2015. Data for the study were gleaned from the World Development Indicators (WDI) and the Worldwide Governance Indicators (WGI) databases. We employ the Generalized Autoregressive Conditional Heteroscedasticity (GARCH, 1:1) in the estimation of volatility and subsequently use system dynamic Generalized Methods of Moment (GMM) in our analysis. The results indicate that output growth, inflation, trade openness and institutional quality all matter for the depth of the financial sector. On the finance – exchange rate volatility nexus, we found an inverse relationship between the two. The study also uncovers a linear relationship between financial development and real exchange rate volatility. Further, the evidence shows that the finance – exchange rate volatility nexus is insensitive to the measurement of financial development. It is recommended that policy makers in SSA should put in place measures to grow their economies and deepen the financial systems since this could reduce the volatility of the exchange rate.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

The role of financial development in promoting economic development is well known among economists (Blanco, 2013; Kagochi, AL Nasser and Kebede, 2013). Without doubt, the development of a deep financial market is indispensable to economic growth although there are debates about whether it is economic growth that leads to banking sector development or vice versa. It is thus not surprising that the benefits of a deep financial markets have been extensively documented (McKinnon, 1973; Shaw; 1973, Adu et al., 2013). An efficient, well-policed markets mobilize resources and funnel them into viable projects. They are also able to properly manage risk, mobilize savings and ensure corporate governance (Levine, 1997). However, a shallow and vulnerable financial system limits the chances of financing the economy, heightens the tendency for financial repression and encourages speculation (Khalifaoui, 2015).

Financial underdevelopment has been continually cited as one of the factors slowing the speed of economic growth in sub-Saharan Africa (SSA) (Azam et al., 2002 cited in Gries and Meierrieks, 2010). Consistent with this, Ibrahim and Alagidede (2017) maintain that countries in SSA are exposed to economic fluctuations on account of their nature and the shallowness of their financial markets. Consequently, policy makers in least developed countries especially in SSA have considered the development of the financial system as part of an overall private sector development strategy, with the aim of mobilizing savings for investment which is expected to trigger higher economic growth so that poverty levels will reduce (Kagochi, AL Nasser and Kebede, 2013).

Subsequently, policymakers in SSA have pursued various policies targeted at deepening the depth of the financial system. Notable among these policy initiatives was the financial system liberalization programme. Which was pursued as part of the International Monetary Fund (IMF) and World Bank (WB) motivated Structural Adjustment Programme (SAP) and Economic Recovery Programme (ERP) that were implemented across SSA countries starting from the mid1980s. There is ample evidence (See Senbet and Ochere, 2005; Nyantakyi and Sy, 2015; Fawowe, 2011) that these policy initiatives yielded benefits.

Ibrahim (2017) shows that financial expansion and coverage as measured by broad money to GDP ratio and domestic credit provided by the financial system as share of GDP respectively, grew progressively over the period under review even though its base remained uninspiring. In particular, the two financial development proxies gradually grew over the period 1985 – 1989 to 2000 – 2004. However, broad money ratio declined to 39.17 per cent from 43.64 per cent over the previous period 2000 – 2004 to 2010 – 2014. Domestic credit also declined by 14.36 per cent over the past ten (10) years recording an average of 58.55 per cent. Private credit has over the period under review grew from 33.82 per cent over 1980 – 1984 to 46.97 per cent over 2010 – 2014 as it declined to 55.18 per cent (2000 – 2004) from 59.42 per cent (1995 – 1999).

There exists some consensus among scholars that these reforms have triggered the arrival of efficient financial intermediaries that are responsive to private sector needs, risk sharing, and funneling funds to more productive users (Nyntakyi and Sy, 2015). The effect of financial sector reforms on investment (Fawowe, 2011) and growth (Akinsola and Odhiambo, 2017) in SSA are also noteworthy.

Despite the reforms, financial intermediation is relatively low in SSA; with wide variations among SSA countries in terms of their state of financial market depth. Moyo et al. (2014) indicate that some SSA countries like South Africa have larger banks than other countries. Financial intermediation as measured by the share of private credit in gross domestic product is higher in upper middle-income economies; particularly, South Africa and Mauritius, but relatively little in low-income countries (Malawi, Uganda and Tanzania) and in new middle-income countries such as Ghana and Zambia.

Additionally, economies that experienced the least levels of financial development are also associated with the lowest levels of efficiency as demonstrated by the highest spread notably in Tanzania and Malawi. The low level of financial depth among poor SSA countries and their equivalents is also exhibited in their illiquidity in financial markets, with the stock market playing a minuscule role as an alternative source of funding investments. Thus, it is not surprising that SSA financial system is largely bank-based which in itself is indicative of the shallow financial depth. Undoubtedly, this is also explained by the low level of financial penetration and outreach. For instance, whereas in Ethiopia 91.7 per 1000 population has access to bank accounts, in South Africa 882.9 out of 1000 have access to bank accounts (Moyo et al., 2014). Given this general picture, some useful questions to ask are: What accounts for the differences in the level of financial development among countries in sub-Saharan Africa? What is the effect on exchange rate volatility of financial development in SSA? This study envisages that understanding the factors driving financial market development and its effect on exchange rate volatility could be useful to policy makers in SSA as they seek to deepen their financial markets and lower real exchange rate volatility.

1.2 Problem statement

The importance of a deep financial system for economic growth has been acknowledged by extant literature (Blanco, 2014; Kagochi, Al Nasser and Kebede, 2013; Mckinnon, 1973; Shaw, 1973; Adu et al., 2013). Thus it is not surprising that financial market development has engaged the attention of researchers and policymakers. While policymakers continue to depend on researchers for ideas to deepen the financial market, much of the studies on this area tend to be dominated by the impact of financial development on economic growth (Ibrahim and Alagidede, 2018; Kagochi, et al., 2013; Blanco, 2013; Bayar, 2014; Dejene Mamo Bekana, 2016; Adu et al., 2013; Giri and Mohapatra, 2012; Ohwofasa and Aiyedogbon, 2013; Ndebbio, 2004 ; Agbélénko and Kibet, 2015; Nzotta, and Okereke, 2009; Onwumere, Ibe, Ozoh, and Mounanu, 2012; Adusei, 2013; Chung, Sun and Vo, 2016), private investment (Sakyi, Boachie and Immurana, 2016), inflation (Ogbuagu and Ewubare, 2014), domestic investment (Bahmani-Oskooee, and Hajilee, 2013), policy coordination (Nguena and Abibola, 2013), macroeconomic volatility (Ogbuagu, and Ewubare, 2017), and openness (Baltagi, Demetriades and Law, 2009).

The few studies that tried to explain the determinants of financial development tend to be clustered around single country studies (For instance see Takyi and Obeng, 2013; Seetanah, Padachi, Hosany, and Seetanah, 2010). Whereas single country studies allow us to understand the peculiar cases of particular countries, they do not allow for wider application of the knowledge they generate (Issahaku, Harvey and Abor, 2016). Even more telling is the fact that most of these studies were done outside sub-Saharan Africa (Zainudin and Nordin, 2017; Law and Habibullah, 2009; Ayadi, Arbak, Naceur and Groen, 2013; Girma and Shortland, 2008; Bertola and Prete, 2013; Herger e tal., 2008; Malmendier, 2009).

Other cross country studies in SSA that tried to explain the level of finance apart from being few (Gries and Meierriesks, 2010; Ibrahim and Sare, 2018) failed to integrate the three dominant theories (Culture, Institutions and Trade) that are known to explain the level of financial development in their model. This limits our understanding regarding the factors that could possibly drive the level of finance. In view of the above, this thesis intends to explain the drivers of financial development from the point of view of culture, institutions and trade, relying on panel data on SSA from 1996 - 2015.

Again, there is growing interest among economists in understanding the nexus between financial development and the fluctuations of exchange rate (Hajilee and Al Nasser, 2016; Gadanez and Mehrotra, 2013). However, earlier studies on the causes of exchange rate volatility in SSA (Insah, 2013; Insah and Chiaraah, 2013; Alagidede and Ibrahim, 2016; Savvides, 1996); Elbadawi and Soto, 1997) have failed to consider the influence of financial development in their analysis. Yet those that came closer to the study of the finance-exchange rate nexus were limited to only the stock market (see Boako, Omane-Agyepong and Frimpong, 2016; Adjasi, Harvey and Agyepong, 2008; Boachie et al. (2016)). However, on account of the fact that the financial system of SSA is largely bank-based (see Moyo et al., 2014; Mlachila et al., 2016) relying on capital market metrics as the only measure of financial development could be misleading as most countries in SSA have poorly developed stock and bond markets. Several studies (see Hausmann, Panizza, and Rigobon, 2006; Alagidede and Ibrahim, 2016; Sissoko, 2012; Bleaney and Francisco, 2016; Devereux and Lane, 2013) have argued that the real exchange rate uncertainty is more of a concern in developing countries than industrialized countries on account of weak economic fundamentals (MacDonald and Nagayasu, 1999).

Moyo et al. (2016) reported that volatile interest and exchange rates could trigger illiquidity in the banking sector. Hajilee and Al Nasser (2017) also alluded to the fact that increasing the depth of the financial sector could dampen exchange rate volatility by reducing information asymmetry, risk, uncertainty and speculation and provides economic agents with ample finances without significant variations in the prices of assets and exchange rates. Implying the presence of an association of exchange rate volatility and financial sector depth. However, this appears to have eluded the attention of researchers. Therefore, on account of the fact that the currencies of SSA countries have experienced severe fluctuations for some time now (Alagidede and Ibrahim, 2016) albeit, nonsymmetrical, it becomes practically useful to determine whether the level of financial development has anything to do with it (Boako, Omane-Agyapong and Frimpong, 2016).

Hajilee and Al Nasser (2016) for instance, argued that much empirical studies have not been conducted to investigate the nexus between financial depth and exchange rate volatility. As limited as the studies are on the subject matter, there is also no agreement on the direction of causation. As Gadanez and Mehrotra (2013) & Hajilee and Al Nasser (2016) observe, the impact on exchange rate volatility of financial development is less clear. Alagidede and Ibrahim (2016) also recognized the fact that, literature is inconclusive on the drivers of real exchange rate uncertainty. Therefore, this thesis seeks to investigate the drivers and impact of financial development on exchange rate volatility in sub-Saharan Africa.

1.3 Research objectives

The general objective of the study is to investigate the drivers and impact of financial development on exchange rate volatility in SSA. The specific objectives of the study include the following:

1. To estimate the drivers of financial development in SSA over the period 1996 – 2015.
2. To analyze the effect of financial development on exchange rate volatility in SSA from 1980-2015.
3. To examine possible nonlinearities in the finance-exchange rate volatility nexus in SSA.
4. To determine whether the measurement of financial development matter in the exchange rate volatility - financial depth nexus in SSA.

1.4 Research hypotheses

To achieve the objectives of the research, we test the following hypotheses:

1. **H₀**: Economic growth, culture, institutions and trade do not explain the level of financial development in SSA over the period 1996 - 2015
2. **H₀**: Financial development has no effect on exchange rate uncertainty in SSA over the period 1980 - 2015
3. **H₀**: There is no linear relationship between financial development and exchange rate volatility in SSA
4. **H₀**: The measurement of financial development does not matter in the finance-exchange rate volatility nexus

1.5 Justification of the Study

Without a doubt, literature on financial development has largely focused on its impact on economic growth (Ibrahim and Alagidede, 2018; Kagochi, et al., 2013; Blanco, 2013; Bayar, 2014; Dejene Mamo Bekana, 2016; Adu et al., 2013; Giri and Mohapatra, 2012; Ohwofasa and Aiyedogbon, 2013; Ndebbio, 2004 ; Agbélénko and Kibet, 2015; Kwarteng, 2015; Nzotta, and Okereke, 2009; Onwumere, Ibe, Ozoh, and Mounanu, 2012; Adusei, 2013; Chung, Sun and Vo, 2016), private investment (Sakyi, Boachie and Immurana, 2016), inflation (Ogbuagu and Ewubare, 2014), domestic investment (Bahmani-Oskooee, and Hajilee, 2013), policy coordination (Nguena and Abibola, 2013), macroeconomic volatility (Ogbuagu, and Ewubare, 2017), and openness (Baltagi ,Demetriades and Law, 2009), development (Stiglitz, 1989). Evidently, this leaves huge space for engagement regarding finance - real exchange rate volatility nexus. To the best of my knowledge, no study in SSA has examined this linkage. The paper envisages that information about the nexus between the two financial variables could be useful for policymakers, financiers and global business people, as it may show the way through which financial depth and exchange rate volatility influence economic growth.

Also, the literature on the drivers of the level of finance has left loop holes in the case of subSaharan Africa. Whereas there is ample literature explaining the level of finance, much of these were focused on other regions. Those that looked at SSA, apart from being singly-country focused, failed to integrate all relevant theories explaining the level of finance. Thus this study closes the literature gap and contributes to ongoing debates about the link between the two financial variables. It also extends the existing literature by finding out if the measurement of financial development matter in the financial depth-exchange rate uncertainty nexus. Furthermore, given the seeming lack

of clarity regarding the finance – real exchange volatility nexus exploring nonlinearities in this twin - relationship could be useful for policymaking purposes.

1.6 Scope of the study and delimitation

This study focused on drivers and impact of financial development on exchange rate volatility in sub-Saharan Africa. Specifically, it estimates the drivers of financial market depth in SSA and also looks at the effect on exchange rate uncertainty of financial development. It also finds out whether the measurement of financial development matter in the fiancé-exchange rate volatility nexus. As well as examined nonlinearities in the finance-exchange rate volatility link. The study covers the period 1980 – 2015, we chose this period because it was within this era that much of the economic reforms took place in SSA. In particular, those that relates to the foreign exchange market.

