TESTING THE FINANCE GROWTH NEXUS FOR SUB SAHARAN AFRICA: A META ANALYSIS OF THE EVIDENCE.

DECLARATION

'I, Anande Samuel Semwenda confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.'

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ABSTRACT

A large body of literature has examined the importance of financial development in ameliorating government intervention in money and credit markets. They argued that financial repression has led to inefficient allocation of resources, increased the segmentation and fragmentation of financial markets, reduced the availability of loanable funds, constrained investments, and stagnated the economy. These issues have taken force following the seminal work of McKinnon Shaw (1973), who provides the basis for analysing financial sector development and outlining policy implications in stimulating economic development. They proposed the importance of interest rate development and the elimination of all forms of financial repression in order to enhance economic growth.

A varied set of studies have seemed to reach a general consensus that financial development enhances economic growth in Sub Saharan Africa. However there have been contradictory cases as to its magnitude. Some authors have indicated the positive effects of finance growth nexus while others have concluded that financial development induces excessive risk taking, increases macroeconomic volatility and leads to financial crisis. By undertaking systematic review of the literature and by using methodical and replicable methods of synthesising the evidence through meta-analysis, this thesis has uncovered positive effect of financial development on economic growth in SSA.

By reviewing 75 empirical studies with 602 estimates to find the combined overall effect, our finding notes a positive albeit weak effect of the finance growth relationship although it confirms the presence of a positive publication bias. The effect found is smaller than what has been presented by many other studies. Moreover, the fixed and random effects revels that the models are correctly specified, however on performing robustness check, the Hausmann test indicates that Random effect model is preferred to Fixed effect model.

IMPACT STATEMENT

Financial development is a necessary tool to support economic growth. However, SSA's financial institutions and markets are lagging. They are generally underdeveloped in terms of depth, efficiency and are less diversified. Although efforts have been made to liberalise the financial markets, the fruits of development are yet to be realised in full leading to a small and shallow financial system with lower outreach and significant lower scale of financial intermediation (Mlachila et al., 2016). This has led to high cost of credit, large number of unbackable populations, proliferation of shark loans to fill in the finance gap, dampening of SME growth and consequently supressing the economy (Tyson, 2021).

To evaluate the challenges at hand and find ways to combat the concerns, this thesis has addressed and analysed the following issues. Firstly, it has empirically analysed whether financial development enhances economic growth in Sub Saharan Africa. By conducting exhaustive search using explicitly stated criteria as well as employing Multivariate Meta Regression analysis, this thesis has been able to provide an objective synthesis of findings. The outcome attained from this synthesis was that financial development enhances economic growth.

Secondly, the research conducted both empirically, theoretically, and conceptually to uncover various solutions that can be applied to enhance the development of financial systems and intermediation. To be able to increase financial inclusion, SSA countries can tap and capitalise on the mobile banking technology that can expand without the necessary traditional infrastructure to fill in the intermediary gap especially in the rural areas (Nyantakyi and Sy, 2015), expanding the outreach of Pan African Banks to unlock the regions potential and economic integration. They will not only encourage competition with local banks but step in funding infrastructure projects through syndicated loans (Chen et al., 2017).

Moreover, the conceptual analysis has noted the capital accumulation and total factor productivity as the two main finance transmission channels to enhance financial inclusion. These can be enhanced through their effect of savings and investment (Kose et al., 2008). This thesis is geared to influence various

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beneficiaries/stakeholders including SME's and the private sector of SSA, various banks both local, intercontinental, and international; African policy makers on financial and economic matters and researchers interested on the finance growth space. The output of this thesis is expected to be shared on various outlets including on articles, extracts to be shared on various platforms including blog posts, books etc.

By working with the above stakeholders, the finding of this thesis is believed to produce a positive and significant outcome. The output of this thesis on various outlet and by working with policy makers of different countries, various results are expected including Firstly, an enforcement of legal and institutions frameworks will entice the increase of number of banks which will enhance competition, low cost of credit, and increase the efficiency of bank operations. Secondly, an increase in financial inclusion especially for the unbanked by capitalising on mobile banking technology. Thirdly, to reduce the crowding out effect of the government to private sector finance.

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This work is dedicated to the memory of my beloved late father Prof S S Mushi

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LIST OF ABBREVIATION

AEO	Africa Economic Outlook
AFDB	Africa Development Bank
AFMI	Africa Financial Markets Initiative
ARDL	Autoregressive Distributed Lag
ASEA	African Securities Exchange Association
BCBS	Basel Committee on Banking Supervision
BCEAO	Banque Centrale des Etats de l'Afrique de l'Ouest
BEAC	Bank of Central African States
BRB	Banque de la République du Burundi
BRVM	Bourse Régionale des Valeurs Mobilières
BSE	Botswana Stock Exchange
BVMAC	Bourse des Valeurs Mobilières de l'Afrique Centrale
CAEO	Central Africa Economic Outlook
CAPEX	Capital Expenditure
CEMAC	Central African Economic and Monetary Union
CFA	the Franc de la Coopération Financière en Afrique
CoSSE	Committee of SADC Stock Exchanges
DFID	Department for International Development
DRC	Democratic Republic of Congo
DSX	Douala Stock Exchange
EASEA	East African Securities Exchange Association
ECM	Error correction Model
ECOWAS	Economic Community of West African States
EIB	European Investment bank
ESE	Eswatini Stock Exchange
EPPI- Centre	Evidence for Policy and Practice Information and Co-ordinating Centre
ETF	Exchange Traded Fund
FE	Fixed Exchange
FMOLS	Fully Modified OLS
FSI	Financial Soundness Indicators
FTSE	Financial Times Stock Exchange
GAX	Ghana Alternative Market
GDP	Gross Domestic Product
GMM	Generalised Method of Moments
GSE	Ghana Stock Exchange
ICT	Information and Communication Technology
IFS	International Financial System
IMF	International Monetary Fund
IPO	Initial Public Offering
JSE	Johannesburg Stock Exchange
LSEG	London Stock Exchange Group
LuSE	Lusaka Securities Exchange
MAER-NET	Meta-Analysis of Economic Research Network
MENA	Middle East and North Africa
MRA	Meta Regression Analysis
MSE	Malawi Stock Exchange
MSCI	Morgan Stanley Capital International

MSM	Maseru Securities Market
NBS	National Bureau of Statistics
NGSE	The Nigerian Stock Exchange
NSE	Nairobi Securities Exchange
NSE	Nigeria Stock Exchange
NSX	Namibian Stock Exchange
OECD	Organisation for Economic Co-operation and Development
OHADA	Organisation pour l'Harmonisation du Droit des Affaires en Afrique
PAB	Pan African Banks
REIT	Real Estate Investment Trust
RSE	Rwanda Stock Exchange
SADC	South African Development Community
SME	Small and Medium Enterprises
SSA	Sub Saharan Africa
SSE	Somali Stock Exchange
UECM	Unrestricted Error Correction Model
UEMOA	Union Économique et Monétaire Ouest Africaine
UN	United Nations
USE	Uganda Securities Exchange
VAT	Value-Added Tax
VECM	Vector Error Correction Model
WACMIC	West African Capital Markets Integration Council
WAMU	West African Monetary Union
WAMZ	West African Monetary Zone
WEF	World Economic Forum
WFE	World Federation of Exchanges
ZSE	Zimbabwe Stock Exchange

CHAPTER 1: INTRODUCTION

1.1 Introduction to the Present Study

Financial development theorem postulates the critical role of financial sector development as a necessary tool to support economic growth. It enhances the free and efficient flow of resources by intermediating between savers and agents due to its role in transforming deposits by making them available to lending agents with investment needs (Calderon and Liu, 2003). It further increases the volume of savings by discouraging firms from investing in low-yielding projects hence improving the efficiency of investment and also increasing the rate of return on money which in turn increases the quality and quantity of investments (Acemogul and Zillibotti, 1997; Serven, 2002), these intermediary services help to facilitate resource allocation, attract more savings, alleviate risks, facilitate the exchange of goods and services, produce information and allocation capital efficiently (King and Levine, 1993).

Many countries have witnessed huge strides towards reforming their financial system as part of their growth-promoting policies propagated by the World Bank and IMF; this was anticipated to lead to deeper financial markets, reduce capital accumulation constraints and enhance the efficiency of financial intermediary services and resource allocation (Levine, 2004). This policy initiative, however effective, has seen many developing economies fail to reap the benefits of financial development. More countries found that their financial markets after financial development have become less stable, experienced more fragility, and exacerbated excessive risk-taking (Kaminsky and Schmukler, 2003; Demirguc-Kunt and Detragiache, 1998).

The development of the financial sector led to both positive and negative consequences. On the one hand, it facilitated the integration with the global financial markets, leading to a more equitable and efficient allocation of resources (Galindo et al., 2007; Chari and Henry, 2008; Abiad et al., 2008) However, on the other hand, it led to output volatility, instability, and crises in the financial system (Kaminsky and Schmukler, 2003; Demirguc-Kunt and Detragiache, 1998). This raised concerns about the effectiveness and authenticity of financial development initiatives in enhancing

economic growth, leading to governments in some countries reconsidering financial market control (Stiglitz, 2000).

The inconclusiveness of results in various studies is mirrored through different macroeconomic frameworks and environments and countries facing different institutional and economic development stages (Arteta et al., 2001; La Porta et al., 1998; MacLiesh et al., 2007; Acemoglu and Johnson, 2005). Studies have used different empirical analysis, including panel data, cross-country data, time series analysis, case studies, etc (Arteta et al., 2001) However, this extensive body of evidence needed more consensus. This thesis plans to fill in the gap by analysing the economic and finance theory and available evidence by conducting an exhaustive systematic review and meta-analysis to ascertain whether financial development has enhanced economic growth in Sub-Saharan Africa.

1.2 Objectives of the study

The overall research problem being investigated is to quantitatively analyse the heterogeneous empirical literature on the finance growth nexus.

The objectives are fourfold:

- Firstly, to analyse whether financial development enhances economic growth in Sub Saharan Africa
- Secondly, to analyse the factors that affect the estimates of the relation between financial development and economic growth.
- Thirdly, to analyze the effect of publication bias in order to ascertain whether there poses an inherent selection bias towards various outcomes.
- Fourthly, to assess the quality of studies by analysing the methodological rigour of the study design
- Fifthly, this thesis will make a methodological contribution by utilising a multi-level model to analyse variance among variables at different levels of the hierarchy while simultaneously analysing the relationship within and between levels in order to differentiate studies between various authors.

1.3 Expected Contribution of the Study

Most primary studies analyzing the relationship between financial development and economic growth (Beck and Levine, 2004; Chang and Caudill, 2005; Ang, 2008; Yu et al., 2012), produce inconclusive results. These studies have shortcomings in that they cover only a tiny fraction of the available studies, they are based on the researcher's subjectivity, their results could be more conclusive and clearer, and most importantly, there is a wide variation in effect sizes. Furthermore, their estimated effects are limited for the research problem of interest by their estimation characteristics, proxy measures used, countries included, or span of data in the estimation. This study differs from the above narrative reviews by conducting an exhaustive search using explicitly stated criteria in an attempt to include all studies to enable replicability (Carney and Geddes, 2002). Moreover, by employing Multivariate Meta-Regression analysis which uses moderator variables to control for various specification and estimation characteristics, it allows the segregation of the role of other control variables and theoretical and methodological issues to explain a wide variation in effect sizes found in primary studies (Rosenthal and DiMatteo, 2001).

Five studies are known to systematically review the impact of financial development on economic growth in developing countries (Bumann et al., 2013; Arestis et al., 2014; Bijlsma et al., 2017; Simplice, 2013; Valickova et al., 2013; Bumann et al., (2013) conducted meta-analysis on the effect of financial development on economic growth in a group of developed, developing, and a mixture of developed and developing countries. Using the t statistics of 60 studies, they found that, on average, financial development has a positive effect on growth; however, the significance of the effect is weak. The grouped studies showed that results do not differ across different countries. Moreover, the combination of measures used to measure financial development and types of countries has yet to find significant results. They also find that financial development measures have been more effective before the 1970s and during the 1990s, confirming the effectiveness of financial development policies in the era of financial development. Furthermore, they found that from 2000 onwards, the weak effect indicates that most countries would have implemented the development policies leading to a marginal effect.

Other researchers who conducted meta-analysis on the finance growth nexus are Arestis et al., (2014), who used a comprehensive search of papers to retrieve 1151 observations from 69 published papers. They found a positive publication bias in their FAT PET analysis, while on the MRA, they found a negative and significant bias. Moreover, they found sources of heterogeneity from the data employed and different variables used in the literature (Bijlsma et al., 2017), on the other hand, estimated a total of 551 observations emanating from 68 empirical studies. Using real GDP per capita as a dependent variable and credit to the private sector relative to GDP as the independent variable, they found a positive but decreasing effect of financial development on growth. Furthermore, they estimated linear and logarithmic models and found evidence of publication bias. Finally, they differ from Arestis et al., (2014) and Valickova et al., (2013) through effect size transformation to enable estimates comparability.

Similarly, Simplice (2013) analysed 20 studies bringing an outcome of 196 observations. They found evidence of publication bias and a genuine effect on the finance growth nexus. Valickova et al., (2013), on the other hand, looked at most of the countries in the world by grouping them as South Asia, Asia, Europe, Latin America, MENA, Sub-Saharan Africa, and the rest of the world, including most of OECD countries. They retrieved 1334 estimates from 67 studies, finding a wide estimate variation on individual studies but a positive and statistically significant effect overall. They found that differences in the result are the outcome of both research design and heterogeneity in underlying effect.

Furthermore, studies that do not consider endogeneity on average exaggerate the effects of financial development on growth. Also, in less developed countries, effects are weaker than in developing countries, while studies utilising stock market variables are associated with a more significant positive effect on economic growth. They further concur with Bumann et al., (2013) in that the effect of financial development on growth declines after 1980.

The study described in this thesis is believed to depart and contribute to existing literature in various ways:

Firstly, the thesis will focus on developing countries encompassing only Sub-Saharan Africa to explicitly analyse countries in a similar stage of development, unlike Bumann et al., (2013), who grouped the countries from developed and developing countries. This approach contradicts the findings of several studies, including Deidda and Fattouh (2002); De Gregorio and Guidoth, 1995; Rousseau and Watchel (2011); and Yu et al., (2012), who report different growth effects on the level of financial development across different countries. In addition, Sub-Saharan African economies are more bank based, unlike other developing countries, which are more market-based (Bhattacharya et al., 1997). Thus, by confining the study to Sub-Saharan Africa, we can see more clearly the effect of financial development on economic growth as they are a relatively homogeneous set of countries with adequate controls for country-wide differences in economic, social, and institutional characteristics (Ekanayake and Thaver, 2021).

Secondly, unlike Valickova et al., (2013), who only analysed published studies that have been peer-reviewed, we will analyse both published and unpublished studies. Using only published studies, as explained by Sterne et al. (2000) and Thornton and Lee (2000), will cause a biased summary effect leading to a biased conclusion about the relationship between financial development and economic growth.

Thirdly, this thesis will explicitly provide a systematic literature review as expounded by the EPPI Centre utilising strict guidelines aiming to minimise subjectivity, maximise transparency and repeatability with an attempt to provide a highly reliable review of the evidence as used in the plethora of fields which is much needed in the economics arena. This method is regarded as a gold standard as it uses a predetermined search strategy to lay out the review methods and search for studies by screening for relevance and quality. The thesis will also use Meta-regression to provide an empirical framework to integrate, explain and summarise disparities in research findings. By providing the rigorous blended methods of systematic review and Meta-regression, this thesis will provide a much-needed balance to interpret results and appropriately enhance the findings' robustness.

Fourthly, this review will strive to be systematic and explicit in all steps undertaken in the discovery of studies, quality appraisal, analysis, and justification thereof, unlike

Bumann et al., (2013) and Valickova et al., (2013), who have not thoroughly explained and detailed the search strategy of inclusion/exclusion criteria's undertaken to enable independent replication and validation, how the studies were assessed in terms of quality and methodological issues, this can lead to a methodological flaw which can eventually bias the conclusion (Mulrow, 1987). Moreover, their selection of primary studies needs to be more systematic. The search terms employed did not use sufficient words to capture all the determinants in question to provide objective and comprehensive studies on the subject, causing their finding to be subject to sample selection bias.

Fifthly this study has used quality tool to assess the study design's validity, reliability, and adequacy. This is important because failure to prespecify an acceptable threshold of study quality for inclusion in the meta-analysis may result in subjective decisions concerning study inclusion (de Dominics et al., 2008). The use of quality in this study is an excellent contribution, as many economic studies still need to embark on quality assessment (Doucouliagos and Ulubasoglu, 2008; de Dominics et al., 2008; Alptekin and Levine, 2012), they allocate equal weights to all primary studies, regardless of their quality resulting in biased estimators among the effect sizes. By deploying dummy variables to capture defined quality attributes and then including them as moderating variables to ascertain their influence on the findings, this thesis will fill the gap of insufficient quality tools in economic studies.

CHAPTER 2: FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH IN SUB SAHARAN AFRICA

2.1 Introduction

Financial development refers to the growth and complexity of a nation's financial system. It embodies the depth, efficacy, and stability of financial institutions and markets, both formal and informal (Levine, 1997). Financial growth can be understood in terms of depth, which encompasses market size and liquidity. The capacity of individuals and businesses to access financial services. Efficiency, the capacity of institutions to provide low-cost financial services with sustainable revenues and the assurance that the system can withstand disturbances without failing. This thesis examines financial development using both bank and stock market variables, such as M1, M2, and M3 for banks and turnover ratio, stock market capitalization ratio, and traded stock value for the stock market (Yu et al., 2012; Rousseau and Wachtel, 2000).

Economic growth is the increase in an economy's output of products and services over time. It reflects a nation's capacity to improve the living standards of its citizens, reduce poverty, and create employment. A positive growth rate indicates that the economy is expanding, whereas a negative growth rate indicates that the economy is contracting (AFDB, 2013; Easterly and Levine, 1997). This thesis measures economic growth using per capita real GDP as the dependent variable. Understanding the relationship between finance and economic growth is crucial for SSA for several reasons. A robust financial system can enhance resource allocation, allowing more individuals to borrow, save, and invest, which can contribute to poverty reduction. When functioning properly, financial markets and intermediaries can channel the limited domestic savings to the greatest investment opportunities. A developed financial system permits households and businesses to better manage risks, resulting in more stable consumption and production (Levine, 1997).

Section 2.2.1 delves deeply into the complexities of the SSA's financial systems. It establishes the context by casting light on the overall evolution of financial systems, paving the way for a comprehensive examination of banking and stock market developments across the continent. Central to this discussion are the challenges and

opportunities that arise, particularly in terms of comprehending how SSA has streamlined its financial resources to invigorate both private and public sectors, thereby stimulating economic growth. The economic development trajectory of SSA is elucidated in section 2.3, which details the economic growth of SSA. A historical overview establishes the context, which is followed by an analysis of the obstacles to growth. This chapter concludes with a discussion of the growth tendencies that have shaped the SSA landscape over time.

2.2. Financial Development of Sub-Saharan Africa

According to Calderon and Liu (2003), Financial development occurs when both the financial markets and institutions experience continued progress in service quality, quantity, and efficiency. Financial development in Sub-Saharan Africa is fast progressing; however, countries still need to catch up in financial institutions and markets compared to other emerging nations. The financial systems are generally underdeveloped in terms of depth and efficiency and less diversified in comparison to other developing countries (Cihak et al., 2012). Banks are the dominant players in the African financial system in saving mobilisation and allocation of resources, whereas stock markets are generally not well developed (Mecagni et al., 2015). Although efforts have been made to liberalise the financial markets, the fruits of development are yet to be fully realized, leading to a small and shallow financial system with lower outreach and a significantly lower scale of financial intermediation (Kasekende, 2010).

The period after development of the 1980s saw a significant financial deepening over time; considerable developments have been made in both market and bank-based financial systems across Sub-Saharan countries; however, the scale of financial intermediation remains at a level low below other developing countries (Cihak et al., 2012). This could be attributed to their failure to stabilising their macroeconomic fundamentals, weak contractual frameworks in enforcing creditor rights, political instabilities, weak institutions, inadequate supervision by regulatory authorities, liquidity constraints, underdeveloped trading, and settlement structures, and limited market information (Andrianaivo and Yatrey, 2009; Beck et al., 2011; Kagochi et al., 2013).

The depth and breadth of financial markets in Sub-Saharan Africa vary widely across countries; the capital market is highly underdeveloped, the average value of the stock market relative to GDP in Sub-Saharan Africa is 23%, but if you include South Africa, it rises to 42% (Moyo et al., 2014). Furthermore, most banking system tends to invest heavily in government securities to avoid high default rates by private firms. This has consequently led to less credit to finance investments (Allen et al., 2011; Beck et al., 2011). The development efforts for both stock and banking have been propelled by the advancement in the ICT sector, driving the vast number of innovative financial products across African countries (Beck et al., 2010).

However, there are still bottlenecks in the growth of the financial landscape in SSA that hinder optimal growth. Lack of institutional quality that can promote efficient allocation of resources and capital accumulation. Also, a weak, ineffective legal framework in protecting and enforcing investors' rights stifles its development (Levine et al., 2000). Political and economic instability has led to high inflation and budget deficit, resulting in unsustainable and unbalanced economic growth (Beck and Honohan, 2007). Lack of integration among countries due to the legal origin and cultural differences has expounded cross-country differences. (Akinlo, and Egbetunde 2010).

Other shortcomings include sparse population density, which does not favor financial development (Allen et al., 2012), insufficient credit information systems, wide interest rate spread, ethical behaviours in management, corporate governance, utilising high international standards in auditing, accounting and disclosing of information and market fragmentation have all culminated to the backwardness of the SSA financial sector hindering it from developing and thriving (Levine et al., 2000). However, with all these impediments, some countries such as Nigeria and Angola have seen tremendous strides in financial development due to oil revenues despite weak institutional frameworks (Mlachila et al., 2016).

2.2.1 Banking Development in Sub-Saharan Africa

The financial landscape in SSA is mainly bank based, where the largest share of financial assets is dominated by the banking sector, which is underdeveloped, shallow,

and less penetrative. (Mlachila et al., 2016) According to IMF International Financial statistics and data files, the depth of financial development using the standard indicator of domestic credit to the private sector, SSA, scored 27.925, which is very minimal as it indicates the reluctance of financial intermediaries in channeling savings to private sector investors hindering productivity. Using this measure shows the shallowness of SSA's financial sector (IMF, IFS and data files, World Bank and OECD GDP estimates). Another common estimate used to measure the banks' penetration is the number of bank accounts per 1000 adult population; this measure has highlighted the pervasive low penetration rates in the continent, especially in rural and low-income communities (Nyantakyi and Sy, 2015; Beck and Honohan, 2017).

The banking system in the continent comprises Central banks and deposit-taking financial institutions. The Central Bank is independent of government control, and its role is to develop the local debt market, enhance and strengthen financial market stability, and help address systemic threats (Beck et al., 2011). The deposit-taking financial institutions consist of state-owned banks, private and community banks, pan-African banks, as well as subsidiaries of foreign banks. However, significant investments of these banks are absorbed in government securities and treasury bills, which crowds out funding to the private sector and causes distortions in the intermediation process. Moreover, the high cost of credit has been a critical factor in suppressing investments in the economy. SSA suffers the highest margins globally between lending and deposit rates and has the highest bank returns and equity, which does not provide a conducive environment for growth (Tyson, 2021).

The reluctance of the banking sector to channel funds to the private sector is due to various factors. First, higher risk in the private sector, culminating in a rise of non-performing loans, has led banks to shift their funding mandate to sovereign paper due to their liquidity and less risky assets. Furthermore, weak legal and institutional frameworks hinder banks' recourse to enforce payments, and poor infrastructure in roads and IT deters banks' penetration beyond the city centres. Moreover, lack of effective credit registers hampers banks' efforts in tracking customers with poor credit histories. Finally, lack of sufficient security has hampered the private sector in getting sufficient credit (EIB, 2018; Nyantakyi and Sy, 2015).

Other constraints in the banking system include high margins between the lending and deposit rates. Although the trend is going down, the banking markets in SSA is marked by high lending rate contrasted with low deposit rate. Furthermore, the sector is highly inefficient and suffers from inadequate competition, culminating in high levels of credit (Tyson, 2021). SSA has the lowest bank account ownership compared to other developing regions and has the lowest percentage of accessing bank loans. In 2017 SSA had 7% access to bank loans compared to 9% in other developing countries leading to 31.8% in domestic credit to the private sector compared to 104.9% in other low-income countries. Moreover, SSA achieved 22.9% of finance extended to businesses compared to 29.1% in other developing countries (EIB 2018).

However, despite the challenges, the continent has made considerable strides in leapfrogging banking technology and innovation ahead of other developed economies in terms of mobile banking. This has complemented and challenged traditional banking as it fills in the intermediary gap and shortcomings of lack of requisite banking infrastructure across the continent, especially in rural areas (Nyantakyi and Sy, 2015). This has led to a rise in account opening by the adult population from 23% in 2011 to 43% in 2017 as a result of mobile payment services, an increase in digital payments made and received from 20% in 2014 to 27% in 2017, furthermore, digital utility payment increased from 10% to 23% from 2014 to 2017 respectively and mobile phone usage to pay wages increased from 8% in 2014 to 19% in 2017 (EIB, 2018).

The rise of mobile banking has seen the number of people in Kenya, one of the pioneers in digital financial technology reaching over 70% in 2018, increasing from only 20% in 2006 to 80% in 2019 (FSD, 2019). Mobile banking has been used to reach out to the unbanked poor with financial services due to low cost, scalability, and convenience. These have been facilitated by increased mobile phone ownership, network coverage expansion, and technological innovation making mobile accounts exceed traditional bank accounts in countries such as Uganda, Zimbabwe, Kenya, Niger, and Côte d'Ivoire (Tyson, 2021).

Pan African Banks (PAB) are leading in expanding financial services, unlocking the region's potential and economic integration in Africa. The rise of these banks escalated after the departure of most Western banks, which had dominated the banking space

since colonial times. This has seen the rapid growth of these PAB's which filled in the gap left by the Western bank rivals. They have become more prominent in their scale of operation as they operate across borders representing a broader geographical reach (Beck, 2014; Chen et al., 2017). The rise of these PABs has encouraged competition with local banks, increased financial inclusion to the unbankable, and involvement in funding infrastructure projects through syndicated loans (Kanga et al., 2019; Leon 2016). As per the discussions above, Sub-Saharan African countries have made considerable progress in financial development over the last decades. However, progress has been mixed and uneven across the region, but there is still significant scope for further development, especially compared with other regions.

Figure 2.2.1

Financial Inclusion in SSA 2020
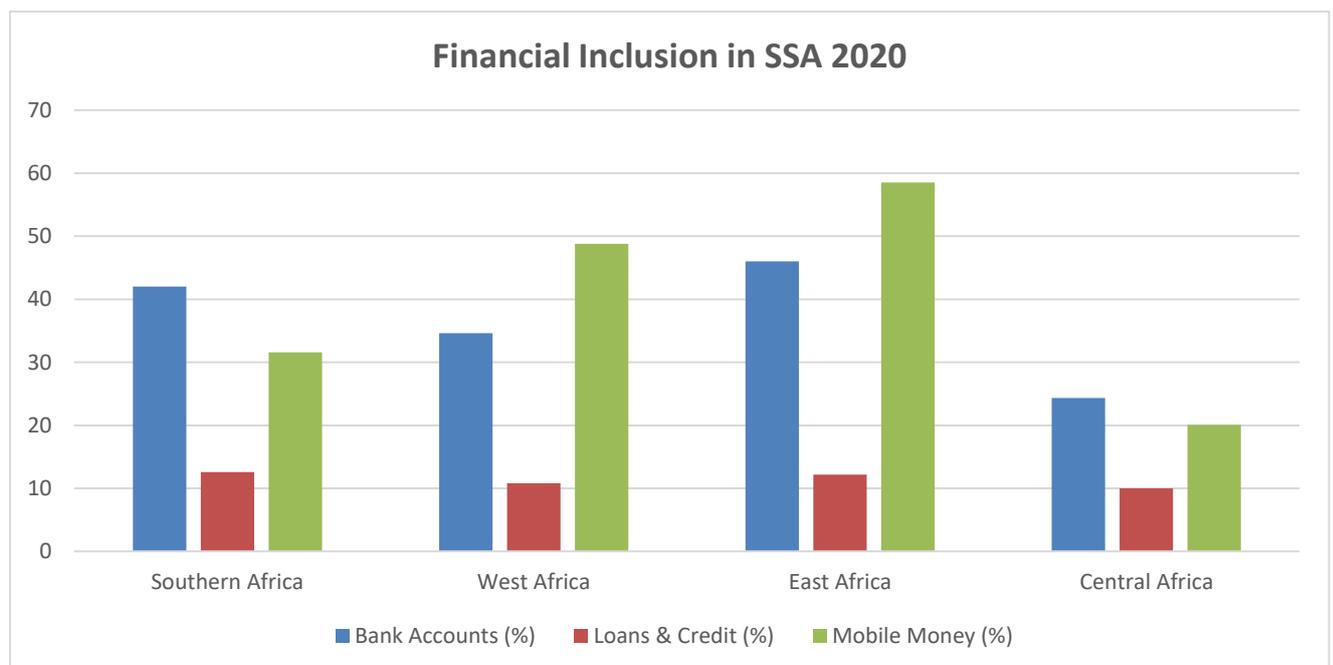
Source: IMF, 2020

As can be seen in the Figure above, most of the region need to be more extensive in extending financial services to most of the population; however, the extent of exclusion varies by country. In East Africa, Banking Industry in the region varies with different performance levels ranging from the extent of competition, the regulatory framework in the country, and macro-economic fundamentals, which determine the efficiency and soundness of the banking industry. Kenya has the highest performance in the region,

ranking fourth in Sub-Saharan Africa, followed by Tanzania, Uganda, Rwanda, and then Burundi. Kenya's financial strength is heightened by adopting technology, a stable regulatory environment, efficient distribution channels, and increased financial inclusion (Osoro and Santos, 2018).

Access to finance in the region is a challenge, particularly for SMEs needing credit for growth. Unlike Kenya, banks in most other countries in the region do not support investment. Almost 70% of firms in Tanzania have faced challenges in accessing credit. The challenge facing the banking industry is penetration to most of the population, about 76% of whom stay in rural areas. Non-performing loans are another drawback that deters bank lending. However, Kenya's high mobile money usage rate of 80% has led to an explosion of mobile banking in the region. Additionally, bank accounts have increased in the region as a result of the growth of M – Pesa. Access to loans and credit remains a problem throughout SSA and the East African region in particular. In 2019, approximately 14% of adults in Kenya borrowed from a bank, while the majority relied on friends, family, or informal groups (Osoro and Santos, 2020).

Access to formal financing remains a challenge for many small and medium-sized enterprises (SMEs) in Sub-Saharan Africa. Important roles are played by informal lending practises, microfinance institutions, and community savings groups. According to FSI Database (2018), credit to the private sector was 24.05% of GDP in 2016. Countries like Nigeria have had deep penetration to its population, accounting for half of its people having access to bank accounts, unlike countries such as Benin, Sierra Leone, and Senegal which only meet financial inclusion of below 20%, lending most people to borrow money from family and friends. West Africa has been slower to adopt mobile money, but platforms like Pega are expanding in Nigeria. The region has only seen an increase of 10% in financial inclusion between the years 2011 to 2017 (EIB, 2018).