1.7 Limitations of the study

Although the study intended to look at the drivers of financial development from the perspective of culture, institutions and openness theories, the lack of a proxy that gives consistent data on culture for all countries in the sample made it impractical to explore the influence of culture on finance. Also, information on institutional quality variables from world governance indicators was only available from 1996 – 2015, this limited the study's ability to investigate the drivers of financial development over a longer time frame. Finally, data on real effective exchange rate was not available for some countries in SSA. This limited the number of countries in our panel to 14 countries in the volatility panel and 17 in the finance panel.

1.8 Organization of the thesis

This dissertation is structured into five interrelated chapters. Chapter One is the Introduction which comprises the background, the problem statement, the objectives of the study, the research hypothesis, the justification of the study, the scope of the study, limitations, and the organization of the study. Chapter Two discusses the review of literature. It covers mainly the theoretical review, conceptual framework as well as the empirical review on drivers of financial development as well as its link with exchange rate volatility. The empirical and theoretical literature on financial development have also been reviewed. Chapter Three outlines the research methodology. While Chapter Four presents and discusses the empirical results. Finally, Chapter five presents the summary of major findings, conclusions and recommendations. It also suggests areas necessitating further research.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This part of the study takes a critical look at the strands of information available with a view to understanding the subject matter. Section 2.2 covers the concept of financial development and its measurement in empirical setting. Section 2.3 conceptualize the concept of real effective exchange rate and its volatility. Section 2.4 presents a review of financial system in SSA. Section 2.5 reviews empirical and theoretical studies on the drivers of financial development. Section 2.6 presents literature on other drivers of financial development. Section 2.7 examines the conceptual framework. Section 2.8 presents previous literature on the connection between financial development and exchange rate volatility. Section 2.9 discusses other drivers of real exchange rate volatility. Finally, section 2.10 draws conclusion on the literature review and highlights the gaps in previous studies which have triggered this current contribution.

2.2 Financial development and its measurement

Financial development is often conceived as the increase in the provision of financial services to an economy. In other words, it is concerned with the degree to which financial markets and institutions are able to meet the desires of a society through financial intermediation (ISSER, 2015; Quartey and Afful-Mensah, 2014). World Economic Forum (WEF) (2012: Xiii) defines financial development as “the factors, policies, and institutions that lead to effective financial intermediation and markets, as well as deep and broad access to capital and financial services”. Thus financial development concerns the perfections in the performance of financial activities such as providing clues on productive investment opportunities and allocating capital to such opportunities, risk

management, mobilization of savings and facilitating transactions in the economy (Sakyi, Boachie and Immurana, 2016).

There are many proxies available to measure financial development depending on the aspect of the financial system that will be of focus at a point in time. Adu et al., (2013) in investigating the growth effect of the level of finance in Ghana used eight proxies for financial development. These include private credit as a percentage of GDP, Private credit as a proportion of total credit, Broad money as a share of gross domestic product, Narrow money to broad money ratio, the ratio of currency to M2+ ratio, Currency to GDP ratio, total bank deposit liabilities as a share of GDP and total credit to GDP ratio. They find that both private and domestic credits are responsive to growth while broad money stock to GDP is not growth inducing. They argue that whether or not financial development is important for growth rests on the proxy that will be used for financial development.

In most of the literature, private credit as a percentage of GDP is normally used to measure the quality of the level of finance because this metric account for loans granted to the private sector thus, encouraging the deployment and provision of credit to more efficient uses has been widely used by researchers (see King and Levine, 1993; Levine et al., 2000; Arcand et al., 2012; Ibrahim and Alagidede, 2016). The financial sector in SSA are undeveloped and the banking systems dominate financial sector activities (Andrianaivo and Yartey, 2009 cited in Ibrahim, 2017). In financial systems often dominated by banks as in many SSA countries, (Hassan et al., 2000; Moyo et al., 2014; Mlachila et al., 2016) argue that the private credit as a percentage of gross domestic product is well suited as the best metric for financial development.

Herger et al. (2008) used stock market capitalization, the monetary value of shares sold on the stock markets, the amount of credit given by banks to the private sector by banking industry to measure financial development. The authors employed these metrics to enable them account for the direct and indirect finance as well as the quantity and efficiency of capital markets. Also, Ang and Mckinnon (2007) cited in Ibrahim (2017) argue that monetary aggregate proxies are not good metrics for financial development because they only re-echo the volume of transactions service provided by the financial system compared with its capacity to move funds from depositors to investors. In this study, we employ credit to private sector as a share of GDP as our metric for financial development. We also employ the domestic credit provided by the financial system as a percentage of GDP and broad money supply as a percentage of GDP to test the sensitivity of financial development – exchange rate volatility nexus to measurement of financial development.

2.3 The concept of real effective exchange rate volatility

Hajilee and Al Nasser (2017: 10) defined the real effective exchange rate as “the weighted average of a country’s currency relative to a basket of other major currencies adjusted for the effects of inflation”. The volatility component of the REER will then means its changes over time. The concept of real effective exchange rate (REER) is extremely important in facilitating international business and serves as a measure of international competitiveness. The real effective exchange rate concept is informed by the understanding that, most countries around the world do not engage in cross-border trade with a sole foreign partner. So of late, policymakers everywhere are not bordered about the exchange rate between their currency as against the currency of a single trading partner but against a basket of foreign currencies with which it trades. In this thesis, we appreciate

the fact that most countries in SSA trade with multiple foreign partners hence, our use of this standard measure.

2.4 Review of financial system in SSA

The financial system of sub-Saharan Africa has come a long way. Prior to the 1980s the financial system of SSA countries could best be described as rudimentary and narrow. As at now, countries in SSA exhibit a greater sense of heterogeneity in terms of the characteristics of their financial systems. In particular, differences exist in terms of the depth and sophistication of their financial systems (Moyo et al., 2014). Thanks to financial system reforms under the auspices of the IMF and WB.

In most SSA countries, the state of financial market depth has deepened gradually over past 40 years. However, relative to other regions, except for the fewer countries which have attained middle income status, both financial markets and intermediaries are underdeveloped (Mlachila et al., 2016). The increase in the number of Pan-African Banks(PABs) has triggered greater economic cooperation and covered the vacuum created by European and American banks albeit with challenges. Notably among these challenges include inadequate supervisory oversight and governance.

The financial system of most SSA countries are largely bank-based than market focused. The only exceptions in this regard are South Africa, Namibia and Swaziland. Even within the banking system, majority of the subsidiaries are owned by foreign investors across all countries categories but with special attention to vulnerable countries like Guinea, Guinea-Bissau, Madagascar and Sao

Tome Principe. Mlachila, Park and Yaraba (2013) estimate foreign bank ownership to account for over 60 percent of overall banking system assets in SSA. Whereas this statistic compares favourably with Europe and Central Asia, it is rather on the high side when compared to other regions in the World. Additionally, in many countries, state-owned assets are more considerable. Particularly, in Ethiopia, Rwanda, Seychelles, and Sierra Leon. In the nonbank financial sector, pension funds dominate the system's assets and financial markets are generally least developed and illiquid (Mlachila et al., 2016).

Despite the strides made by the region in terms of the depth of the financial sector, it still lags behind other developing regions and this is in part due to the lower average incomes levels in SSA. For instance, the SSA's average ratio of private credit to GDP soared nearly by 10 per cent since 1995 to about 21 per cent in 2014. However, this is just approximately, 50 per cent the size of its counterparts in other regions of the world. This is attributed partly to the relatively larger number of poor countries in the region in per capita income terms.

Analysis of financial development index in SSA thus suggests that financial development has been uninspiring over the past 30 years, although there has been some moderate progress over the past 17 years. However, the state of financial market depth is not homogeneous across the SSA region. Whereas countries like Mauritius, Namibia, Seychelles and South Africa have witnessed rapid progress since 1980s, the pace has however, being slower in other groups in the region. In countries such as Central African Republic, Cameroon, Chad and Sierra Leon, the present levels of financial development are worse than they were in the 1980s. Yet, others in East Africa particularly, Kenya have had its financial development understated on account of the non-inclusion of mobile

payments system (M-PENSA) which has transformed the banking sector and largely nurtured bank penetration and increased financial access (Ondiege, 2013). IMF (2011) reports that, M-PESA daily domestic volume of transactions surpasses that of the Western Union worldwide. It covers over 70 per cent of the adult population in Kenya. However, it is only in recent times that these statistics have been captured in conventional access literature.

2.5 Drivers of financial development: a review of theoretical and empirical literature

Broadly speaking, much of the engagement on the factors explaining the level of finance and its differences across countries around the globe have been clustered around three theories. As Herger, Hodler and Lobsiger (2008) indicate there are three main theories at present explaining the level of finance in some countries. These include: i) the role of culture and beliefs, ii) the quality of institutions; and iii) trade openness and financial liberalization.

On the cultural front, Stul and Williamson (2003) cited in Herger et al., (2008) argue that cultural legacy may support certain common beliefs although they may be inimical to financial development. Notably, religions, prescript rules of conduct on issues involving wealth seeking or illegal acquisitive practices such as usury. Some religious groups advocate the rights of borrowers over those of lenders and some even demonize the charging of interest. Without doubt, this will adversely undermine financial development since finance thrives in environment where the property rights of creditors or property owners are well protected (La Porta et al., 1998; Ibrahim and Alagidede, 2017). Herger et al. (2008) opine that culture directly influences the creation of financial markets and institutions when norms that minimize doubts are encouraged in the conduct of transactions or beliefs that sacrifice debtors or creditors rights are maintained in the interest of

religion. However, in their empirical test (Herger et al., 2008) found that aside catholic dominated countries that have relatively shallow capital markets, there is not enough information to support the argument that religious practices limit the creation of an efficient financial sector.

Secondly, institutional theories articulate the view that proper enforcement of property rights – in particular, the right of owners of property to make profits on their investment provide an important safety net especially, when transactions do not take place immediately. Borrowers will not get access to investment capital if investors entertain fears of default and expropriation of their capital. As a result of this, the law - finance model of La Porta et. al. (1998) indicates that legal frameworks vary clearly in terms of their ability to protect property rights. Consistent with this view, Beck and Levine (2003) find that legal origin affect financial depth via: (i) the political and (ii) adaptability routes. The earlier one rest on two doctrines: 1) legal heritage differs in relation to its stress on safeguarding the rights of individuals in relation to that of the government; 2) safeguarding the property rights of individuals serves as a springboard for the deepening of the financial market. The law - finance theory argues that countries that leans on the French legal doctrine have weak protection for individual property rights and lower financial development compared to other legal origins. So legal origins matter largely because investors rely on the courts to force debtors to settle their financial commitments.

Nevertheless, imposing contracts through the giving out of discretionary power to some state authority, creates avenues for corruption and rent seeking behavior among state actors such as political appointees, bureaucrats and judges as they interfere with the property rights of others to profit from rents accruing to financial contacts (Acemoglu and Johnson 2005). In a recent empirical

work on the law-finance nexus by Ibrahim and Alagidede (2017) relying on 33 SSA Countries over the period 2004-2011, suggest that legal origins significantly explain the differences in financial development among countries in SSA. In particular, they showed that English legal legacy countries and those in Southern Africa have deeper financial markets in terms of quantity and quality relative to civil law countries.

Similarly, the adaptability mechanism – linking legal origin with financial development also rests on two things: 1) legal leanings differs regarding their flexibility in responding to different circumstances. 2) if a country's law tradition leisurely adapts to varying circumstances, obviously there could be a mismatch in terms of the country's financial requirements and what its legal framework will be able to accommodate (Beck and Levine, 2003 cited in Ibrahim and Alagidede, 2017). Arguably, common law is said to be more dynamic in responding to the changing financial needs of society relative to Civil law.

Gries and Meierriesks (2010) investigate the institutional drivers of financial market depth for 19 SSA countries for the period 1984 to 2007. Their findings suggest some variables associated with higher institutional quality bring to bear a positive causal effect on financial development. In particular, they found factors such as strong property right protection and political stability to significantly affect financial market depth. They expect future improvements in institutional quality to affect economic growth largely through their positive impact on financial development. Law and Habibullah (2009) also report the quality of institutions as statistically significant determinant of financial sector depth. Also, in Ancient Roman, Malmendier (2009) provides evidence in support of better institutions in financial development, He maintains that legal tradition

seems to matter little insofar as the law as practiced was dynamic in responding to economic needs.

In Southern and Eastern Mediterranean (Ayadi, Arbak, Naceur and Groen, 2013) demonstrate that some elements of institutional quality are known to exert strong influence on financial sector depth especially when they are present collectively. In particular, the authors emphasized institutions responsible for ensuring rule of law, proper democratic regimes and proper reforms in the financial system to have much bearing on financial development when present at the same time. Moreover, inflation appears to undermine banking sector development, but less so when the capital account is open. Growth in public debts was however found to be inimical to the level of finance on account of the crowding-out effect of public debts. Finally, capital inflows were reported by the authors to have strong positive correlation with increasing credit availability largely because of its income effect.

Finally, instituting and maintaining a liberal and transparent economic and financial system may not always meet the desires of elite groups. Although, financial markets and institutions notably banks, promote businesses for everyone, Rajan and Zingales (2003) contends that in less opened economies political power groups may take control of the financial system and therefore restrict new or potential entrants and thus protect their economic privileges. When countries are open to foreign competition and cross-border trade, the benefits accruing to elites may be reduced through competition with foreign firms irrespective of the efficacy of domestic financial systems. Corruption, in particular is said to be more of a problem in countries with little trade as a share of

GDP (Ades and Di Telia, 1999). These results highlight the critical role of trade and financial liberalization in bolstering financial development in economies all over the world. The political economy theories of financial development as noted by Girma and Shortland (2008) indicate that in every country where a few circle of elites take political decisions, financial development may be restricted to prevent potential competitors from getting access to finance.

Law and Habibullah (2009) relying on data on 27 countries covering the G-7, Europe, East Asia, and Latin America, spanning 1980-2001 show that trade openness is the most important in facilitating capital market development. With regards to financial liberalization they indicate that the fine-tuning of domestic financial systems tends to enhance the development of the banking sector, whereas, equity market liberalization is effective in promoting stock market development. Though the financial liberalization programmes are more responsive in developed economies. Herger et al, (2008) in a multi-country research found that trade liberalization and institutions restricting politicians from confiscating investors funds tend to further financial development. Bertola and Prete (2013) argue that in more liberalize and open economies, the ruling class may find it more cumbersome to finance and implement public policies that may substitute private financial transactions and are therefore likely to deregulate financial markets.

Braun and Raddatz (2008) argue that elites in diverse setups have different motives to facilitate or inhibit the establishment of deeper financial markets. Financial development will occur depending on the power of opponents relative to promoters. If promoter industries are stronger, the wind of financial development will swing towards promoters and financial expansion will occur and vice

versa. Thus, corruption in the form of rents in the hands of incumbents have a greater chance of influencing financial development than the benefits of having the financial market developed.

Girma and Shortland (2008) investigate the effects of a country's democratic features on regime change on financial development, relying on panel data on developed and developing countries over the period 1975 - 2000. Their results show that governance stability and democracy promotes financial development with additional benefits from full democratic regime. Thus, to the extent that democracy limits the bargaining power of elite groups and lobbies, this logic is in consonance with the argument by Rajan and Zingales (2003) that political systems controlled by a fewer elite groups limits financial development.

In a study of how financial market depth depends on trade openness and various types of institutions, Hodler, (2011) shows that elite can rely on financial repression to exclude ordinary citizens from producing capital intensive commodities. In a close economy, financial repression raises the costs of these commodities. They maintained that for most world market prices, trade openness restraints financial repression thus, increasing financial development. Under these circumstances, better political institutions are needed to increase financial development by preventing elites from promoting financial repression.

2.6 Other drivers of financial development

Besides trade, institutions and cultural or demographic variables, other factors that influence the level of financial development include economic growth, macroeconomic in(stability) and government expenditure. Opinions are divided on the nexus between economic growth and financial development. Whereas some group (the demand-following hypothesis) argues that it is

economic growth that explains the development of the financial sector on the premise that as an economy grows, it triggers higher demand for financial services and this demand, in turn, attracts the emergence of new financial institutions and products to supply these services. Thus, least developed countries have shallow financial sectors because of limited demand for banking services. The supply-leading hypothesis contends that causality rather runs from banking sector development to economic growth since the development of the banking sector is a prerequisite for economic growth largely through its role in capital mobilization for investment. Yet, others (feedback-hypothesis theorists) suggest a reverse causality between economic growth and banking sector development. The feedback theorists maintain complementarity relationship between the two variables indicating that a developed banking sector is crucial to economic growth and economic growth definitely needs a developed banking sector (Pradhan, Arvin, Norman and Nishigaki, 2014).

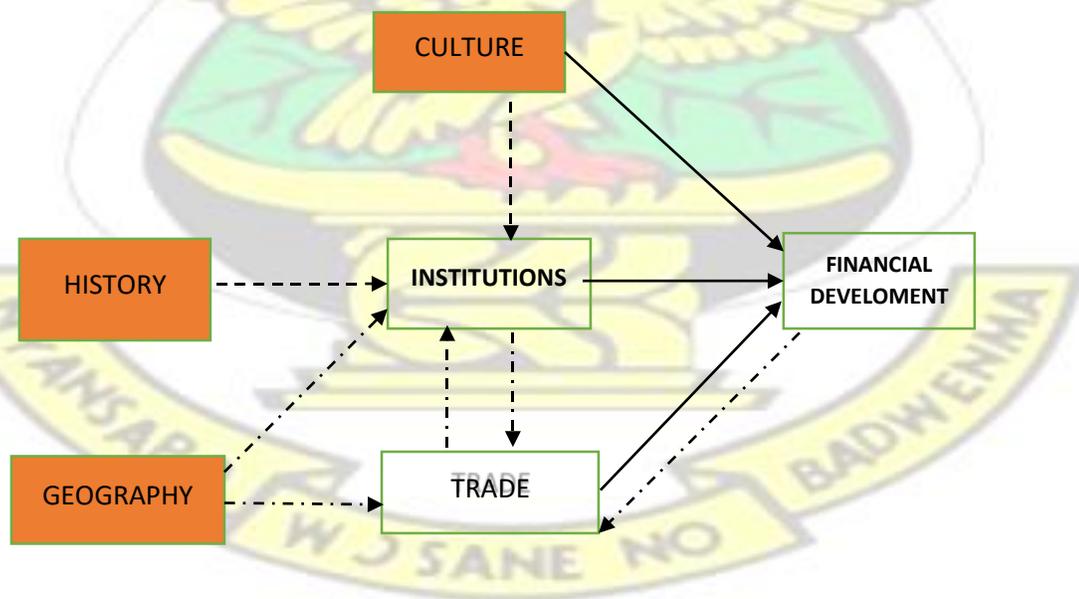
The rate of inflation is inimical to activities in the financial market. A sustained rise in the general price level would have a negative influence on financial market performance. Boyd et al., (2001) indicate that in periods of higher inflation, financial intermediaries fail to perform their role efficiently. In particular, asset return volatility increases with higher levels of inflation resulting in information asymmetry.

2.7 Conceptual framework

In an era of globalization and trade liberalization, we observe a change from personal finance to impersonal financial exchanges, which requires institutions (both political and economic) that safeguard investors from expropriation. Economic integration provides another avenue via trade

openness for protecting investors against rent seeking behaviour of elites/incumbents as well as sidestepping their opposition to financial development. Culture influences financial development directly, when norms that minimize uncertainties in financial markets are encouraged or creditors and or borrowers' rights are sacrificed in the interest of religion.

On one hand, some of the factors explaining the depth of finance are endogenous, which are determined in Figure 1, by the level of finance or some other third variable. These variables include, institutions and trade. In particular, quality institutions lower transaction costs which in turn promotes trade, thus exerting an indirect influence on the financial system. In the opposite direction, open markets foster the development of strong institutions, when new innovations move along the trading routes. Reverse causation again occurs, when a developed banking and capital markets promote access to external finance by both domestic and international business persons, hence feedback upon trade openness.



Source: Adapted and modified from Heger et al., (2008)

Figure 2.1: Conceptual framework for the level of finance

On the other hand, the exogenous factors exerting their effect on financial development include culture, colonial history, and geography. Culture may also affect financial markets indirectly by strengthening the quality of institutions. Some of the institutions which provide safety nets for investors against the risk of fraud, default and expropriation were propagated and diffused by colonialism and there is empirical evidence, showing that institutions change only slowly overtime. Implying that the impact of the institutions transplanted by colonial authorities would have far outlived their exit for a longer time (Herger et al., 2008). Despite significant reduction in transportation costs, external trade is still limited by geographical factors. Finally, linking institutional factors to geographical factors hinges on the premise that financial less developed countries are located in the tropics and sub-tropics than in the temperate zones. According to Heger et al. (2008) there is no known theory relating climatic or ecological factors to the level of finance.

2.8 Exchange rate volatility and financial development: an empirical review

Researchers do not agree on the effect financial market depth on exchange rate fluctuations in both developed, emerging and developing economies. Thus there exist a considerable level of debates among policymakers and empirical researchers on the link between the two variables. However, it is well known among economists that exchange rate unpredictability is but one of the many factors that affect financial market performance (Kurihara, 2006; 2013; Hajilee and Al Nasser, 2016).

Boako, Omane-Adjepong, & Frimpong, 2016) examine the link between returns on stock and exchange rates in Ghana, their results indicate strong reliance of the stock market on the foreign exchange market. They further noted that the relationship between the two markets leans on the international trade model than the portfolio balance theory. Boachie et al. (2016) also find the

functioning of the Ghana equity market to be highly influenced by the exchange rate among other factors. Consistent with this development, Aggarwal (2003), Osei-Fosu and Osei-Fosu (2013) and Maku and Atanda (2010) contends that exchange rate variability is anticipated to influence the profitability of the equity market on account of its effect on a country's external outlook and trade balance between countries. Contrary to the results of (Boako et al., 2016; Boachie et al., 2016), Adjasi et al., (2008) investigate the nexus between the equity market depth and the foreign exchange market, and estimated whether trends in forex price have an impact on Ghana's equity market. The results show an inverse relationship between forex rate risk and equity market returns. Thus a depreciation of the local currency results in an increase in stock market yields in the longterm. However, it reduces equity market returns in the short run.

Hajilee and Al Nasser (2014) using panel data determines the influence of uncertain exchange rates on the stock market capitalization. Their findings reveal that exchange price unpredictability pose a significant influence on the depth of the equity market in the short and long term in most part of their sample. They noted that the effect on equity market depth of a volatile exchange rate works through each country's unique fundamentals. Also, Hajilee and Al Nasser (2016) examine the financial depth-exchange rate link among 26 developing, emerging and developed economies. Their findings indicate that financial depth reacts significantly to volatile exchange rates in 16 of the countries. However, using bound testing approach reveals that real exchange rate volatility has a significant effect on financial deepening in 20 out of 26 economies in the short term. However, with respect to the direction of impact this study recorded mixed results as the relationship between the two financial variables were found to be positive in nine of the countries but negative in seven others. Thus, exchange rate unpredictability could serve as an incentive for economic agents to

possess more or less of the local currency or buy stocks in the equity market, conditional on their beliefs.

Nei and Lee (2001), Oyinlola, Adeniyi, and Omisakin (2012) examine the nexus regarding exchange rate uncertainty and stock returns for G-7 countries. However, contrary to the findings of Maku and Attanda (2010) their results suggest no significant long term dependence between the two financial variables. Similar to the findings of Nei and Lee (2012), Tsai (2012) also finds no significant long term connection between exchange rate and stock market depth in six Asian countries. Rahman and Uddin (2009) examine the interactions between stock values and exchange rates in Bangladesh, India and Pakistan. Their results indicate no co-integrating equilibrium between stock prices and forex rates. They also found no causality among stock prices and the volatility of the exchange price. This vary widely from the results of Diamandis and Drakos (2011) who find a one-way causality running from exchange rate uncertainty to stock market depth in Brazil and Argentina, a two-way causality in Chile, and one-way causality from equity market depth to exchange rates volatility in Mexico. Their results revealed no significant long-run connection between the two variables in any country. This collaborates perfectly with the results of (Zhao, 2010) who identify no significant long-term link among exchange rates and stock returns.

The role of a developed financial system in mediating the effect of unstable exchange rates on other macroeconomic variables have also received much research attention. For instance, Aghion et al. (2009) observe that uncertain exchange rates can exert a significant impact on the rate of output growth over a long-term, however, the impact depends on an economies state of financial development. For economies with comparatively shallow financial depth, instability generally reduces growth, but for financially developed economies, there is no significant impact. Also,

Khraiche and Gaudette (2013) assess the role of a countries state of financial depth in explaining the effect of exchange rate fluctuations on FDI among 39 emerging economies spanning 35 years. The findings reveal that the effect on FDI of uncertainty exchange rate for countries with shallow financial market tends to be significant and positive, but the effect is insignificant for economies with deeper financial markets. They argue that when financial markets are deeper businesses may need less FDI to hedge against real exchange rate volatility. Bristy (2014) finds a significant positive effect of financial market depth on FDI. Implying that as financial markets are shallow, anticipation of exchange price risk dampens innovation which in turn depresses the growth of Bangladesh.

2.9 Other drivers of real exchange rate volatility

Literature on exchange rate dynamics have come a long way in international economics. In the aftermath of world forex market liberalization, MacDonald and Nagayasu (1999) pinpoint two important concerns that relates to exchange rate behavior: (i) long-run correlation between economic fundamentals and real exchange rate and; (ii) the role of shocks in total exchange rate fluctuations. According to Alagidede and Ibrahim (2017) we can classify the sources of exchange rate fluctions into: 1) internal real shocks influencing demand; 2) internal real shocks influencing supply; 3) nominal shocks and external real shocks reflecting changes in money supply. Indeed, current literature on volatility have considered the role of shocks. For instance, Adom, Morshed and sharma (2012) in their study observe that real demand shocks account for a large part of the volatility in real exchange rates in all countries in their sample. Consistent with Adom et al. (2012), Sissoko (2012) also found real shocks to be exceedingly important in triggering exchange rate instability. Similarly, Sissoko (2012) investigated the causes of real exchange rate fluctuations in

sub-Saharan Africa and report that volatile exchange rates in the region is driven by real disturbance in both CFA and CFA countries. Further, the authors found nominal shocks to be extremely relevant in explaining the behavior of the exchange rate in the short run in only the NonCFA countries.

From the seminal works of Mundell-Fleming and its later extensions in the popular Dornbusch overshooting model. Where domestic price level rise sluggishly in reaction to an unanticipated monetary policy shocks causing current exchange rate to depreciate more than their long run equilibrium levels. As Dornbusch (1976) noted money supply growth results in a fall in the exchange rate which is greater than its long-run counterpart. This suffices for the overshooting which was before now referred to, when the instantaneous reaction to a disturbance is larger than its long run counterpart. So the influence of money growth and its shock has been key to exchange rate dynamics till date. It is thus of little wonder that most empirical works still find the influence of money extremely significant in their works. For instance, Samara (2009) found the exchange rate response to monetary volatility to be synonymous with those in the Dornbusch's model.