Finance bottlenecks in West Africa led to challenges in growth of a number of businesses especially smaller firms unlike their medium and large companies' counterparts. This is as a result of inefficiencies of the demand and supply of financial markets in meeting the needs of this segment. Lack of sufficient collateral, informality, and perceived risks forces banks to request for twice or even triple the value of assets

to be pledged for a loan. This is prevalent in Senegal which sees many businesses lack access to bank funding. Furthermore, most banks in West Africa are in favour of providing more expensive short term versus cheaper long-term loans to businesses (Cali et al., 2018).

As per Figure 2.2.1 Central African Republic has the smallest and underdeveloped financial sector in the region. Financial services are minimal compared to countries with the same level of development. This has hindered bank accounts and, consequently, loan access. In 2020 35% of adults in Cameroon had access to bank accounts while only 9% of adults had formal bank account in Central African Republic. Due to several factors, SMEs who depend on bank facilities for growth have been extremely limited. Weakness of the judicial system limits lending rates contrary to market fundamentals, lack of information systems, and the government's crowding out the private sector as banks hold substantial claims making it unattractive to extend credit to the private sector (IMF, 2009).

Although the region has a lower threshold of below 30% in account ownership rate, which is lower than the SSA average, financial inclusion is slightly converging to the rest of SSA. Mobile banking has been catalytic in enhancing bank usage in the region. In 2020, approximately 15% of citizens in Gabon were active mobile money users. While Gabon has a relatively superior traditional banking infrastructure, mobile money continues to expand. This digital transformation has seen innovative applications of a wide range of services, including Ecobank Mobile in Cameroon, which enhances the swift sending and receiving of money across 33 African countries. Excellence 2020" project from BGFI Bank Group, electronic portfolios from Orange Money, and MTN Mobile Money, just to name a few (Stijns et al., 2018).

In Southern Africa, access to finance for firms is a significant constraint in the region as banks in most countries divert funds from the private sector in favour of government bonds; this is more prevalent in Zambia and Mozambique where 33% and 25% of adults had access to bank accounts in Zambia and Mozambique respectively. Firms in Namibia and South Africa have easier access to finance than other countries in the region where 69% in South Africa and 60% in Namibia have access to bank accounts in 2020. However, the economic slump caused by weaker GDP growth, depressed

currencies, and reduced tax collection in these countries has seen banks tightening their lending procedures to support sovereign debt (Theobald and Zwart, 2018).

2.2.2 Stock Market in Sub-Saharan Africa

Following financial liberalisation in the 1990s, many African economies established stock exchange markets to promote financial development and economic growth. These markets comprise many small underdeveloped, small market capitalised, institutionally weak, thin, and illiquid markets with few large stock exchanges. There are 30 organized stock exchanges where securities can be listed on the African continent, representing 40 of 54 African countries (Schiereck et al., 2018). According to "JSE" (2020) Johannesburg Stock Exchange (JSE) in South Africa is the oldest, largest, and most sophisticated stock exchange, with a market cap of US$1,005 billion and 250 listings.

The African Securities Exchange Association (ASEA) was established in 1993 in Nairobi, Kenya, to provide a formal framework and unlock Africa's capital market potential to strengthen and enhance the development and sustainability of African economies. The association has 27 security exchanges as members (ASEA, 2020). Further, 7 African exchanges are also members of the World Federation of Exchanges (WFE), and 5 are affiliates whose aim is to set best practice standards, supervise financial markets and ensure a well-functioning capital market worldwide (WFE, 2020). Moreover, exchange associations within the African continent focus on the capital market within different local regions, including the West African Capital Markets Integration Council (WACMIC), the Committee of SADC Stock Exchanges (CoSSE), and the East African Securities Exchanges Association (Schiereck, et al., 2018).

Several African stock markets have taken steps to integrate with both markets from within the continent and abroad. The WAEMU stock exchange in Nigeria and Morocco collaborated with Paris EUROPLACE, the London Stock Exchange Group (LSEG), and the Financial Times Stock Exchange (FTSE) Group. Further, the ECOWAS launched the West African Capital Markets Integration Council (WACMIC) (Schiereck, et al., 2018). This integration brings with it many benefits. They enable the market to become more efficient and hence more competitive; they improve liquidity and cost

reduction (Fish and Biekpe, 2002). They provide a wider choice of services and more depth due to financial market integration (Irving, 2005). Furthermore, financial integration will enhance visibility globally, provide better information and promote trade among African financial markets (Lugangwa, 2012), with all these benefits, Schiereck et al., (2018) assert that more efforts must be made to reap the full reward of the financial market. Hence, a deliberate effort must be made to unite different regional or continental markets with other external markets (Gourene, et al., 2019).

From 2000 to 2010, the financial market witnessed exceptional growth in the capitalisation of 10 of the most prominent African stock markets at 390.77%. Two hundred new companies on 18 African stock exchanges have posted more than $10 billion as part of their IPO offering. In addition, $6.1 billion was also raised between 2011 and 2016 through 125 IPOs. However, the rapid growth of financial markets in Africa, its extent is still not sufficient when compared to other developing regions as in the year 2015, only 1.4% of the world's market capitalization was accrued by African financial markets, with 77% stemming from South Africa. This shows that more capitalisation is needed to catch up to world levels (Gourene, et al., 2019).

Despite the improvements in the stock exchanges, the capital market in SSA still needs to be developed. High dominance of public debt in the form of short-term government securities is prevalent in the continent; there is a limited range and tenue of securities, and several small economies cannot sustain a well-developed capital market. All these challenges lead to high issuance costs and volatility in the market (Tyson, 2021). This deficiency in the capital market arises due to structural factors in the countries, including macroeconomic frameworks, business environment, and institution quality (Gourene et al., 2019). More policy efforts are needed to align the needs of establishing a well-capitalized and robust capital market and the needs of the investors to enter and list their companies in these markets.

Despite these challenges, African stock markets have provided extraordinary returns compared to their global counterparts. In 2004, for example, it witnessed an average return of 44% of the African stock market compared to 30% return from Morgan Stanley Capital International (MSCI) and 26% from Standard and Poor's index. In the same year, we also see a growth rate of 144% in the Ghana stock market, pushing it

to the first place in the world for best-performing stock market for the year 2004 (Databank, 2004). Zimbabwe was among the world's best rank performing index between 2006 and 2007. Furthermore, the recent 2008 financial crisis that crippled most stock markets around the globe had a very insignificant impact on most African stock markets, excluding the more significant financial markets of South Africa, Nigeria, and Egypt (Thupayagale, 2010).

Various challenges plague the African stock markets. Firstly, the lack of buy-in from local investors who need a sufficient understanding of how the markets work leads to low liquidity and the weakening of the domestic investor base and lessens credibility from international investors. Secondly, cross-listing is another challenge contributing to low liquidity of African markets, caused by poor information linkages to deter investments from less efficient and poorly managed markets to better and efficient stock markets (Lesmond, 2005). Thirdly, lack of adequate and enabling legal, regulatory, and institutional frameworks which cannot enforce contracts and efficient settlement processes in many of Africa's bourses except in South Africa, Mauritius, Egypt, and Tunisia (Hearn and Piesse, 2013) Furthermore, the perception of volatile political and economic conditions by most international investors in most African economies and the effect of currency depreciation deters investment appetite of these investors (Senbet and Otchere, 2010).

Figure: 2.2.2A

STOCK EXCHANGE FOUNDED
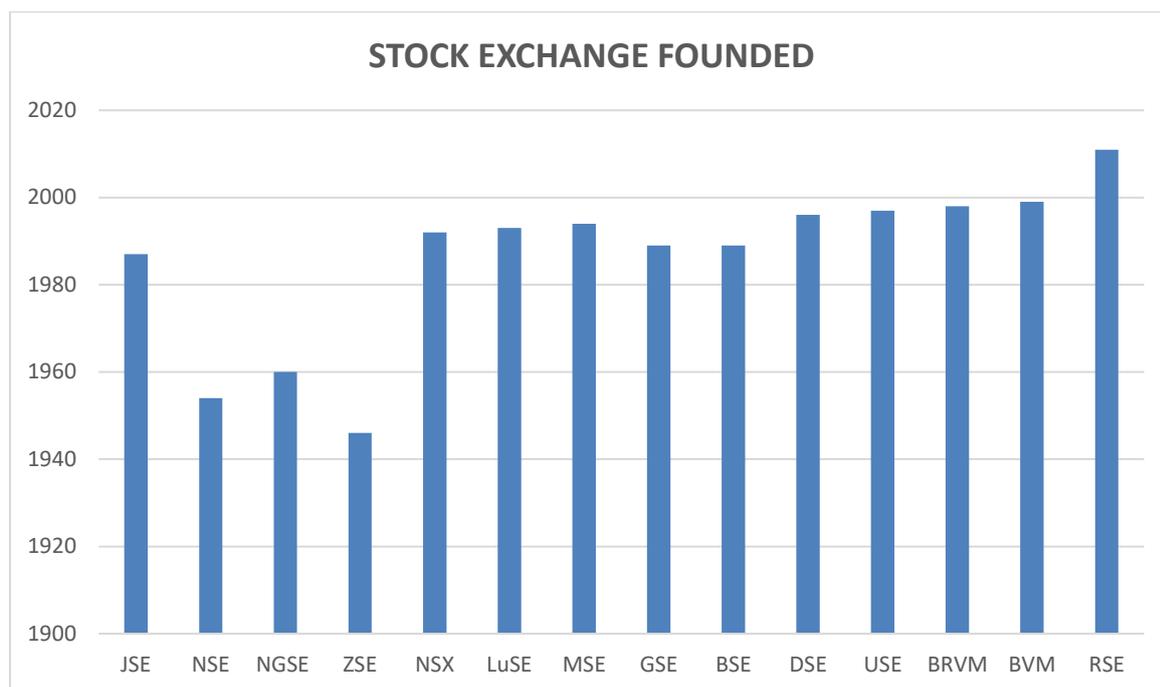
Source: IMF, 2020

As can be seen from Figure 2.2.2A, Sub-Saharan Africa (SSA) stock exchanges have experienced significant development and evolution over the past several decades. While many of the region's stock exchanges have a shorter history than their counterparts in more developed markets, they have made significant progress in terms of scale, accessibility, and functionality. JSE is the largest stock exchange in Africa and ranks among the top 20 exchanges in the globe in terms of market capitalization. JSE has its origins in the discovery of gold in Johannesburg. Other Stock exchanges in SSA emerged predominantly during the post-colonial period, beginning in the 1960s. These include the Nigeria Stock Exchange (NGSE), the Nairobi Securities Exchange (NSE) in Kenya, and the Ghana Stock Exchange (GSE) (JSE, 2020; EIB, 2018).

Zimbabwe Stock Exchange (ZSE) is one of the oldest exchanges in Southern Africa, dating back to 1896 when Cecil Rhodes founded it in Bulawayo. It transformed into Zimbabwe Stock Exchange (ZSE) after the change of Act in 1976. The ZSE facilitates the operation of several indices, including the Mining Index, Industrial Index, and the All-Share Index (ZES, 2020). Thirty years after the (NGSE), Ghana Stock Exchange (GSE) in Accra started operations as a private company before converting to a public

entity in 1990. In East Africa Rwanda's capital market was established in 2011. The Rwanda Stock Exchange (RSE) is underdeveloped and one of the smallest and newest stock exchanges in Africa (Schiereck et al., 2018).

Figure 2.2.2B
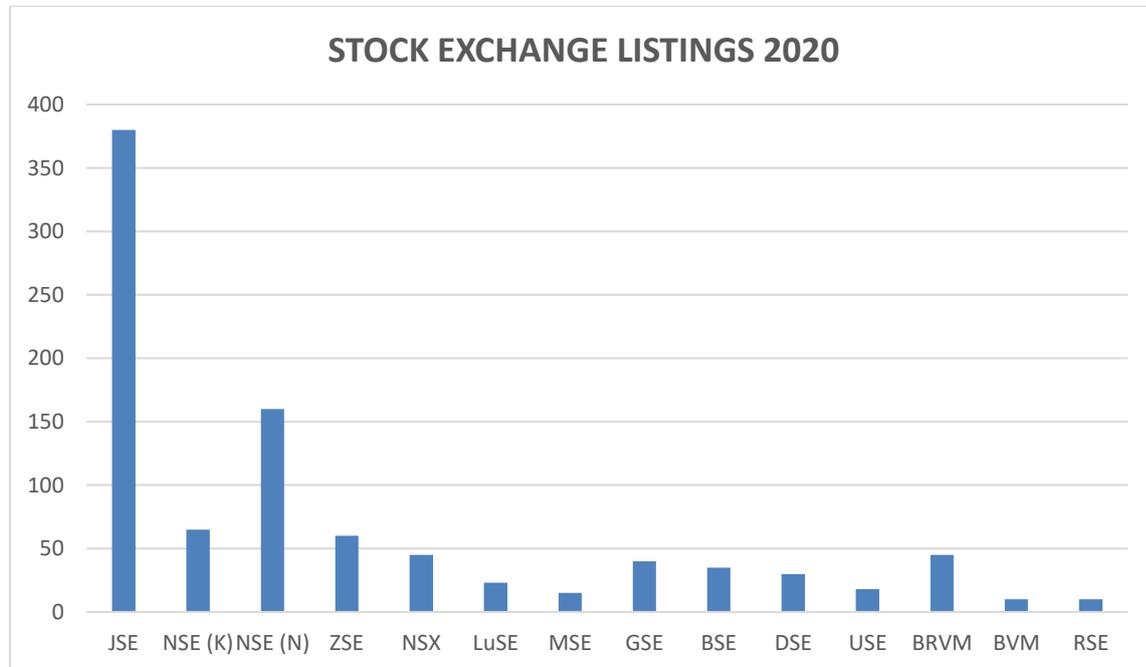
Source: IMF, 2020

As can be seen from Figure 2.2.2B, Johannesburg Stock Exchange (JSE) has the largest market capitalization in SSA. The exchange trades on equity, debt, bonds, derivatives, and commodities with over 400 current listings on the equity section. Challenges plaguing the exchange and hence undermines investors' confidence include economic slump, uncertainties regarding the governance of state-owned enterprises as well as instability in the political sphere (JSE, 2020). NSX is the second largest exchange in Southern Africa, having 43 listed companies trading on stocks and ETFs; NSX has a market capitalisation of $1.89 billion (NSX, 2020).

The East African market is thin and underdeveloped compared to its northern and southern African counterparts. However, it has significantly improved regulation, awareness, and trade automation over the years. The Nairobi Securities Exchange (NSE) in Kenya is the largest market in East Africa. The NSE lists 65 companies with a total market capitalization of $18 billion. The second most significant exchange in

the region is the Dar Es Salaam Stock Exchange (DSE) in Tanzania. It started operating in 1996 as a catalyst for developing the country's financial markets (Tyson, 2021). The Uganda Securities Exchange (USE) had listed debt instruments comprising treasury bonds, corporate bonds, and treasury bills; it also listed equities, and the trading volume increased from 47,779,920 in January 2019 to 167,683,250 in January 2020 (USE, 2020).

In West Africa, the Nigerian Stock Exchange (NGSE) in Lagos is the third largest African exchange, following the Egyptian Exchange and Johannesburg Securities Exchange; it has a market capitalisation of $34.79 billion, with over 300 listings. It is the largest stock exchange in West Africa. NSE is promoting the development of Nigeria's stock market on the one hand and Africa's on the other. By encouraging integrity and transparency in the marketplace, the exchange strives to enhance the stability and ethical ways of conducting business practices (NSE, 2020). On the other hand, the Ghana Stock Exchange (GSE) in Accra has a total of 40 companies whose shares are traded on the exchange; The exchange serves two categorise of listings; the official list, which include shares, bonds and unit and mutual funds and the Ghana Alternative Market (GAX) which caters for SME's (GSE, 2020).

In Central Africa, most economies operate in the informal sector; the stock market is very small, illiquid, and suffers from weak regulatory institutions and infrastructural constraints. The domestic capital market in CEMAC is small and plays a minor role in the continent. In 2003, a regional stock exchange in Libreville was created by the CEMAC countries, which is the Securities Exchange of Central Africa (BVMAC); similarly, the Douala Stock Exchange (DSX) was created in Cameroon as their national stock exchange, which has very little to no active trading in the market. From 2012 to 2018, the Cameroonian government issued two bond issues and listed three companies. This has, however, created some friction hampering capital market development and activities in the region (Schiereck et al., 2018).

Conclusion

This chapter has discussed the role, effect, and effectiveness of banks and stock markets in Sub-Saharan Africa in enhancing economic growth. Banks have been noted to be the dominant players in the financial landscape compared to the stock market, which is still shallow and underdeveloped. However, various factors have been propounded to hinder growth, including weak institutional and legal quality, political and economic instability, lack of integration among countries, sparse population density, and insufficient credit information systems are among the constraints to financial development. The banking system needs to effectively channel funds to the private sector as most of its investments are absorbed in government securities and treasury bills, crowding out funding to the private sector. Moreover, high margins between the lending and deposit rates, lack of competition, and low bank account ownership are some of the shortcomings prevalent in the banking system.

The rise of mobile banking, however, has helped many banks to leapfrog the infrastructure constraints leading to expansion and coverage reaching the unbanked poor with financial services. The stock markets in SSA are still underdeveloped, undercapitalised, and institutionally weak to enhance efficiency in the mediation service. Since its inception in the 1990s, we have witnessed the growth of many African stock exchanges leading to massive capitalisation and IPOs. These have provided extraordinary returns compared to their global counterparts. However, the growth stock market remains underdeveloped compared to world-level standards. High dominance of public debt, limited range and tenue of securities, and several small economies cannot sustain a well-developed capital market. To ensure banks and the stock market expand and operate efficiently, more must be done.

2.3. Economic Growth of Sub-Saharan Africa

Sub-Saharan African countries experienced moderate growth from late 1960 to mid-1970, followed by a decline in annual GDP growth from 4.6% to 2.2% from 1980 to 1990 (Ahmed, 2011). The decline of growth resulted from the misguided policy in post-independence, where economic growth was directly pursued through direct government intervention leading to the nationalisation of the banks, directed credit to

priority sectors, and maintenance of low or negative interest rates. In addition, the repressed financial market resulted in the stagnation of the growth of the banking sector, inefficient resource allocation, discouraged saving mobilisation and investment, increased segmentation of financial markets, and financial disintermediation of the banking system (Gelbard and Sergio, 1999).

In order to restore growth in the economic sector in general and the financial system in particular, the governments in Sub-Saharan Africa abandoned the repressive policy. They approved the development reforms propagated by the IMF and World Bank. This was anticipated to encourage the accumulation of capital, remove public bottlenecks and enhance the efficient allocation of resources (Nissanke and Aryeetey, 1998). Despite the development programs embarked on by African countries, most indicators of financial development as measured by the ratios of broad money M2 and private sector credit to GDP shows a decreasing trend from their peak in the 1990s; only a few countries have had positive growth over the period 2000-2005. Furthermore, the financial system is inherent with a small absolute size of banks and banking systems, a large informal sector, limited outreach, and a lower scale of financial intermediation (Egbetunde, 2009).

The economic growth of SSA countries has not been uniform; some countries have experienced rapid and high growth while others have been slow and low growth or even have seen stagnation and decline of growth. From mid-1990 to 2015, African countries grew at an average of 5% annually. Even after the global financial crises of 2008 – 2009, the slight drop in growth quickly reverted to the expected average pre-crisis. Angola, Chad, Equatorial Guinea, Ethiopia, Ghana, Liberia, Sierra Leone, Tanzania, Uganda, and Zambia had recorded growth of over 5%, surpassing some emerging countries. However, some countries witnessed a growth of less than 2%, while others grew from 3 to 4%. (IMF, 2015).

Figure 2.3A

REAL GDP IN BILLION DOLLARS

Legend: WEST AFRICA — EAST AFRICA — SOUTH AFRICA — CENTRAL AFRICA
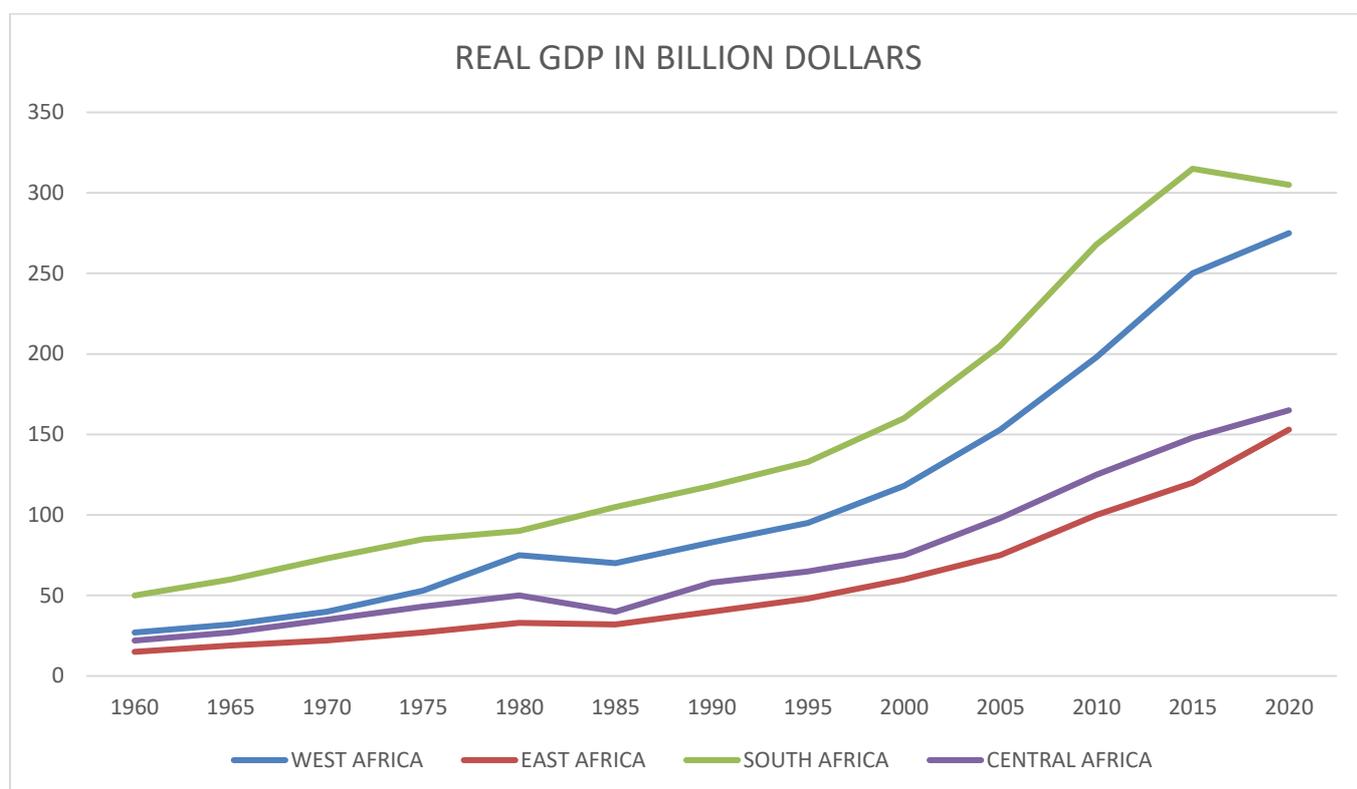
Source: IMF, 2020

After a decade of post-independence challenges and opportunities, West African economies were beginning to take shape. In 1970, the estimated average Real GDP was $40 billion. From 1975 to 1980, Nigeria, the region's most populous nation with substantial oil reserves, was a key economic player. Its oil growth was especially noteworthy. In the 1980s and '85s, a number of nations faced economic difficulties, which were exacerbated by falling commodity prices, rising external debt, global economic downturns, and political instability. In 1990, the economic landscape presented obstacles, as structural adjustment programmes and political instability were prevalent in some nations. Due to the global commodity boom, the region experienced varying development rates from 2000 to 2005, with countries such as Nigeria benefiting from rising oil prices. Real GDP averaged between $118 and $153 billion. Regarding the years 2000 and 2005, respectively. In 2015, the global price decline impacted many nations in this region, including oil-dependent Nigeria (AFDB, 2019).

The East African community was witnessing some economic cooperation in 1970, despite the presence of challenges. The average Real GDP was estimated to be $22 billion. The East African community encountered obstacles that ultimately led to its demise in 1977. In addition, Uganda experienced economic declines in 1980 due to political instability. In 1985, countries continued to face economic challenges, such as structural adjustment programmes. In 1990, East African nations made efforts to liberalise their economies, and thus the origins of a recovery were visible. For some countries in the region, economic reforms and regional cooperation initiatives began to bear fruit between 2000 and 2005. During this time period, substantial growth, enhanced stability, and economic reforms were evident. Real average GDP was $60 billion. Numerous East African nations gained momentum in 2010 with relatively high growth rates. The region experienced relative economic resilience and expansion in 2015. The region was anticipated to have one of the highest development rates in Africa, albeit from a smaller starting point. The pandemic had varied effects on the year 2020, but the region exhibited resilience overall (AEO, 2020).

Prior to the mid-1970s, Central Africa experienced both post-independence development and challenges. The average Real GDP was estimated to be $37 billion. In 1980, several countries in the region, including Angola, struggled with political instability and civil wars. Additionally, price fluctuations played an important influence. In 1985, there were significant economic disparities in the region, with some countries enjoying relative prosperity and others facing significant difficulties. The economic situation in 1990 was varied, with some countries, such as Cameroon, experiencing recessions while others attempted to stabilise their economies. Some countries in the region began to stabilise in 2000, while others, such as the DRC, remained in conflict. The region's average Real GDP was $75 billion. In 2010, the economic outlook for the region was mixed, with countries such as Angola benefiting significantly from oil exports. The decline in oil prices in 2015 had a significant impact on oil-producing nations like Angola (CAEO, 2020).

In parts of the Southern African region, economic development was evident, particularly in South Africa. The average Real GDP was estimated to be $73 billion. In 1975, the region was influenced by economic complexities, including the effects of apartheid. In 1980, Zimbabwe had recently attained independence, and its economy

was initially relatively robust. The South African economy remained preeminent in this region in 1985, despite political pressures including international sanctions. In 1990, as the end of apartheid drew near, South Africa underwent significant changes that affected the entire region. In 2000, the region experienced a positive trajectory, despite the fact that HIV/AIDS began to have a significant impact on the economies. In 2005, the economies, particularly South Africa, benefited from global economic growth, despite the persistence of obstacles. South Africa faced a variety of obstacles in 2015, including energy shortages, which moderated economic expansion. Due to the pandemic's impact on various industries, the region experienced a severe economic decline in 2020. The region's average Real GDP was $305 billion (AEO, 2020; UN, 2020).

Figure 2.3B
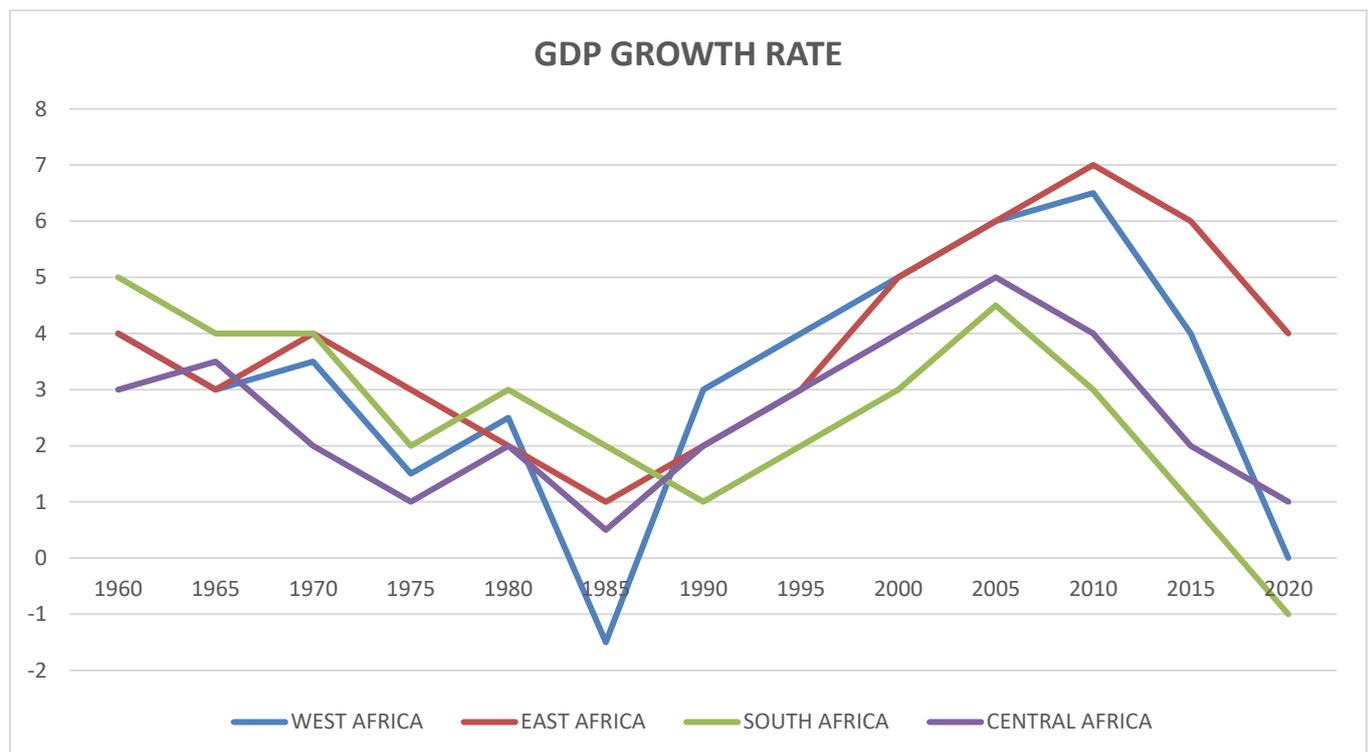
GDP GROWTH RATE

Source: IMF, 2020

West Africa has a population of around 366 million, with an increase in GDP from 2.7 percent in 2017 to 3.3 percent in 2018. The region's diverse income per capita ranges from $452 in Niger to $3,678 in Cabo Verde in 2018. Real GDP growth in most West African countries was above 5% except few countries. Cote D'Ivoire is among the

countries in West Africa whose economy is growing very fast. The country experienced GDP of 8.3%, 7.8%, and 7.3% in 2016, 2017, and 2018 respectively. Ghana is another fast-growing economy with 7.1% of real GDP in 2019. Burkina Faso experienced high growth of 6% in 2019, down from 6.8% in 2018, accelerated by both private and public consumption. Cape Verde witnessed a GDP growth of 5% in 2019, driven by productivity in industry, commerce, fisheries, and tourism. On the other hand, Gambia had a slight drop in GDP from 6.6% in 2018 to 5.4% in 2019 due to the current account deficit. The improved reforms in the business sector helped Guinea to witness an increased GDP from 6% in 2018 to 6.2% in 2019 (EIB, 2018; AEO, 2020).