Besides, monetary shock, the role of government expenditure on volatility has featured prominently in empirical papers. In particular, Edwards (1989), Frenkel and Mussa (1995) have noted that incessant growth in public spending causes an appreciation of the real exchange rate. Also, Insah and Chiarah (2013) investigates the sources of the volatile exchange rate using Ghana as a case study and found government expenditure to be directly related to exchange rate volatility. External debts and domestic public debts were however negatively related to volatility as well as the latter's four period lag. This means that incessant increase in public spending will exacerbate

volatility while a rise in public debts will arguably lower volatility. The level of public spending affects real exchange fluctuations because of the apportionment of public expenditures between non-tradeable and tradable goods. The impact of public spending on volatility rest on the BalassaSamuelson theory which says that, the supply side of the economy completely determines the real exchange rate. Ajao and Igbekoyi (2013), relying on an error correction model, also found volatility to be driven mainly by government expenditure, trade openness, movements in interest rate as well as a lag of the exchange rate in the Nigerian economy. The forgone discussion shows that extant studies have found real shocks, supply shocks, monetary shocks, government expenditure, inflation, and previous volatility of the exchange as important drivers of real exchange rate volatility in their models.

In recent times, literature on the factors driving exchange rate changes is still trending. As (Alagidede and Ibrahim, 2016) indicate, Literature on the sources of the real exchange rate volatility is inconclusive. Consistent with this, economist at different times, in different places faced with different challenges have hypothesized different factors to have an influence on both nominal and real exchange rates variability in empirical literature. Bleaney and Francisco (2016) indicates that exchange fluctuations rises with country size and inflation rate and is particularly more of a concern in developing countries than developed countries. This implies that both inflation and country size are positively related to volatility. Devereux and Lane (2003) in their examination of the nominal exchange rate over 1995 – 2000 period, find exchange rate volatility to be inversely related to external debt, financial market depth, trade openness and business cycle asymmetry. They maintain that real exchange rate tends to be volatile and more of a concern in sub-Saharan Africa than their model predicts. This is probably so on account of the rather weak

economic fundamentals that characterized many SSA economies (MacDonald and Nagayasu, 1999).

Also, (Bleaney, 1996; Gonzaga and Terra, 1997 as cited in Bleaney and Francisko, 2016) found periods of high inflation to be associated with exceptionally high real exchange rate fluctuations. The implication is that inflation is positively related to exchange rate volatility. Policymakers should work on reducing inflation in order to lower volatility. In more recent study, Alagidede and Ibrahim (2016) demonstrate that whereas volatility characterizing the exchange rate are mean reverting, misalignments tend to correct very slowly, which adversely affects economic agents as they have to readjust their consumption and investment decisions. They further posit that approximately 75 per cent of the shocks to the real exchange rate are own-driven, and the rest of the shock is accounted for by public spending, growth of money supply, output and real shock (or terms of trade volatility).

2.10 Summary of literature and research gaps

In conclusion, Literature on financial development is diverse but what seem to be missing particularly in the case of sub-Saharan Africa is the absence of a study that integrate the three dominant theories in explaining the level of finance. Many of the literature have focused on single country studies. But as Issahaku et al., (2016) noted single country studies although they allow us to understand the peculiar cases of particular countries, they do not allow for wider application of the knowledge they create. This presents huge space for engagement regarding the drivers of the level of financial development in SSA. Similarly, many studies have empirically tested the impact of exchange rate and its instability on the performance of the financial market but with mixed

results. Studies linking financial market depth to the volatility of the exchange rate have concentrated on the stock market. However, on account of the fact that the financial system of SSA is largely bank-based, the use of capital market metrics as the sole measure of financial development could be misleading in examining the level of finance – real exchange rate volatility nexus. More so, with the exception of Devereux and Lane (2003), none of the above works have actually considered the influence of finance in their model, this presents a seeming missing link on the sources of real exchange rate fluctuations. In modern economies, we expect a developed financial market to provide useful information that reduces information asymmetry, risk, uncertainty and speculation (Hajilee and Al Nasser, 2016). Thus, guiding economic agents to make rational investment and consumption decisions, this could therefore lower volatility. Previous studies have also measured volatility based on the standard deviation, the current study utilizes the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) in estimating volatility. Largely, the literature review is link to this current contribution in a number of ways. 1) it allows us to diagnose the problem of investigation more clearly. 2) it informs the choice of the methods and the measurement of key variables, and 3) it guides us in interpreting and making intuitions that are grounded in theory.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology. In particular, section 3.2 presents the research design. Section 3.3 discusses data types and sources. Section 3.4 captures the model specifications.

3.2 Research Design

The study adopts a quantitative research design. This is justified in terms of the data, methods of analysis and the presentation and discussion of results. In particular, the use of quantitative design is informed by the fact that this study rests largely on hypothesis testing. We seek to make generalization on the impact on exchange rate volatility of financial development based on a sample of countries in SSA. This approach encapsulates counting and measuring of events as well as conducting statistical test of numerical data. The positivists believe in the existence of an objective truth in the universe which can be explained and measured scientifically. The main tenets of the quantitative tradition are that measurements should be amenable to generalization, valid and reliable in the prediction of the cause and effect.

3.3 Data types and sources

3.3.1 Data types and sources for model one

We test the hypotheses of the study by compiling a panel dataset on 17 countries in SSA for the period 1996-2015 (See Appendix 3) for the list of countries studied. The choice of the countries is informed strictly by data accessibility for a reasonable period of time. Annual data for the variables were put together from the World Bank's World Development Indicators (WDI) and World Governance Indicators (WGI) bases. The study relied strictly on secondary data.

Dependent variable: Financial development

Based on standard literature, the thesis employed domestic credit to the private sector as a percentage of GDP to proxy financial development on account of the fact that this measure is a commonly used by researchers in empirical settings. More so, the financial sector of SSA is largely Bank-based thus, consistent with the suggestion of Hassan et al. (2000) the use of private credit is a more suitable measure. Also we used this measure because it represents the deployment and allocation of credit to more efficient use (Ibrahim, 2017). Data on this was drawn from WDI

Independent Variables:

Inflation

The inflation variable is the consumer price index (CPI) (Constant 2010 US\$). We used this to proxy macroeconomic (in)stability. Inflation is inversely related to financial market depth. As macroeconomic instability heightens would have a negative effect on financial market performance. Boyd et al., (2001) indicate that in periods of higher inflation, financial intermediaries fail to perform their role efficiently. In particular, asset return volatility increases with higher levels of inflation resulting in information asymmetry. High rate of inflation distorts the allocative power of prices by giving wrong signals about relative value of goods and services resulting in inefficient capital allocation by economic agents. The negative effect of inflation on capital market development is reduced when the capital market is open (Ayadi, Arbak, Naceur and Groen, 2013). Data on inflation is extracted from WDI.

Economic growth

GDP per capita (constant 2010 US\$) is used to proxy economic growth. Opinions are divided on the nexus between economic growth and financial development. Whereas some group (the demandfollowing hypothesis) argues that it is economic growth that explains the development of

the financial sector on the premise that as an economy grows, it triggers higher demand for financial services and this demand, in turn, attracts the emergence of new financial institutions and products to supply these services. Thus, least developed countries have shallow financial sectors because of limited demand for banking services. The supply-leading hypothesis contends that causality rather runs from banking sector development to economic growth since the development of the banking sector is a prerequisite for economic growth largely through its role in capital mobilization for investment. Yet others (feedback-hypothesis theorists) suggest a reverse causality between economic growth and banking sector development. The feedback theorists maintain a complementarity relationship between the two variables indicating that a developed banking sector is extremely relevant to economic growth and economic growth definitely needs a developed banking sector (Pradhana, Arvinb, Normancd and Nishigakie, 2014). Data on this variable was obtained from WDI.

Trade openness

Trade openness (TO) variable is measured as total trade (i.e. export plus import) as a percentage of GDP. Higher levels of openness are noted to spur higher levels of financial development. Rajan and Zingale (2003) have argued that in less open economies elites with government power may take control of the financial system so as to prevent market entry in order to protect their privileges. Less open economies are also known to be highly correlated with higher levels of corruption and hence, less financial development. For instance, Ades and Di Tella (1999) find corruption, as a special form of rent-seeking behaviour, to be largely a concern in economies with small trade (exports plus imports) as a share of GDP. Thus, we expect higher openness to support financial market depth. Information on trade openness is taken from WDI.

Institutional Quality

Data on the Institutional quality (INSQ) is obtained from the world governance indicators (Kaufmann et al., 2010). The institutional quality variable is an average of the six different institutional quality and governance indicators which include: rule of law (RL), regulatory quality (RQ), political stability and absence of violence (PS), control of corruption (CC), voice and accountability (VA), and government effectiveness (GE). The WDI ranks countries on a scale of 0-100, where 0 represents lowest level of institutional quality and 100 represents the highest level of institutional quality. Higher level of institutional quality is expected to exert a positive influence on financial development. In particular, Girma and Shortland (2008) report that regime stability and democracy promotes financial development.

3.3.2 Data types and sources for model two

Also based on standard exchange rate literature (Alagidede and Ibrahim, 2016), we hypothesized government expenditure (GEXP), terms of trade (TOT), output growth (OUTPUT), money supply (MS), foreign direct investment (FDI), inflation volatility (our measure of monetary shock), and terms of trade volatility (our measure of real shock) to have an effect on the volatility of real effective exchange rate (RERV). We include private credit (a measure of financial development) to find out if the level of finance could also influence the volatility of the exchange rate.

In addition, in order to test if the measurement of financial development matters in the financial development – real exchange rate volatility nexus, we include domestic credit provided by the financial system as a percentage of GDP (DOMCR) and Broad money supply as a percentage of GDP (MS). Information on these variables were gleaned from the WDI of the WB.

Government Expenditure (GEXP)

We used government expenditure (GEXP) as a proxy for final government consumption expenditure expressed as a percentage of GDP to represent government size. Data on this variable is obtained from WDI. We expect a positive relationship between government expenditure and exchange rate volatility.

Foreign Direct Investment (FDI)

Foreign direct investment (inflows) is expressed as a percentage of GDP and used to proxy each country's integration with the international financial system. Data on FDI is obtained from WDI. We expect a positive relationship between the volatility of the exchange rate and FDI. We expect the coefficient of FDI to be positively signed to suggest that integration into international financial market worsens exchange rate volatility.

Real Exchange rate

Real effective exchange rate (REER) which is the weighted average of a country's currency relative to basket of other major currencies adjusted for the effects of inflation is used to proxy the real exchange rate. Data on REER is extracted from WDI. We used information on REER to estimate the volatility of REER.

Terms of Trade (TOT)

The terms of trade variable is the net barter terms of trade index which is estimated as the percentage ratio of the export unit value indexes to the import unit value indexes, using year 2010 as a reference. Data on this variable was taken from WDI. We expect the coefficient of terms of trade to be negative implying that an improvement in the terms of trade position will lower volatility.

while a deteriorating terms of trade position worsens exchange rate uncertainty. Data on this variable was obtained from WDI.

Real exchange rate volatility (RERV)

RERV which is the volatility measure of REER is constructed via the generalized autoregressive conditional heteroscedasticity (GARCH 1,1) using data on the REER. RERV is the dependent variable in model two.

Financial development (FinDev)

We use the credit to private sector as a percentage of GDP to proxy financial development. We also employ the domestic credit provided by the financial system as a percentage of GDP and Broad money supply as a percentage of GDP to test the sensitivity of financial development – exchange rate volatility nexus to measurement of financial development. We expect the coefficient of financial development to be negatively signed on account of the fact that further development of the financial sector is expected to dampen exchange rate volatility through its effects on reducing information asymmetry, risk, uncertainty and speculation and provides economic agents with access to more financial resources without a noticeable change in exchange rates and asset prices (Hajilee and Al Nasser, 2016). Financial development is our variable of interest in model two. Data on FinDev were obtained from WDI.

Inflation (INF)

Inflation (our measure of macroeconomic in(stability) as measured by consumer prices (annual percentage) is positively related to the volatility of the real exchange rate. The intuition is that higher rates of inflation increases exchange rate volatility. This logic rest on the fact that higher inflation tends to amplify uncertainty and speculation in the foreign exchange market. Data on inflation are extracted from WDI.

Real Shock (TOTS) and monetary shock (INFS)

We measured real shock and monetary shock using terms of trade and inflation as proxies following Beck et al. (2006) and Ibrahim (2017). We also employ GARCH (1,1) to estimate the volatility measures of terms of trade (real shock) and inflation (monetary shock).

Transmission channels

In addition, we construct our transmission channels by including the multiplicative interaction terms of private credit (PC) (our measure of financial development) with output (LNPCOUT) and inflation (LNPCINF).

3.4 Model Specification

3.4.1 Empirical model of real exchange rate volatility

Several empirical studies (Hajilee and Al Nasser, 2017; Gadanecz and Mhrotra, 2013; BahamaniOskooee and Hajilee, 2010) have estimated exchange rate volatility using standard deviation, however, according to Alagidede and Ibrahim (2016) this way of measuring volatility is limited because of two reasons: First, it imposes the assumption of normality around the distribution of the real exchange rate. Second, it fails to capture historical data of the exchange

rate. Therefore, following Alagidede and Ibrahim (2016) the empirical model for the GARCH model will be

specified as:

$$LnRERV_t = \alpha_1 + \beta LnRER_{t-1} + \mu_t \quad (3.1)$$

$$\mu/\Omega_t \sim iidN(0, h_t)$$

$$h_t = \gamma_0 + \delta \mu_{t-1}^2 + \phi h_{t-1} \quad (3.2)$$

Where $\gamma_0 > 0$, $\delta \geq 0$ and $\phi \geq 0$

Therefore, the conditional variance h_t captures the (γ_0), information about the prior volatility, μ_{t-1}^2 (ARCH term) and the previous forecast error variance, h_{t-1} (GARCH term). Thus, our GARCH model permits the disturbance term to have a dynamic variance conditional on the historical behavior of the series hence, reflecting the actual volatilities as perceived by economic agents.