The South African region suffers from various economic challenges, such as a massive public debt burden, weaker currencies, and slower GDP growth are among the constraints plaguing the countries in this region; however, following 2018, the countries have started to regain their economic strength. An increase in diamond production in Botswana has led to an increase in GDP to 3.5% in 2019. A similar scenario is witnessed in Lesotho, where the improved textile industries and global mineral prices have led the country's economy to grow at 2.6% in 2019. In Malawi, cyclone Idai affected maize agriculture; however, despite the agricultural challenge, real GDP increased from 4.0% in 2018 to 5.0% in 2019. Mauritius is the most advanced country in the region, driven by the service sector, which accounted for 76% of GDP in 2019, followed by industry 21% and agriculture 3% of GDP. Real GDP has been stable for four years, averaging 3.8% in 2019 (AEO, 2020).

In Central Africa, the region is blessed with enormous natural resources, including mines, oil, arable land, and forests, and so much dependence has been directed to the primary production of extractive commodities. In 2019 the region's growth was 2.8%, below Africa's average of 3.2%. The region's GDP was $137 billion in 2019, with DRC and Cameroon contributing half of it, followed by Gabon, Congo, Equatorial Guinea, Chad, and CAR (EIB, 2018; UN, 2020). The economies of countries in the region have improved despite a wide array of challenges. The security threats of Cameroon and the Central Africa Republic did not deter an upswing in growth. Central Africa Republic GDP in 2019 was 4.5%, increasing from 3.8% in 2018, while Cameroon's GDP grew to 4.1% in 2019. Chad's growth also increased in 2019 to 2.4% GDP growth despite decreased oil prices, while in Congo, there was a slight increase

in GDP from 1.6% in 2018 to 2.2% in 2019 despite weak domestic fundamentals (UN, 2020).

East African region most population live below the poverty line and depend on agriculture for their subsistence. Ethiopia is the most populous country in the region, followed by Tanzania, then Kenya. Most countries, except Kenya, face the same developmental challenges in all economic fonts and heavily depend on agriculture. Over the past decade, the region has been outperforming most other regions in the continent with GDP growth of 6.5%; however, in 2017, the region's growth decreased to 5.3%, with Kenya and Uganda least performing the others. Burundi's growth increased by 3.3% as it increased its export of coffee and its yield in agricultural productivity (EIB, 2018). In Ethiopia, the GDP growth of 7.7% was slightly reduced to 7.4% in 2019 as the country experienced social unrest and consolidated its fiscal position. On the other hand, Uganda witnessed a significant growth of 6.3% in 2019, driven by retail, construction, and telecommunications. Rwanda, on the other hand, saw an economic boom that started in 2000 because of successful government policy. This led to an increase in GDP growth of 7.2% in 2018, up from 6.1% in 2017 (AEO, 2020).

Conclusion

The growth of SSA countries had been modest since their independence in 1960 due to the repressive policies adopted, resulting in stagnation in the banking sector. The abandonment of the repressive policies saw the resurgence of economic growth in various countries. However, the economic growth of most SSA countries has not been satisfactory, as could be seen in slow growth and decline in economic fundamentals. In West Africa, GDP grew steadily from 2017 to 2018. Cote d'Ivoire and Ghana were notable performers among the countries with substantial GDP growth rates in excess of 5%. Despite economic difficulties, the Southern African region displayed resiliency. Botswana's diamond production and Lesotho's prospering textile industry demonstrate the region's resolve to restructure its economy.

Central Africa has not been able to capitalise on its plethora of natural resources. Individual nations in the region have shown commendable development despite the

fact that the region's growth in 2019 was slightly below the continental average. The combined GDP of the DRC and Cameroon demonstrates the region's economic potential. East Africa had a varied economic history. With the majority of the population dependent on agriculture and living below the poverty line. In spite of this, the past decade has revealed the region's development potential, which has consistently outpaced other African regions. Despite their internal difficulties, countries like Ethiopia demonstrate the region's economic resilience and potential.

2.4 Empirical Review

2.4.1 Introduction

Financial market development is crucial for economic development. it can be used as a mediator for growth through the mechanism of channelling funds from surplus to deficit agents with productive investment prospects (Schumpeter, 1912). Although SSA has made huge strides in developing its financial markets since the 1990's, for both the bank based and market based financial systems, the continent has faced challenges in reaping the benefits of liberalisation. Some of the constraints emanate from the practical functioning of the financial system and other constraints on the macroeconomic fundamentals such as political instability and unrest, macroeconomic uncertainties, high volatilities in economic growth, liquidity constraints, limited market information, underdeveloped trading and settlement structures, lack of adequate supervision by regulatory authorities just to name a few (Aziakpono, 2005; Beck et al., 2004 and Easterly and Levine, 1997).

An extensive number of empirical studies have been conducted to test the finance growth nexus by examining different techniques such as cross sectional, time series and dynamic panel datasets (King and Levine, 1993; Levine and Zervos, 1998; De Gregorio and Guidotti, 1995; Ndikumana, 2000; Levine, Loayza and Beck, 2000; Benhabib and Spiegel, 2000). The challenges and benefits are well noted (Quah, 1993; Casselli, Esquivel and Lefort, 1996). In SSA, various studies have endeavoured to empirically evaluate the impact of financial liberalisation and reform on economic development. These studies have looked at both single and a group of countries. By using a range of different variables to proxy financial development and growth, the

results have been conflicting. Factors that have contributed to inconsistent results have been mainly due to the financial indicators used in the analysis, level of countries development (Apergis et al., 2007), time examined, statistical methods used (Chang and Caudill, 2005) and nature of institutions and structural characteristics of the economies studied (Ang, 2008).

This chapter has compiled some studies done in SSA that have been included in data analysis of this thesis, looking at the relationship between financial development on economic growth in order to analyse the patterns and trend in this finance growth nexus space. When we look at table 2.4, we see that most studies used panel datasets, these are a set of cross-sectional units followed over time. Panel data are superior to cross sectional or even time series as they can measure and detect statistical effects more easily and takes into account more information, more variability, and more efficiency, furthermore, panel data set allows unobserved differences to be correlated with observed factors (Arellano and Honore, 2001). It can also be noted that most studies found positive support to the finance growth nexus. Most studies that found negative support was a result where preconditions have not been met. These include level of county's development, choice of proxies used, macroeconomic fundamentals met, institutions development and level of inflation.

Table 2.4 Summaries of Empirical Studies

Author	Test	Methods	Main Findings	Implication for financial Development
Adejare, (2013)	Analysed the effect of stock market on economic growth in Nigeria	Regression analysis and correlation	Stock market enhances growth in Nigeria	Positive support
Abubakar et al., (2015)	Analyse the effect of financial development on	Fully Modified OLS (FMOLS) and	Financial development enhances economic growth	Positive support

	economic growth on Ecowas countries	Dynamic OLS estimators (DOLS)		
Acaravci et al., (2009)	Analyses the causality between financial development and economic growth in SSA	Panel cointegration and panel GMM estimation	There is no long run relationship between financial development and economic growth	Negative support
Adusei, (2013)	Assess the relationship between financial development and economic growth in Ghana	FMOLS, ECM and GMM	Financial development weakens economic growth in Ghana	Negative support
Adjasi and Biekpe (2006)	The effect of stock market development on economic growth	GMM dynamic instrumental variable approach	Stock market enhances growth on middle income economies and where stock market is advanced whilst for low-income countries and less developed stock market, gains from stock market are not much	Little support
Adu et al., (2013)	Effects of financial development on economic growth of Ghana	ARDL	The effect of financial development is dependent on the choice of proxy used	Little support
Adusei, (2013)	Effect of finance on economic	GMM	They found a bidirectional causal relationship between finance and economic growth	Positive support

	growth in 24 African countries			
Akinboade, (2000)	Studied the relationship between financial deepening and economic growth in Tanzania between1966-1996	Used Static and dynamic ordinary least squares	Small positive and significant during the development phase and negative and insignificant during the period of repression.	Positive Support
Allen and Ndikumana (2000)	Studied the role of financial intermediation in stimulating economic growth for countries of the Southern African Development Community (SADC)	Simple OLS regression, regressions including country – specific fixed effects	Financial development measured by liquid liability (M3) is positively correlated with growth rate of real per capita	Positive Support
Adeniyi and Egwaikhide (2013)	Effect of financial development on domestic investment	OLS and FE	Financial development enhances economic growth	Positive Support
Adeninyi et al., (2015)	Effect of financial development on economic growth in Nigeria	ARDL	Financial development matters for growth where precondition have been met	Mixed support
Adusei, (2014)	Effect of stock market	ARDL	There is long-term relationship between stock	Positive support

			market development and economic growth	
Santos, (2015)	Effect of financial development on economic growth in 7 SSA countries	Static and dynamic panel data approach	Financial development did not lead to economic growth	Negative support
Aziakpono, (2005)	Effect of financial development on economic growth in 5 Southern African countries	A panel data econometric technique	Financial development has effect on growth on countries that had strong financial systems, institutions, and structural frameworks	Mixed support
Meshel et al., (2014)	Effect of bank and stock market development on economic growth in South Africa	ARDL and VECM	Financial development enhances economic growth in South Africa	Positive support
Dabos and Tomás (2009)	Effect of financial development on economic, capital and productivity growth	GMM	The effect of financial development in economic growth is greater in less developed regions	Mixed support
Effiong, (2015)	Effect of financial development on economic growth	OLS and GMM	Existing institutions has not enhanced finance -growth development	Negative support
Enowbi and Kupukile (2012)	Effect of financial liberalisation on economic growth		Financial development led to economic growth, Moreover, financial development	Positive support

		A treatment effect, two step methods and a panel probit method	reduced the likelihood of banking crisis	
	on 53 African countries			
Adam, (2009)	Effect of financial liberalisation on economic growth in Ghana	ARDL	Financial development enhances economic growth	Positive support
Fowowe, (2008)	Effect of financial liberalisation on economic growth in Nigeria	ARDL	Financial liberalisation enhances economic growth in the long run even though it can result in fragility in the short run	Positive support
Fowowe, (2011)	How financial reform affects private investments in African countries	GMM	Financial liberalisation has led to positive effect on private investment	Positive support
Taofik and Mohammed (2013)	Effect of financial development on economic growth in Nigeria	UECM bounds test	Financial development enhances economic growth in the short and long term	Positive support
Iyoboyi, (2013)	Effect of financial development on economic growth in Nigeria	ARDL	Financial development enhances economic growth	Positive support
Ikikii and Nzomoi, (2013)	Analysed the effect of stock market development on economic growth in Kenya	Multiple linear regression was used to analyse the effect of stock market to economic growth	Stock market development has led to economic growth in Kenya	Positive support

Jalil et al., (2010)	Effect of financial development on economic growth in South Africa	ARDL	Financial development leads to growth	Positive support
Kagochi et al., (2013)	Effect of bank and stock market development on economic growth of 7 SSA countries	Panel Regression	Both stock market and banking development enhances growth	Positive support
Kagochi, (2013)	Financial development and economic growth in Kenya	ARDL approach	Financial development has enhanced economic growth in Kenya	Positive support
Pierre and Moyo (2015)	Effect of Financial development and economic growth in 5 SADC countries	Fixed Effects, GMM and fully modified OLS (FMOLS)	There is positive relationship between financial development and economic growth	Positive support
Maduka and Onwuka (2013)	Investigates the long and short run effect of financial development and economic growth in Nigeria	VECC model	Financial market has a negative and significant effect on economic growth	No support
Mandiefe, (2015)	Effect of Financial development and economic growth in Cameroon and South Africa	VECM	Financial development enhances economic growth in the long run	Positive support

Nurudeen, (2009)	Does Stock Market development enhance economic growth in Nigeria	Error Correction Model	Stock market development promotes economic growth	Positive support
Nyasha and Odhiambo (2015)	The relationship between bank and stock market development to economic growth in South Africa	ARDL approach	Market based rather than bank based financial development is what drives economic growth	Little support
Nyasha and Odhiambo (2015)	The relationship between bank and stock market development to economic growth in South Africa	ARDL	The development of real sector in South Africa is driven by the Stock market	Positive support
Fofana, (2006)	The effect of stock market to economic growth in Cote d'Ivoire	ECM	There is long run relationship between stock market and economic growth	Positive support
Odhiambo, (2004)	The effect of banks to economic growth in South Africa	ECM	It is growth which drives financial development in South Africa	Positive support
Odhiambo, (2007)	The effect of financial development to economic growth in 3 African countries	ECM	There is relationship between financial development and economic growth, but the direction of causality depends on the variables used	Positive support

Odhiambo, (2008)	The effect of financial development to economic growth in Kenya	ECM	There is uni-directional causal flow from economic growth to financial development	Positive support
Odhiambo, (2009)	The effect of financial development to economic growth in South Africa	ECM	Economic growth enhances financial development	Positive support
Odhiambo, (2009)	The effect of financial development to economic growth in Zambia	ECM	Financial development enhances economic growth	Positive support
Odhiambo, (2010)	The effect of financial development to economic growth in Lesotho	ECM	Economic growth enhances financial development	Positive support
Odhiambo, (2010)	The effect of financial development to economic growth in Tanzania	ECM	No sufficient result for finance led growth	Negative support
Onuonga, (2014)	The effect of financial development to economic growth in Kenya	ARDL	Financial development enhances economic growth as well economic growth enhances financial development	Positive support
Owolabi and Ajayi (2013)	The effect of stock market development to	OLS	There is positive link between stock market and economic growth in Nigeria	Positive support

	economic growth in Nigeria			
Owusu and Odhiambo (2013)	Effect of financial liberalisation on economic growth in Ivory Coast	ARDL	The effect of financial liberalisation to economic growth are negligible both in the short and long run	Little Support
Owusu and Odhiambo (2014)	Effect of financial liberalisation on economic growth in Nigeria	ARDL	Financial liberalisation policies have effect on economic growth in Nigeria	Positive support
Polat et al., (2013)	Effect of financial development on economic growth in South Africa	Cointegration Approach	Financial development stimulates growth	Positive support
Rafindadi and Yusof (2013)	Effect of financial development on economic growth in Sudan	ARDL	The effect of financial development to economic growth is dependent to the variables used	Mixed support
Rafindadi and Yusof (2014)	Effect of financial development on economic growth in Nigeria	ARDL	The effect of financial development to economic growth is dependent to the variables used	Mixed support
Raheem and Oyinlola (2015)	Effect of financial development on economic growth in West Africa	OLS	Financial development is detrimental to growth where inflation is above a certain threshold	Little support
Saibu et al., (2009)	The effect of financial structure in economic growth in Nigeria	VECM	Financial structure has no significant effect on real sector	Negative support

Uddi and Shahbaz (2013)	The relationship between financial development and economic growth in Kenya	ARDL	The development of the financial sector has influence on economic growth in the long run	Positive support
Sunde, (2012)	Financial sector development and economic growth in South Africa	ECM	Financial sector has effect on economic growth	Positive support
Tachiwou, (2010)	Stock market development and economic growth in West Africa	ECM	Stock market development positively affects economic growth	Positive support
Tswamuno et al., (2007)	Financial liberalisation and economic growth in South Africa	ECM	Liberalisation of the capital account is necessary but not sufficient for economic growth	Mixed Support

2.4.2 Empirical Literature Review

The effect of financial intermediation in enhancing economic growth has been a contending issue of debate among economists. Its role in strengthening the financial systems, reducing the cost of acquiring information and lowering of transaction costs has been noted to contribute to higher growth (Bonfiglioli, 2005). Financial liberalization is expected to improve the financial system of a country by correcting non-market disparities by encouraging efficient allocation of loanable funds to the real sector and market interest rates (Rousseau and Watchel, 2000). This in-turn stimulate savings and investments, promote the development of new financial instruments that will reduce risk, increase the intermediation of economic agents, increase competition in the banking sector, which will produce competition and better service delivery, improves the speed and diversity of banking activities through transferring skills

and financial technology across borders (Greenwood and Smith, 1996; Khan and Senhadji, 2003).

A vast majority of researchers are in favour of the effect of financial development in improving the countries' economies by stimulating investment and savings, however others are unconvinced to financial effect and note on the contrary the reactive response to the demands of the real sector (Lucas 1988). Some stress the detrimental negative effects created by short-term volatility and fragility of the financial system that arise to instigate the boom-bust short cycles with negative effects on long-term output, stimulate excessive speculative behaviour causing the economy to enter into a crisis (Kaminsky and Reinhart, 1999). However, the detriments of financial liberalisation, Ranciere et al., (2006), notes that the gains acquired as a result of liberalisation of the financial market far outweighs the negative effects.

The quest to liberalise the financial markets in Sub Saharan African markets have not brought about the fruits anticipated. These can be seen from mixed results in empirical studies above. Although many studies have seen positive support on the finance growth nexus (Abubakar et al., 2015; Adejare, 2013; Akinboade, 2000; Fowowe, 2008; 2011; Iyoboyi, 2013), just to name a few, yet a few have not yielded the positive fruits of liberalisation (Adusei, 2013; Effiong, 2015; Odhiambo 2010; Maduka and Onwuka, 2013). The failure can be as a result of failure to meet the preconditions necessary to enable successful impact which can include reduction in inflation, stable and growing economy, bank supervision and regulation just to name a few (Chapple, 1990; Akinlo and Egbetunde, 2010). Furthermore, differences in results may be due to time period analysed, whether single or multiple countries assessed, proxy variables used and whether models utilised are robust and can be correctly deduced for appropriate inference (Adu et al., 2013; De Gregorio and Guidotti, 1995; Fernandez and Galetovic, 1994; Ram, 1999 and Favara, 2003).

Most literature that have studied the finance growth nexus in SSA have utilised panel data analysis which is far superior to the cross-sectional studies (Levine, Loayza and Beck, 2000; Benhabib and Spiegel, 2000). It has been argued that the use of cross-sectional studies can be flawed as it lumps together and averages countries of different stages of development. This in return means the analysis fails to consider

country specific effects, hides key potential variables and does not accommodate the existence of cross-country heterogeneity leading to inconsistent and biased estimates (Ghirmay 2004; Quah, 1993; Casselli et al., 1996). Various researchers are advocating the use of time series studies as they capture the prevailing fundamental conditions of the countries over a long period of time (Bell and Rousseau 2001; Arestis and Demetriades, 1997). Others propagate the use of dynamic panel data for its inherent properties to control bias emanating from cross country regressions (Levine, Loayza and Beck, 2000; Benhabib and Spiegel, 2000).

An array of empirical studies done have considered bank-based effect on economic growth than stock market effect. This is a result of a well-developed bank-based system in comparison to stock market system which are not well developed in the region (EIB, 2018). Studies have shown that efficient functioning banks enhances economic growth but have failed to concurrently determine the growth enhancing effect of stock markets development. The evaluation of positive relationship effect of banks to the economy without considering stock market development effect makes the assessment difficult as we fail to ascertain the independent effect of each variable of stock or bank in facilitating growth, furthermore this dilemma makes it difficult to identify policy necessary to stimulate growth (Caporale et al., 2004).

Many scholars are in favour of the fact that a well-developed financial market spurs economic growth however they differ in the level and direction of effect Kuznets (1955) notes that the growth of financial market can be realised where the economy moves towards maturity stage, this is not the case with Lewis (1956) who advocates the immediate growth of the financial market and eventual drives the real economy. These opposing views are termed supply leading and demand following hypothesis. The supply leading view notes that a well-developed financial system enhances economic growth, on the other hand the demand following approach advocates that the demand for financial services is achieved as real economy grows which eventually causes the development in the financial sector (Patrick, 1966). Others have argued that financial sector development might not lead to an increased growth and can be a factor to deform a continuous path towards development. These studies have found that the supply leading view is more applicable in developed markets whereas in developing

countries the demand following view is more pronounced (Kaminsky and Reinhart, 1999).

The supply leading stance has been the popular view for a long while before the demand view surfaced which contends the role of the real sector in promoting the financial sector. Graff, (1999) posit neither the demand nor the supply stance is at work but rather neither of them influences the other that is they are not causally related. Graff notes that the growth of both sectors are unrelated and hence follow their own path whereas the real sector is promoted by the real factors while the state and history of financial institutions are prominent in fostering the financial sector. In the Sub-Saharan African studies, we see a few studies that follow a demand leading view. When studying the effect of finance on economic growth, Odhiambo (2010; 2009) found economic growth enhances financial development in Lesotho and South Africa respectively. When studying the same effect in Kenya, Odhiambo (2008) found a uni-directional causal flow from economic growth to financial development. On the contrary Onuonga (2014) found that financial development enhances economic growth as well economic growth enhances financial development in Kenya.

Patrick, (1966) notes that the relationship of finance and growth moves from finance to growth in early phases of economic development and from economy to finance as the economy matures. In contrary, Greenwood and Jovanovic (1990) advocates the costly creation and deployment of financial institutions which can indicate its pre-eminence over economic growth later in development. Negative effect of financial development has been noted to curtail economic growth as a result of inflationary pressures led by the financial crisis (Roussseau and Wachtel, 2011). Others have raised concerns over the effect of financial sectors to brain drain the real sector as the cost of financial development might outweigh its benefits as it diverts talent away from sectors were marginal effect is higher (Deidda, 2006).

A proliferation of empirical reviews has propounded various exogeneous factors that lead to the effect of financial mediation on economic growth. Some advocate that differences stem from institutional and economic structures (LaPorta *et al.*, 1998; Bell and Rousseau, 2001), others note that the effect is sector wise in a sense that sectors that have high scale of operation and increased productivity can benefit more from

financial development (Kletzer and Pardhan, 1987; Beck, 2002). Furthermore McKinnon, (1973) and Fry, (1995) notes the effectiveness of financial development is more prominent in the early stages of the economy's development. However, this contradicts the view where more developed economies will benefit more from financial development unlike less developed economies, Akinboade, (2000) supports this view when he found a small positive and significant effect of finance during the development phase and negative and insignificant during the period of repression in Tanzania.

Others propound that, legal systems are a key factor in influencing the effect of financial development. They contend that effective legal protection for both lenders and borrowers cause financial institutions to work properly, on the other hand weak contractual enforcements deters the effect of financial systems and hence their development. Moreover, corrupt practices and political infiltration in financial intermediation may lead to unproductive investment being promoted unethically (LaPorta *et al.,* 1998), others have noted the effect of politics, factor endowment, culture and geographical regions in their influence on economic growth (Engerman and Sokoloff, 1997; Acemoglu et al., 2001; Beck et al., 2003; Easterly and Levine, 2003).

Countries with favourable factor endowment can be seen to have institutions that disproportionally favour the small elite group in expense of the masses as they maintain their thrust of power since colonial era (Engerman and Sokoloff, 1997). Acemoglu et al., (2001) notes the force of political power in influencing the economic institutions in a country. While Easterly and Levine, (2003) provides evidence to the fact that geography/endowment of tropics, germs, and crops affect development through institutions by influencing the inputs into the production function. Countries with inhospitable geography/endowment saw their economies inclining towards extractive institutions to exploit natural resources, while on the contrary, economies with hospitable endowment encouraged settler institutions.

In studying the finance growth nexus in Sub - Saharan Africa, various factors have contributed to the advancement or demise of the relationship Effiong, (2015) noted that existing institutions has not enhanced finance - growth development whereas Aziakpono, (2005) found that financial development has effect on growth on countries

that had strong financial systems, institutions, and structural frameworks. The same outcome was observed by Adeninyi et al., (2015) who noted that financial development matters for growth where precondition have been met. When looking at the effect of inflation on matters of growth and finance, Raheem and Oyinlola, (2015) found that financial development is detrimental to growth where inflation is above a certain threshold, while Rousseau and Wachtel, (2000) concurs with the view and notes that high inflation weakens the effect that finance has on growth.

It is understood from Levine, (2005) that finance facilitates economic growth through the reduction of transaction and information costs, monitor investments, reduce risk, mobilise savings and facilitate exchange of goods and services. The efficiency of these financial function is dependent on the institutional differences in various countries and hence will determine the quality and effectiveness in promoting growth. The role of Institutional quality in influencing financial development is indirectly channelled and hence its effectiveness matters. A sound institutional framework constituting laws, rules and codes of conduct should be effective in enhancing sound banking and financial institutions which will eventually lead to economic growth (Arestis and Demetriades, 1997; Demetriades and Law, 2006).

Conclusion

The empirical literature of SSA has produced mixed results. Most studies found positive outcome, some found negative results, and a few found mixed and little support. By using different techniques, different countries with different level of development, different variables to proxy financial development, different time examined and statistical methods has not been able to establish a conclusive evidence (Chang and Caudill, 2005; Apergis et al., 2007; Ang, 2008). Moreover, the effective functioning and rewards of the finance growth nexus is dependent on conditions being met such as the effectiveness of the legal systems in enforcing contracts, appropriate supervision of financial institutions, strong institutions and structural frameworks. To ascertain a conclusive and reliable outcome, this thesis is assessing meta-analysis to consider whether the finance growth relationship constitutes a genuine effect.

2.5 The Dynamics of Financial Development and Economic Growth

2.5.1 Introduction

Sub-Saharan Africa's economic landscape, diverse in its phases of development and abounding with potential, has long been the focus of study. The intricate interplay between financial development and the metrics used to evaluate economic growth is crucial to comprehending this landscape. This chapter analyses the pivotal role of financial systems in determining economic trajectories and the instruments and indicators used to measure progress.

Our research begins by explaining the significance of financial development as a pillar of economic growth. The pace and direction of a nation's economic development are frequently determined by the effectiveness of its financial systems, despite the fact that numerous factors contribute to this growth. In addition to fostering capital accumulation, financial mechanisms also facilitate technological innovation, risk diversification, and efficient resource allocation.

The Gross Domestic Product (GDP) is the defining indicator of economic progress. While the Gross Domestic Product is a universally accepted indicator of economic health, its scope, limitations, and relevance to the Sub-Saharan context warrant a closer look. We seek to comprehend why, despite a multitude of available metrics, GDP continues to be the preferred metric and what implications this has for interpreting economic progress.

As we progress, we are confronted with the intricate, frequently bidirectional relationship between finance and growth. While financial development can stimulate economic growth, it is also possible for growth to stimulate financial development. This chapter explains why we have chosen to focus primarily on the narrative in which finance functions as a precursor to growth, shedding light on the empirical evidence and theoretical frameworks that support this point of view.

Finally, we recognise the diversity inherent to the Sub-Saharan region. With countries in varying phases of economic growth and development, comparisons are fraught with

difficulties. Recognising these disparities is crucial, and our discussion focuses on approaches and considerations that enable a nuanced and fair comparison across nations.

2.5.2 The Primacy of Financial Development in Economic Growth

Financial development refers to the level of complexity and breadth exhibited by a nation's financial system (Gertler, 1988). In economies characterised by an evolving financial infrastructure, a discernible absence of mechanisms that stimulate economic progress can be observed. Extensive research has consistently demonstrated a strong correlation between the depth, functionality and breadth of the financial sector and long-term economic advancement.

Numerous factors exertinfluence on economic growth, encompassing a diverse range of factors such as a strong institutional framework, stable macroeconomic conditions, a proficient labour force, adisposition towards trade openness, technological progress, enhancements in infrastructure, and the availability of naturel resources (Levine, 1997). Each of these drivers assumes a distinct function in influencing the economic trajectory of nations; nonetheless, the significance of financial development becomes notable prominent. This section aims to shed light on why financial development holds such a prime position when discussing the drivers of economic growth.

A robust institutional framework that promotes the rule of law, property rights protection, and minimal levels of corruption is essential for promoting economic growth. Stable institutional environments preserve investments, foster corporate confidence, and offer stability (Aziakpono, 2005). According to Acemoglu et al., (2004), institutions are essential for long-term growth and economic development. In addition to criticising the limited focus on financial development, they emphasise the need of inclusive institutions, property rights, and the rule of law in promoting long-term economic success. Institutions are cited by North (1990) as another important factor in growth.

Inflation, fiscal and monetary management, exchange rate volatility, and trade volatility, to name a few, are essential macroeconomic fundamentals that contribute to

the creation of an environment conducive to economic growth (Beck et al., 2003). Dollar and Kraay (2002) cast doubt on the notion that financial development is the primary means of alleviating poverty. They highlight the significance of overall economic growth in enhancing the living standards of the impoverished and suggests that policies should focus on promoting broad-based growth as opposed to narrowly targeting financial development. Human capital, including talents, productivity, and education, are a further factor. A competent, healthy, and educated labour force is crucial for economic expansion (Easterly and Levine, 2003). Beck and Honohan, (2017) argue that although finance can contribute to economic development, the relationship between the two is complex and context dependent. The paper emphasises the need for an approach that takes into account other development drivers, such as human capital and innovation.

Innovation and technological advancement are additional crucial factors that have a transformative effect on economic growth Chang, (2005) contests the conventional economic theories that prioritise financial development as the primary generator of economic expansion. He argues for a heterodox approach that acknowledges the significance of industrial policies, technological progress, and institutional factors in attaining sustained and inclusive economic growth. Infrastructure development is an additional economic growth driver. Physical capital investment increases productivity and efficiency, resulting in economic growth Rajan and Zingales, (2003) criticise the International Monetary Fund's (IMF) policy of promoting financial development as an economic growth panacea. They argue that while finance is essential, it should be considered within a broader framework that also includes institutions, education, and infrastructure as growth drivers.

These factors are interdependent and mutually reinforcing, and they all contribute to economic expansion. This study emphasises and utilises financial development due to its unique function in facilitating and supporting other economic growth drivers. The role of capital allocation is one of the factors that places financial development as a pivotal role. The mere presence of all these growth drivers does not guarantee robust economic growth. For these drivers to be completely realised, it is necessary to have an efficient system in place that directs available resources towards them; without such a system, these elements may remain underutilised. Not only do financial

systems serve as this mechanism, directing savings and investments to where they are most required, but the value addition of other factors depends on the existence, accessibility, and availability of capital (Greenwood and Jovanovic, 1990).

Another factor is the multiplier effect. Financial development is not independent; it amplifies the effects of other growth drivers. For example, financial markets can facilitate the adoption of new technologies by assisting innovators in securing the necessary funding. Similarly, a sound financial system can increase the productivity of human capital by ensuring that businesses have the resources to train employees, implement new technologies, and expand (Paun et al., 2019). The financial system's interconnectedness with other economic sectors is an additional important advantage. The health and effectiveness of the financial system has ripple effects on all other industries. For instance, if credit is readily available and affordable, industries ranging from agriculture to manufacturing will be able to secure the funds necessary to innovate, expand, and employ, resulting in widespread economic growth (Levine, 1997).

Risk management and financial stability are additional reasons for its importance. Financially developed economies are frequently better able to withstand economic disruptions be they domestic disruptions or international crises. This resiliency is essential for sustained long-term growth (Beck et al., 2000). Moreover, financial inclusion and social mobility is another prominent factor leading to its importance. A developed financial sector, particularly when coupled with financial inclusion initiatives, can contribute to more inclusive economic growth. By providing financial services to underserved segments of society, the government can pave the way for broad-based economic growth (Rajan and Zingales, 1998).

2.5.3 GDP as a yardstick of Economic Progress

The Gross Domestic Product (GDP) is one of the most frequently employed measures of a nation's economic performance. It represents the monetary value of all finished products and services produced within the borders of a country during a given time period. In addition to GDP, economic growth is typically measured with a variety of indicators that capture the expansion of an economy over a specific time period. Some

of these measures include Labor productivity, Investment, Consumer spending, Trade balance, Employment and unemployment rates, Consumer Price Index (CPI) and Inflation Rate, Income Distribution Measures, Business and Consumer Confidence just to name a few. This section will examine why GDP has acquired such prominence and what considerations should be made when employing it as a metric.

Stiglitz et al,. (2009) address the limitations of using Gross Domestic Product (GDP) as the sole measure of economic and social progress and propose alternative indicators that provide a more comprehensive picture of well-being and sustainability Sen, (1999) reflects Stiglitz's emphasis on the need to evaluate economic growth in terms of its effect on human development and well-being. He criticises GDP for its limited emphasis on material production and proposes incorporating indicators such as education, health outcomes, and personal liberties.

Clifford et al., (1995) criticise GDP for disregarding factors such as income inequality, environmental degradation, and the value of domestic labour. They propose the Genuine Progress Indicator (GPI) as an alternative measure that accounts for these variables and provides a more accurate depiction of societal progress and well-being. Similarly, Coyle (2014) examines the limitations of GDP as an indicator of economic development. He emphasises issues such as the omission of environmental costs and the exclusion of non-market activities. Coyle advocates for the incorporation of these factors into economic measurement and proposes alternative metrics that incorporate a broader range of indicators.

These articles represent a small portion of the extensive literature that criticises the use of GDP as the singular measure of economic growth. They emphasise the need to consider a broader set of indicators and dimensions when evaluating economic development, such as environmental sustainability, social well-being, income distribution, and subjective quality of life measures. However, there are numerous economists who support GDP as a reliable indicator of economic expansion.

The originator of the concept of GDP Kuznet (1955), provides a comprehensive analysis of GDP as a measure of economic development. Kuznets contends that the Gross Domestic Product (GDP) is a useful summary measure of economic activity and

captures the size of an economy as a whole. He acknowledges its limitations, but stresses that it is a useful instrument for comparing economic performance over time and between nations. On the other hand, Coyle (2014) asserts that GDP has become the standard metric for measuring economic performance due to its simplicity, comparability, and capacity to capture the production of commodities and services within an economy.

Coyle contends that despite its limitations, GDP remains essential for informing economic policy. Easterlin (2001) also investigates the relationship between GDP and subjective well-being in his paper. While acknowledging the positive correlation between GDP growth and well-being in developing nations, Easterlin argues that above a certain income threshold, a higher GDP per capita does not inevitably result in greater happiness. Nevertheless, he acknowledges that GDP remains an essential measure of material living standards and economic development.

Hall and Jones (1999) analysed the differences in GDP per capita between nations and the factors that contribute to variations in economic output. They argued that GDP per capita is a crucial metric for comparing nations' living standards and economic prosperity. Additionally, Durlauf and Quah (1999) reviewed the empirical literature on economic development and emphasised the importance of GDP as a leading indicator of economic performance. They argued that GDP encompasses the multifaceted nature of economic development, including technological advancement, capital accumulation, and labour productivity.

These papers support the use of GDP as a measure of economic development because it provides a standardised and widely accepted metric for comparing and evaluating economic performance. In addition to its ability to summarise economic activity, capture trends in productivity, facilitate international comparisons, reflect living standards, and incorporate various factors influencing economic output. In addition, they emphasise the need for additional indicators to capture non-economic aspects of well-being and to address the limitations of GDP in providing a comprehensive assessment of societal progress.

In consideration of all the above highlighted measures of economic growth, this study has chosen to utilise GDP as a measure of economic growth due to various reasons:

First, GDP is an All-inclusive measure. It measures the total value of products and services produced within a nation's borders during a given time period. Consumption, investment, government expenditure, and net exports are all included in this comprehensive measure of economic activity. By aggregating these components, GDP provides a comprehensive overview of an economy's size and growth rate (Kuznets, 1955). The second benefit is Comparability. GDP enables comparisons across countries and time periods. It provides a standardised metric that economists, policymakers, and analysts can use to evaluate and compare the economic performance of different nations. Using a standard metric such as GDP makes international and historical comparisons simpler (Coyle, 2014).

Another key reason for using GDP is its widespread use in international rankings and comparisons, such as the World Bank's GDP rankings and the International Monetary Fund's World Economic Outlook, is another important cause for its prevalence. These rankings serve as a standard for evaluating the economic standing and global competitiveness of a nation (IMF, 2020). Lastly, GDP is readily accessible, comparable, and retrievable by numerous researchers. Numerous economic analysts favour this metric due to the abundance of data that is routinely collected and reported by government agencies and international organisations (Kuznets, 1955).

2.5.4 Unidirectional Focus: Finance Leading to Economic Growth

The relationship between finance and economic development is bidirectional, meaning it can operate in both directions. This thesis has chosen to examine one orientation of the relationship, the direction of finance leading to economic growth, for a number of reasons.

Analysing the impact of finance on economic growth permits researchers to investigate the possibility of a causal relationship. By examining how changes in financial factors such as credit availability, interest rates, and stock market performance affect economic growth, researchers can determine the channels through which finance

influences the economy. In a study by Rajan and Zingales (1998), they discovered that industries that are inherently more reliant on external financing grow disproportionately more rapidly in nations with more developed financial markets. In addition Beck et al., (2000) demonstrated that the operation of financial markets and institutions influences growth positively by enhancing capital allocation.

There is a large body of economic literature, including theories such as the Financial Development Theory, that contends for the significance of finance to economic growth. This viewpoint suggests that an efficient and well-functioning financial system supports investment, capital accumulation, technological advancement, and productivity growth, which all contribute to economic growth (Adeninyi et al., 2015; Akinboade 2000; Beck and Levine 2004). Goldsmith (1969) was one of the early researchers who presented empirical findings that substantiated the positive correlation between financial development and economic growth through cross-country analyses. On the other hand, King and Levine (1993) found a robust positive association between financial development and the pace of capital accumulation among nations.

Understanding the relationship between finance and economic development is crucial for policymakers. Governments and central banks frequently seek to develop and regulate financial systems to stimulate economic development, and analysing the role of finance in this process assists in identifying effective policy interventions. Researchers can contribute to an understanding of how financial policies and reforms affect economic outcomes by focusing on the direction of finance leading to development (Law et al., 2013; Nelson and Sampat, 2001). Financial stability is indispensable for sustained economic growth. Policymakers can create regulations and safety nets to prevent or mitigate financial crises if they understand the system's potential hazards and vulnerabilities (Montiel, 1995).

Numerous empirical studies have investigated the connection between finance and economic growth. Some of these studies provide evidence in support of the notion that financial development causes economic growth. Due to the availability of extant literature, data, and methodologies that facilitate examining the relationship from this perspective, many researchers prefer to examine this direction. Financial indicator historical data, such as credit availability, interest rates, and stock market

performance, are frequently accessible. Obtaining high-quality data on economic growth and its determinants can be more difficult than collecting comprehensive data on financial institutions, indicators, and transactions. Due to data constraints, researchers may opt to examine the relationship between finance and growth (Adejare, 2013; Abubakar et al., 2015; Adusei, 2013; Meshel et al., 2014; Enowbi and Kupukile, 2012).

Financial intermediaries, such as banks and financial institutions, play a crucial role in facilitating the passage of funds from savers to borrowers, according to the Financial Intermediation Theory. This process of intermediation supports investment, entrepreneurship, and innovation, which are all vital to economic growth. Therefore, studying the effect of finance on economic growth is consistent with the financial intermediation theory, which emphasises the positive function of finance in promoting economic activity (Adam, 2009; Fowowe, 2008; Iyoboyi, 2013; Kagochi, 2013). Diamond and Dybvig (1983) developed a model in which banks provide liquidity and permit risk-sharing among depositors, illustrating the stabilising function of financial intermediation, whereas Stiglitz and Weiss (1981) investigated how information asymmetries can lead to credit rationing in markets. The study highlighted the role of banks and other intermediaries in addressing these market flaws.

Policy Importance is another reason to study the finance growth relationship. Analysing the finance-to-growth direction is also motivated by the relationship's practical significance for countries at different phases of development. Establishing robust financial systems and mobilising capital for productive investments is frequently a challenge for developing economies. Policymakers, financial institutions, and investors are extremely interested in determining how financial development can stimulate economic growth. Examining the impact of this direction of finance on economic growth helps identify potential barriers and provides insight into policies that can enhance financial sector development, attract investments, and promote sustainable economic growth (Pierre and Moyo, 2015; Mandiefe, 2015; Fofana, 2006; Mandiefe, 2015; Fofana, 2006).

While it is valuable and common to analyse the direction of finance leading to economic growth, it is essential to recognise that the relationship is complex, dynamic,

and reciprocal, and that both directions merit consideration. Some researchers examine the inverse relationship, examining how economic growth influences financial development via factors such as increased savings, increased demand for financial services, and enhanced investment opportunities. Comprehension of both directions of the relationship provides policymakers with an in-depth understanding of the interplay between finance and economic growth and enables them to make informed decisions.

2.5.5 Diversity in Growth and Financial Development across Sub-Saharan Nations

When comparing Sub-Saharan nations in various stages of economic growth and development, it is essential to account for their unique circumstances and conduct an analysis that takes them into account. Here are some essential considerations for effectively addressing this issue:

First, we must acknowledge that each country in Sub-Saharan Africa has its own economic, social, and political context; therefore, it is essential to differentiate between them. We must avoid generalisations and take a case-by-case approach to each country in order to comprehend its unique challenges and opportunities (World Bank, 2008; AFDB, 2013). Sachs and Warner (1995) studied the "resource curse" and discovered that countries with an abundance of natural resources tend to have slower economic development than countries without such resources. This phenomenon is evident in a number of SSA nations, highlighting the need for individualised economic strategies. The study by Herbst (2000) provides context for comprehending the dynamics and variations of political systems throughout the continent.

Secondly, development levels must be contextualised. It is essential to recognise that each country's development trajectory is influenced by historical context, natural resources, political stability, civil conflicts, colonial legacy, and regional dynamics. To avoid generalisations, it is essential to understand the unique challenges and opportunities faced by each nation (Easterly and Levine 1997). The institutions established during colonial periods, according to Acemoglu et al., (2001), have a significant impact on current economic performance. Their theory emphasises the

enduring influence of historical institutions on development outcomes. Murshed and Gates (2005), on the other hand, discuss how neighbouring conflicts can influence the political stability and economic performance of the surrounding region.

Thirdly, it is important to classify countries into distinct development stages, such as low-income, middle-income, and high-income, to account for differences in their economic structure and challenges. This permits for more precise comparisons within similar groups, as opposed to direct comparisons between stages. Classifying nations according to their income levels assists in identifying the challenges and opportunities unique to each stage. For example, low-income nations may struggle more with fundamental infrastructure, whereas middle-income nations may face the "middle-income trap." As nations rise through the income brackets, they confront new challenges. It is essential for effective policy intervention as well as comparison and analysis to recognise these obstacles (Bhorat et al., 2015; AFDB, 2013).

Comparative analysis within peer groups is another essential consideration. Grouping countries according to similarities in their development stage, regional context, or economic structure can facilitate more meaningful comparisons. This allows for a more accurate evaluation of progress and the identification of best practises applicable to specific groups. Countries within the same region often share historical, cultural, and economic linkages. Comparing them can reveal insights into regional trends, opportunities and challenges (Easterly and Levine, 1997). In addition, grouping SSA nations by their income levels can help identify shared challenges encountered by nations at similar stages of development. For example, least-developed nations may struggle with fundamental issues such as infrastructure and primary healthcare, whereas middle-income nations may struggle with industrialization and value addition (Ndulu et al., 2007).

Another important point to take note is the fact that Sub-Saharan Africa is comprised of diverse regional blocs with varying degrees of integration and economic cooperation, making regional dynamics an additional essential factor to consider. It is essential to acknowledge the diversity of the Sub-Saharan region and compare countries within their subregions or economic communities. This allows for more meaningful comparisons by recognising the impact of regional dynamics, trade

relationships, and shared challenges (Bhorat et al., 2015). SSA can be subdivided into East Africa, West Africa, and Southern Africa, among others. Each of these regions has its own geopolitical and economic dynamics, and the study of countries within these boundaries can shed light on regional trends (Miguel, 2004).

The analysis of policies and institutions is an additional essential consideration. It is vital to evaluate the effectiveness of development-promoting policies and institutions. Governance, transparency, the rule of law, levels of corruption, and the existence of inclusive institutions must be assessed. These factors significantly affect a nation's capacity to utilise its resources and promote sustainable development (AFDB, 2013). The outcomes of a nation's development frequently depend more on its policies and institutional strengths than on its natural resources or population. The Primacy of Institutions over Geography and Integration in Economic Development" by Rodrik et al,. (2004) emphasises that institutional quality is the primary determinant of economic performance between nations.

Lastly, policies should be tailored to the local environment. It is crucial to recognise that there is no one-size-fits-all solution. Each nation's policies and interventions should be tailored to its unique requirements and challenges and hence it is paramount to promote context-specific strategies that take local circumstances, cultural norms, and institutional capacity into account. It is crucial that policymakers move away from comprehensive solutions. A complete understanding of local contexts, whether they be historical, sociocultural, economic, or ecological, is indispensable. As highlighted by the World Bank's emphasis on context-specific strategies, there is a greater likelihood of attaining sustainable growth and development by cultivating policies rooted in the unique circumstances of each country (World Bank, 2008).

By employing these approaches, it is possible to address the issue of comparing Sub-Saharan nations in various stages of growth and financial development more effectively and to gain a more nuanced understanding of their particular circumstances.

CHAPTER 3: CONCEPTUAL FRAMEWORK

3.1 Introduction

The role of financial systems in an economy cannot be understated, it can be used as a mediator for growth through the mechanism of channelling funds from surplus to deficit agents with productive investment prospects (Schumpeter, 1912). With this mechanism, the effect on the economy can either be positive or negative. On the positive note, it can help promote the allocation of capital to more productive entities, ameliorate intervention costs and eventual accelerate investments (Levine, 2005). A negative side of financial intermediation and systems has been propounded to instigate the boom-bust short cycles with negative effects on long-term output, stimulate excessive speculative behaviour causing the economy to enter into a crisis (Kaminsky and Reinhart, 1999).

Financial intermediation enhances the development of the financial sector through its mechanism of reducing the cost of acquiring information and lowering of transaction costs (Gertler, 1988; Levine, 1997). Financial liberalization is expected to improve the financial system of a country by correcting non-market disparities and encouraging efficient allotment of finance to the real sector and market interest rates (Rousseau and Watchel, 1998). This will stimulate savings and investments, promote the development of new financial instruments that will reduce risk, increase the intermediation of economic agents, increased competition in the banking sector, which will produce competition and better service delivery, improves the speed and diversity of banking activities through transferring skills and financial technology across borders (Levine, 1997).

Andersen, Jones and Tarp (2012) notes that in order for finance to promote economic growth, there has to be the liberalisation of the domestic sector which enhances financial development and eventual economic growth. McKinnon (1973) and Shaw (1973) argue that liberalisation of the financial sector would facilitate access of international capital markets which will result in consumption smoothing, risk sharing and efficient capital allocation. Both Campbell and Mankiw, (1989); Bandiera et al., (2000) argue that the impact of financial development to growth is dependent on the

size of household income and substitutional effects. An increase in income and saving rates may motivate households to invest in non-financial assets and diminish aggregate savings.

However, financial liberalisation has proven to be a double-edged sword. On the one hand, the positive effects can stimulate investment, and promotes economic growth but on the negative effect, financial liberalisation can create short-term volatility and fragility of the financial system because of relaxing or removing all public financial regulations, bringing about market imperfections and information asymmetries (Kaminsky and Schmukler, 2003) Kaminsky and Reinhart, (1999) also notes that the liberalisation of financial markets gives banks more autonomy to take more risks magnifying the instability of the stock market cycles which is then transmitted to the real economy.

The crises that arose because of financial liberalization has called for a necessity to strengthen financial institutions and the establishment of sound systems of prudential and capital regulation, existence of deposit insurance and supervision before liberalizing financial markets and capital flows (Levine et al., 2000). Others note that opening up to foreign capital will stimulate changes in institutional environments and eventually improve financial systems (Rajan and Zingales, 2003). However, the detriments of financial liberalisation, the gains acquired as a result of liberalisation of the financial market far outweighs the negative effects, a call for institution set of prudential regulation and supervision to ensure financial systems operate efficiently is advocated (Ranciere et al., 2006).

To guide the analysis, this section has developed and analysed a simple static logic model to aid the conceptualization of the theoretical and empirical discussion by graphically explaining the channels and mechanism through which financial development enhances growth. Moreover, the model stipulates the interventions needed to enhance financial institutions to operate efficiently. According to Anderson et al., (2011), Kneale et al., (2015) and Noyes et al., (2016) logic models can be used to direct and guide the study process, identify the most relevant variables, highlight explicitly the causal pathways converting inputs to outcomes. Due to the transparent

and holistic nature of the logic model, this thesis has adopted it to aid the illustration of the hypothesized relationship.

Figure 3.1

LOGIC MODEL TO ANALYSE THE IMPACT OF FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH

INPUT	INTERVENTION	MECHANISM	OUTCOME
BANKS	**Financial Intermediation** ◦ Interest rate increase ◦ Removal of credit constraints ◦ Privatisation ◦ Reducing government intervention ◦ Capital account development	**Capital Accumulation (Savings)** ◦ Increased output ◦ Distribution of resources, income and assets	**Positive Traits** ◦ Increased savings ◦ Increased investment ◦ Stimulate innovation ◦ Reduce poverty
STOCK MARKET	**Macroeconomic Fundamentals** ◦ Inflation control ◦ Structural reforms ◦ Financial stability ◦ Fiscal, monetary and exchange rate policy **Institutional Reforms** ◦ Regulatory reform ◦ Contract enforcement ◦ Corporate governance ◦ Business	**Total Factor Productivity Investment)** ◦ Innovation ◦ Efficiency	**Negative Traits** ◦ Exposure to toxic assets ◦ Large capital reversal ◦ Financial fragility ◦ Enhanced volatility ◦ Accelerated speculation

3.2 Financial Liberalization

It is an established fact that an efficient financial system is an integral element to enable sound fundamentals of the economy. The prominent role of financial intermediation and financial markets cannot be overemphasized as it requires much attention from researchers and policy makers (Gertler, 1988; Levine, 1997). In order for the finance growth nexus to be effective in influencing financial intermediation and growth enhancing mechanisms, various economic and non-economic factors need to be in place. Financial liberalization can be categorized in two dimensions: domestic and external liberalization. Domestic financial liberalization is where government reduces ownership and regulatory restriction over financial markets improving resource allocation and mobilization. On the other hand, external liberalization is the opening of the financial sector by allowing capital account liberalization and foreign competition to enable a country tap into savings from foreign nations and to better allocate funds to efficient projects (Laurenceson and Chai, 2003).

The liberalisation of the financial system entail removing capital constraints, increase interest rates to align to the market demand and supply, removing government intervention and capital account development. These policies will enable governments reduce intervention in financial markets, paving the way to privatization of state-owned banks and promoting local stock markets among others (Mehran et al., 1998) Liberalisation of the financial markets greatly benefited African economies as they were able to tap into the external savings enabling them to undertake investments in excess of their level of domestic savings (EIB, 2018), brought about increase of competition in the financial sector and technological transfer due to the opening up of external capital transfers, entry of foreign banks and removal of barriers to stimulate investment and growth (Ozdemir, 2014).

Although the justification of interest rate deregulation is to combat financial repression, Stiglitz and Weiss, (1981) points out that asymmetric information can cause interest rates to be charged below market clearing rates even in liberalised period. The probability of default from borrowers as a result of imperfect information necessitates banks to ration credit and charge a reduced optimum interest rates even where borrowers are willing to pay higher rates. Furthermore, where the economy suffers

sever macroeconomic imbalance and is unstable, and where default conditions of certain segments of borrowers might cause systemic financial crises, governments may force banks to charge lower interest rates even under competitive credit conditions (Villanueva and Mirakhor, 1990). Conditions can become sever where there is deposit insurance with lack of effective prudential and supervision control, banks may embark on moral hazard, lending carelessly at higher interest rates without regard of borrower's circumstance as they are assured of loss absorption (EIB, 2018).

To adopt interest rate deregulation, countries should ensure they have first stabilised the macroeconomic environment and have sufficient supervisory and prudential controls. If that is not the case, interest ceilings should be adhered awaiting macroeconomic fundamentals to be in place before they are gradually removed (Villanueva, 1988). Furthermore, before the deregulation of interest rates, countries should take into account situation of the real sector as well as the cyclical phase of the economy. If the real sector is weak, the freed interest rates will weaken the net-worth of financial institutions, consequently, where the economy experiences a cyclical downturn due to negative shocks such as recession will cause borrowers net-worth to decline as well as increasing the cost of external finance. All these results in decline in real investments. Governments should therefore adopt interest rates deregulation in good times and gradually where the economy is not performing at its best (Caprio, Atiyas and Hanson 1994).

The structural adjustment propagated by IMF and WB prescribed interest rate liberalisation as the main policy prescription in SSA. Interest rate ceilings brings about a 'wedge between the social and private rates of return on asset accumulation, thereby distorting intertemporal choices in the economy (Agenor and Montiel, 1996, p.152) Villanueva (1988) stresses the importance of interest rate reforms which has an effect to both the monetary control and savings mobilization. An increase in real interest rates motivates consumers to suspend consumption and increase savings. Furthermore, an increase in interest rate leads to increase in income which stimulates demand and hence increase consumption. Interest rate liberalization or deregulation was, thus, to align interest rates toward market equilibrium (World Bank 1994, p.112).

McKinnon (1973) therefore posits the need for high equilibrium interest rates as the opposite curbs savings and exacerbates current consumption. This is contrary to the Keynesian view which propounds the need of keeping interest rates low in order to promote investments and eventual growth. Stiglitz and Weiss (1981) on the other hand are in favour of keeping low interest rates, pointing out that higher interest rates instigate moral hazard, incentive and adverse selection on bank loans. According to Stiglitz and Weiss, high interest rates aggravate the risk of assets. It reduces the project returns and causes projects that are less risky and unprofitable (incentive effect) to be abandoned and necessitates firms to shift to more risky projects as a result of high interest rates. Secondly, where banks screen borrowers using interest rate as a device, they may end up attracting risky borrowers as they are not concerned with high interest due to the fact that they will not repay the loans back (adverse selection effect).

Directed credit is another repressive policy that should be taken with caution. When it is terminated abruptly, banks that were previously shielded by the government would enter into markets without being fully equipped leading to asset bubbles. With insufficient stock of human and managerial capabilities post financial repression, banks need time to invest in such skills and risk analysis. This abrupt portfolio reallocation causes banks to end up with large exposure leading to high credit risk of non-performing assets. To combat this challenge, banks portfolio reallocation should be accompanied by institutional strengthening and prudential control as well as a gradual phasing of directed credit to new markets (Caprio, Atiyas and Hanson 1994).

Bank competition is another activity that follows after liberalisation of the financial sector. This is applied in order to improve efficiency. However, abrupt opening up of bank to competition straight after reform might cause more harm than good. Being operating under the government intervention for a long-time cause inefficiencies and unsound bank practices. If they are open to competition too soon, it might cause a systemic crisis as they are now bound to compete with stronger institutions leading to sever unsound practices especially with weak supervisory base. To ensure banks tap into the efficiencies of competition, banks prudential and regulatory controls should be put in place (EIB, 2018).

To enable financial markets, operate efficiently, there needs to be a strong institutional framework such as legal framework, contract enforcements, corporate governance, business environment, Prudential Financial regulation and supervision in which financial institutions operate to enhance financial intermediation and eventual economic growth. These institutional reforms should be efficient and conducive to enhance financial system stability (Ozdemir, 2014). Efficient institutions enable resources to be allocated appropriately to enable best combination of return and risk, enhances the development of financial systems in terms of its depth, access, quality and stability (Nelson and Sampat, 2001) on the contrary, inefficient institutions in an economy would cause widespread corruption, unenforced and undefined property rights, high uncertainty which would adversely affect the allocation of resources (Toke, 2009).

Furthermore, successful financial liberalization depends on macroeconomic stability. Significant macroeconomic policies and environment enhances or deters the efficiency of the financial sector. Volatility in terms of trade, high inflation rates and weak exchange rates are some of the economic fundamentals that makes banks asset portfolios vulnerable (Kaminsky and Reinhart, 1999; Demirguc, Kunt and Detragiache, 1998). The management of macroeconomic fundamentals is crucial to economic growth especially with the opening up of capital accounts as market forces can penalise inefficient macroeconomic policies. Sound policy frameworks promotes growth by keeping the current account sustainable, inflation and budget deficit small, leading to a sustainable and balanced economic growth (Fischer, 1998).

Liberalizing the financial sector coupled with strong Institutional framework and macroeconomic fundamental results in the allocation of resources to activities producing highest yield leading to greater capital accumulation and eventual higher economic growth. Policies implemented for a particular country may not be as suitable as other economies as the financial structure, institutional base and international connections are different from country to country. All these fundamentals once properly adhered will enable financial intermediaries, productivity and capital accumulation to take place leading to positive results (Levine et al., 2000). The importance of all the fundamentals to be in place is what is termed better finance, more

growth (Olaniyi and Oladeji, 2020; Taghizadeh-Hesary et al., 2019; Raheem and Oyinlola, 2015; Law et al., 2013). It is not just more finance as stressed by Levine (2003), but where all fundamentals are working properly and in order, can lead to strong positive effect on growth (Tang and Abosedra, 2020; Ntow-Gyamfi et al., 2019).

To achieve success in financial reforms, predetermine sequence should be followed. Khatkhate argues that there is a certain order with which these various elements of financial reform should be implemented which is more prominent than how they are implemented. Macroeconomic stability, structural as well as fiscal adjustments should precede financial reforms. Moreover, the domestic liberalization should precede external liberalization to avoid capital flight as government intervention of regulation and controls will hinder domestic banks from competing with foreign banks. All these structures should not be implemented all at once in order to achieve the intended effect (Khatkhate, 1998). Many countries however suffered a huge failure in the wake of liberalisation policies and in some case governments had to intervene in order to stabilise the economies or rescue banks from failing. Part of this failure was the timing of the sequence but as well lack of retaining and reinforcing prudential regulation and controls (Abayomi and Ikhide, 1997).

In enhancing economic growth through the role of financial development, Ndikumana (2000) notes that instead of countries to preoccupy in developing a particular type of financial structure, they should focus their efforts in implementing policies geared to stimulate and alleviate constraints in financial markets. Some of the policies to be established includes removing capital constraints, increase interest rates to align to the market demand and supply, removing government intervention and capital account development on one side and ensuring that macroeconomic fundamentals are adhered to including Inflation control, Structural reforms, financial stability, fiscal, monetary & exchange rate policy on the other side. These will eventually stimulate the development of both bank and stock market and produce an inevitable effect on the economic growth.

3.3 Financial Repression

Financial repression refers to the notion of government intervention in financial markets. By using policies such as ceilings of interest rate, excessive bank reserve requirements, liquidity ratio requirements, capital controls, limitations on market entry into the financial sector, credit ceilings or restraints on where to allocate credit and government ownership or controlling of banks (Reinhart, 2012). The downside of this system is that it prevents the economy from functioning to its full capacity as it discourages both savings and investment. This inefficient allocation of capital restricts competition in the financial sector, increases the cost of financial intermediation and as a result hinders economic growth. Furthermore, interest-rate ceilings stifle savings and reduce the quality of investments (Roubini and Sala-i-Martin, 1992).

Financial repression was firstly implemented in SSA during their initial stage of growth. Governments believed that financial intermediation can be effectively harnessed through intervention processes rather than letting the market forces determine its course. Low interest rates were believed to promote investment and economic growth. This was advocated because of market failure in developed countries which hindered economic agents to make reasonable judgements on saving and investing. However, intervention practices made the economy worse off (Fry, 1995). This notion gained steam from the Keynesian and neo-classical advocates who contends that low levels of interest rates to a level where full employment is achieved and increasing government intervention in financial markets will increase investments, accelerate capital accumulation, savings and stimulate overall growth (Molho, 1986).

Some economists have attacked the hypothesis of financial repression claiming that not all forms of government intervention fall in the category of financial repression. They assert that governments might have a valid reason to intervene in financial markets. Various elements of market forces might need to be mediated to ensure a smooth and efficient running of the economy. Competition in the market can enhance effectiveness but can as well lead to risk return deterioration and speculative activity. In order for the government to be able to swiftly move from a repressive economy to a liberalised one, they have to ensure they secure their source of income as most of it would have come from repression. Domestic banks for instance are a good source of

revenue to the government to pay for their fiscal deficit, by removing these regulations without a clear means of tax collection, will bring some contentions and ineffective liberalization policies (Gibson and Tsakalotos, 1994).

Market failure in financial markets is another reason that may necessitate government to intervene. As financial systems are liberalised, competition will increase and thus the possibility of instability. Where financial markets are not subject to appropriate supervision, regulation and intervention, systemic crises may arise, but on the contrary financial repression can improve capital allocation due to influx of quality of borrowers as a result of low interest rates and an increase of firm's equity as a result of lower cost of capital (Stiglitz, 1994). Contrary to the move towards financial liberalisation, Stiglitz and Weiss (1981) notes that markets are not necessarily at full employment and thus can hinder some firms from accessing capital even with high expected returns.

Gurley and Shaw (1955,1960) were the first to expound the implications of government intervening in the financial system. They used the debt intermediating hypothesis to ascertain the role of increased savings in relation to the economy's activities to enhance investment and consequently economic growth. They discussed the two channels within which financial repression can be transmitted. Firstly, savings will be reduced from the banks as credit is not utilised and deployed according to market clearing rates and prices and secondly, a reduction in the savings as a result of low interest rates reduces the accumulation of capital. It was not until 1973 where McKinnon and Shaw coined the term financial repression where interest rate controls reduce the real rate of return and as a result decline in capital accumulation as well as savings (McKinnon and Shaw, 1973).

Various effects have been noted to result from financial repression. In the first instance lack of competition in the financial sector as funds to be used in productive activities is hampered as governments direct credit allocations. Furthermore, Supply and demand on loanable funds are not considered as banks are forced to finance government priority sector which are mostly of low quality, moreover domestic residents are hindered from diversifying their investment in an attempt to spread their risk (Dooley, Frankel and Mathieson, 1987). Institutions which are a basis for swift

operation of any society is not included in coordinating and collecting information between market participants in order to reduce uncertainties (Soskice, 1991). These institutions which were inherited from colonial masters continued discriminating against the populous in favour of the elites and urban areas who are given the privilege of accessing credit (Mauri, 1983).

Other effects include low returns on deposits as capital is under-priced by banks and interest rate charged at below equilibrium conditions making them unattractive relative to real assets. Potential savers lack motivation to save in banks and shift their savings to tangible assets. Lack of incentive to fund profitable projects is another effect as banks are forced into credit allocations, the tax base of the country can be greatly reduced. Low yields in local markets can cause borrowers to shift their resources to alternative market with higher yields (Dooley and Mathieson, 1987). Mauri, (1983) supports this argument by purporting that financial repression further gives rise to unofficial money markets that does not fall under government supervision and taxes.

Beim and Charles, (2001), notes the reasons that have led governments to utilise these repressive policies is mostly to enhance fiscal control. This control enable governments to channel funds cheaply from the financial systems without going through bureaucratic legislation. Furthermore, the government can create monopoly over these financial markets by restricting certain conducts in order to finance its overall budget. According to Kaminsky and Sergio, (2002) high rates of reserve ratios has been used to generate revenues. This requirement acts as an implicit tax to the banks as they don't gain any interest on their reserve deposits. "The financial system is used 'as a way to extract resources by levying an inflation tax on currency, and by borrowing at less than market rates through the imposition of interest rate ceilings" (Montiel, 1995:18).