3.4.1 Model one (1): Analysis of drivers of financial development

As discussed in the conceptual framework, we anticipate endogeneity and reverse causality between the endogenous variables (financial development, trade openness and culture). To deal with this endogeneity bias and to ensure that our estimates are consistent, we employ the generalized methods of moments (hereafter GMM) in our analysis. The random-effects and fixed effects models are able to deal with unobserved heterogeneity but fail to solve endogeneity bias caused by simultaneity and dynamic endogeneity and are thus referred to us static models.

However, GMM is superior to static models in dealing with the problem of endogeneity in dynamic panel data by dealing with the three causes of endogeneity: i). Unobserved heterogeneity; ii). Simultaneity and iii). Dynamic endogeneity (Ullah, Akhtar and Zaefarian, 2018). Arellano and Bond (1991) and Blundell and Bond (1998) developed the GMM model, which can be used for dynamic panel data. The cause and effect relationship in dynamic panel data for underlying phenomena normally changes over time. Thus, the GMM model is said to provide consistent results in the face of the different sources of endogeneity referred earlier (Wintoki, Linck, and Netter, 2012). The GMM eliminates endogeneity by internally processing the data. The GMM is also associated with two methods of estimation: i) the first-difference transformation; and ii) the second order transformation (system GMM). This study uses the system GMM in order to guarantee that data will not be lost as a result of the internal transformation of the data that is associated with difference GMM. Following Ibrahim (2017), we specify the empirical model as:

$$FD_{it} = f(Z_{it}, TO_{it}, INSQ_{it}, INF_{it}, OUTPUT_{it}, FD_{it-1}) \quad (3.3)$$

$$FD_{it} = \omega + FD_{it-1} + \phi TO_{it} + \gamma INSQ_{it} + \delta OUTPUT_{it} + \varphi INF_{it} + \gamma_{it} + \mu_{it} + \varepsilon_{it} \quad (3.4)$$

Where FD_{it} and FD_{it-1} represent financial development and its one period lag respectively.

TO_{it} denotes trade openness; $INSQ_{it}$ represents a vector of institutional quality variables;

$OUTPUT_{it}$ stands for economic growth and φINF_{it} signifies our inflation (our measure of

macroeconomic (in)stability). γ_{it} is country-specific fixed effects; μ_{it} is time effects while ε_{it}

is the error term. i and t respectively denote country and time indices. We specify our general

GMM model as:

$$FD_{it} = \sum_{k=1}^{\rho} \tau FD_{it-k} + \varphi_1 TO_{it} + \varphi_2 INS_{it} + \varphi_3 OUTPUT_{it} + \varphi_4 INF_{it} + \epsilon_{it} \quad (3.5)$$

$$t = \rho + 1, \dots, T; i = 1, 2, \dots, N$$

$$\epsilon_{it} = \gamma_i + \mu_i + \varepsilon_i$$

where φ_1 through to φ_4 are the parameters associated with each independent variable while ρ is the maximum lag in the model.

Estimating equation (3.5) above requires the error term to be uncorrelated with the explanatory variables and can be written by allowing an arbitrary time period T for a random country i as:

$$\gamma_i = W_i \xi + \lambda_i \gamma_i + \epsilon_{it} \quad (3.6)$$

Where ξ is a vector of τ 's and φ 's; W_i is a vector containing the lagged financial development components and all the explanatory variables while λ_i is a $T \times 1$ vectors of unity.

The robustness of GMM estimates rests on the instruments validity. We employ the Sargan tests for over-identifying restriction and the serial correlation test to evaluate the consistency of our estimates.

3.4.2 Model two (2): Analysis of effect of financial development on exchange rate volatility in SSA

To estimate the effect of financial development on exchange rate volatility, this study makes use of the SYS-GMM. We use this in the light of the seeming lack of clarity on direction of causality and potential reverse causality in the finance-exchange rate volatility nexus. The GMM is well

known to deal with problems of endogeneity. Following Ibrahim (2017), we begin the estimation by first of all estimating equation 3.9 in a general form.

$$RERV_{it} = f(FD_{it}, CON_{it}, TRAN_{it}) \quad (3.7)$$

$$RERV_{it} = \phi_0 RERV_{it-1} + \phi_1 FD_{it} + \phi_2 CON_{it} + \phi_3 TRAN_{it} + \gamma_{it} + \mu_{it} + \epsilon_{it} \quad (3.8)$$

Where $RERV_{it}$ and $RERV_{it-1}$ represent the volatility component of real exchange rate and its one period lag respectively; FD_{it} remains as before; CON_{it} is a vector of control variables where as $TRAN_{it}$ denotes a vector of transmission variables constructed by interacting financial development with terms of trade and inflation. While γ_{it} ; μ_{it} and ϵ_{it} remain as defined earlier.

We estimate equation (3.8) above by employing the system GMM dynamic pooled estimator. Thus we specify our general GMM framework as:

$$RERV_{it} = \sum_{k=1}^{\rho} \tau_k RERV_{it-k} + \phi_1 FD_{it} + \phi_2 CON_{it} + \phi_3 TRAN_{it} + \epsilon_{it} \quad (3.9)$$

$$t = \rho + 1, \dots, T; i = 1, 2, \dots, N$$

$$\epsilon_{it} = \gamma_i + \mu_i + \epsilon_{it}$$

where ϕ_1 through to ϕ_3 are the parameters associated with each explanatory variable while ρ is the maximum lag in the model.

Estimating equation (3.9) above requires the error term to be uncorrelated with the explanatory variables and can be written by allowing an arbitrary time period T for a random country i as:

$$\gamma_i = W_i \xi + \lambda_i \gamma_i + \epsilon_{it} \quad (3.10)$$

Where ξ is a vector of $\tau's$ and $\phi's$; W_i is a vector containing the lagged exchange rate volatility components and all the explanatory variables while λ_i is a $T \times 1$ vectors of unity.

Again, as indicated earlier, we check the robustness of the GMM estimates relying on Sargan test for over - identifying restrictions to ensure that our instruments are valid and the serial correlation.

3.4.3 Examining threshold effect in the finance – exchange rate volatility nexus

In examining the threshold effect in the finance – real exchange rate volatility nexus, we reestimate equation 3.9 by including the square term of private credit (our measure of financial development) in our model. If the sign of the coefficient of financial development and its square term are different, we fail to reject our null hypothesis of no linear relationship between the level of finance and the volatility of the exchange rate and proceed to estimate a threshold value. However, if after our estimation the two coefficients fail to change sign, we reject the null hypothesis stated earlier in chapter one, and conclude that there is a linear relationship between the two. In other words, there is no threshold effect in the relationship. The estimation here is done at two levels: 1) we estimate a baseline model by regressing exchange rate volatility on financial development and other control variables; 2) we re-estimate the model by including the square of financial development to our baseline model.

3.4.4 Analyzing the effect of financial development on exchange volatility: Does the measure of financial development matter?

Here, we do the analysis by substituting various proxies of financial development (private credit as a percentage of GDP, domestic credit as a percentage of GDP and broad money supply as a percentage of GDP) in turns in to our model two and estimating the model in each case. The results

of the estimates with the three proxies are then compared to find out if the results are different in terms of direction of effect (sign). If the sign of the coefficient of financial development changes after our estimation with each proxy, then we reject our null hypothesis and conclude that the level of finance-exchange rate nexus is sensitive to the measure of financial development, otherwise, we fail to reject the null hypothesis in which case we conclude that the twin-nexus is insensitive to the measurement of financial depth.



CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter of the report presents and discusses the results of the study. The chapter tested the research hypotheses in the order in which they were presented in chapter one. First, it estimates the drivers of financial development in SSA. Secondly, it establishes the effect of financial development on exchange rate volatility in SSA relying on panel data on 14 countries from 1980 - 2015. It also examines nonlinearities in the finance-exchange rate volatility nexus. Finally, it determines the sensitivity of the measurement of financial development in the finance-volatility nexus.

4.2 Descriptive Statistics

4.2.1 Summary statistics for model one

In order to familiarize ourselves with the trends in the data and the kind of estimations and diagnosis to perform, we first present in Table 4.1 the summary statistics of our variables. The mean of private credit is 16.26 relative to its standard deviation (31.44) thus showing some degree of absolute variability. The value of the skewness implies that financial development proxied by the percentage of private credit to GDP is positively skewed. The value of the skewness and kurtosis indicate that financial development is not normally distributed and therefore leptokurtic. We employ the Jarque-Bera (hereafter J-B) test to formally test for normality. Based on results from Table 4.1, we report high J-B test statistics for all our variables under consideration thus denying the null hypothesis of normal distribution in these series. With regards to skewness, all our variables are rightly skewed with the exception of only political stability (PS) variable which

is skewed to the left. The mean value of our Institutional quality (INSQ) indicator is 27.86 showing the relatively weak institutions in SSA. Its standard deviation of 16.35 shows high degree of volatility. Also, the mean value of trade openness (79.08) is indicative of the high trade intensity index of most countries of SSA in the sample.

Table 4.1: Summary Statistics for model one

Variable	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	CV
OUTPUT	2387.45	20172.31	205.07	3917.01	2.48	8.73	814.83 [0.00]	1.64
INF	18.08	513.91	-35.84	49.52	7.28	64.67	56884.84 [0.00]	2.74
INSQ	27.86	64.41	2.46	16.35	0.45	2.16	21.49 [0.00]	0.59
DOMCR	16.26	78.29	0.15	17.64	2.19	6.80	476.73 [0.00]	1.09
PC	20.91	160.12	0.20	31.44	3.12	11.97	1691.09 [0.00]	1.50
TO	79.08	531.74	20.96	62.45	3.80	22.25	6068.78 [0.00]	0.79
VA	28.07	73.00	0.48	18.00	0.65	2.70	25.00 [0.00]	0.64
PS	30.79	74.07	0.00	20.33	-0.06	1.76	22.06 [0.00]	0.66
CC	26.73	76.34	0.00	18.74	0.77	2.66	35.50 [0.00]	0.70
RQ	28.95	75.00	0.52	17.30	0.53	2.55	18.60 [0.00]	0.60
GE	24.64	83.06	0.95	19.78	0.82	2.82	38.36 [0.00]	0.80
RL	28.00	64.42	0.94	18.43	0.27	1.60	31.81 [0.00]	0.66

Note: figures in parenthesis are probabilities. CV is coefficient of variation. All variables remained as were defined at the methodology section

Source: Author's construction, 2018 based on WDI

The output variable records an average per capita income value of \$2387.45 showing the low per capita income levels of countries in SSA. In order to do a relative comparison of volatility in our data series, we calculate the coefficient of Variation (CV) as the standard deviation divided by the

mean. From Table 3.1, inflation and output show a higher degree of relative volatility, with the former being more volatile than the latter. While institutional quality (INSQ) appears as the least volatile in our series.

4.2.2 Summary Statistics for model two

All the variables presented in Table 4.2 are averaged over the study period (1980 – 2015) and presented in percentages. The mean value of real effective exchange rate is 155.55 relative to its standard deviation 236.03, implying some degree of variability. The value of its skewness (10.12) and kurtosis (124.79) indicate that real effective exchange rate is skewed to the right and nonnormally distributed, respectively.

The J-B test statistics show that all the series are not normally distributed on account of our complete rejection of the null hypothesis of normality on these series. The values of the skewness tell us that all the variables are positively skewed. The coefficient of variation (CV) which is a measure of relative variability shows that Real effective exchange rate volatility (RERV), Foreign Direct Investment and portfolio inflows (FDI), and Inflation volatility are the most volatile variables in the sample whereas the least fluctuating variables are the square term of broad money supply (LMSSQ) and the interactive term of private credit with output (LNPCOUT).

The proxies for our financial development i.e. private credit, domestic credit and broad money supply as percentage of GDP record a mean value of 16.75, 29.27 and 26.06 respectively. This imply that average financial development in SSA over the sample period when we use private

credit as percentage of GDP is as low as 16.75 thus confirming the rather low development of the financial sector in the region. Average FDI in SSA over the period under review record as low as 3.45 per cent of GDP relative to government expenditure our proxy for final government consumption expenditure expressed as a percentage of GDP (our measure of government size) which is 84.75 per cent.

Table 4.2: Summary Statistics for model two (2)

Variable	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	JarqueBera	CV
REEV	29723.58	6854195.00	0.01	350786.80	16.26	300.64	1822852.00 [0.00]	11.80
OUTPUT	2414.90	20172.31	205.07	3803.31	2.32	7.89	925.02 [0.00]	1.57
PC	16.75	78.29	1.54	14.52	2.19	7.86	869.76 [0.00]	0.87
DOMCR	29.27	192.66	-25.93	34.96	2.91	12.25	2427.92 [0.00]	1.19
MS	26.06	80.80	5.74	13.69	1.48	5.16	272.49 [0.00]	0.53
TOT	131.54	357.58	21.40	56.29	1.21	4.53	166.86 [0.00]	0.43
GEXP	84.75	225.68	-18.00	34.94	0.02	5.03	83.98 [0.00]	0.41
FDI	3.45	161.82	-8.59	10.41	9.79	127.62	323579.60 [0.00]	3.02
INF	11.38	160.98	-17.64	17.78	4.52	30.94	17527.59 [0.00]	1.56
LNPCOUT	17.96	38.84	2.84	7.10	0.89	3.93	81.53 [0.00]	0.40
LNPCINF	25.13	193.09	-64.28	29.28	2.18	10.71	1597.02 [0.00]	1.17
DOMCRSQ	2076.73	37117.93	0.00	5957.94	4.33	21.45	8446.98 [0.00]	2.87
LMSSQ	10.09	19.29	3.05	3.11	0.60	3.11	29.18 [0.00]	0.31
LNPCSQ	6.98	19.01	0.19	3.92	0.95	3.87	88.99 [0.00]	0.56
MSG	19.62	174.43	-51.99	20.47	1.92	13.67	2613.85 [0.00]	1.04
RE	155.55	3657.31	49.74	236.03	10.12	124.79	320109 [0.00]	1.52

TOTS	129.45	357.58	21.40	55.47	1.23	4.71	182.85 [0.00]	0.43
INFS	1402.86	160690.3	3.23E-05	12009.60	10.96641	129.1428	334691.5 [0.00]	8.56

Source: Author's construct, 2018 based on WDI

This demonstrate the rather high involvement of government in economic activities across the sample of SSA countries. Whereas government size matters, the quality of government expenditure is extremely important than the size of government expenditure (Ibrahim, 2017).