Kamal, (2013) argues that high reserve ratio reduce money supply in circulation, restricts effective allocation of productive funds on investments by banks, acts as a preferential tax for government as it competes other financial instruments and penalises savers who receive lower interest payments on their savings. Government's feared that opportunistic and oligopolistic private individuals and groups will arise and dominate the market as one of the reasons they did not want to liberalise the economy.

They feared that interest rates left to market forces would easily be influenced and abused by the player of financial markets. Moreover, Kirkegaard and Carmen notes that governments further use capital control to repress the economy in order to control the potential overheating of hot money flows to cause high inflation (Kirkegaard and Carmen, 2012).

Furthermore, liquidity ratio is another way government repress the financial markets. It has been used as a tax or financial repression tool. By requiring banks, private sector, insurance companies, pension funds and other public financial institutions to hold lower yield government securities and cash reserve requirement with the central bank, this reduces funds available for productive activities (Carlson, 2015; Aikman et al., 2016). The cash and security requirement has been used to achieve varied purposes. It has been used as a tool to constrain credit or curb interest rates (Huberto and Todd, 2008). It has been used as a tax imposed on banks (Romer, 1985). Furthermore, it has been used to influence banks to on lend to priority sectors and to the government (Monnet, 2018). Other forms of financial repression are where banks are forced to align with the country's industrial policy, by directing them to allocate funds to the priority sectors or at subsidised rates such as state-owned enterprises. This directive could ensure a steady flow of capital to strategic industries while at the same time distorting the market as it inhibits the efficient distribution of capital and thereby blights economic growth (Kirkegaard & Carmen, 2012).

Restrictions on capital and exchange is another form of government intervention on repressive economies. By restricting the inflow and outflow of capital and investment vehicles, domestic firms and investments suffer as they cannot tap into cheaper capital, attractive offshore returns, limits diversification of portfolio, reduces competition and aggravates inefficiencies of domestic financial institutions (Edwards, 1999; Edwards and Rigobon, 2009). Further restrictions include holding of certain assets like foreign currency, gold, taxes on flows from non-residents, special licensing requirement just to name a few. These measures could be applied nationwide or industry/sector specific (Magud and Reinhart, 2006). Some have noted the challenges posed by capital inflow including economic overheating, excessive appreciation and stagnation on various sectors leading to advocacy of a number of policy tools such as macroeconomic policies and prudential measures to combat the effects (Dell' Ariccia

et al., 2008). These among other tools have been found to ameliorate short term volatile capital flows, enhance the independence of monetary policy and reduce real exchange rate pressures (Ostry et al., 2010; Magud and Reinhart, 2006).

The drawback of the repressed economies necessitated McKinnon and Shaw to theories the implications of a repressed financial sector. They argue that a repressed financial sector discourages both saving and investment because they offer rates lower than the prevailing market rates. According to their argument, savings rate will diminish as their returns are negative, unstable and are not allocated efficiently; poor government financial policies will discourage investments as they promote artificially low loan rates. With the repressive system, financial intermediaries do not function at their full capacity and fail to channel saving into investment efficiently, thereby impeding the development of the overall economic system (McKinnon and Shaw, 1973).

McKinnon Shaw framework argue that financial repression shrinks the real economy and the actual size of the financial sector and hinders their development. They place more emphasises in interest rate control as the main hindrance to economic growth. Their arguments claim that it discourages the investments into risky but potentially high-yielding investment projects, it might aggravate preferential lending to less risky borrowers and may cause an inclination towards capital intensive over labour intensive projects as a result of low-cost finance. They argue in favour of financial sector liberalisation to allow market clearing rates (McKinnon Shaw, 1973).

McKinnon-Shaw (1973) calls for the removal of interest rate ceilings and other government intervention in credit market which hinders competition for loanable funds as priority government projects accumulates a large portion of resources available leaving the rest of the economy scanting for inadequate resources from the informal market. By leaving the interest to operate on free market rates there will be a true reflection of capital available which will take into account demand and supply forces enabling the private sector to participate freely in economic activities.

3.4 Financial transmission channels

According to Levine (2004) financial development can act as a catalyst to stimulate efficient savings mobilisation, capital allocation to productive investments, monitoring of investments, diversification of risks and exchange of goods and services. Each of these financial functions play a key role in promoting and influencing savings and investment choices of funds allocation. Efficient savings mobilisation is attained where firms and individuals are attracted by high interest rates to deposit funds in the financial systems, which eventually heightens the pool of capital to be deployed for investment activities (Pagano, 1993; Berthélemy and Varoudakis, 1996; King and Levine, 1993). Moreover, risk amelioration, through insurance and risk hedging facilities has been a key factor to increase finance to investment projects especially in sectors where risks are significantly higher (Obstfeld, 1994). All these roles of financial sector development can be affected through the channels of capital accumulation and factor productivity in an attempt to enhance growth.

Two financial transmission channels have been highlighted to influence economic growth. The capital accumulation and Total Factor Productivity (TFP) channel. These two channels are enhanced through their effect of savings and investment (Kose et al., 2008). These two channels have been widely contended and expounded by the traditional and endogenous growth theory. In the traditional growth theory, they utilise the neoclassical understanding which notes that capital accumulation as a result of macroeconomic efficiencies is deemed as supreme in enhancing economic growth. This traditional theory assumes an exogenous productivity growth which can have a transitory effect leading the diminishing returns to scale of capital stock (Solow, 1956). The endogenous growth theory on the other hand, advocates the role of factor productivity as the prime engine for long term economic growth. This theory takes cognisance of endogenous technological progress through R&D together with innovation and hence does not suffer from diminishing returns to capital (Romer, 1985; Greenwood and Jovanovic, 1990; Bencivenga and Smith, 1991).

The fundamental function of capital accumulation channel (which is also known as quantitative channel) in financial intermediation is reliant on the accumulation of capital from both domestic and foreign capital investments resulting in savings mobilisation

which can in turn be used as investment to entrepreneurs (Aghion and Howitt 1992). Capital accumulation can be enhanced through effectively allocating savings as well as efficiently converting savings into investments. All these are dependent on effective institutions which will not only ensure security of savings ie insurance deposit but as well have access to a wide pool of investment opportunities (Abramova et al., 2022). This is concurred by Romer (1990) who notes that capital accumulation is affected by financial systems by either modifying the savings rate or by rearranging savings to different productive investments.

Total factor productivity (which refers to the qualitative channel) on the other hand alleviates the undesirable effects of information asymmetries by capturing various aspects of financial intermediation in order to reduce transaction costs and eventual allocate resources appropriately and exercise corporate control. It is also referred to as the allocative efficiency (Bencivenga and Smith, 1991; Bencivenga, Smith and Starr, 1995). This channel according to Romer (1990); Grossman and Helpman (1991) centres on changing the rate of technological practices by developing and deploying novel production processes and facilities. Rioja and Valev (2004), notes that the level that financial development will affect economic growth is dependent on the channel of transmission and the income level of countries. They argue that high income countries receive higher positive effects than lower income countries on one end and capital efficiency through productive investments which consequently produces highest effect in capital accumulation.

3.5 Banks

According to Andersen, Jones and Tarp (2012) Banks are dominant players in financial intermediation in developing countries due to their ability to operate in institutionally deficient environments. They link individuals with surplus funds to borrowers with deficient funds thus filling in the funding gap. They enhance economic activities in a country by providing funds to enable businesses to grow as they pool a large number of small savings and allocate resources effectively (Ndikumana, 2003). Banks are the dominant institution in African financial systems, with their weak and small banking structures, they are not effective in channelling funds to most efficient uses (Isaac, Lemma, and Witness, 2017). African governments are restricting and

repressing banking activities in order to eliminate the risk of excessive and uncontrolled capital inflows which can cause boom-bust cycles and reduce monetary policy effectiveness.

Furthermore, governments used the repressive policies to favour particular sectors and groups of the economy in order to reduce the cost of borrowing and guarantee their survival hence using banks as their public utilities (Giovannini and de Melo, 1993; Fry, 1997; Honohan, 1997). These restrictive policies were geared to appropriate rents from financial system, export promotion, technological development as well as to support priority industries (Stiglitz, 1994; Fry, 1982). The use of repressive policies by African governments using policies such as interest rate ceilings, liquidity ratio requirements, high bank reserve requirements, capital controls, putting constraints on market entry into the financial sector, credit ceilings or restraints on how credit how credit is allocated, and government ownership or domination of banks prevents the economy from functioning to its full capacity as it discourages both savings and investment. This inefficient allocation of capital restricted competition in the financial sector, increased the cost of financial intermediation and as a result hindered economic growth (Roubini and Sala-i-Martin, 1992).

Proponents of bank-based systems advocates that bank systems are superior to market-based systems in their effect of promoting economic growth. They are better suited for countries that are in their early stage of economic progress (Levine, 2002). Banks can be a source of economic growth through its mechanism of enhancing efficiency of investments, mitigate information asymmetries, managing intertemporal and liquidity risks and motivating debt repayment of firms (Bencivenga and Smith, 1991; Diamond, 1984; Sirri and Tufano, 1995). Efficiency of investment can be achieved by banks through easing the difficulties of matching deficit and surplus units to overcome financing constraint and investment needs, moreover, they are able to improve the efficiency of capital allocation by facilitating portfolio diversification in order to identify investment opportunities that are most productive. Efficiency of investment can also be achieved by exploiting economies of scale where the returns of mobilisation of investments and funds far exceeds the costs of implementation. Here banks can use their fixed resources to evaluate a pool number of investments and reducing duplication and free riding effect (Sirri and Tufano 1995; Lamoreaux 1995).

Another key mechanism that banks can offer is to ameliorate or mitigate information asymmetries. By having substantial information of borrowers and investors, banks are able to exploit exchange opportunities to uncover worthy investment projects and eventual meet the quantity and quality of noteworthy investments (Myers and Majluf, 1984). Moreover, banks can mitigate intertemporal and liquidity risks by lowering transaction costs and enhance cross sectional risk sharing. By holding a standardised portfolio of assets achieved through an accumulation of a number of small asset classes, banks may radically lower the cost of transactions, lower contracting costs, pool savings and engage in liquidity transformation. By having a long run investment perspective while offering low returns in boom periods and high returns in bad times, banks may attract savers to invest in long term commitment by offering higher returns than those offered on short investment commitments. To meet the needs of short-term savers, banks invest some funds in short term securities (Diamond and Dybvig, 1983; Bencivenga and Smith, 1991).

Banks do not need to depend on complementary institutions but rather can gather private information which eventually enables creditors to be able to exert corporate control and reduce risk. This is contrary to stock market institutions which depend highly on complementary and public information to reveal information to a large number of investors which ultimately demotivate investors to collect and research information of firms as they are readily available in the public domain, causing the free rider problem. Banks therefore are better in enhancing, utilising and benefiting from information gathered (Levine, 2002; Stiglitz, 1985). Moreover, banks which acts as a coordinated coalition of investors has an incentive to monitor firms unlike stock markets with its uncoordinated market can encourage post lending moral hazard and eventual asset substitution (Boot and Thakor, 1997). This concept is further taken afield by Shleifer and Summers (1988); Shleifer and Vishny (1986) who contend that readily available information availed by bank investors equips them to avoid takeovers as they are more informed on corporate governance than stock markets do, furthermore, diffuse ownership and lower exit costs in stock markets does not incentivise investors to exert corporate governance.

It is clear that the higher the countries financial development is, the faster the rate of reduction in income inequality and hence poverty alleviation (Beck, Demirgüç-Kunt and Levine, 2007). Moreover, the higher the level of financial development, the more it is able to reduce the cost of external finance and hence facilitate economic growth (Rajan and Zingales, 1998). According to Bencivenga, Smith and Starr, (1995) where the banking sector in an economy is not developed, the savings are not utilised effectively and hence becomes unproductive liquid assets, but where the sector develops it continues to be illiquid but is now a productive asset. When the financial markets develop even further to incorporate stock markets, liquidity risks is eliminated and investors are now free to invest in long term projects. In spite of all the evidence in favour of a well robust financial system in enhancing the economic growth of a country, many countries in Sub Saharan African still lag behind with underdeveloped financial systems. Banks are highly concentrated, inefficient in financial intermediation and inclusion (Isaac, Lemma and Witness, 2017). However, the challenges, the continent has made huge strides in leapfrogging in banking technology and innovation ahead of other developed economies in terms of mobile banking. This has complemented and challenged traditional banking as it fills in the intermediary gap and shortcomings of lack of requisite banking infrastructure across the continent and especially in the rural areas (Nyantakyi and Sy, 2015).

3.6 Stock Market

The stock market is a network of financial institutions that facilitates medium- and long-term funds. Unlike banks which predominantly provides short term lending, stock market is well placed to facilitate funding for longer term projects and is more efficient in capital allocation (Tachiwou, 2010). A well-developed stock markets offer a varied kind of financial service in comparison to banks and hence provides a different and complementing drive to the development of the economy (Levine and Zervos, 1996). They enhances fund mobilization, increases tradability of financial assets, allocates resources efficiently and improves the assessment of relevant information to boost investments which leads to the reduction of liquidity risk (Inanga and Emenuga, 1997). Stock markets intermediates between surplus and deficit units and is divided into primary and secondary market. Primary market is where stocks are created by firms and institutions to sell new stock which are publicly traded for the first time. Once

investors have purchased the stocks through subscriptions, the security is then listed on the stock exchange for the purpose of trading. This is called the secondary market which is also called the stock market (Papaioannou and Karagozoglu, 2017).

Stock markets act as a platform with which to connect savers and borrowers while pricing, distributing and trading equity and debt. They do not use their balance sheet in the intermediation process and hence are not affected by high leveraged institutions. On the contrary in financial intermediation, banks bears risks in their own balance sheet as they have large asset-liability mismatch which can lead to bank runs and consequently systemic risk due to the liquidity and interest rate shocks vulnerability (Craig and von Peter, 2014). In the wake of financial crisis of 2008, it was most notable that the crisis was readily able to emanate from bank-based systems more than the market systems. This was a result of inappropriate allocation and overextension of credit from banks in boom cycles and credit rationing in bad times (Pagano et al., 2014). In contrary to stock market which is more able to match asset – liability, they are less financially interconnected as they are indirectly linked to the payment infrastructure. Furthermore, markets can cover the gap when bank finance is disrupted (Crouzet, 2018).

The interconnectedness of the bank systems is another key driver that can lead to systemic risks where the market goes downturn. As they work in a chain of many markets, payment and settlement systems together with an array of intermediaries, can create a web of complexity and risks especially where losses from one bank, quickly spills over the entire web of banks. This can be very severe to the real economy as banks provide some essential services which are not easily substitutable to the economy (BCBS, 2013). Financial assets trading in stock market can be sold and bought quickly and cheaply hence making it less risky. This enables businesses to access finance readily through equity issues hence improving capital allocation (Bencivenga, Smith, and Starr, 1996). The rapid development of stock market however has its adverse effect, it can result in speculative pressures that is generated by euphoria behaviour that encourages short termism unlike long termism. Stock markets could fail to address the agency problems and short termism (Singh, 1997; Stiglitz, 1985).

This preference of borrowing will encourage speculators to finance short term investments due to anticipated higher returns which in turn push upwards interest rates and eventually reduce the total volume of real-sector investment (Federer, 1993; Grabel, 1995). Furthermore, the high liquidity nature of stock market may encourage investors to easily move their funds due to the easiness within which the market operates, this may cause slackness in exerting corporate control (Jensen and Murphy, 1990). However, the drawback, stock market has access to a pool of risk management tools to ameliorate the risks. This can range from diversification where one can spread the risk by investing in a stock-based portfolio covering idiosyncratic risks and holding assets which are easily liquidated reducing risk associated with a single investment; hedging on the other hand can be another form of risk tool where specific measures are taken to protect your investment (Grabel, 1995). Although bank based may benefit in standardised, basic and inexpensive risk management tools, a more developed market system has greater flexibility to tailor customised risk management tools to aid in capital raising, boosting liquidity and risk hedging mechanisms (Acemoglu and Zilibotti, 1997).

According to Caporale et al., (2004) investment productivity is the primary channel through which stock market development enhances growth. This relationship between stock market and investment is affected by price of stocks and marginal productivity of capital whereas the higher the price of stock, the higher the marginal productivity of capital which eventually enhances investment activities and consequently economic growth (Tobin, 1969; von Furstenberg, 1977). Furthermore, a link between the financial market and endogenous growth model exist to accommodate the effect of stock market development (Romer, 1985; Lucas,1988; Rebelo, 1991; Chick and Dow, 2005). According to Ndikumana, (2003) Three main channels have been advocated by researchers whereby stock markets affects investments. Firstly, the role of price setting by stock market produces information necessary to convey signals to stakeholders. Higher price stock is positively correlated to future investment growth. As a result, a higher savings will be directed to finance positive Net Present Value (NPV) Investment through the dynamics of stock market developments.

Secondly, the cost of obtaining capital is another dynamic where stock market affects investment. Baker et al., (2003) notes that the cost and availability of equity finance is

the key ingredient in determining the price of stock and consequently investment decisions of firms. A readily available equity finance obtained at a lower cost will result in the increased stock prices and as a result increases investment by firms. This sequence further expands the stock market making it more liquid, increases the opportunities for risk sharing and consequently lowers the cost of equity finance (Ndikumana, 2003). Thirdly, stock market enhances investments through corporate governance. By exerting pressure on corporate management to align their interest to those of shareholders, it results to a well-functioning stock market as a result of increase of firm performance and profitability (Ndikumana, 2003). Unlike bank-based systems which might not be very effective in exerting corporate governance as bank managers may collude to acquire influence on banks and other corporations. This has seen many banks fail to represent the company's accounts as well as discipline management (Wenger and Kaserer, 1998; Charkham 1994).

A well-functioning stock market can motivate investors to acquire information of firms unknown to the public and use it for their benefit and profit generation. It can also help to alleviate risks as financial assets are diversified (Levine, 1991). Stock market catalyses the need for investors to acquire and publish information about firms leading to effective resource allocation. Unlike banks who can use this acquired information in negative ways such as rents seeking (Grossman and Stiglitz 1980; Rajan, 1992). Although banks eliminate the cause of duplication of information gathering and processing, they are also not effective in gathering and processing information in non-standard environments where circumstances are uncertain and involves new innovative products and processes (Allen and Gale, 1999). Contrary to banks, stock markets affect growth through liquidity, making investments less risky hence stable economic growth (Levine, 1997).

Agents are motivated to invest to acquire information by researching larger and more liquid markets as they have positive implications of capital allocation and profitability by trading in those markets (Holmstrom and Tirole, 1993; Merton, 1987).

3.7 Measures of Variables

Baswir (2007:1) defines financial development as "an integral part of overall economic development by specifically promoting the role of the market and minimising the role of the state in determining who gets and gives credit and at what price." Similarly, Baden (1996:2) notes that "financial development is the removal of government ceilings on interest rates and other controls on financial intermediaries" World Economic Forum (WEF) 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" (WEF 2012:1). These financial systems comprise of financial institutions like deposit taking institutions such as commercial banks, non-deposit taking institutions such as lending institutions, insurance, Microfinance and financial markets such as stocks, bond markets, foreign exchange and derivative markets (WEF, 2012).

Based on the definitions above, this thesis will define financial development as the abolition of excessive government intervention in money and credit markets on the pricing and allocation of credit. Repressive government intervention led to distortions, restriction and retarded the efficient allocation of resources, retarded savings, constrained investments and in turn lowered the rate of economic growth. We will follow the standard literature by utilising financial development measures of commercial banks and stock market as they are readily available unlike other financial variables which have a limited number of studies conducted hence does not allow for a meaningful meta-analysis.

3.7.1 Commercial Banks

Several indicators have been utilised to proxy financial development of commercial banks. They can be broadly defined as the financial depth, financial access, financial efficiency, bank ratio and financial activity measuring the allocation of capital, accessibility and convenience to both the private and public sector, on one hand and on the other hand bank assets which encompasses deposit money assets in the bank measuring the development of the banking sector.

Financial depth is measured by the money supply M1, M2 and M3. These measure the size of the financial sector. M1 is the ratio of money stock held outside the banking sector. The higher the M1 the less intermediation as more currency is held outside the financial system. M1 may also imply capital flight and hence less economic growth. M2 is liquid liabilities which comprise of currency together with demand and interest-bearing liabilities of banks. This measure covers a wider span encompassing various financial institutions. This indicator however has been criticised as it does not distinguish whether the liabilities are coming from commercial banks, other financial institutions or the central bank (King and Levine, 1993; Levine and Zervos, 1998). M3 the broader aggregate money supply which is less liquid in comparison to M1 and M2 (Favara, 2003; Deidda and Fattouh, 2002). M3 is preferred to M2 in economies where money is mostly used as a store of value (Yu et al., 2012).

Khan and Senhadji (2003) argue that countries with underdeveloped financial systems should not use M2 as a proxy to financial development as high level of monetisation might be associated with underdevelopment. Some authors prefer to use the difference between M3 and M1 to GDP to counteract the pure transactional aspects of narrow monetary aggregates (Yilmazkuday, 2011; Rousseau and Wachtel, 2002). The measures of financial depth have shortcomings in a sense that they are purely quantitative and fail to reflect the quality of financial services. Furthermore, they may include deposits of other financial intermediaries which raise issues of double counting (Levine, 1997).

Another proxy used to measure financial development is bank ratio, which is the ratio of bank credit to the total of bank credit and domestic assets of the central bank. This ratio shows how credit enhances the allocation of resources to the economy. Levine (1997) notes the weaknesses with this measure; first it does not consider other institutions which perform this financial function. Secondly, it does not stipulate the beneficiaries of credit allocated, thirdly, it does not gauge how efficient bank performs. Another measure is the ratio of commercial bank assets to the sum of commercial bank and central bank assets.

Financial activity is another measure that is used to proxy financial development. They include ratio of private domestic credit provided by deposit money banks to GDP (Cole

et al., 2008), the ratio of private domestic credit provided by deposit money banks and other financial institutions to GDP (Anderson and Tarp, 2003) and the ratio of credit allocated to private enterprises to total domestic credit (Rousseau and Watchell, 2011). As these measures ascertain credit issued to the private sector, they provide a better indication of the size, efficiency and enhancement of credit provided by financial sector.

Credit to the private sector isolates credit issued to governments and other public entities. It is total credit provided to the private sector by the banks and represents financial intermediation and determines the quality and quantity of investments and productivity to a higher extent than credit provided to the government does and hence facilitates economic growth. This can be partly accredited to the fact that these private enterprises must go through stringent conditions to access funding hence the quality of investments (Levine and Zervos, 1998a, Levine, 1997). However, the increase in reserve requirements may cause investments to decrease (Beck et al., 2003; Demetriades and Hussein, 1996).

Financial access is another measure that is used to ascertain accessibility and convenience of financial services. This measure is geared to improve financial access by reducing funding constraints in utilising the financial services and hence promoting economic growth of both individuals and enterprises. Measures include number of commercial bank branches in terms of demographic or geographic position, outstanding deposits and or loans with commercial banks and numbers of ATM's per population. Financial efficiency is another measure that has been used to measure intermediation. Proxy's used include Net interest margin, Lending-deposits spread, non-interest income to total income, overhead costs to total assets, return on assets and return on equity (Sahay et al., 2015).

To ascertain the various policy changes and their effect on financial intermediation to economic growth, a combined financial liberalisation index is calculated using principal component analysis (PCA). To develop the financial liberalisation indices, each policy variable takes some arbitrary value between 0 and 1, 0 being repressed and 1 being fully liberalised depending on the policy implementation (Caprio et al., 2003). Some of the policies that have been used for the index include Regulatory and Legal Reforms

policies, Institutional Restructuring policies, Capital Account liberalization policies, Monetary control policies, Interest Rate policies, Capital Market development, Secondary Reserve requirement policies and the Creation of Universal banking policies (Laeven, 2003).

3.7.2 Stock Markets

As the financial sector develops, hence is the efficiency of stock market. This provides savings mobilisation to enable economic growth by financing of long-term massive projects which would not have been feasible to finance (Greenwood and Smith, 1996; Levine, 1991). It further facilitates the easiness of raising capital through its liquid markets mechanisms thus lowering the cost of capital (Bencivenga et al., 1995; Neusser and Kugler, 1998). Despite the notion that stock markets play a minor role in developing economies as most of the financial landscape is predominantly bank based, it is still vital in increasing liquidity in institutions and efficient allocation of resources (Bencinvenga et al., 1995).

Several research have used various measures to proxy the impact of the stock market to the economy (Atje and Jovanovic, 1993). These include the stock market capitalisation ratio (Chakraborty, 2010; Yu et al., 2012), stock market activity (Manning, 2003; Shen et al., 2012), turnover ratio (Beck and Levine, 2004; Liu and Hsu, 2006) Sahay et al., (2015) categorised financial markets into depth which encompass the liquidity and size of the market, access which looks at the easiness of accessing financial services and efficiency which is the trade-off between the cost and sustainability of the services provided (Tyson and Beck, 2018).

Stock market capitalisation ratio refers to the total value of listed shares on domestic exchanges in a year. This ascertains the overall size of the stock market and its ability to allocate capital more efficiently and facilitate risk diversification. The stock market activity is the total value of traded shares relative to GDP, which measures the trading volume as a share of national output and the extent to which stock market is used to trade reflecting liquidity on economy (Levine and Zervos, 1998a). The turnover ratio on the other hand, is the total value of traded shares relative to the stock market

capitalisation. It measures the efficiency of the stock market to provide liquidity assets (Pagano, 1993; Demirgiic-Kunt and Levine, 1996; Rousseau and Wachtel, 2000).

Other measures used to proxy the development of the financial sector include: how financial markets allocates there resources efficiently by ascertaining the overall stock market development. This is done by analysing the market size, liquidity in the financial system and the integration with the global capital markets (Naceur and Ghazouani, 2007). This thesis will make use of all commercial banks and stock market measures of financial development as they represent the size, activity and efficiency of the financial sector.

Conclusion

This chapter analysed the pathways within which finance enhances growth. This was done by conceptualising the key variables of the finance growth nexus, by defining and expounding the effect financial development and financial repression have on the real economy. This was followed by the discussion of the channels and mechanisms within which financial development enhances growth. Two outlets that affect the relationship variables through their effect of savings and investment were examined. The discussion continued by analysing both the bank-based and market-based models and their implication in the economy. The chapter further went on to discuss the proxy's used to measure financial development by looking at both the commercial banks and stock market to see how the size, activity and efficiency of financial variables affects growth. To be able to gauge the effect of finance on economic growth, a meta-analysis of the evidence will be undertaken.

CHAPTER 4 – OVERALL APPROACH OF METHODS - METHODOLOGICAL CONTRIBUTION

4.1 Introduction

Chapter four looks at the overall methods that are being utilised by this thesis. This chapter will explicitly go in depth to analyse and rationalise the reasons behind the methods used. The chapter will also draw on the advantages and drawbacks that come about when using different methods deployed. This will enable the appreciation and clearly attributing the contribution made by using these various methods. The chapter starts by introducing the concept of systematic review, defining it and analysing where the concept emanated from. From there the thesis will discuss both the advantages and challenges of systematic review. The chapter then goes deeper to ascertain the steps used in conducting a systematic review, this was analysed by explaining the steps taken by this thesis.

Following from systematic review, the thesis went on to explain another method used which is meta-analysis. A discussion of the history of the method is firstly expounded before providing an explanation of the method. This was followed by the advantages and challenges that might accrue in using this method. Steps to undertake meta-analysis was expounded considering what was done by the thesis. To put this thesis into context, a blended approach was utilised where meta-analysis used in the framework of systematic review is clearly articulated to ensure a distinction from other economics studies utilising the same method. Here the advantage of this blended approach is analysed as well as its pre-eminence over vote counting, and narrative review is clearly stipulated.

4.2 Systematic Review

4.2.1 Introduction

A systematic review is an exhaustive search of primary study literature to enable the inclusion of all studies meeting a pre-defined criterion. This approach summarises all available research relevant to a particular question by using an explicit and systematic

method to enable transparency, replicable, accountable, and updateable findings. By following a standard set of stages, this type of review aims to minimise potential reporting bias and enhance rigor (Gough et al., 2012). It is comprehensive as it takes into account the whole range of relevant studies on a particular topic removing over influencing of accessible studies. Moreover, systematic reviews are transparent in a sense that they are explicit in reporting the methods used making them more reliable and robust than narrative review (Kitchenham et al., 2009).

A systematic review is also considered as the art and science of gathering an explicit summary of multiple studies on a particular field of research. The aim is to provide a detailed, reproducible and clearly defined objective to answer explicitly a review question. The review uses an explicit, accountable rigorous research methods for the purposes of integrating the findings of different studies by transparent means of gathering, appraising and synthesising evidence to answer a well-defined question (Kitchenham et al., 2009). The review design summarises all research evidence that fits pre-specified eligibility criteria in order to generate, explore or test theory. By using strict guidelines aiming to minimise subjectivity, maximise transparency and repeatability, systematic review produces a more comprehensive and trustworthy outcomes (Gough et al., 2012).

Systematic reviews started its roots from the health sciences in the 1970's to ascertain the effectiveness of medical intervention and more importantly evidence-based medicine. In 1992, the Cochrane Collaboration put together principles and methodologies to guide and manage medical knowledge to enhance quality control, accessibility, collection and aggregation. The study design was adopted to other fields of study (Petticrew, 2001; Oakley et al., 2005) In the 20[th]century systematic review expanded to education, social care and crime. (Davies et al, 2000) In education field, the EPPI-centre was formed to compile a database of various intervention and later was broadened to include other reviews in the field (Oakley et al., 2005). Economics studies are slowly adopting the rigorous and more robust systematic reviews as it is applied in other fields although more work needs to be done to apply it appropriately.

4.2.2 Advantages of Systematic Reviews

Systematic reviews are the most reliable, comprehensive and transparent form of literature review. Unlike traditional reviews which are not transparent in their search strategy used in identifying, selecting and evaluating previous studies, systematic review applies a robust and critical appraisal tool to explicitly appraise previous studies (Oxman and Guyatt, 1993). As the researcher's assumptions are not explicitly stated, traditional reviews are prone to bias and more importantly, their findings cannot be replicated. This is not the case for systematic reviews where explicit methods of extracting and synthesising studies are provided to allow scrutiny of their rationale, assumptions, methods and search strategy. This makes systematic reviews to be considered as robust, gold standard and objective method for research process (Kitchenham et al., 2009; Nightingale, 2009).

Systematic review method is also comprehensive in its approach. It collates all relevant studies available on a given topic of study. Traditional reviews are haphazard in their approach, they are not thorough in that they are restricted to compiling literature that is known or easily accessible to the researcher. This way of research is limited, does not give the whole picture of what the collection of studies is saying and produces bias as the same studies are always retrieved for analysis as the authors provide finding based on flawed assumptions (Tranfield et al., 2003). Systematic review on the contrary reduces this bias by applying predefined and predetermined search criteria, search strategies and an explicit inclusion and exclusion criteria. This enables and forces the researcher to search beyond their field of interest, study and network as the strategy is more objective (Kitchenham et al., 2009).