4.3 Correlation coefficients

Appendices II presents the correlation matrices for the real effective exchange rate volatility and other variables including private credit, inflation, government expenditure, terms of trade, terms of trade volatility, inflation volatility, broad money, domestic credit, the square terms of private credit, domestic credit and broad money as well as the multiplicative interactive term of financial development with output and inflation. The results show a negative association between real exchange rate volatility and all other variables except inflation, government expenditure inflation volatility and the multiplicative interactive term of private credit and inflation. As expected, we found a strong positive correlation between private credit (PC), domestic credit (DOMCR) and broad money supply (MS). We also found private credit to be strongly positively correlated with its square term and the interactive term of private credit and output. Correlation between inflation and the multiplicative interactive term of private credit and inflation is very strong.

4.4 Analysis of regression results: model I and II

This section presents the regression results for the various models estimated.

4.4.1 Analysis of the drivers of financial development in SSA

Our diagnosis results presented in Table 4.4 shows that our model is well specified and our instruments are valid. The Sargan test in particular, indicates that our model is valid and our instruments are correctly specified. The serial correlation test thus, AR (1) indicates the absence of first order correlations on account of our failure to deny the research hypothesis in this case. However, the null hypothesis of the second order serial correlation was rejected, indicating the presence of second order autocorrelation. The p-value of Wald chi-square shows that all the models estimated as reported in Table 4.3 are significant at 1 per cent.

Table 4.3: Results of system dynamic panel GMM estimation, dependent variable: Financial Development

VARIABLES	(1)	(2)
First Lag of Financial Development	-0.0901** (0.0453)	-0.0378 (0.0694)
Output	0.00130*** (0.000165)	0.00180*** (0.000577)
Inflation (INF)	-0.0759** (0.0372)	-0.0685 (0.0457)
Trade Openness(TO)	0.0597*** (0.0156)	0.0326 (0.0244)
Voice and Accountability(VA)		-0.163* (0.0896)
Political Stability (PS)		-0.442*** (0.124)
Government Effectiveness (GE)		-0.388** (0.194)
Regulatory Quality(RQ)		1.234*** (0.259)
Control of Corruption(CC)		0.924*** (0.166)
Rule of law(RL)		0.704*** (0.259)
Second Lag of financial development	-0.277*** (0.0371)	-0.332*** (0.0704)
Institutional Quality(INSQ)	0.387*** (0.0989)	
Constant	14.60*** (2.659)	3.293 (4.783)

Diagnostics:

Observations	300	300
Number of countries	17	17
AR(1) z-value [p-value]	-3.8031[0.0001]	-3.6851[0.0002]
AR(2) z-value [p-value]	3.0161[0.0026]	1.6283[0.1035]
Sargan chi-square [p-value]	19.988[0.280]	18.68593[0.209]
Wald chi-square [p-value]	232.11[0.0000]	1702[0.0000]
Number of instruments	139	144

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1 Source:

Author's construct, 2018

From Table 4.3, the coefficient of real GDP per capita which is used to proxy for economic growth is positive in both column 1 and 2, which is consistent with economic theory. Thus other things being equal, an increase in real GDP per capita by \$1.00 will increase domestic credit to the private sector by 0.0013 per cent. The influence of real GDP per capita on financial development has been found to be statistically significant at 1 per cent conventional level. Thus we reject the null hypothesis of no effect of economic growth on financial development at 1 per cent. This result supports the postulate of the demand-following hypothesis which argues that economic growth triggers higher demand for financial services which, intend attracts the emergence of new financial institutions and products to supply these services. In particular, Hassan et al. (2011) find a unidirectional causality in the finance-growth nexus in developing countries, with causality running from growth to finance on account of higher demand for financial services. Hence, we envisage higher economic growth in SSA to elicit higher demand for financial services leading to higher financial development. Thus, higher per capita income should trigger higher financial development in SSA.

Based on model 1 in Table 4.3 we regress an aggregate measure of institutional quality on financial development using SYS- GMM. The coefficient of institutional quality is positive and significant at 1 per cent. The results suggest that higher institutional quality is found to be associated with higher level of financial development. This suggest that we reject the null hypothesis of no effect of institutional quality on the depth of finance at 1 per cent. This finding collaborates the results of Huang (2010) who found institutional quality as a determinant of financial development. Thus, the results concur with the popular held notion that better institutions are correlated with better financial intermediary development. However, Mlachila et al. (2016) results indicate only a moderate role of institutional quality on financial development. Consistent with Huang (2010), Toroyan, & Anayiotos, (2009) show that institutional factors matter for financial depth and access to financial services in SSA.

In column 2 of Table 4.3, we disaggregate the measure of institutional quality into its component parts to find out the unique effect of each institutional quality variable on financial development. Again contrary to the findings of Mlachila et al. (2016) who suggest only legal framework (in particular, protecting minority shareholders' interests, and strengthening judicial independence and investor protection) and corporate governance indicators to matter in financial development than other institutions in SSA, our results indicate that all six institutional quality variables in the model including voice and accountability, political stability, government effectiveness, regulatory quality, control of corruption, and rule of law all matter in financial development. Among these components, voice and accountability as well as government effectiveness affect financial market development at 10 per cent and 5 per cent levels, respectively. The rest influence the level of

finance at 1 per cent level. In particular, higher level of political instability is noted for lower level of financial development and political stability (strong institution) does the opposite. The intuition is that, in periods of political instability investors are discouraged from investing in long-term projects and short-term projects rather get funded. Under these circumstances, the demand for sophisticated finance may not emerge and this could result in financial underdevelopment. This finding is in sync with the results of Gries and Meierrieks (2010) who find political stability as a key driver of financial market depth in SSA.

Similarly, consistent with conventional wisdom, higher regulatory quality is associated with higher level of financial expansion. “Regulatory quality reflects perceptions of the ability of the government to formulate and implement policies and regulations that permit and promotes private sector development” (Kaufmann et al., 2010: 1). Based on column 2 of Table 4.3, the effect of regulatory quality (RQ) on financial intermediary activities is positively signed and significant at 1 per cent. Hence, better promulgation and implementation of policies and regulations will boost financial intermediation in SSA.

Also, the rule of law variable is positively signed and significant at 1 per cent. Thus all else equal, the better the protection of property rights, the deeper the level of finance will be. Institutional theories posit that well enforced property rights, in particular, the right of property owners to gain returns from their investment provides an important safety net where transactions do not take place immediately. Borrowers will not get access to credit if investors entertain fear of default and expropriation of their capital. Property rights protection through rule of law thus forms the bedrock of financial development. Mlachila, Park, and Yabara (2013) indicate that weak judicial system is

a hindrance to banking system's development in sub-Saharan Africa. Similarly, the more effective the control of corruption, the deeper financial markets become. From Table 4.3, the coefficient of the control of corruption indicator is positive and significant at 1 per cent. Without control of corruption, state officials such as judges, bureaucrats and politicians who are given discretionary power to work on behalf of the state could use their authority as an avenue to engage in rent seeking behavior and corruption by infringing upon the property rights of others in order to profit from rents accruing to financial transactions. Weak legal frameworks and high levels of corruption may be associated with weak property rights protection and therefore lower levels of financial development.

The coefficient of trade openness is positive and statistically significant determinant of financial development in column 1. Trade openness affects finance at 1 per cent level of significance in column 1 of Table 4.3. So we reject the null hypothesis at 1 per cent. This implies that the more SSA countries open their economies to trade in goods and services, the more competitive and deeper their financial markets become. However, this was not robust as it fails to be significant in column 2 when we disaggregate institutional quality into its component parts. This finding is consistent with theory, for instance, Bertola and Prete (2013) postulate that in more open economies, government may be constrained to finance and enforce public policies that substitute private financial transactions and hence, there is a higher tendency towards deregulating financial markets.

More so, in a closed economy incumbents profit from financial underdevelopment because it guarantees their rents from privileged market positions. However, in the face of economic integration incumbents need access to external finance and financial instruments to hedge against risks that are associated with economic openness. In this regard, they are attracted towards supporting financial market development (Rajan and Zingales, 2003). The significantly positively signed relationship between openness and financial market depth is also consistent with recent empirical work by Huang (2010) who consistent with conventional wisdom, found trade openness as a booster to financial intermediary development.

Inflation which is our proxy measure for macroeconomic (in)stability has been hypothesized to have a negative effect on financial development. From our empirical results in Table 4.3 the sign of inflation is consistent with our theoretical expectation. Indicating that the higher the levels of inflation (macroeconomic instability) the less the development of the financial market. The logic as noted by Boyd et al., (2001) is that in periods of higher inflation, financial intermediaries fail to perform their role efficiently. In particular, asset return volatility increases with higher levels of inflation resulting in information asymmetry. Also, as inflation increases, the purchasing power of money decreases as a result, people lose confidence in money as a store of value. Therefore, they invest in real assets rather than financial assets. Consequently, the demand for financial services decreases leading to a reduction in financial development. Thus, we expect higher episodes of inflation rates in SSA economies to result in a reduction of financial market depth. In model 2 and 3 the influence of macroeconomic instability on financial development is significant at 5 per cent and 1 per cent respectively but insignificant in model 3.

Last but not the least, the first lag of financial development (i.e. previous level of financial development) has been found to be a significant driver of the level of finance in SSA. In particular, the second lag of financial development is found from our empirical estimation to be statistically significant at 1 per cent in models 1 and 2. However, the effect of the first lag of financial development in determining current level of finance is significant at 5 per cent in only model 1. The implication of this result is that financial development is partly self-driven.

4.4.2 Analysis of the effect of financial development on real exchange rate volatility in SSA

To investigate the effect of financial development on real exchange rate volatility in Sub-Saharan Africa, we estimate our model specified earlier using the SYS-GMM. Our empirical results are reported in Table 4.4. As indicated earlier, the validity of our estimated models depend on the validity of our instruments. The test for over-identifying restrictions confirms the validity of the instruments for all models. This follows our failure to reject the null hypothesis of the Sargan tests. The p-value of Wald chi-square shows that all the models estimated as reported in Table 4.4 are significant at 1 per cent. The serial correlation tests thus, AR (1) and AR (2) indicate the absence of first order and second order correlations on account of our failure to reject the null hypothesis in both cases.

In the baseline model presented in column one (1), we hypothesized previous volatility of the exchange rate ($LNRERV_{t-1}$), inflation, foreign direct investment, economic growth, financial development, government expenditure and terms of trade, to drive real exchange rate volatility in SSA. The econometric results as presented in column one (1) indicate that only foreign direct investment, financial development and terms of trade were significant at various levels.

Our estimated results in Table 4.4, show a negative relationship between terms of trade and the real exchange rate volatility. Thus, all else equal, an increase in terms of trade index by 1 per cent may reduce real exchange volatility by as much as 0.00158 per cent. On one hand, this implies that an improvement in terms of trade dampens exchange rate volatility. On the other hand, a deteriorating terms of trade position worsens exchange rate volatility. The intuition is that, better terms of trade position results in an increase in external purchasing power capacity which reduces import prices. The influence of terms of trade on exchange rate volatility is statistically significant at 5 per cent. This result is consistent with that of Alagidede and Ibrahim (2016).

In theory, we expect a direct relationship between foreign direct investment and portfolio flow (our measure of global financial market integration) and exchange rate volatility which implies that integration into international financial markets exacerbates exchange rate volatility. However, our empirical results are different from this theoretical expectation as the coefficient of foreign direct investment is negatively signed and significant at 1 per cent. In particular, all else equal a 1 percent increase in foreign direct investment and portfolio flow could reduce exchange rate volatility by 0.0450 per cent. This result remains robust irrespective of model specification (column 1 – 4). The plausible intuition for this outcome is the rather weak integration of African financial markets with the rest of the world. In particular, Alagidede (2008) finds weak stochastic trends between African markets and the rest of the world. His results suggest that African markets with the exception of South Africa, tend to react to local news rather than global information. This is not surprising given that the financial system of SSA is largely bank-based (see Hassan et al., 2000; Moyo et al., 2014; Mlachila et al., 2016). Our findings concur with the results of Elbadawi and Soto (1997) who found

foreign direct investment as significant factor responsible for long run fluctuations of the real exchange rate in developing countries. But it also differs from it on account of our rather negative relationship between foreign direct investment and exchange rate volatility.

The previous volatility ($LNRERV_{t-1}$) is also found to be directly related to current real exchange rate volatility in our sample of SSA countries over the period 1980 to 2015. From Table 4.4, the coefficient of $LNRERV_{t-1}$ is positively signed implying that previous volatility drives current volatility. Thus a 1 per cent increase in past shock to real exchange rate will increase current volatility by less than unity (0.0391) percent. However, this is not statistically significant in our model. Therefore, contrary to the findings of Alagidede and Ibrahim (2016), we do not find enough evidence to support own-driven volatility in our sample of SSA. In particular, they indicate that nearly three-quarter of exchange rate volatility in Ghana are own-driven. They added that unbridled interventions in the foreign exchange market may not only amplify the volatility but could also negatively affect output and welfare. Our estimated results also fail to agree with that of Adjao and Igbekoya (2013) who in their error correction model found exchange rate volatility to be significantly driven by its own lag.

In accordance with the standard exchange rate dynamic literature, we found output growth to be inversely related to volatility. Implying that higher output growth reduces exchange rate volatility. However, we fail to reject the null hypothesis of no effect of output growth on volatility on account of the fact that the coefficient of output was not significant at any of the conventional levels. Our finding of a negative relationship between output growth and volatility is consistent many empirical literature (see Dollar, 1992; Bosworth, Collins and Chen, 1995; Holland et al., 2011;

Eichengreen, 2008; Gadanecz and Mehrotra's, 2013). Dollar (1992) for instance, established a negative relationship between exchange rate volatility and economic growth in a study of 95 developing countries. Consistent with this, Bosworth, Collins and Chen (1995) demonstrate that real exchange rate volatility dampens growth by reducing total factor productivity.

Table 4.4: GMM results on the effect of financial development on exchange rate volatility in SSA

Variables	(1)	(2)	(3)	(4)
Lagged exchange rate volatility	0.0391 (0.0461)	0.0397 (0.0469)	0.0269 (0.0435)	0.0106 (0.0573)
Inflation	0.00459 (0.00953)	0.00605 (0.00988)	0.0312** (0.0128)	-0.0284 (0.0268)
Foreign Direct Investment	-0.0450*** (0.00962)	-0.0449*** (0.00983)	-0.0455*** (0.00946)	-0.0458*** (0.00925)
Financial Development	-0.640*** (0.115)	-0.112 (0.819)	-0.646*** (0.124)	-1.183 (0.828)
Government Expenditure	0.115 (0.387)	0.0345 (0.405)	0.157 (0.389)	0.133 (0.387)
Economic Growth	-0.155 (0.102)	-0.124 (0.102)	-0.113 (0.102)	-0.201 (0.329)
Terms of Trade	-0.00158** (0.000701)	-0.00153** (0.000711)	-0.00121* (0.000709)	-0.00120 (0.000736)
Financial Development x Output Growth				-0.0395 (0.101)
Financial Development X Inflation				0.0236* (0.0128)
Financial Development Square		-0.102 (0.142)		
Monetary Shocks			-4.19e-05** (1.88e-05)	
Real Shocks			-2.14e-05* (1.27e-05)	
Constant	8.353*** (2.396)	7.125** (3.008)	6.872*** (2.396)	8.197** (3.946)
Diagnostics:				
Observations	468	468	455	468
Number of countries	14	14	14	14

AR(1) z-value[p-value]	-3.8211[0.0001]	-3.7232[0.0002]	-3.6402[0.0003]	-3.7304[0.0002]
AR(2) z-value[p-value]	-0.90586[0.3650]	- 1.046[0.2955]	-1.1895[0.2342]	-0.79981[0.4238]
Wald chi-square[p-value]	86.85[0.0000]	193.66[0.0000]	90.44[0.0000]	117.37[0.0000]
Number of instruments	94	95	86	96
Sargan chi-square[p-value]	12.312[0.410]	15.442[0.291]	11.276[0.315]	12.900[0.421]

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Author's construct, 2018 based on WDI

Eichengreen (2008) argues that too much exchange rate volatility is noted to reduce the level of economic growth by creating business uncertainty, deteriorating competitiveness, lowering productivity and profits as well as increasing domestic prices. Gadanecz and Mehrotra's (2013) study suggests that real exchange rate volatility helps in reducing the impact of a shock as well as limiting output volatility, but they cautioned that, too much of volatility in exchange rate increases output volatility. However, the relationship between growth and volatility is not always negative as Alagidede and Ibrahim (2016) posits a U-shape relationship between growth and volatility implying that volatility could be detrimental to growth up to a certain point and turns to positively affect it.

Inflation (our measure of macroeconomic in(stability)) is positively related to real exchange rate volatility but insignificant in column 1, 2 and 4. However, in column 3 of Table 4.4, we find the coefficient of inflation to be significant at 5 per cent. The policy implication of this outcome is that high(low) rates of inflation increases(reduces) exchange rate volatility on account of heightening (lowering) uncertainty and speculation in the foreign exchange market. Our findings are in synch with previous literature. In particular, Bleaney and Francisca (2016) found exchange rate volatility

to increase with rising inflation. Also, (Bleaney, 1996; Gonzaga and Terra, 1997 as cited in Bleaney and Francisko, 2016) found periods of high inflation to be characterized by exceptionally high real exchange rate volatility. In this regard, it will be pertinent for policymakers to ensure macroeconomic stability by reducing inflation in order to lower real exchange rate volatility. Similarly, government expenditure (our proxy for government size) is directly related to exchange rate volatility however, its influence on exchange rate volatility is not statistically significant in our models (column 1-4) in Table 4.4.

From Table 4.4, the effect on real exchange rate volatility of financial development is negatively signed and significant at 1 per cent in column 1 which is our baseline model. So we reject the null hypothesis of no effect of financial development on exchange rate volatility at 1 per cent. Thus holding other drivers of volatility constant, an increase (decrease) in domestic credit to private sector as a percentage of GDP (our financial development measure) by 1 per cent will reduce (increase) real exchange rate volatility by approximately 0.640 per cent. The implication of this finding is that increasing (decreasing) the depth of the financial systems lowers (heightens) volatility in the foreign exchange market. The plausible intuition is that higher financial development lowers information asymmetric, risk, uncertainty and speculation, and provides economic agents (especially, government and private operators with access to adequate funds without a change in asset prices and exchange rates (Hajilee and Al-Nasser, 2017). Our empirical finding of an inverse nexus between finance-exchange rate volatility supports many others in the empirical literature. In particular, Hagilee and Al-Nasser, (2017) in their investigation of the financial depth-exchange rate volatility nexus involving 26 developing, emerging and developed countries, over the period 1980 to 2013, found a significant negative relationship between the exchange rate volatility and financial market depth in seven out of their sample. However, the also

found significant positive relationship in nine others. Further, using bounds testing approach they found the impact between the two variables among 20 countries in the short-run.

In column 2 of Table 4.4, we resolved the debate on the financial development – exchange rate volatility nexus by including the square term of private credit in the model. The same (nonchanging) sign of the level of private credit and its square term is evidence of a linear relationship between financial development and exchange rate volatility. The results support a negative and linear relationship between financial development and exchange rate volatility. Thus we posit the absence of threshold effect in the finance - exchange rate volatility nexus. Intuitively, this result shows that increasing development of the financial sector will continue to dampen exchange rate volatility via its effect on reducing information asymmetry, risk, uncertainty and speculation in the foreign exchange market.

In column 3 of Table 4.4, we investigate the influence of monetary shocks and real shocks in driving real exchange rate volatility consistent with the standard literature on exchange rate dynamics. We found both monetary and real shocks to be negatively related to exchange rate volatility. The influence of monetary and real shocks in explaining volatility are statistically significant at 5 per cent and 10 per cent respectively.

Finally, we examine the channels through which financial development affects exchange rate volatility by including a multiplicative interactive term of output growth and inflation. From column 4 in Table 4.4, the coefficient of the interaction of financial development and output growth

is negative but not significant at any of the conventional levels. However, in appendices 1, when we use domestic credit to private sector by the financial system as a percentage of GDP and broad money supply as a percentage of GDP as proxies for financial development, we find the coefficients of the interaction of financial development and output growth to be negative and significant at 1 per cent. This result suggests that financial development dampens exchange rate volatility by increasing output growth. Thus other things being equal, a 1 percentage increase in financial development could lower exchange rate volatility by as much as 3.95 per cent.

This channel of manifestation is consistent with the supply-leading hypothesis, which contends that financial sector development is a prerequisite for economic growth through its role in capital mobilization for investment (Pradhana, et al., 2014). In addition, from appendices 1, the coefficient of the interaction of financial development and inflation is positive and significant at 10 per cent. In contrast, when we employ domestic credit provided by the financial system as a percentage of GDP and Broad money supply as a percentage of GDP as measures of financial development, the coefficient of the interaction of financial development and inflation is still positive but insignificant. Since higher inflation has a negative effect on financial market performance, the indirect effect of financial development on volatility through inflation appears to have been overshadowed by the direct effect of inflation on volatility.

4.4.3 Analysis of threshold effect in financial development and exchange rate volatility nexus

In this section, we investigate the threshold effect of financial development on exchange rate volatility. We examine this by including the square term of financial development in column 2, 4

and 6 in Table 4.4. The same signing of the coefficients of financial development and its square terms in column 2, 4 and 6 is indicative of the absence of threshold effect in the level of finance – volatility nexus. In our baseline models (column 1, 3 and 5), the relationship between the level of financial development and exchange rate volatility is insensitive to both model specification and the measurement of financial development. In particular, whether we measure financial development in terms of domestic credit provided by financial system, private credit by banks or broad money supply as a percentage of GDP, the coefficients of financial development and its square term remains negative. Implying that further development of the financial sector will continue to drag real exchange rate volatility through its effect in reducing information asymmetry, risk, uncertainty and speculation in the foreign currency market. The coefficient of the square term of financial development is significant at 10 per cent and 1 per cent in column 2 and 6 respectively, but insignificant in column 4. The same (non-changing) sign of private credit and its square term suggest a linear relationship between financial development and exchange rate volatility. So we flatly reject the null hypothesis of no linear relationship between financial depth and real exchange rate volatility 10 per cent and 1 per cent in column 2 and 6 respectively.

Table 4.4: Threshold in financial development-exchange rate volatility nexus

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Domestic Credit		Private Credit		Broad Money Supply	
L.lnreev	0.00451 (0.0455)	0.0149 (0.0476)	0.0391 (0.0461)	0.0397 (0.0469)	0.0201 (0.0455)	0.0375 (0.0424)
Inf	0.0166 (0.0142)	0.0166 (0.0143)	0.00459 (0.00953)	0.00605 (0.00988)	0.0102 (0.00989)	0.0136 (0.00999)
Fdi	-0.0432*** (0.00954)	-0.0421*** (0.00930)	-0.0450*** (0.00962)	-0.0449*** (0.00983)	-0.0404*** (0.00817)	-0.0237*** (0.00844)
FinDev	-0.00735*** (0.00202)	-0.00257 (0.00618)	-0.640*** (0.115)	-0.112 (0.819)	-0.347*** (0.118)	-10.24*** (2.180)
Lngexp	0.0503 (0.383)	0.0471 (0.373)	-0.115 (0.387)	0.0345 (0.405)	0.168 (0.372)	0.437 (0.341)
Lnoutput	-0.200* (0.107)	-0.181* (0.100)	-0.155 (0.102)	-0.124 (0.102)	-0.288*** (0.0986)	-0.0739 (0.0982)
Lntott	-0.00123 (0.000756)	-0.00114 (0.000758)	-0.00158** (0.000701)	-0.00153** (0.000711)	-0.00119* (0.000704)	-0.00135* (0.000752)
FinDevSq		-6.21e-05* (3.40e-05)		-0.102 (0.142)		-1.666*** (0.348)
Constant	6.556*** (2.471)	6.304*** (2.350)	8.353*** (2.396)	7.125** (3.008)	8.925*** (2.294)	-11.86*** (3.656)
Diagnostics:						
Observations	453	453	468	468	468	468
Number of countries	14	14	14	14	14	14
AR(1) zvalue[p-value]	-3.2483[0.0012]	-3.2707[0.0011]	-3.8211[0.0001]	- 3.7232[0.0002]	-3.4709[0.0005]	-3.3169[0.0009]

AR(2) z-value[p-value]	-1.8239[0.0682]	-1.6965[0.0898]	-0.90586[0.3650]	-	-1.1814[0.2374]	-1.2125[0.2253]
				1.046[0.2955]		
Wald chi-square[pvalue]	123.39[0.0000]	144.52[0.0000]	86.85[0.0000]	193.66[0.000]	91.20[0.0000]	155.99[0.0000]
Number of	92	93	94	95	94	95 instruments
Sargan chi-square [pvalue]	13.122[0.24]	14.121[0.321]	12.312[0.410]	15.442[0.291]	14.412[0.301]	15.123[0.431]

Note: L. REER is the lagged exchange rate volatility. INF is inflation (our measure of macroeconomic in(stability)). FDI is foreign direct investment (our measure of global financial integration). FinDev represents financial development. LnGexp is the natural log of government final consumption expenditure (our measure of government size). Lnoutput is the natural log of output (our measure of economic growth). Lntott is the natural log of terms of trade. FinDevSq is the square term of Financial development. Robust standard errors in parentheses. ***, ** and * represents significant at 1%, 5% and 10% respectively.