Other advantages of systematic review are in its inherent application of analysing study quality. The established standards of systematic review in classifying the quality and characteristics of studies against predetermined standardised criteria enables robust findings as it provides greater objectivity in rating and weighing studies whilst reducing bias. This enables researchers to be more critical in engaging with studies providing consistent quality of evidence (van der Knaap *et al.,* 2008). Unlike traditional reviews which takes on results of previous studies without considering their study design, theoretical analysis and methodology used. By using systematic review in

extraction of information on study design, it produces a robust empirical derived finding producing a more objective response to research question (Higgins and Green, 2011).

A proper systematic review follows a well-designed, pre-established protocol to clearly stipulate the objective of the review. The means of systematic review in identifying the scope of review in advance through a protocol not only helps to keep the researcher on track but also establishes transparency in the process (Gough and Elbourne, 2002). By stipulating the setting and defining the parameters within which research will be based, registering and publicly publishing the protocol prior to analysing available studies and starting the review helps to minimise author bias of data extraction, arbitrary decision making and duplication of efforts (Light and Pilllemer, 1984). The protocol also reduce bias, enables the researcher to be focused and more so enables future replication of the study. Furthermore, the search strategy used in systematic reviews where an exhaustive and comprehensive identification of studies is conducted removes the researcher bias of confining their search within their scope of subject area and networks (Drucker et al., 2016).

This replication of future studies is possible as systematic review uses a standardised and rigorous process, transparency and objective baseline with which future research can be assessed and applied (Oakley et al., 2005). Aside from the general merit, systematic reviews can enable the researcher to attain breadth of the studies as it fills in the knowledge gaps as it can highlight inconsistencies in methodological designs, theoretical and conceptual weaknesses and has capabilities to resolve irregularities between conflicting findings (van der Knaap *et al.*, 2008). Furthermore, systematic review increases breadth as its search strategy is thorough and allows it to access to a wide range of databases and peer-reviewed journals making it possible to identify many and comprehensive studies (Higgins and Green, 2011). As a result it produces independent, unbiased and objective assessment of evidence, but where the evidence is unavailable or insufficient, systematic review advises areas of further research (Gough and Elbourne, 2002).

4.2.3 Challenges of Systematic Review

The advantages of systematic review are well noted; however, we also have some setbacks and limitation of the review. In the first instance, systematic review process is time consuming and resource intensive. This is a result of a rigid procedure of undertaking the task as a high number of studies needs to be located, retrieved and assessed in both stages of the screening process. This might pose a challenge where there is no sufficient manpower and capacity. Furthermore, to be able to appropriately apply the principles of systematic review, a rigid application of its methodological intent has to be adhered which include the search strategy, information searching and retrieval, synthesis is some of the skills that are needed to enable the actualisation of a rigorous and replicable systematic review (Mallett et al., 2012).

Another limitation of systematic review is where review is needed but there are time and resources constraints. Here rapid reviews are utilised which compromises a rigid and a thorough review process. This is a more simplified process of systematic review where some of the processes are omitted or not adopted comprehensively (Khangura, 2012). This method can lead to publication bias due to reduced searching and limited appraisal of evidence, studies with poorer quality may be disproportionately weighted, inconsistencies and contradictions in data may be overlooked as attention to synthesis is diminished, furthermore most studies that undertake rapid review fail to explicitly state the methodological design used, the use of peer review and external experts is unlikely to be used and finally, the limitations of the review method and more importantly the omission of certain criterion are more often not analysed (Tricco, 2008; Watt et al., 2008; Harker and Kleijnen, 2012).

Furthermore, to be able to conduct the review appropriately, a wide range of databases and sources need to be reviewed, this poses another challenge especially for non-academic researchers and others in unprivileged regions who cannot access or even afford these databases and studies. Limited access to published literature in journals and databases to enable the swift conduct of systematic reviews as a result of lack of sufficient financial capacity of the reviewer and or the affiliated institution providing access subscription of these literature is one of the limiting factors in accessing relevant databases which consequently affects the quality of the reviews

especially in developing nations. This can lead to publication bias and contradictions in findings as limited number of studies are used (Bennett et al., 2015).

Further challenges spring from the difficulties in screening studies for inclusion and exclusion process. Some studies titles are vaguely stated making it difficult to assess the studies accurately and swiftly. Moreover, poor and insufficient presentation of key statistical data to enable the researcher retrieve essential variables can be another limiting factor in the effectiveness of the review (de Dominics et al., 2008). For systematic review to be robust, a clear and consensus approach in quality assessment of studies need to be applied. Lack and ambiguity of grading, quality scales and assessment tools make it difficult to reach consensus especially where studies are qualitative in nature. Most scales have been well established and are predominant in quantitative methodology where measurable outcomes are evident and quantifiable (Doucouliagos and Ulubasoglu, 2008; de Dominics et al., 2008).

Systematic reviews are not well suited to synthesis complex concepts of qualitative reviews. Challenges exists in search strategy, accessing appropriate assessment tools, decisions about inclusion or exclusion of studies, data extraction and synthesis. Reporting standards are very cumbersome when dealing with qualitative reviews (Noyes et al., 2016). The non-informative information from titles and abstracts makes the information retrieval process very cumbersome, further unstandardized terminology and inappropriate indexing makes the task very challenging. Contrary to quantitative reviews, systematic review methodology of qualitative reviews is still underdeveloped due to its complexity and conceptual nature, more work needs to be undertaken to ensure quality tools are relevant and applicable to qualitative study designs (Booth et al., 2016).

The diffuse terminology in qualitative studies hinders efficient study selection. To combat this, search filters or topic-based search can be applied, however poor indexing and lack of specificity makes citation searching difficult (Rogers et al., 2018). Quality assessment of primary qualitative studies is another concern as most tools do not rigorously address methodological strength as well difficulty arise in deciding about inclusion or exclusion of studies as qualitative evidence syntheses is more complex (Munthe-Kaas et al., 2019; Noyes et al., 2019) Furthermore, methods of data

extraction can be a challenge considering the nature of qualitative finding sources and diverse study designs, hence the researcher might need to move backwards and forwards to explore evidence from specific contexts (Sandelowski and Barroso, 2002).

4.2.4 Steps in Systematic Review

Problem of The Thesis

This thesis started by analysing the research question "Does Financial development lead to economic growth in Sub Saharan Countries? A Meta-Analysis of evidence." With this question, the researcher analysed a body of research to not only assess its relevance but also to understand the scope and scale of the problem. The pre and post liberalisation analysis was expounded to assess their aim, application, challenge and contribution. The thesis went on to dissect the theoretical and conceptual framework underpinning the field of study. The theoretical framework analysed chronologically different theories that have been purported to model and hypothesise the relationship between financial development and economic growth. This theoretical analysis informed on the progression and extensions of the theoretical discussion, it also suggested the variables to be included in the model as well as the conditions through which the models can or cannot work.

Furthermore, to dichotomise the problem of the thesis, the researcher went on to analyse the conceptual framework to analyse the mechanisms with which financial development enhances growth. To guide the analysis, a logic model was outlined to visualise and map the clear path of intervention, influential factors and consequent outcome (Rehfuess et al., 2018). This was followed by the explicit exposition of schools of thought ie financial liberalisation and repression. Further, in-depth analysis of the transmission channel to assess how financial development stimulates economic growth was expounded. This brought into light the realisation that the level that financial development will affect economic growth is dependent on the channel of transmission and the income level of countries (Rioja and Valev, 2004).

The sources of which financial development affects growth was researched, these include banks and stock markets in Africa. Here the advantages and disadvantages

were discussed as well as their significance in their mediation process and in enhancing growth was analysed. The main channels through which they affect growth was analysed, prerequisite for their efficient operation was discussed, their effect and challenges are also elaborated. To understand how different studies measured the thesis variables of interest, explicit research was conducted. This search informed on several indicators that have been utilised in measuring both the banks and stock markets in African studies. This enlightenment enabled the researcher to use this information when coding, retrieving and setting inclusion and exclusion criteria.

Search Strategy

Search strategy is an exhaustive, comprehensive and systematic means of searching of studies to identify all relevant studies, published or not, on a given topic. By explicitly providing a clear information of how studies have been identified and strategies used for searching, it leaves the reader with no doubt and enhances replicability (Lefebvre and Duffy, 2021; Hammerstrom et al., 2010). Search strategy also involves several standard processes, such as developing search strings, searching across bibliographic citation databases that index various publications, looking for "gray," or unpublished literature, and hand searching. These processes remove the researcher bias of confining their search within their scope of subject area and networks (Hammerstrom et al., 2010).

The aim of search strategy is to locate as many or all studies as possible in order to minimise bias resulting from limited study searching. Where only easier studies to find are retrieved, and where they are systematically different from more difficult to find studies, it results in misleading findings. To combat this, search strategy needs to assure quality while conducting searching and screening of studies, furthermore more than one researcher might be deployed to reduce reporting bias as well to enhance retrieval of a maximise number of potentially relevant studies (Lefebvre et al., 2021). Moreover, where the search strategy is set from a systematic plan of guidelines on scope of the review, search concepts and terms are used, sources to be searched and the search limits put in place will all lead to a more comprehensive and explicit search (Edoardo and Dagmara, 2014).

After thoroughly identifying the research question as expounded above, next step is to identify the key concepts in the research question that we will need to search on. Once the concepts have been identified, appropriate thesaurus terms from the databases selected is searched in order to ascertain appropriate index term for each concept. To start, only the most important terms should be searched, as the search progresses, more general terms can be added. Where thesaurus does not yield the relevant term for the concept, the use of free text can be used. Moreover, free text can be used to search for synonyms of the thesaurus terms in order to create a sensitive search. To be able to retrieve an exhaustive list of studies, we need to add a variation in search terms such as truncation, abbreviations, opposites and spelling differences. To be able to search words with the same word stem, truncation is used. A search for develop* will retrieve development, developing, developmental (Bramer et al., 2018).

To obtain the most studies relevant to the thesis topic, various databases and sources were used both published and unpublished. As each database is different, search strategy had to be adapted to take into account each specific database as syntax of search strategies is database specific. To guarantee optimal, adequate and efficient coverage, an array of database search needs to be conducted. Furthermore, a consistent and structured searching of the database was used as it is very important to refine and track search history to enhance transparency of search process. And hence in the first stage of research, we conducted a systematic search of the literature on the impact of financial development on economic growth in Sub Saharan African countries. Our search included studies that have been both published in peer review and in grey literature with a publication date of 1990's onwards; this is to consider the fact that most countries have undertaken financial reforms from late 1980's.

To retrieve the published studies, various databases were used including:
· Econlit
· JSTOR
· IDEAS
· SSRN
· Web of Science
· Scopus
· Econpapers

- Science Direct
- ProQuest Social Science
- Google scholar

To identify unpublished studies databases used include:
- World Bank e-library
- Havard Kennedy e-library
- National Bureau of economic research
- 3ie database
- Research 4 DFID
- IMF e-library.

Other Search Sources

To ensure a wide coverage of the research search, manual searches were used to complement studies that were not able to be picked through electronic searches, bibliographies of studies achieved were checked, websites of references were checked. Grey literature and unpublished studies were analysed from sources such as:

- Business and Dissertation Abstracts
- African Journal Online
- Inter-American Development
- British library for Development Studies
- DEReC (Development Assistance Committee Evaluation Resource Centre)
- FRANCIS (Humanities and Social Sciences Studies)
- Social Science Citation Index
- PRISMA (Hispanic, Latin America & Caribbean journals through ProQuest)
- Conference Proceedings Citation Index- Social Sciences
- EPPI Centre website

To retrieve linked studies, we went backward and forward through citation chasing including snowballing approach. This was used where a systematic review of reference list of studies was used to find new studies and also to verify the quality of

searches. Furthermore, grey literature including Google Scholar search was used to capture any missed studies and to attain rigour and holistic search. Various researchers have expounded the effect of including and excluding unpublished papers in meta-analysis. Schmucker et al., (2017) have argued against the inclusion of unpublished papers. They note that quality bias will be introduced in the meta-analysis as they have not undergone through the explicit peer review process. Others have noted the importance of grey literature that meet pre-defined criteria. This conclusion was based on a random sample analysed from 135 meta-analyses, where published papers yielded only 15% larger estimates comparing to unpublished papers (McAuley L et al., (2000) Further support in favour for the inclusion of unpublished papers is advocated by Stanley et al., (2008). They argue for the need to include all papers in order to acquire a wider variation among reported estimates in order to obtain reliable findings.

Concept/keyword specification

To attain a comprehensive search strategy, a variety of database sources was utilised to capture key synonyms for our key variables of interest, financial development and economic growth.

To be able to capture all possible search terms, the researcher browsed the thesaurus to identify appropriate terms to use controlled vocabulary applicable to different databases. On some occasions the researcher had to use thesaurus to identify appropriate keyword terms to be able to locate appropriate records found in the title or abstract. This helped to highlight and reconcile terms that have various meanings. Furthermore, the researcher searched the free text fields especially for databases which did not have controlled vocabularies or in order to avoid indexer interpretation bias or error. Once these terms were identified, Boolean operator was used to link the concepts together and to enable a wider search. The operator OR was used to combine each concept and were linked with Boolean operator AND.

By utilizing this method, an extensive search strings for all possible search terms for the concepts of the study was developed with the assistance of an information specialist and second supervisor Dr Dylan Kneale for comment. However, as some

databases do not work with long strings, smaller yet intensive strings were employed to suit such databases. Appropriate controlled terms were utilised to suit different databases. EPPI reviewer was used as our data storage and management platform to upload all search results.

Searches in databases were conducted using the text mining technique suggested by CRD (2009), this was conducted as "Title", "Abstract", "Keyword" and "Text" searches. These were driven by the following specifications:

Search 1: Concept– Financial Development

Synonyms: Financial n4 Develop* OR Financial n4 Dereg* OR Financial n4 Liberal* OR Financial n4 Integr* OR Financial n4 Global* OR Financial n4 Regulat* OR Bank* n4 Privat* OR Financial n4 Market n4 Develop* OR Financial n4 Market n4 Reform* OR   Financial n4 Reform* OR   Bank* n4 Reform* OR Interest n4 Rate* n4 Reform* OR Credit n4 Reform* OR Credit n4 Control* OR Credit n4 Market n4 Reform* OR Credit n4 Market n4 Control* OR   Bank* n4 Control* OR Bank* n4 Regul* OR Bank* n4 Deregul* OR   Bank* n4 Liberal* OR   Market n4 Liberal* OR Stock n4 Market n4 Liberal* OR Stock n4 Market n4 Develop* OR   Capital n4 Account n4 Liberal* OR Capital n4 Market n4 Liberal* OR Bank* n4 Sector n4 Growth*
(Use in "Title" "Abstract" and "Keyword" search)

Search 2: Concept – Empirical Studies

Synonyms: Empirical OR Quant* OR IV OR OLS OR Regress* OR Economet* OR Analy* OR Statistic* OR Testing OR Estimat* OR Measur* OR Variable* OR stat* OR Standard error OR Stat* w1 Significan* OR Data OR Random n1 effect* OR Fixed n1 effect* OR Model* OR Predict* OR Robust OR Time n1 Series OR Panel OR Longitudinal OR Cross n1 section* OR Quasi n1 Experimen* OR Correlat* OR Coefficient* OR Macroec*
(Use in "Title" "Abstract" and "Keyword" search)

Search 3: Concept – Sub Saharan Africa

Synonyms: Sub w1 Sahara* w1 Africa OR Africa OR African n1 Union OR African n1 Economic n1 Community OR South* w1 Africa OR Emerging w1 Econom* OR Develop* w1 Econom* OR Develop* w1 Countr*OR Africa* w1 Countr* OR Africa* w1

Econom* OR Angola OR Benin OR Botswana OR Burkina Faso OR Burundi OR Cameroon OR Cape Verde OR Central w1 African w1 Republic OR CAR OR Chad OR Comoros OR Congo OR Congo w1 Brazzaville OR Congo n2 Democratic n2 Republic OR Congo w1 Kinshasa OR Côte d'Ivoire OR Djibouti OR East n1 African n1 Community OR EAC OR ECOWAS OR Economic n1 Community n2 West n1 African n1 States OR Equatorial n1 Guinea OR Eritrea OR Ethiopia OR Gabon OR Gambia OR Ghana OR Guinea OR Guinea-Bissau OR Kenya OR Lesotho OR Liberia OR Madagascar OR Malawi OR Mali OR Mauritania OR Mauritius OR Mozambique OR Namibia OR Niger OR Nigeria OR North w1 Sudan OR South w1 Sudan OR Rwanda OR Rhodesia OR Senegal OR Seychelles OR Sierra n1 Leone OR Somalia OR South n1 Africa OR South n1 West n1 Africa OR Southern n1 African n1 Development n1 Community OR SADC OR South Sudan OR Sudan OR Swaziland OR Tanzania OR Togo OR Uganda OR Zambia OR Zimbabwe OR Zaire OR LMIC OR LAMI OR Low n2 Middle n1 Income n1 Count*OR Third World OR Develop* n1 World OR Develop* n1 Countr* OR Develop* n2 Nation*

(Use in "Title" "Abstract" and "Keyword" search)

Note:

·   An asterisk * finds all words that shares the same root

·   n4 is a near operator indicating that words on either side operator must occur within 4 words of each other in either direction

·   w1 is a within operator indicating that the word that follows the operator must occur within 1 word that preceded the operator for a record to match.

When searching the countries, attention has been given to include countries that have changed their names since 1980's, countries that have merged to form another country, new countries that have emerged because of splitting from one another.

    Combine Search 1, 2 and 3 results with "AND"
    Time Period: From 1990 – 2021
    Month of access: June to August 2015 and March 2022

The first search is on the intervention which refers to the policies referring to financial development. The second search is on the study type, this is to enhance the scope of

analysis needed and remove all theoretical studies, the third is on geographical area. An example of the search strategy for EconLit is listed above. This strategy was modified to suit different databases. Also reference lists of included studies were searched for other potential studies.

Selection (inclusion/exclusion) criteria

After specifying the search strategy, studies were selected to be included in the Meta regression by using the following criteria:

- Studies that analyse the direct effect of financial development on Economic growth. Studies selected encompassed measures of financial development as stipulated on section 3.4
- Studies whose regression analysis represent Economic growth as the dependent variable and financial development as the key independent variable of interest versus control variable.
- To increase comparability of estimated effects, studies whose dependent variable is the growth rate of total GDP or GDP per capita were included in the analysis.
- Both published and unpublished studies were used in the analysis.
- Empirical Studies were only included in the Meta-analysis; pure theoretical studies were excluded. In this regard, studies that provided sufficient statistical information such as the t-statistic, standard error and degree of freedom or sample size were included. This is to enable the calculation of correlation coefficient for individual estimate.

Examples of studies that have been included and uploaded to the EPPI Reviewer are:

- Akinboade, A. (2000). 'The Relationship Between Financial Deepening and Economic Growth in Tanzania', *Journal of International Development,* 12(7), pp.939-950.
- Akinlo, A. and Egbetunde, T. (2010). 'Financial development and economic growth: The experience of ten Sub Saharan African countries revisited', *The Review of Finance and Banking,* 2(1), pp.17-28.

Examples of studies that have been excluded considering the selection criteria are:

- Baden, S. (1996). *Gender issues in financial liberalization and financial sector reform*. Paper prepared for EU and OECD: Sussex Bridge.
- Chakraborty, I. (2010). 'Financial development and Economic Growth in India: An analysis of the post reform period', *South Asia Economic Journal*, 11(2), pp.287-308.

Quality of Evidence

Quality assessment is an important process in systematic reviews intended to assess the validity, reliability and adequacy of study design. Having a way to capture quality is a vital part of interpreting the evidence as it solves the validity problems in the design and execution of individual studies (Higgins and Green, 2011). An assessment of the validity of studies help to explain variations in the results of the studies by highlighting heterogeneity of results, systematic error, deviation from the truth, erroneous positive, negative or no effect conclusions, overestimate or underestimate of the true effect (Detsky et al., 1992). Hence it is important to assess the quality of studies irrespective of the anticipated variability and or robustness as failure to prespecify an acceptable threshold of study quality for inclusion in meta-analysis may result in subjective decisions concerning study inclusion (Higgins and Green, 2011).

To be able to assess the quality of primary studies, various quality dimensions were analysed based on their methodological rigour and generalisability. These were developed to assess bias and determine weight attached to them. The dimensions were categorised by analysing the internal and external validity. The internal validity comprised nine methodological dimensions such as endogeneity, problems with cross country analysis, adequacy of independent variables, model specification, confounding effects, power of studies, correlation, time invariant and robust standard errors. External validity includes wo dimensions of representativeness, missing data and reliability of data.

The thesis also developed a structured instrument/quality tool aimed at assessing the quality bias of included primary study by analysing internal and external validity. Quality bias was assessed on the following: cross country studies, appropriateness of

financial development variables used, endogeneity issues, model specification, confounding effect and power of studies. The tool was pilot tested on various economists to test its consistency and practicality for study quality. Ten economist reviewers were asked to assess economic studies selected at random from a group of studies. The quality tool was used to assess each study whether they met the internal and external validity by recording for Yes or No to the key methodological and representation variables.

Identifying Primary Studies

Studies are identified after a thorough systematic search strategy is applied as explained above. Here a comprehensive literature search is undertaken to ensure studies identified offer estimates that are comparable between studies. This was conducted on various databases using the keyword specification explained earlier taking cognisance of the inclusion and exclusion criteria. All studies collected were then recorded on EPPI Reviewer for further analysis.

Once on EPPI Reviewer, the first step consisted of a preliminary screening of the papers by reading the articles title, abstract and keywords to identify papers that are not relevant or have no enough information to judge eligibility. In this level, a citation was only moved to the next screening level if it does not refute the PIOS criteria (Population-Independent Variable- Outcome Variable – Study design) as suggested by the University of York (CRD, 2009).

- Exclude if not from Sub Saharan (Population)
- Exclude if studies whose regression analysis does not represent financial development as the key independent variable of interest versus control variable (Independent Variable)
- Exclude if studies whose regression analysis does not represent Economic growth as the dependent variable (Outcome)
- Exclude if not an empirical study (Study Design)
- Include if it meets the inclusion criteria or if it is not clear from the title and abstract.

All search results were imported into EPPI Reviewer 4 and duplicates were removed. The screening of papers utilised a text mining method developed at EPPI-Centre to enable rapid screening in the most efficient way possible. Studies that were more likely to be included for screening were given priority. This was to ensure the assessment of most relevant papers was attended at first instance. All results from the grey literature were added into the software and were screened at full text.

The second step was to refine the first step which screened on title and abstract, as we encountered many papers that did not meet the selection criteria, to accomplish this more detailed look at the text of full papers took place. A random selection of studies was selected for double screening against the review inclusion criteria. To achieve coherence the first supervisor resolved any unreconciled results. Papers that agreed with the inclusion criteria based on full text screening were included in the review.

Data Extraction

To make sense of the massive array of literature, a systematic way of summarising information needed to be applied to enable easy management, analysis and interpretation. To achieve this task, descriptive codes detailing information retrieved was applied. It is the application of phrases, key features/words, annotations and qualities used to summarise information. This provides a holistic analysis of the literature's characteristics to establish the research undertaken, gaps in the field, it guides on appropriate allocation of time and resources and aide's interpretation of findings by contextualising the information (Sutcliffe et al., 2017).

Once more relevant papers have been sifted through; detailed categorisation was used to identify specific characteristics of studies at hand using a standardised data extraction form. Data and information were extracted on:
- Bibliographic information – name of the author, year of publication, type of paper (published paper or working paper)
- Study characteristics – study type, study design, nature of data used, information on dependent, independent and control variables.

- Estimation methods used – ordinary least squares techniques, panel data techniques, time series techniques and instrumental variables techniques.
- Quality information used – Correlation, Instrumental variables, Heterogeneity, Financial development variables used, Endogeneity, Misspecification Error, confounding effect, power of studies, robust standard errors, data source and missing data.
- Outcome reported – estimated parameters for all independent variables, standard errors or t- statistics of the estimates, also estimates associated with linear, non- linear and interaction terms.

Sutcliffe et al., (2017) analyses the principles that are needed to be followed when coding in systematic review. Firstly, coding needs to be coherent and meaningful to ensure they help to define and depict the holistic body of knowledge in the literature in answering the research question.

Secondly, coding should be reliable and explicit. Here the authors emphasise the need to use a comprehensive and precise standardised tool to be able to portray an exhaustive picture of the body of research. Thirdly, they note that coding should be sensitive to subjectivity. Here the researcher will need to ensure that the coding used has taken into consideration the possibility of misrepresentations. They advocate a careful analysis of how and what is coded should be properly analysed.

To enable synthesis of information, an extraction of both substantial descriptive and quantitative data was retrieved from included papers. Excel sheet was used to record the descriptive, methodological and quantitative data. Furthermore, excel was also used to extract quantitative information of findings.

Information Management

Information management is clearly defined as an explicit process to explain the method that took place throughout the review. This includes details of how studies were retrieved, how they were stored, why and what was the categorisation, how was data analysed and how the information was presented while conducting the review.

This transparent process enables other researchers to independently audit trail what has been done, why studies were excluded or included in the review. Furthermore, information management enables ease of replication of both methods and outcomes of information. It clearly describes the transparency and as well it enables swift means of updating the review (Brunton et al., 2017). Information management also enables good use of resources both financial and human resources. It clearly defines and describes the review process thus hindering time wasting as duplication is highly minimised, loss or distortion of information can be alleviated as all information can be clearly systematically tracked and audited. The explicit process also allows for coordinated efforts in the review process which allows for quality control, inspections, revisions and amendments leading to a more rigorous review process. By clearly explaining the review process, it becomes easier to see how a study was or was not selected or included in the review and what has been done to the included studies. This process provides an objective assessment of the review process (Brunton et al., 2017).

To be able to enhance information management, this thesis has captured the flow process of information through a Prisma diagram see figure 5.2. To increase efficiency and maximise methodological rigour, this thesis utilised several management and storage of information tools to aid the review process. These tools enhance swift data storage and management in study selection, data extraction, data coding, quality assessment, data analysis, coordinate team progress and communication (Kohl et al., 2018). The first is EPPI Reviewer 4 which was used as a software tool to help in studies integration and screening. To be able to keep track of numerous citations, reference management tools were used. This thesis made use of Endnote as a reference management software that helped to manage bibliographies and references while writing this thesis. Furthermore, data synthesis was done using STATA software to analyse quantitative data. Here various statistical analysis was deployed to enable multiple measurements. Excel spreadsheet was also used to compile all data categories that were coded to enable ease of review and extraction.

4.3. Meta-Analysis

Meta-analysis has its roots from the medical sciences since 1970's. The methodology was adopted in the economic fields in the 1990's (Jarrell and Stanley, 1990; Doucouliagos,1995; Card and Krueger, 1995). In the health research, unlike in the social sciences, conducting research is an expensive and intensive endeavour, hence in order to accumulate knowledge, synthesis of previously conducted experiments and studies are assessed to determine outcome of that body of research, this design has made it possible to cheaply ascertain concrete evidence by simply sifting through an array of studies into a single quantitative summary. This study design found its application in social sciences such as macroeconomics, labour economics, environmental economics just to name a few as it has been proven useful for policy assessments (Stanley, 1998, 2008; Card and Krueger,1995; Brouwer et al., 1999).

Meta-analysis is a formal, quantitative and objective study design used to analyse and combine similar but independent multiple studies to ascertain conclusions on that body of research (Glass, 1976). This study design also investigates the consistencies and variations between studies and hence provides an objective synthesis of findings. The resulting outcome is the determination of the magnitude of effects between various variable in study (Stanley, 2008). The use of meta-analysis can enhance the power of a single study as it increases the sample sizes thus resulting in more precise estimates. Furthermore, the use of moderator variable can be used to ascertain multiple level of analysis as well as to explain heterogeneity and variation among studies (Rosenthal and Di-Matteo, 2001).

Meta-analysis is more systematic and objective study design than its counterpart narrative and vote counting. Through this systematic and formal approach, the design is more transparent, can be repeated and verified and hence is better able to minimise bias as objective measures are undertaken to result in robust findings (Rosenthal and Di-Matteo, 2001). The study design also makes it possible to attain precise effect sizes as it transforms the results of a single study into a common metric and as a result can enhance synergy between conclusive and inconclusive individual studies improving statistical power of study findings. It can also be used to deal with underpowered studies and correct effect sizes that are less reliable. Furthermore, the study design

can enable generalisation to a wider population of studies and hence is considered powerful design with highest level of accuracy (Cumming, 2014).

Another advantage of meta-analysis is its capability to add new and relevant information that was not available from original studies. This capability can help to correct for a varied biases such as misspecification and omitted variable. It can also correct for skewed findings brought about by publication bias and can help increase statistical power as it combines varied underpowered studies. Moreover, it helps to explain variation in research findings. By coding different variables, MRA is able to correct the biases unlike narrative reviews and primary studies which can only be influenced by factors that are study invariant. By taking into account these study-invariant dimensions, and by drawing data from a wider pool of studies, MRA is able to collect more information which vary across studies enabling it to account for potential trends or path dependencies, model and estimate systematic differences and guide policy implications (Doucouliagos, 2016; Stanley and Jarrell, 1989; Stanley et al., 2008).

Despite the designs benefit, like any other methodological tool, meta-analysis is prone to flaws. The validity and robustness of the study design is hinged on its quality assessment of primary studies and the search strategy used to identify the studies. Where quality assessment of studies is not considered, the resultant outcome will be biased as all studies will be considered with equal weight and power irrespective of methodological and conceptual differences (Sharpe, 1997). Secondly, the methodology of summarising of multiple varied studies may generalise findings without taking cognisance of individual study's effect sizes especially where there is significant heterogeneity among studies might result in biased estimates, however it can be advantageous as it can enhance generalisability of study findings. This occurrence is better served through shifting away from summary effect to heterogeneity (Rosenthal and Di-Matteo, 2001).

Other limitations of meta-analysis stem from its inherent design. The mixing of different varied studies might not only be too heterogeneous to combine but also might result in spurious results especially where the variation is significantly prominent. However, as the design is meant to tackle the broad ranging question, it has the capacity to

incorporate different studies and still be able to spew out a meaningful outcome (Finckh and Tramèr, 2008; Higgins and Thompson, 2002). Furthermore, the study design is prone to be affected by publication bias, the tendency of publishers to report positive effects more frequently thus overestimating the actual magnitude of outcome. This bias can only be mitigated where all relevant studies are taken into account as well as using appropriate tools to detect the bias such as funnel plots and Egger's linear regression test (Egger et al., 1997).

This thesis has used various steps to conduct meta-analysis. After undertaking systematic review and retrieving included studies for analysis, the thesis went on to use the reported statistical results to ascertain effect sizes. This thesis has used Partial Correlation Coefficient to determine the effect size on the relationship between financial development and economic growth. The presence of variation in the true effect sizes in a set of studies distinguished between within study variability and between study variability. This was analysed through fixed effect and random effect respectively. The thesis went on to look at the publication bias if it exists in the finance growth nexus by ascertaining whether journal editors have a disposition towards positive and significant results. This was checked and verified through funnel plots and more formally by the Funnel Asymmetry Test (FAT).

To determine whether the results systematically vary across different contexts in which the thesis estimated the effect, a Multivariate Meta regression was employed. This was used to explain research heterogeneity and to test for statistically significance of intercept and slope coefficients by utilising Weighted Least Squares WLS. Moderator variables were included in the multiple meta regression analysis to capture the differences in regressions included in the reported growth regressions. They have been chosen for inclusion as they have been informed by the theoretical, empirical and methodological aspects. information such as study design were differentiated into OLS, panel data, time series, instrumental data and other techniques. An account was taken to ascertain whether the studies had used instrumental variables, controlled for heterogeneity and whether they considered the problem of endogeneity.