Source: Author's construct, 2018 based on WDI

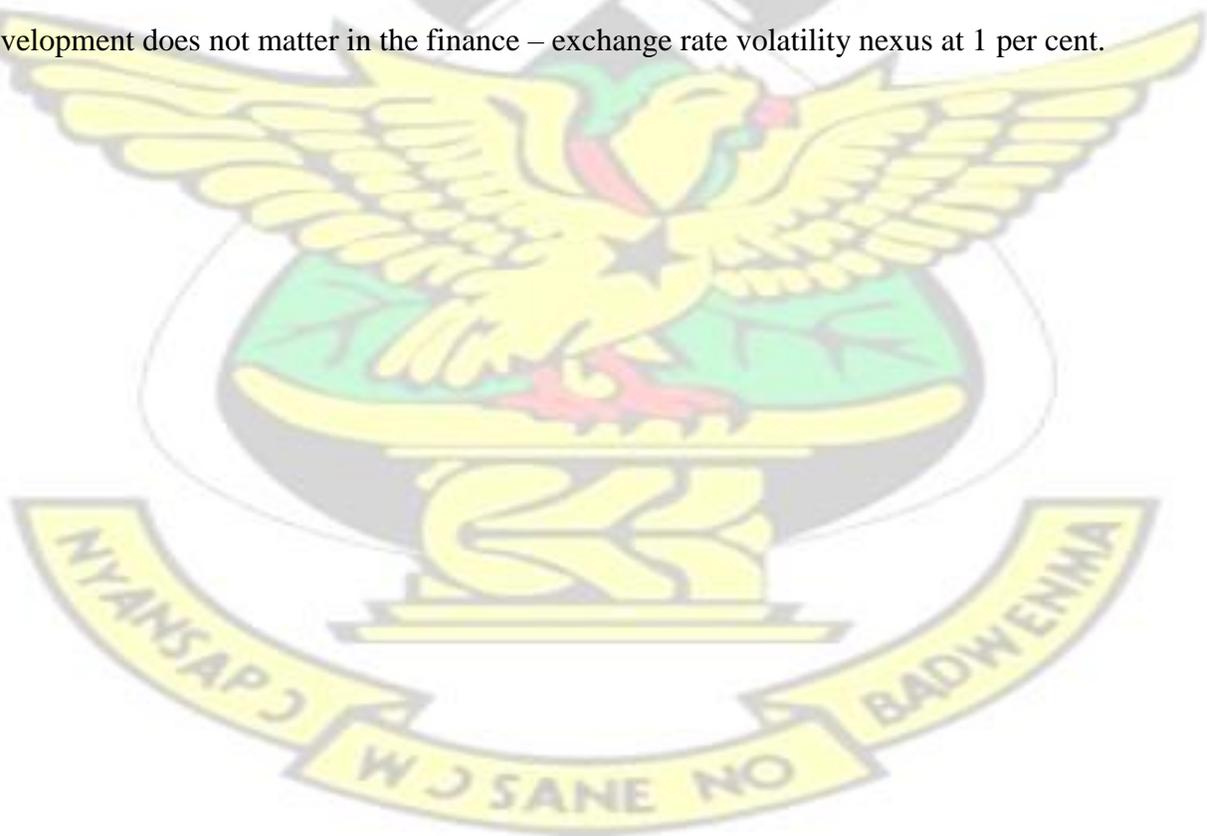


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4.4.4 Does the measurement of financial development matter in the finance-exchange rate volatility nexus?

In this section, we re-examined the finance-exchange rate volatility nexus with the aim to understand whether the measurement of the level of financial development matter. Based on evidence in appendices 1, columns 1-12, the coefficient of financial development is negative and significant at 1 per cent. The results suggest that the financial depth – exchange rate volatility nexus is insensitive to the measurement of financial development. Whether we use domestic credit provided by the financial system as a percentage of GDP, private credit provided by banks as a percentage of GDP or broad money supply as a percentage of GDP to proxy financial development. We found the relationship between the level of finance and real exchange rate volatility to be negative. Thus we fail to reject the null hypothesis which states that the measurement of financial development does not matter in the finance – exchange rate volatility nexus at 1 per cent.



CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter is subdivided into six sections. The first part is this introduction. Section 5.2 of the chapter summarizes the major findings of the thesis. Section 5.3 draws conclusions on the research. Section 5.4 proffers policy recommendations based on the findings and finally, section 5.5 suggest areas necessitating further research.

5.2 Summary

This study sets out to investigate the drivers and impact of financial development on exchange rate volatility in Sub-Saharan Africa. In particular, the study specifically seeks to achieve the following objectives: 1) To estimate the drivers of financial development in SSA over the period 1996 – 2015. 2) To analyze the effect of financial development on exchange rate volatility in SSA from 1980-2015. 3) To examine possible nonlinearities in the finance-exchange rate volatility nexus in SSA and Finally, to determine whether the measurement of financial development matter in the exchange rate volatility-financial depth nexus in SSA.

By employing the generalized methods of moments, the study estimated the drivers of financial development in a sample of 17 SSA countries over the period 1996 – 2015. The results reveal that output, trade openness, inflation, second previous level of financial development and institutional quality all matter in driving the level of finance in SSA. However, economic growth, institutional quality and the second lag of financial development may be more important than other factors. In

particular, with regards to the effect of economic growth on the level of finance, our finding supports the postulate of the demand-following hypothesis which argues that economy growth triggers higher demand for financial services which, intend attracts the emergence of new financial institutions and products to supply these services. Among the institutional quality factors, we, found political stability and absence of violence, government effectiveness, regulatory quality, control of corruption, and rule of law to matter most than voice and accountability.

Again, using system dynamic generalized methods of moments (GMM), we determined the effects of financial development on exchange rate volatility on a sample of 14 SSA countries over the period 1980 – 2015. We established a negative relationship between the depth of finance and the volatility of the real exchange rate. Other control variables that matter in driving real exchange rate volatility in SSA include; terms of trade, foreign direct investment, monetary shocks and real shocks. In addition, we explored the conduits through which finance could pass through to affect volatility and we found that the finance-output transmission channel may be more important in mediating the effect of output on volatility when the financial market becomes more developed. This channel is robust and insensitive to the measurement of financial development.

Also, we investigate threshold effect in the level of finance – real exchange rate volatility nexus in our sample of 14 SSA countries over the period 1980 – 2015. The results from our system dynamic generalized methods of moments suggest the absence of threshold effect in the financial development – real exchange rate volatility relationship. This conclusion rests on the same

(nonchanging) sign of the coefficient of financial development and its square term in all our models.

The policy implication is that further development of the financial systems in SSA will continue to dampen real exchange rate volatility via its effect on reducing information asymmetry, risk, uncertainty and speculation in the foreign exchange market.

Finally, by employing system dynamic generalized methods of moments we found that the measurement of financial development is insensitive to the level of finance – real exchange rate volatility nexus. Whether we use domestic credit provided by the financial system as a percentage of GDP, Private credit provided by banks as a percentage of GDP or broad money supply as a percentage of GDP to proxy financial development. We found the relationship between the level of finance and real exchange rate volatility to be negative.

5.3 Conclusions

On the basis of the findings, the following policy implications emerged. First, output growth, inflation, trade openness and institutions all matter in financial development in SSA. Also, the study established a linear and inverse relationship between the level of financial development and exchange rate volatility in SSA. This implies that increasing the depth of the financial system could lower volatility in the foreign exchange market as it reduces information asymmetry, risk, uncertainty and speculation, and provides economic agents with access to adequate funds without a noticeable change in asset prices and exchange rates. This relationship persists irrespective of the proxy used to measure financial development and model specification.

5.4 Recommendations

Based on the findings and conclusions made, the thesis proffers the following policy recommendations:

We recommend that policymakers in SSA should put in place measures to grow the economy and deepen the financial systems since this could reduce the volatility of the exchange rate. In particular, policymakers in SSA should continue to pursue and implement policies that will further the development of the financial sector in order to dampen real exchange rate volatility.

Also, policymakers should pursue policies that will attract more FDI and portfolio inflows into Sub-Saharan Africa. In particular, lessening political risk and economic risk as well as reducing all impediments to the movement of financial resources will be useful in attracting more FDI and portfolio inflows. Consequently, more FDI inflows into SSA will help minimize exchange rate volatility in SSA.

Moreover, since the quality of institutions is exceedingly important for financial development in SSA, governments in the region should put in concerted efforts and political will to developed the quality of institutions. In particular, emphasis should be placed on ensuring political stability, regulatory quality, control of corruption, and rule of law.

Furthermore, policymakers and governments in SSA should try to promote necessary policies such as encouraging more trade and financial liberalization among countries as this could enhance financial development and economic growth. In particular, governments should eliminate or

reduce bottlenecks to trade, promote democratic accountability to limit rent-seeking behavior among public officials.

Finally, governments in the sub-region should work at achieving and maintaining macroeconomic stability since this will promote investor confidence and boost financial development. In particular, policymakers in SSA should work at ensuring low and stable rate of inflation that is consistent with the growth of the individual economies.

5.5 Areas for further research

Based on the limitations of the study among others, future studies can look at the finance – volatility nexus relying on more countries over a longer time frame. Another obvious gap in the literature is to estimate the extent to which financial development can reduce information asymmetric, risk and speculation. Country specific level studies should be undertaken to find out the impact of financial development on exchange rate volatility.

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Appendices

Appendix 1: The impact of financial development on exchange rate volatility does the measurement of financial development matter?

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Variables	Domestic Credit as % of GDP				Private credit as % of GDP				Broad Money Supply as % of GDP			
L.Inreev	0.00451 (0.0455)	0.0149 (0.0476)	0.0651 (0.0449)	0.00856 (0.0530)	0.0391 (0.0461)	0.0397 (0.0469)	0.0269 (0.0435)	0.0106 (0.0573)	0.0201 (0.0455)	0.0375 (0.0424)	0.0430 (0.0416)	0.00423 (0.0552)
inf	0.0166 (0.0142)	0.0166 (0.0143)	0.0406*** (0.0149)	-0.0146 (0.0377)	0.00459 (0.00953)	0.00605 (0.00988)	0.0312** (0.0128)	-0.0284 (0.0268)	0.0102 (0.00989)	0.0136 (0.00999)	0.0379*** (0.0134)	-0.0207 (0.0248)
fdi	-0.0432*** (0.00954)	-0.0421*** (0.00930)	-0.0432*** (0.00929)	-0.0492*** (0.0109)	-0.0450*** (0.00962)	-0.0449*** (0.00983)	-0.0455*** (0.00946)	-0.0458*** (0.00925)	-0.0404*** (0.00817)	-0.0237*** (0.00844)	-0.0437*** (0.00827)	-0.0433*** (0.0114)
FinDev	-0.00735*** (0.00202)	-0.00257 (0.00618)	-0.00735*** (0.00213)	-0.00293 (0.00435)	-0.640*** (0.115)	-0.112 (0.819)	-0.646*** (0.124)	-1.183 (0.828)	-0.347*** (0.118)	-10.24*** (2.180)	-0.553*** (0.133)	-0.908*** (0.282)
Ingexp	0.0503 (0.383)	0.0471 (0.373)	0.259 (0.405)	0.164 (0.364)	0.115 (0.387)	0.0345 (0.405)	0.157 (0.389)	0.133 (0.387)	0.168 (0.372)	0.437 (0.341)	0.247 (0.399)	0.233 (0.363)
Inoutput	-0.200* (0.107)	-0.181* (0.100)	-0.164 (0.111)	-0.163 (0.135)	-0.155 (0.102)	-0.124 (0.102)	-0.113 (0.102)	-0.201 (0.329)	-0.288*** (0.0986)	-0.0739 (0.0982)	-0.214** (0.101)	-0.334** (0.152)
Intott	-0.00123 (0.000756)	-0.00114 (0.000758)	-0.000905 (0.000776)	-0.00123* (0.000744)	-0.00158** (0.000701)	-0.00153** (0.000711)	-0.00121* (0.000709)	-0.00120 (0.000736)	-0.00119* (0.000704)	-0.00135* (0.000752)	-0.000797 (0.000732)	-0.00149** (0.000718)
infs			-3.83e-05 (3.47e-05)					0.0395 (0.101)			-4.67e-05** (2.02e-05)	
tots			-2.29e-05 (1.41e-05)					0.0236* (0.0128)			-2.16e-05* (1.29e-05)	

Source: Author's construct, 2018 based on WDI

Appendix 2: Correlation matrix

Variable	LNREE V	LNP C	INF	FDI	LNGEX P	LNTOT T	TOT S	INF S	LNPCOU T	LNPCIN F	MS	LMSS Q	LNPCS Q	DOMC R	DOMCRS Q
LNREEV	1.00														
LNPC	-0.23	1.00													
INF	0.21	-0.28	1.00												
FDI	-0.17	-0.16	-	1.00											
			0.03												
LNGEXP	0.18	-0.06	0.07	0.13	1.00										
LNTOT	-0.09	-0.06	0.08	-	-0.41	1.00									
			0.08												
TOTS	-0.05	-0.17	0.43	-	0.03	0.14	1.00								
			0.01												
INFS	0.00	-0.16	0.49	-	0.03	0.09	0.51	1.00							
			0.02												
LNPCOU T	-0.27	0.91	-	-	-0.32	0.06	-0.15	-	1.00						
			0.25	0.11				0.14							
LNPCINF	0.14	0.01	0.85	-	0.06	0.00	0.29	0.31	0.00	1.00					
			0.05												
MS	-0.16	0.75	-	-	0.14	-0.07	-0.10	-	0.70	0.10	1.0				
			0.10	0.10				0.08			0				
LMSSQ	-0.02	0.01	-	0.00	-0.08	0.00	-0.09	-	0.02	0.01	0.0	1.00			
			0.03					0.07			1				

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LNPCSQ	-0.21	0.98	-	-	-0.05	-0.04	-0.13	-	0.93	0.03	0.7	0.00	1.00		
			0.22	0.13				0.13			9				
DOMCR	-0.11	0.64	-	-	0.03	-0.07	-0.02	-	0.69	0.13	0.7	0.02	0.75	1.00	
			0.02	0.10				0.03			1				
DOMCRS	-0.17	0.57	-	-	-0.04	-0.03	-0.03	-	0.67	0.06	0.6	0.01	0.68	0.94	1.00
Q			0.05	0.05				0.03			9				



Appendix 3: List of countries in the sample

SN	Panal 1	Panal 2
1	Ghana	Ghana
2	Nigeria	Nigeria
3	South Africa	South Africa
4	Sierra Leon	Gabon
5	Zambia	Togo
6	Cote I'dvooire	Cameroon
7	Gabon	Lesotho
8	Togo	Uganda
9	Cameroon	Central Africa Republic
10	Lesotho	Malawi
11	Congo, Democratic Republic	Burundi
12	Uganda	Gambia
13	Central African Republic	Cote d'voire
14	Malawi	Equitorial Guinea
15	Burundi	
16	Gambia	
17	Equitorial Guinea	

Source: Author's construct, 2018



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