To determine whether there is a file drawer problem, a graphical representation is analysed through a funnel plot and thereafter a more objective statistical test

propounded by Egger. This test clearly determines whether there is systematic heterogeneity. Moreover, Weighted Least Squares is used to overcome the issues of heteroscedasticity and to complement publication bias. Fixed and Random effects were further employed to calculate a summary effect. Cluster Analysis is further conducted to divide the authors into some distinct clusters in order to achieve maximum homogeneity of objects within the clusters and maximum heterogeneity between the clusters. Following on, Meta regression analysis is conducted to determine whether covariates explain any of the heterogeneity of treatment effects between studies.

4.4 Blended Approach

This thesis has used a blended method from both the systematic review and meta-analysis paradigms to provide a meta synthesis of the empirical evidence which is highly lacking when undertaking a systematic review of applied econometric papers (Mallet et al., 2012). Most studies in economics put much weight and emphasis on the quantitative synthesis of data and does not provide an exhaustive and systematic analysis of data extraction and search strategy.

This blended approach, where both sides of study design are comprehensively implemented is hailed as gold standard as they consider a predetermined search strategy by establishing methods for review, criteria for inclusion and exclusion, assessing quality and methodological issues whilst using statistical analyses to synthesize and summarize results (Crocetti, 2016). By combining both paradigms, the positivist and interpretivist epistemological viewpoints and analysis, the thesis has brought in the holistic and balanced understanding of knowledge, synergising the ontological framework, harmonising paradigm wars and as a result enable a more explicit, robust and rigorous findings (Levers, 2013).

A Blended Approach

Blended Approach
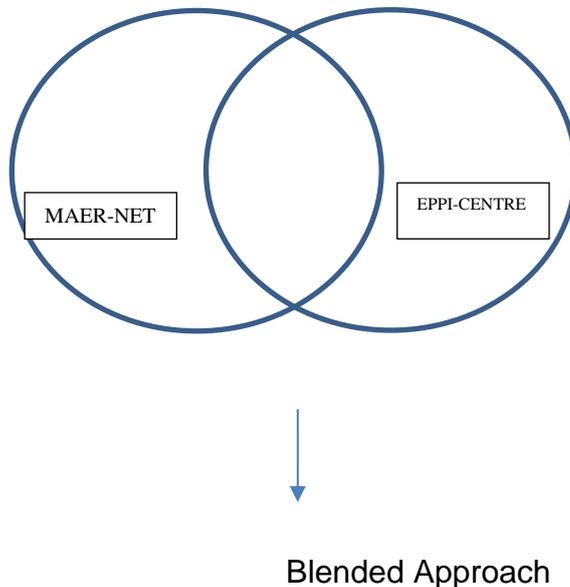
The thesis follows guidelines proposed by the Meta-analysis of Economics Research Network (MAER-Net), which seeks to synthesise, combine, summarise and explain the disparity and consistency of empirical evidence (Florax et al., 2002). Furthermore, the thesis has explicitly applied the guidelines of systematic literature review as expounded by the Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) of the Institute of Education. This guidelines emphasis on the art and science of gathering, appraising and synthesising of an exhaustive array of primary studies (Glass, 1976). The thesis has built on the work that DFID started and follows on from studies by Hawkes and Ugur, 2012 who provided a meta-synthesis where meta-analysis of empirical evidence is estimated with a combination of a systematic review of on the relationship between education/ skills on economic growth. This blended approach provides comparable, reliable and verifiable findings (Cumming, 2014; Higgins and Green 2011; Nightingale, 2009).

The thesis has endeavoured to not only be systematic by providing a detailed, exhaustive and objective means of collecting, appraising and synthesising evidence but also has strived to assess the quality of studies and methodological challenges that could potentially bias the findings. This is a contribution to econometrics field where it is not common to conduct a thorough, systematic and transparent search strategy of studies selection to enable replication and validation (Card and

Krueger,1995; Brouwer et al., 1999). The study has also used a statistical procedure to summarise results of multiple separate studies in order to come up with a single quantitative summary to demonstrate magnitude of effects. This Meta Regression will utilise an empirical framework to provide an objective estimate (Cumming, 2014).

This blended method of accommodating both systematic review and meta-analysis is not always the case. Most studies in the clinical field use it more widely than other fields especially in the social sciences. In the econometric studies, the scale is more tilted on the meta-analysis and fewer aspects of systematic review is applied. On the other hand, narrative reviews place more reliance and emphasis on systematic review of evidence and on rare occasion, meta-analysis of evidence is exhaustively undertaken, that is a statistical synthesis of evidence is not analysed. Furthermore, the blending of paradigms overcomes the shortcomings of reliance on statistical significance which focuses on answering one major question: Is there an effect? Through an integrated approach, the researcher not only establishes a statistical significance but as well practical significance (Stanley, 1998, 2008).

The use of a blended approach has many other advantages. Firstly, it can be used to answer several research questions which might include theoretical research questions (Roberts, Walton, and Viechtbauer, 2006), and methodological aspects of research (Hale, Crocetti, Raaijmakers and Meeus, 2011). According to Rosenthal and DiMatteo (2001), this blended approach can also be used to ascertain the magnitude effect and contribution of each moderator variable. Moreover, the paradigm can consider both consistent and inconsistent studies as well as analyse both small, medium and large pool of studies. By employing a transparent, systematic, comprehensive search strategy and yet a robust methodological approach, the blended method can provide an objective statistical estimate that can be integrated, repeated and verified providing the highest quality of evidence as they produce more reliable and impartial evidence (Cumming, 2014).

The blended approach is highly robust, systematic and objective method of synthesising evidence in comparison to other alternative ways of literature reviews such as narrative and vote counting. These traditional review strategies are subjective, flawed and are not adequate as they do not provide search strategies by providing

detailed search string and database used as well does not consider systematic means of studies searching for evidence, screening studies for inclusion/exclusion and synthesis of evidence (Stanley and Doucouliagos, 2012). They are prone to be plagued by selection and publication bias. Furthermore, they are likely to not be representative of the whole body of evidence. These shortcomings limit the researcher's ability to verify, update and replicate findings resulting in unreliable and biased estimates (Hunter and Schmidt, 2004).

Vote counting is a synthesis procedure of analysing literature by counting estimates to compare and see how many estimates are positive, negative, statistically significant or not. It can be very useful in presenting the distribution of meta-analysis data but not very useful in determining a genuine empirical effect (Stanley and Doucouliagos, 2012). This method is a quantitative method of research synthesis where studies with statistically significant and non-significant results are weighed against each other through sorting into categories. Those which support or do not support the hypothesis are counted and the category with the highest studies is considered to provide evidence of the effect (Hunter and Schmidt, 2004). This approach is flawed as it treats all studies with the same level of reliability and weight regardless of their statistical properties and precision, does not consider the magnitude and sources of variability, cannot detect statistical power for small studies, as well does not consider the quality of studies and size of effects of different studies (Stanley and Doucouliagos, 2012).

Furthermore, the search strategy does not consider the direction of findings of insignificant estimates. The result of this strategy most always produces a biased and misleading results (Pedersen and Fenton, 2015). As well the fault in findings comes about because of ignoring the effect of sampling error. The variation in results leads to conflicting estimates (Hunter and Schmidt, 2004). Another drawback of vote counting is its lack in providing an economic magnitude beyond statistical significance. Moreover, vote counting obscures the need for dealing with key structural weaknesses in the data such as the effect of publication bias with the need to correct it for valid inferences. Furthermore, the need to establish the source of variation between studies and not merely the direction of estimates (Stanley and Doucouliagos, 2012).

Narrative reviews on the other hand are subjective and non-quantitative. They are effective in historical analysis of ideas, highlighting conceptual understanding and perspectives (Stanley and Doucouliagos, 2012). They are inherently flawed as they lack methodological rigor as they seldom apply systematic means of search strategy hence cannot be replicated and or updated. This method is very inefficient as it cannot handle large number of studies as well as variation of findings from multiple studies especially where there exist many explanatory variables. This makes the process of sifting through an array of explanatory studies unmanageable (Pedersen and Fenton, 2015). Furthermore, it lacks systematic processing of information, the method lacks critical appraisal, quantitative synthesis of data resulting in inconsistent findings as different researchers draws different findings on similar studies leading to errors and bias (Stanley and Doucouliagos, 2012). These drawbacks emphasise the need to use formal, systematic and rigor methods incorporating systematic reviews and meta-analysis to provide robust conclusions.

Conclusion

This chapter has explicitly expounded the overall methods used by this thesis to determine their rationale and reasoning in using them. To start with it has gone through systematic review method looking at its history, benefits and drawbacks before reiterating how this thesis has applied this methodology. Following on, the chapter went to analyse critically the Meta-Analysis methodology by looking at its history, benefits and the limitations and challenges that might occur. The thesis then explained how it has used the steps taken to incorporate this methodology.

After analysing both systematic review and meta-analysis, the thesis noted the need to combine the two methods in order to provide a more holistic and balanced understanding of knowledge and ultimately achieving gold standard research. This chapter further explained the challenges facing the economics in embracing systematic approach to literature as more weight is placed on quantitative synthesis and analysis of data. To end the discussion the chapter contrasted the blended approach to the subjectivity of vote counting and narrative reviews.

CHAPTER 5: SYSTEMATIC REVIEW RESULTS

5.1 Introduction

This chapter is looking to understand the characteristics of studies retrieved for data synthesis and analysis. A total number of studies acquired is stipulated together with an exposition of where the studies were taken from. Here both published and non-published sources were analysed. Moreover, the factors considered on inclusion and exclusion of studies is explained resulting on final studies to be included for data extraction and analysis. All these are explained using the flow diagram. Going on from here, the chapter analysed key study variables to shed more light on the data. These variables include countries studied, financial development variables, publication outlet, control variables, study period, estimation methods and quality variables. Studies were analysed in respect of these variables to provide a clear and practical understanding of data characteristics.

5.2 Studies Retrieved

The researcher has been able to retrieve a total of 15,086 studies coming from various databases after removing duplicates:

Table 5.2 Studies Retrieved

DATABASES	NO OF STUDIES
JSTOR	755
IDEAS	10
SSRN	2
Econlit	8,818
Web of Science	4,456
Scopus	23
ECONPAPERS	57
Science Direct	912
ProQuest	21

Google scholar	26
National Bureau of Statistics	2
IMF	2
Harvard Kennedy	2

The search strategy was developed over time, piloted and then modified to be able to come up with the final version. These studies were then uploaded to EPPI reviewer to screen on title and abstract. As per Table 5.2 92 studies were excluded on duplicates, 61 studies on date, 464 studies for not being economic studies, 4,280 on country, 33 as they were news, 3,593 excluded for not having financial development, 1 as it was clearly historical, 3,393 if dependent study was not economic growth, 2,595 if not an empirical study, 100 if the study focus on micro level, 6 if study is sub national and 13 if studies are systematic study. 455 studies were included on full text.

In screening on full text, 211 studies were excluded on country, 17 were excluded on duplicates, 33 were excluded if not financial development, 26 were excluded if not economic growth, 47 were excluded if the study was not an empirical study, 1 was excluded for systematic review, 45 studies were excluded for insufficient statistical coefficient, 75 studies were included for data extraction and analysis. This is an improvement from other studies done which retrieved fewer studies as they did not perform a comprehensive study search.

Various other studies that have embarked on this topic have been able to retrieve lower studies dependent on financial development variables used, countries studied, shallowness in search strategy and systematic assessment, databases omitted, and estimates retrieved. Bijlsma et al., (2018) was able to include 68 studies for analysis unlike Arestis et al (2015) retrieved 69, Simplice, (2013) obtained 20 studies, Bumann et al., 2013 and Valickova et al., 2013 retrieved 60 and 67 studies respectively.

Although Bijlsma et al., (2018) analysed studies across the globe, they used one indicator, private credit to GDP as a proxy for financial development to enhance comparability. This dramatically reduced the studies to be analysed. Although they utilised estimates from both the main and robust regression, this did not reflect on the

increased number of studies. Arestis et al., (2015) on the other hand followed closely the guidelines set by MAER-NET, but on the other did not follow a comprehensive search strategy as expounded by the EPPI Centre, furthermore, they only resorted to only use published papers as it will not affect the findings (Stanley and Doucouliagos, 2012).

Simplice, (2013) outcome of 20 studies retrieved from countries across the world is very limited. Although they were willing to collect all available observations from both the main and robust estimates, as long as the model has highest coefficient of determination and difference in statistical significance. Bumann et al., (2013) and Valickova et al., (2013) found less studies in comparison to this thesis although they used a mixture of countries. Furthermore, an explicit and comprehensive search strategy was not utilised in all studies.

Figure 5:2: A Flow Diagram

Identification

Records identified through database searching (n = 17,728)

Records after duplicates removed (n = 2,642)

Screening

Records screened Title & Abstract (n = 15,086)

Records excluded
Duplicate (n = 92)
Date (n = 61)
Not Economic study (n= 464)
Country (n = 4,280)
News (n = 33)
Not financial development (n = 3,593)
Clearly historical (n = 1)
Not Economic growth (n = 3,393)
Not empirical Study (n = 2,595)
Micro level (n = 100)
Sub National (n = 6)
Systematic study (n = 13)

Eligibility

Full-text articles assessed for eligibility (n = 455)

Full-text articles excluded
Country (n = 211)
Duplicates (n = 17)
Not financial development (n = 33)
Not economic growth (n = 26)
Not empirical study (n = 47)
Systematic study (n = 1)
Insufficient statistical coefficient (n = 45)

Included

Studies included in quantitative synthesis (meta-analysis) (n = 75)

The following data were obtained from the above retrieved 75 empirical studies:

- Bibliographic information – name of the author, year of publication, type of paper (published paper or working paper)

- Study characteristics – study type, study design, nature of data used, information on dependent, independent and control variables.

- Estimation methods used – ordinary least squares techniques, panel data techniques, time series techniques and instrumental variables techniques.

- Quality information used – Correlation, Instrumental variables, Heterogeneity, Financial development variables used, Endogeneity, Misspecification Error, confounding effect, power of studies, robust standard errors, data source and missing data.

- Outcome reported – estimated parameters for all independent variables, standard errors or t- statistics of the estimates, also estimates associated with linear, non- linear and interaction terms.

As can be seen from the table above, the thesis has used a systematic, explicit and comprehensive strategy of retrieving studies and hence was able to gather an optimal number of studies. Exploration of data was done through a fuller analysis of studies to clearly ascertain their appropriateness in meeting the criteria but more importantly to capture key variables of interest. This method of data synthesis is very robust as it uses an explicit, accountable rigorous research methods for the purposes of integrating the findings of different studies by transparent means of gathering, appraising and synthesising evidence to answer a well-defined question.

This method provides a detailed, reproducible and clearly defined objective to answer explicitly a review question. By collating all relevant studies available on a given topic of study, it is comprehensive in its approach unlike literature review highlighted above conducted in economic studies where it is not common to conduct a thorough, systematic and transparent search strategy of studies selection to enable replication and validation (Lefebvre et al., 2021). Furthermore, systematic literature review analyses quality of studies against predetermined standardised criteria enabling robust findings as it provides greater objectivity in rating and weighing studies whilst

reducing bias. This enables researchers to be more critical in engaging with studies providing consistent quality of evidence (Hammerstrom et al., 2010).

5.3 Studies Analysis

As can be seen on Figure 5.3A most studies did their research on SSA which accounted to 14 papers, these are papers that researched most countries of SSA countries. The same number of papers researched financial development on economic growth in Nigeria and South Africa. Kenya is another country that was highly researched by 8 studies followed by Ghana with 7 papers. In Tanzania, only 4 studies looked at the finance economic relationship while 3 studies looked at a compilation of countries in the Southern part of Africa. The rest of studies researched less than 2 papers on average for the rest of the countries. It can be seen that no studies were done to assess the finance growth nexus in East African countries unlike West and Southern Africa. In East Africa it can be noted that studies have embarked on individual countries and not as a group of countries. Moreover, there are countries that have not been studied like Uganda, Rwanda, DRC in the east as well as Sierra leone, Gambia etc in west Africa, making the findings unrepresentative of all the countries in SSA.

Figure 5.3A
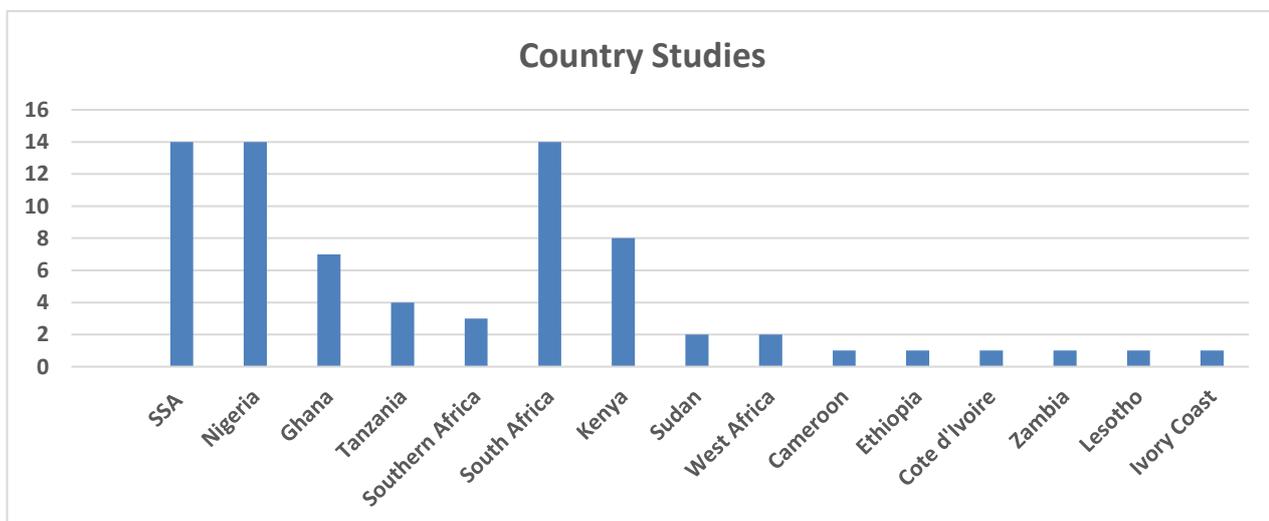
When you look at the financial variables used from Figure 5.3B, we can clearly see that most studies utilised bank ratios in their assessment of whether financial development enhances economic growth in SSA. This is not a coincidence as most of the financial landscape of the continent is bank based and hence it is reflected on the proxies used. 13 studies used stock market ratios to assess the finance economic nexus and 14 studies resorted to use a mixture of bank and stock market ratios.

Figure 5.3B

FINANCIAL DEVELOPMENT VARIABLES

■ Bank Ratios ■ Stock Market Ratios ▪ Bank and Stock Market Ratios
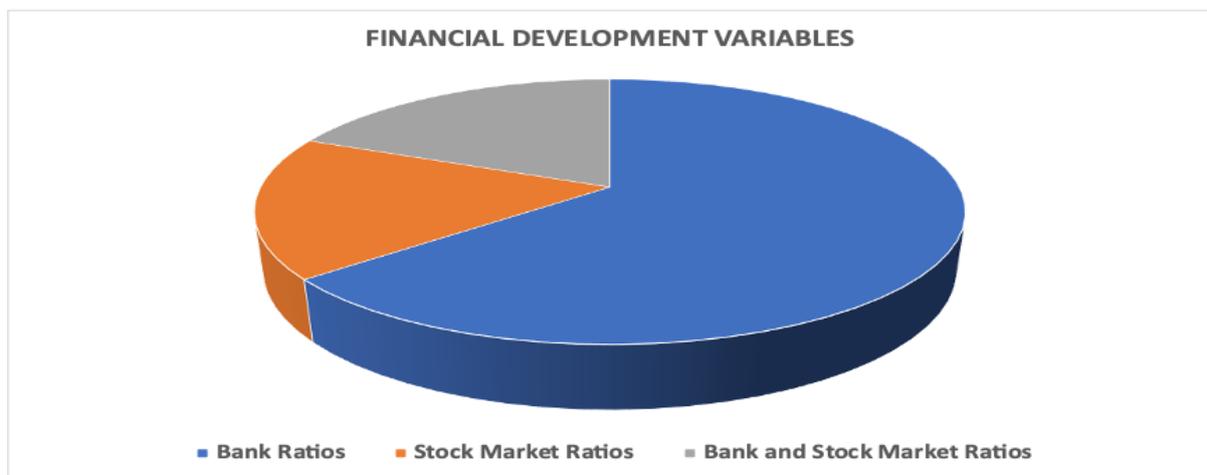
From Figure 5.3C below it is very apparent that studies retrieved from journal papers constitute most studies researched on this subject matter. This shows that this subject is of high academic interest. Following that, studies published on working papers accounted to 26 studies while studies from books and other sources were very minute.

Figure 5.3C

PUBLICATION OUTLET
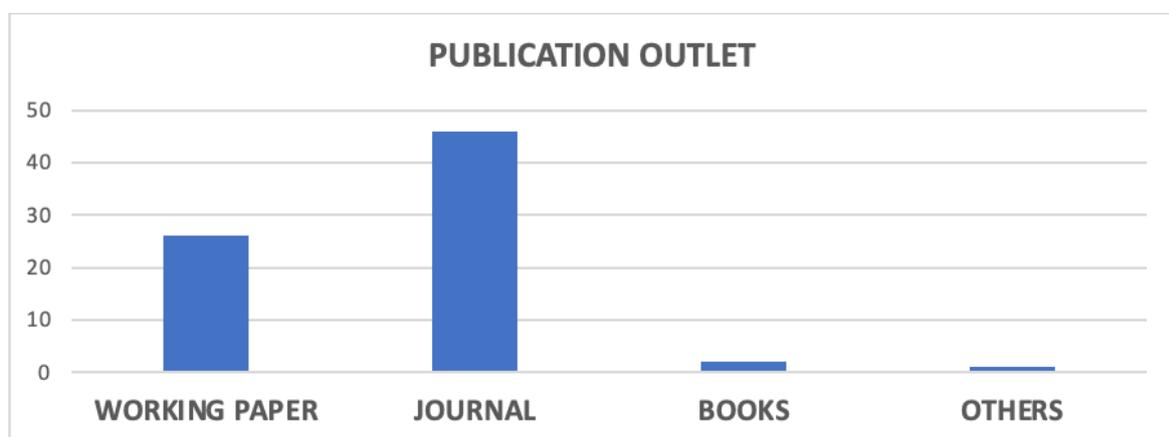
As from Figure 5.3D Almost the same number of studies used control variable as the ones that did not use control variables. The use of control variables is very paramount in research as it limits the influence of confounding and other extraneous variables in the model. By controlling the relevant variables that are not of interest to the study's aim but that can equally influence its outcome, you are more able to establish a correlation or causal relationship between the variables of interest. To be able to control this effect, the confounder must be added to the multiple regression in order to be able to attribute the effect to the primary variables of interest (Wooldridge, 2010).

Figure 5.3D
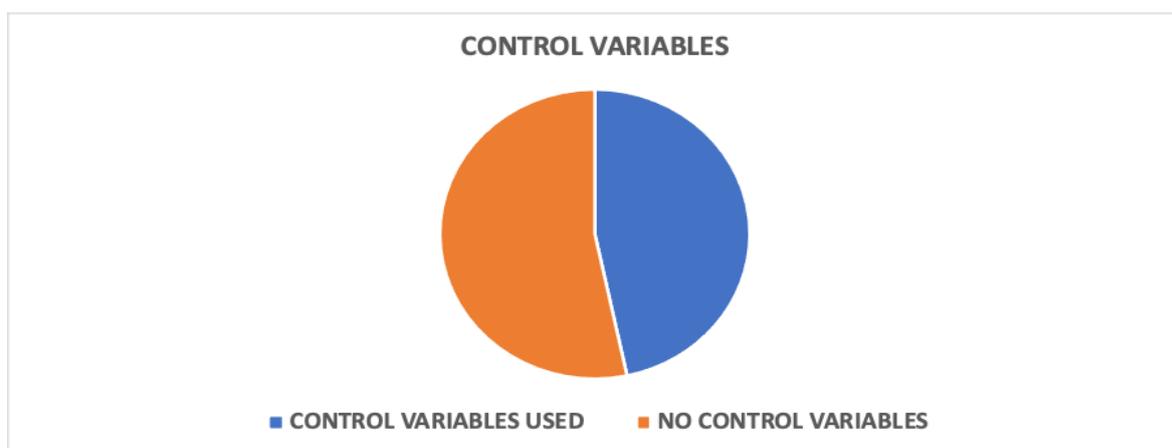
Figure 5.3E below reiterates the study period used in our study analysis. It can be noted that many studies conducted their analysis in Study 1 and 3 which represents a period before 1976 to after 1992 to a period from 1980 to after 2000 respectively. The first period represents the period of financial repression to after liberalisation whilst Study 3 represents the periods after financial liberalisation. This is very crucial as papers that did study 1, were able to contrast the two periods of repression and liberalisation to ascertain their effect on economic growth whereas the papers that concentrated on study 3, where able to focus on the period where financial liberalisation was in force. These 2 dominant periods have been able to provide an explicit and holistic analysis of how financial development affects growth in SSA.

Figure 5.3E

STUDY PERIOD
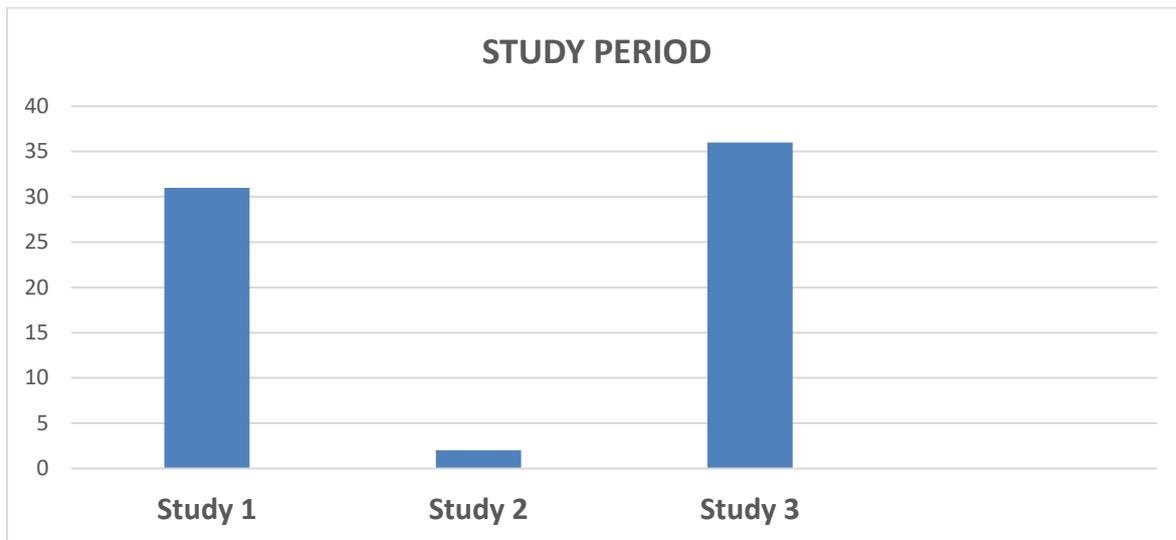
Note:

Study 1 represents study conducted before 1976 to after 1992

Study 2 represents study conducted before 1976 to before 1992

Study 3 represents study conducted from 1980 to after 2000

Figure 5.3F below highlights estimation methods used in the studies. We can see that most studies have used panel data techniques. Unlike Method 1 which uses OLS where only 2 studies used that method while 3 studies used time series techniques. The preference of using panel data over other techniques lies on their effectiveness in controlling for possibly correlated, time-invariant heterogeneity without observing it. It can also provide more informative data, more variability, can predict the future with more certainty, can observe heterogeneity, individual and time effects, can deal with more complex data, more efficiency, it can better detect and measure effects that simply cannot be observed in pure cross-country studies, can allow great flexibility in modelling differences in behaviour across individuals. Moreover, panel data methods can enrich empirical analysis in ways that are not feasible through cross sectional or time series data (Burdisso and Sangiacomo, 2016).

Figure 5.3F
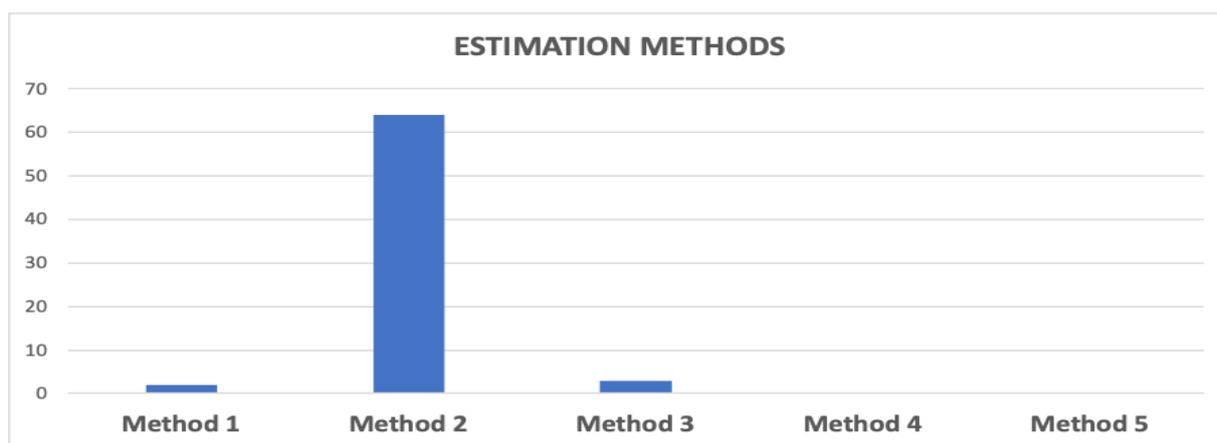
Note:

Method 1 represents studies that use OLS techniques

Method 2 represents studies that use Panel data techniques

Method 3 represents studies that use Time series data techniques

Method 4 represents studies that use Instrumental variables techniques

Method 5 represents studies that use other techniques

Figure 5.3G below highlights the quality variables captured for different studies. As can be seen from the table, most studies have used more than one indicator of financial variable. This is very important as the use of multiple variables are more capable of capturing the dynamics of financial development. Due to the complexity of financial development variable and multidimensional aspect, it demands the use of wide range of indicators to be able to capture the dimensions of financial depth. Moreover, different measures of financial depth imply different degrees of involvement of the private and public sector and different efficiency in the functioning of financial system, hence the use of a wide network of variables will better able capture the depth of intermediation process.

We can also see from the Figure below that all studies that had considered the problems of endogeneity as well as misspecification error in their analyses have deployed methods to address the problems. This is very important as the model chosen needs to accurately represent the relationship among variables. It can be noted that very few studies have used instrumental variables to control the effect of confounding and measurement errors in explanatory variables. This shows that not all

studies that have considered and addressed the problems of misspecification error and endogeneity did not use Instrumental variables but rather other variables to counteract the effect.

A few studies have considered the use of robust standard errors as a tool to correct standard errors and model specifications. This can be considered the case as most studies used standard diagnostic tests to ensure their models fits the data and consequently respecified the data, this removed the need to use robust standard errors. We can also see that very few studies had missing data. This is very encouraging as missing data in research can have a detrimental effect on the findings. It can affect the precision of confidence interval; it can weaken the statistical power as well as bias the parameter estimates (Soley – Bori, 2013).

Figure 5.3G
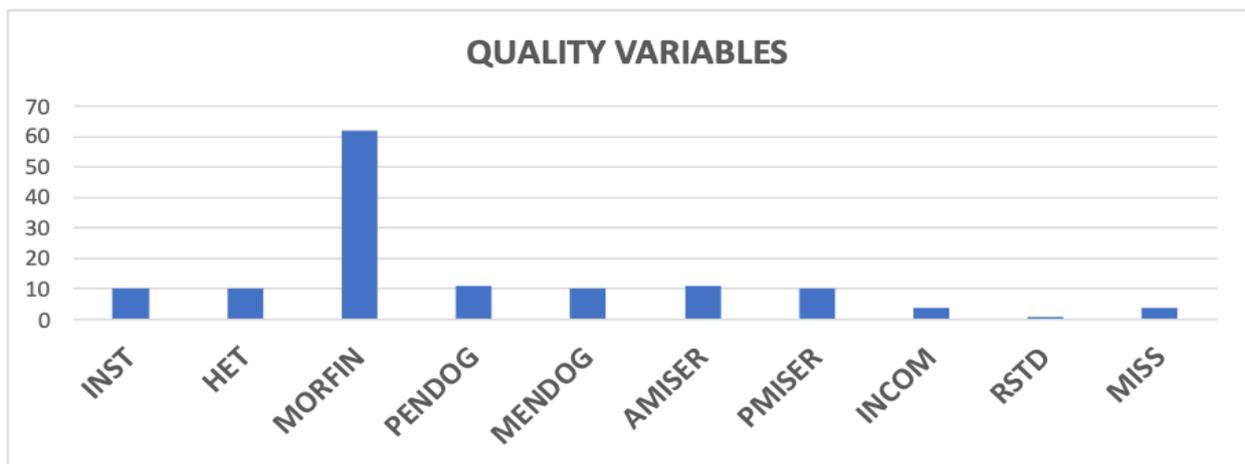
Note:

INST represents studies that have used instrumental variables to take into account time invariant.

HET represents studies that have used panel data or instrumental variables to control for heterogeneity.

MORFIN represents studies that have used more than one indicator of financial development.

PENDOG represents studies that have considered the problem of Endogeneity.

MENDOG represents studies that have used methods to address the problem of Endogeneity.

AMISER represents studies that are aware of misspecification error.

PMISER represents studies that have used methods to address the problem of misspecification error.

INCOM represents studies that have used instrumental variables to control for confounding effect.

RSTD represents studies that have considered robust standard errors.

MISS represents studies that have missing data.

Conclusion

This chapter has looked diagrammatically at the characteristics of studies retrieved in this thesis to be able to understand what is going on in the data. On looking at the countries researched on this thesis, it is noted that the majority of studies analysed SSA as well as larger economies of Nigeria and South Africa. It can be seen that majority of SSA countries were not studied individually. Most researchers studied a panel/group of countries. Moving on to analyse proxies used for financial development, it is evident that 64% of studies used bank ratios as opposed to 17% of stock market and 18% of combination of bank and stock market respectively.

When looking at the sources of studies used, it is clearly seen that most studies resorted to publish in Journals followed by working paper. Moreover, many studies did their analysis before 1976 to after 1992 as well as from 1980 to after 2000. Following on we see that most studies utilised panel data techniques unlike other methods. Lastly, we can observe the distinctions in the use of quality variables. It can be noted that very few studies have used instrumental variables to control the effect of confounding and measurement errors in explanatory variables. Few studies have considered the use of robust standard errors as a tool to correct standard errors and model specifications and as well very few studies had missing data.

CHAPTER 6: QUALITY ASSESSMENT

6.1 Introduction

Quality assessment is an important process in systematic reviews intended to assess the validity, reliability and adequacy of study design. Having a way to capture quality is a vital part of interpreting the evidence as it solves the validity problems in the design and execution of individual studies (Higgins and Green, 2011). An assessment of the validity of studies help to explain variations in the results of the studies by highlighting heterogeneity of results, systematic error, deviation from the truth, erroneous positive, negative or no effect conclusions, overestimate or underestimate the true effect (Detsky et al., 1992). Hence it is important to assess the quality of studies irrespective of the anticipated variability and or robustness as failure to prespecify an acceptable threshold of study quality for inclusion in meta-analysis may result in subjective decisions concerning study inclusion (de Dominics et al., 2008).

Quality is a subjective concept ranging from technical focus to philosophical and sociological perspectives (Popay et al., 1998). Most consideration of quality analysis has been conducted among reviews of interventions particularly health studies (Doucouliagos and Ulubasoglu, 2008). Due to a great emphasis on evidence based in medical research and a great consequence on treatment effectiveness, risk of bias is carefully assessed to instil confidence in the findings. To effectively prevent misleading results, clinical research undertakes four sources of bias which include selection bias, performance bias, attrition bias and detection bias. Furthermore, two complementary aspects of study quality should be performed, that is methodological quality and reporting quality. The former relates to the design and conduct of research while the later ensures that all relevant information about a study is available (Sanderson et al., 2007). In economic studies however, reporting quality is not very significant to bring about significant risk of bias (Stanley et al., 2008).

In economic evaluation studies, Critical Appraisal Skills Programme (CASP) tools have been established to ascertain the validity of economic evaluations; this however is not useful for this study as it concentrates on evaluating the economic viability of health intervention's effectiveness. In economic development studies, various authors

have used impact factor of journal and citations as a measure of quality (Valickova et al., 2013). In the case of using journal Impact factor (for example retrieved from Social Science Citation Index (SSCI), a higher weight is assigned to journals with a larger impact factor. In addition, citations from these sources only represent a partial analysis. These weight scores might capture the quality of the journal in general and not necessarily the quality of individual studies (Stanley et al., 2008).

Quality assessment is widely prevalent in natural sciences affording less attention to economic studies. Many economic studies on meta-analysis have not embarked on quality assessment (Doucouliagos and Ulubasoglu, 2008; de Dominics et al., 2008; Alptekin and Levine, 2012). They tend to allocate equal weights to all primary studies, regardless of their quality resulting in biased estimators among the effect sizes. They claim that differences in finding are as a results of sample size used, time period, control variable and functional form used (Dunne, 1996). This necessitates the inclusion of all relevant studies, thereafter, deploying dummy variables to capture different defined quality attributes and then include them as moderating variables to ascertain their influence on the findings Stanley et al., (2008). argues in favour of the use of all studies available as they are useful in identifying specific research dimensions among a wide variation of independent variables in research methods, models and data. This method could be useful where very few studies exist on the topic, however it can lead to flaws in the research and consequently biasing the results.

Some studies use sample size and examine whether power calculation was analysed, others require ethical approval to be considered as an aspect of quality, and some will only use peer review studies in the belief that their quality would be high as they undergo an explicit process of peer review (Walter, 2004; Jefferson and Wager 2002). This however has been challenged by the fact that reviewers have been found favouring colleagues or penalising rivals (Ryan et al., 2001). Impact Factor, an index which measures the frequency within which articles in journals are cited has been widely hailed and used as a measure of research quality (Bornmann and Marx, 2016). This index measures the importance of a journal as the higher the journals are cited, the higher the impact factor and consequently the higher the journal is ranked (Shanta et al., 2013). However useful this metric is, it cannot be used to gauge the quality of a

particular journal as it measures the integrity and quality of the journal and editorial team, the quality of a journal does not correspondingly reflect the quality of article and citations are not necessarily the measure of quality (Grech and Rizk, 2018).

Woodward and Wui (2001) controlled for study quality by differentiating between high and low study quality with specific dummy variables. Stanley and Doucouliagos (2012) on the other hand insist study quality to be coded and included as moderator variable and thereafter calculated as the inverse of the estimates standard error. By coding and quantifying these dimensions of quality in Meta Regression Analysis, the study will be able to ascertain the effect of quality on reported estimates. This according to them is statistically more robust than other forms of quality as they are not subjective. While Longhi et al (2006) on the other hand computed four groups of quality indices were studies weighed accordingly such as good quality journals, standard errors, econometric approaches used, differenced or level data.

6.2 Quality Dimensions

In consideration of the subjective nature of quality appraisal tools and the realisation of lack of sufficient tools to be used in economic studies, this thesis has developed a structured instrument aimed at assessing the quality bias of included primary study by analysing internal and external validity. The dimensions were categorised by analysing the internal and external validity. The internal validity comprised eight methodological dimensions such as endogeneity, problems with cross country analysis, model specification, confounding effects, power of studies, correlation, time invariant and robust standard errors. External validity includes four dimensions of representativeness, appropriateness, missing data and reliability of data.

By assessing both the internal and external validity of the study design we will be able to sift through studies to determine the extent to which results of included studies undertook rigorous quality process. To be able to capture quality aspects, 15 quality aspects were retrieved from included studies, codded with 1 or 0 dummies where 1 represents Yes and 0 represents No. The coded quality domains are thereafter included as moderator variable to ascertain their influence on the findings. Moreover, weights of studies were derived by using each estimate's precision as the indicator of

quality which is calculated as the squared inverse of the estimate's standard error. This method encourages the use of all studies as observable quality differences are modelled in the MRA and hence can account for even the poorer studies on reported findings.

Problems with cross country studies

Economic literature has well propounded the problems with pure cross-country studies. This is where values of one or more variables are collected for several countries at the same point in time. The method may lead to inconsistent and misleading estimates as it fails to explicitly address the potential biases induced by the endogeneity of the explanatory variables and the existence of cross-country heterogeneity (Quah, 1993; Caselli, Esquivel and Lefort, 1996).

Another methodological challenge faced is the interpretation of coefficients. These coefficients are not structural parameters as they reflect intercountry averages and do not apply to any single country, they merely establish patterns of correlation between growth and each regressor while others are held constant. Furthermore, there may be unobserved heterogeneity where variables that have a direct effect on both the independent and dependent variables are omitted, independent variables will be correlated with errors and regression coefficients will be biased measures of the structural effects (Ram, 1986).

In order to control for possibly correlated, time-invariant heterogeneity without observing it, the use of panel data techniques can take such heterogeneity explicitly into account by allowing for individual-specific variables. It can also provide more informative data, deal with complex scenarios, observe both individual and time effects, and can better detect and measure effects that simply cannot be observed in pure cross-country studies, can allow great flexibility in modelling differences in behaviour across individuals. Moreover, panel data methods can enrich empirical analysis in ways that are not feasible through cross country studies (Burdisso and Sangiacomo, 2016). In analysing the quality of studies by this dimension, studies will be rated as low quality if they analyse cross country studies.

Appropriateness of financial development variables

There are two issues that needs to be discussed to ascertain the adequacy of explanatory variables; insufficient variable used to capture the dynamics of financial development and the appropriateness of the proxies used in the analysis. We understand that financial development is a complex and multidimensional process, hence, to be able to capture the measure of financial depth, the use of a wide range of indicators needs to be considered, the use of one or two proxies are inadequate to measure the dimensions of financial depth (Cihak, Demirguc-Kunt, Feyen and Levine 2013).

Moreover, different measures of financial depth imply different degrees of involvement of the private and public sector. Studies that provide composite index created from principal component analysis or derived from a larger set of proxies will capture an accurate indicator of how the financial system functions and will be rated highly. Another concept that is pertinent in analysing the appropriateness of explanatory variables is the choice of proxies used. Since different measures of financial depth imply different efficiency in the functioning of financial system, hence the choice of proxy variables will determine its implication on the depth and intermediation in the mobilization of resources for growth and eventual development (Beck, 2015).

Endogeneity problem

Endogeneity refers to the condition in which an explanatory variable correlates with the error term. This may arise due to the omission of explanatory variables in the regression, hence violating basic assumption behind ordinary least squares (OLS) regression analysis. It may also be caused by the dependent variable being influenced by one or several explanatory variables, which in turn are influenced by the dependent variable. When endogeneity is present, it is said that 'X is endogenous' or the 'parameter is not identified' (Hill et al., 2020) "Endogeneity bias can therefore cause inconsistent estimates (i.e., not tend to be the true value as sample size increases), which potentially leads to wrong inferences, misleading conclusions and incorrect theoretical interpretations" (Ullah et al., 2018:4).

Different methods exist to address the problem of endogeneity. The dynamic generalized method of moments model (GMM) can tackle the problem of panel data (i.e., dynamic endogeneity bias) whereas two-stage least squares (2SLS)/three- stage least squares (3SLS) are more relevant for survey data. Other methods include instrumental variable (IV) using a 2-stage least square regression (2SLS). Another method is using a Heckman correction. In this thesis, studies will be analysed to ascertain whether they have considered endogeneity problems and provided solutions for it.

Model Specification Error

In developing an empirical model, it is paramount that the model chosen accurately represents the real relationships among variables. If the model is not "correctly" specified, there arises the problem of model specification error or model specification bias. Various reasons exist leading to model specification error, this includes Omission of a relevant variable(s), inclusion of an unnecessary variable(s), adopting the wrong functional form and errors of measurement (Gujarati and Dawn, 2009).

The omission of a relevant variable is where the researcher has not included the variable or do not have data for it. This has been demonstrated by Caudill and Holcombe (1999) who notes their findings when they randomly chose a data set, they found levels of significance to be lower than those reported. They propose to interpret with caution significance levels where the model has more than one specification. Leamer and Leonard (1983) presents similar tension in reporting conflicting inferences from a given data set, they recommend identifying a whole set of alternatives models to determine whether the inference is credible or fragile.

Another problem that causes model specification error is Inclusion of an unnecessary variable(s). This is where the researcher adds variables that are not relevant to the equation. This can be done in an attempt to avoid the problem of exclusion of variables and therefore include variables based on their statistical relevance. To combat this challenge, the researcher should only include explanatory variables that, directly influence the dependent variable on theoretical grounds, but are not accounted

for by other included variables. This can be accomplished through the F test which measures of the overall significance of the estimated regression (Green, 2000).

Adopting the wrong functional form is another problem which can cause specification error. This is where the functional form is incorrect. Relationship between variables can take on various forms i.e., linear, log linear, exponential, logarithmic function, so choosing the right functional form plays an important role in determining the model accuracy. For this reason, researchers need a formal test of comparing alternative functional forms, this can include examination of residuals which will exhibit distinct patterns, The Durbin–Watson d Statistic and Ramsey's RESET Test (Gujarati and Dawn, 2009).

Another challenge we can encounter is errors of measurement. This occurs when we cannot accurately measure the magnitude of the variable of interest leading to larger variances for the model, Error can occur on the dependent or the independent variables. When occurring in dependent variables they give unbiased estimates of the parameters and their variances and hence they are consistent, on the other hand if they occur in the explanatory variables, they pose a serious problem as they make consistent estimation of the parameters impossible. To combat this error the use of instrumental or proxy variables that is highly correlated with the original X variables, but un- correlated with the equation and measurement error terms will need to be used to provide consistent estimate of β (Ullah et al., 2018).

This thesis will analyse the included studies to determine whether there are no specification errors in the model so as to ensure robustness of the regression model, an examination of whether tests of specification have been conducted will be analysed, coded and included in the moderator analysis.

Controlling for confounding effects

A variable is considered to be confounding where its presence obscures the effects of other variables affecting the actual relationship between the variables under study and consequently its findings. These variables correlate with both the dependent and independent variables positively or negatively obscuring the real effect of an outcome.

This threatens results as it produces a cause-and-effect relationship that does not actually exist (Vogt, 1993). To ensure internal validity of research, confounding variables must be accounted for as failure to do so may cause confusion as to the findings from the data (Tchetgen, 2014).

A common goal of statistical analysis is to deduct the contribution of specific variable of interest and establish inferences over the findings. When regressing different variables, the aim is to determine the effect or no effect among the variables. This is normally done by controlling other variables to determine whether they remain statistically significant or not. Where an independent variable in a multiple regression has an estimate that is significantly different from zero, it is inferred that the estimate makes a significant contribution to the findings. Instrumental variables (IVs) are used to control for confounding (Jager et al., 2008; Lipsitch et al., 2010).

The problem of Power studies

Studies with low power are a major problem that has been highlighted as one of the major issues in all fields of study. According to Ioannidis et al., (2017) almost 80% of the reported effects in empirical economics research are overstated. They claim that statistical power is paramount in justifying the value of an empirical study. Without power an empirical finding is worthless. "Unless (we) begin to incorporate methods for increasing the power of (our) studies, Not only do underpowered studies lead to a confusing literature, but they also create a literature that contains biased estimates of effect sizes" (Maxwell, 2004, p.161).

Researchers are motivated to highlight statistically significant results to enable them to publish their studies, as a result they embark on flexible study designs and statistical analyses and conduct studies with low statistical power. As a result, low statistical power diminishes the chance of detecting a true effect, produces more false negatives and spurious results (Button et al., 2013). Sedlmeier and Gigerenzer, (1989) urge researchers to redirect their attention to power of their studies than to put more emphasis on the level of significance.

Factors that influence the extent of power are the effect size in the population, level of significance and number of observations. An optimum sample size ensures sufficient power considered to be 80% to reveal statistical significance. Statistical Power is correlated positively with sample size (Suresh and Chandrashekara, 2012). Faul et al., (2007) notes that studies that fail to analyse statistical power of significant tests will not be able to differentiate H0 from H1. They propose G Power 3 to assess statistical power. This program tests power from post hoc analyses that is studies that have already been conducted by ascertaining whether the attained statistical test has a reasonable chance of rejecting an incorrect H_0. We will use Cohen's ideal power of 80% as an accepted standard of power.

Robust Standard Errors

Robust Standard Errors are used to compute and correct standard errors for model misspecification and violations of the assumption of constant variance in regression and related models (Greene, 2012). Linear regression models usually exhibit some form of heteroskedasticity especially ordinary least squares is not robust to outliers as the error variances are not the same for all observations. However even under these circumstances it stays unbiased and strongly consistent, but the significance tests become inappropriate and can lead to incorrect inferences. This non constant error variance is what is termed as heteroskedasticity, where variabilities in the regression model changes not because of included predictors but something that is not in the model. This can be prompted contingent to how the dependent variable or set of predictors are being measured (Long and Ervin, 2000).

Heteroskedasticity influences the regression model in various ways including biasing the standard errors and test-statistics as well uncertainties around the model, that is the F-test associated with it (Hayes & Cai, 2007). To correct this source of dependency, robust regression estimators have been introduced to overcome these problems. Various types of tests can be used, Breusch–Pagan test which can be used to test for heteroskedasticity of errors in a linear regression model. The test measures whether the errors in a model relate to any of the model predictors. Another test that can be used to assess the presence of heteroskedasticity is the Breusch–Godfrey test,

this is a test for autocorrelation in the errors of a regression model, a test to detect serial correlation. Furthermore, we have the White test which detects the functional forms of heteroskedasticity (Astivia et al., 2019).

6.3 Quality Assessment Tools

Quality assessment tools are structured instrument that facilitate the user to assess quality. According to Sanderson et al., (2007) to achieve its validity, reliability and replicability a tool must undergo a rigorous development process to ensure they are evidence-based, easy to use and readily interpretable. An important component of tool design is in its provision of a clear-cut objectives of quality threshold levels for studies to be included in the analysis (Seehra et al., 2016). Tools for assessing quality are widely prevalent in natural sciences affording less attention to similar tools for economic studies. These tools include scales, checklists and domain-based evaluation.

The use of Scales is derived where different quality variables are scored and pooled to give a summary score, which involves assigning 'weights' to different items in the scale; checklists on the other hand is where specific questions are asked to assess an overall qualitative assessment of the studies quality. In contrary a domain-based evaluation is where critical assessments are made separately for different realms (Juni, 2001; Sanderson et al., 2007). The use of scales has been criticised heavily as they are not supported by empirical evidence, cannot justify weights assigned, provides unreliable assessment of validity, leads to oversimplification of quality assessment, pose greater risk with inter rater-reliability (Juni, 1999; Emerson, 1990; Higgins and Green, 2011) In commenting on the use of scales for clinical trials, Kirsty et al., (2017) noted that they should be avoided.

The rise of evidence-based medicine has necessitated the development of methodological and reporting guidelines for quality assessment to improve the rigour of their studies. Methodological quality is concerned with the risk of bias emanating from the key aspects of study design and conduct of a study, while the reporting quality refers to how well the findings were described in the study. This helps to ensure studies are reported in a transparent manner to enable the reader to understand

(Sanderson et al., 2007). Furthermore, to promote the use of standardised approach to the risk of bias Cochrane categorised bias into selection, performance, detection, attrition, reporting and other biases that affect quality of studies (Higgins and Green, 2011). For an economist, it is necessary to assess the quality of the included studies by developing tools that are consistent to the study design applicable to the field.

In consideration of the subjective nature of quality appraisal tools and the realisation of lack of sufficient tools to be used in economic studies, this thesis has developed a structured instrument aimed at assessing the quality bias of included primary study by analysing internal and external validity. The internal validity comprises of eight methodological dimensions such as endogeneity, problems with cross country analysis, model specification, confounding effects, power of studies, correlation, time invariant and robust standard errors. External validity includes three dimensions of representativeness, missing data, adequacy/appropriateness of variables and reliability of data.

6.4 Tool Testing

Before using our quality tool, we pilot tested it to assess its validity, reliability, and replicability to ensure its adequacy on study design and reporting quality. To evaluate its consistency and practicality for study quality, we tested on independent experts from both social and natural sciences who have the knowledge of the field and methodology used to advise whether it was comprehensive and robust to be able to reduce the risk of bias and to instil confidence in the findings. Moreover, the tool was presented on MAER-Net conference and received feedback from economists who were more inclined on the quantitative bias as opposed to qualitative risk.

To improve our tool adequacy for its purpose, the experts using their finer knowledge and the breadth of the subject, were asked to provide feedback of the tool independently and privately by analysing whether it was capable to capture both the internal and external validity as intended. These experts provided deep insight which enabled reflection, modification by proposing specific changes to the tool, and revision of the tool to consider some missing, overlooked, and overstated elements so that it can function properly as a valid and reliable tool. Although the experts from differing

fields ie natural sciences and social sciences provided feedback which was heavily inclined towards their scope of field, a balance was sought and adopted to ensure all important and relevant aspects are taken into account to enable a blended approach where both paradigms from both the systematic review and meta-analysis are applied to enable a more explicit, robust and rigorous findings (Levers, 2013).

Some economist's reviewers were asked to assess economic studies selected at random from a group of studies. The reviewers were given guidance regarding the use and interpretation of the tool before reviewing the papers. Most economists were interested and provided more feedback on methodological designs whilst those from natural sciences were keener on reporting bias that is how well the findings were described in the study. Some of the feedback highlighted were overrepresentation of panel than time series analysis, need to assess power of studies, strong on cross sectional and panel estimates, covered most methodological flaws in econometrics, the tool was good and comprehensive.

The tool was then modified to consider feedback received by including aspects to measure the time series studies, to ensure that an all-encompassing aspect to capture methodological bias as well as ensuring the power of studies was indicated as a measurement of study quality. The modified quality tool does seem to capture all aspects of internal and external validity and will be ready to be scaled out where it will receive a wider critical assessment of its applicability, effectiveness and probably modification.

Table 6.4 Quality Tool

	DETAILS	YES (1)	NO (0)
	INTERNAL VALIDITY		
1.	Is the study not a pure cross-country?	Yes, if the study looks at more than one country	No, if the study only looks at one country

2.	Has the study taken into account correlation?	Yes, if they have used control variables or run tests to take into account correlation; Studies may use the The Breusch – Godffrey test, The Durbin Watson statistic test to test for serial correlation	No if they have not used control variables or run tests to take into account correlation
3.	Has the study taken into account time-invariant?	Yes, if they have used instrumental variables to take into account time invariant variables	No if they have not used instrumental variables to take into account time invariant variables
4.	Has the study taken into account heterogeneity?	Yes, if they have used panel data or instrumental variables to control for heterogeneity; The study can use panel cointegration tests which allows for heterogeneity among cross section units. These tests include both first- and second-generation panel cointegration tests; residual - based test and error correction-based test.	No if they have not used panel data or instrumental variables to control for heterogeneity
5.	Has the study considered endogeneity problems?	Yes, if the study has considered the problem of Endogeneity	No if they have not considered the problem of Endogeneity
6.	Has the study provided solutions for endogeneity problem?	Yes, if they have used methods to address the problem of Endogeneity. The panel GMM estimator, dynamic instrumental variable modelling approach, where the lagged values of the dependent variable (growth) and differences of the independent	No if they have not used methods to address the problem of Endogeneity

		variables are suitably used as a valid instrument to control for this bias.	
7.	Is the study aware of misspecification error?	Yes, if the study is aware of misspecification error	No if they are not aware of misspecification error
8.	Has the study provided solutions for misspecification error?	Yes, if they have used methods to address the problem of misspecification error. Tests such as the Durbin–Watson d Statistic and Ramsey's RESET Test.	No if they have not used methods to address the problem of misspecification error
9.	Has confounding effect been controlled?	Yes, if they have used instrumental variables to control for confounding effect	No if they have not used instrumental variables to control for confounding effect
10.	Does the study have sufficient power?	Yes, if the studies power is greater or equal to 80%	No if the studies power is less than 80%
11.	Has the study taken into account robust standard errors?	Yes, if the study has taken into account robust standard errors	No if they have not taken into account robust standard errors
	EXTERNAL VALIDITY		
1.	Does the study use reliable data source?	Yes, if the study uses reliable data source. Reliable data source include data produced/collected by government agencies, multilateral organisations such as International financial statistics, World Development Indicators, World Bank social development indicators etc	No if the study does not use reliable data source

2.	Does the study not have missing data?	Yes, if the study does not have missing data;	No if the study does have missing data
3.	Has the study dealt appropriately with missing data and not merely deleted it?	Yes, if the study dealt appropriately with missing data. Missing data techniques used may include various imputation techniques, propensity adjustment techniques, attrition, singular spectrum analysis etc	No if the study has not dealt appropriately with missing data
4.	Are the Independent variables utilised appropriate?	Yes, if they have used appropriate indicator of financial development; Appropriate indicators include M1, M2, and M3 for bank variables and stock market variables such as stock market capitalisation ratio, stock market activity and turnover ratio.	No if they have not used appropriate indicators of financial development
5.	Are the Independent variables utilised sufficient?	Yes, if they have used more than one indicator of financial development	No if they have not used more than one indicator of financial development

6.5 Discussion of the Tool

Quality assessment tools in research is very paramount as they assess the validity, reliability and adequacy of study design. This assessment enables the researcher to ascertain and explain quality variabilities in individual studies (Higgins and Green, 2011). Since systematic reviews deal with identifying, selecting, integrating, and synthesizing research findings of separate studies, all studies included for analysis must meet rigorous methodological quality. With a lack of quality assessment tools in economic research, most studies included in reviews are of poor quality as there are no acceptable and standardised tools to handle biases and establish whether scientific rigour has been followed. This failure to identify or prespecify acceptable threshold of

study quality for inclusion in meta-analysis may result in subjective decisions concerning study inclusion and consequently biasing the results (Detsky, 1992).

This thesis has developed a tool that can be used to critically appraise and assess methodological rigour and quality of studies undertaking meta-analysis of evidence in economic field. The tool is used to ascertain the extent to which studies have addressed and considered biases in data analysis and study design. This tool can be used by researchers to determine, assess and differentiate high quality primary studies as well it will enable the decision makers to have guidelines and quality appraisal tool with which to assess high quality systematic reviews in economic fields. By combining both paradigms from positivist and interpretivist, this thesis has bridged the gap by bringing in the holistic and balanced understanding of knowledge, synergising the ontological framework, harmonising paradigm wars and as a result enable a more explicit, robust and rigorous findings (Levers, 2013).

To be able to capture quality aspects, the tool indicates a Yes or No to the quality domains which represents 1 or 0 respectively. Yes or 1 signifies the positive quality trait that enhances the rigorous aspect of quality while the No or 0 denotes the negative trait where the study is deemed as of low quality and consequently expected to bias the results. The coded quality domains are thereafter included as moderator variable to ascertain their influence on the findings. This contrasts with most economic reviews where they consider all primary studies, regardless of their quality resulting in biased estimators among the effect sizes (Dunne, 1996). This thesis on the other hand has been able to assess quality of individual studies by capturing both the external and internal set of domains where the risk of bias is ascertained. This has enabled the distinguishing of studies through the variations of quality aspects.

Various limitations have been noted in assessing quality of primary studies in this thesis. Very few studies undertook rigorous methodological analysis, this can be seen by the lack of tests such as The Breusch –Godffrey test, The Durbin to take into account correlation (Aluko et al., 2020; Inoue and Hamori, 2016; Maganya, 2018; Taivan and Nene, 2016). We also see a shortage of studies that used instrumental variables to take into account time invariant variables as well as to control for heterogeneity, endogeneity and confounding. This is important as it solves the

problem incurred when explanatory variables correlate with the error term and as well variables correlating with both the dependent and independent variables among others (Jager et al., 2008; Lipsitch et al., 2010; Ullah et al., 2018).

Majority of studies have used sufficient number of independent variables to appropriately capture the complex and multidimensional aspect of financial development. According to Cihak et al., (2013) an array of financial indicators needs to be considered as different measures of financial depth measures different degree of finance penetration in both the private and public sector (Beck, 2015). Very few studies have used methods to address the problem of misspecification. This problem stems from various reasons including Omission of a relevant variable(s), inclusion of an unnecessary variable(s), adopting the wrong functional form and errors of measurement (Gujarati and Dawn, 2009).

Power of studies is another quality measure that has been captured. This variable is important as it is paramount in justifying the value of an empirical study. Studies with low statistical power leads to biased estimates of effect sizes and spurious results (Button et al., 2013; Maxwell, 2004). It can be seen that less than 30% of included studies do not have sufficient power. Reliability of data source is another important variable that this thesis has captured. Most studies have shown to utilise reliable data source which emanated from government agencies, multilateral organisations such as International financial statistics, World Development Indicators, World Bank social development indicators etc. moreover, majority of studies did not suffer from missing data.

As can be noted, the various quality domains as enlisted above are paramount to establish methodological rigour of research and help to achieve, distinguish and expound between high- and low-quality studies so that they can be differentiated and classified accordingly. By using quality assessment tools in research in general and in economics field in particular, we not only remove bias included in the body of research but also raise the standard of scientific rigour, explain heterogeneity and grade the strength of body of evidence. More research is needed to establish a standardised tool that can be used widely in economics field in order to improve transparency, consistency and scientific rigour.

Conclusion

This chapter has expounded the concept of quality and its role in validating research studies. It started by defining the term, followed by the explanation of its importance in natural sciences unlike the social sciences. Here we note the great emphasis placed by natural scientists in quality assessment due to its greater consequence from the risk of bias, much higher than in social sciences. The chapter then went on to explain the development of structured instruments to assess quality bias through the 8 elements of internal validity and the 3 elements of external validity respectively. This filled in the gap of insufficient tools in economic studies. Following on, the chapter went on to illustrate the quality assessment tools that have been used in the natural science to set the stage for the developed tool. The developed tool was pilot tested to ensure its adequacy and comprehensiveness before delving into the categorisation and explanation of how the tool is actualised. Finally, the discussion of the tool was illustrated to enhance the understanding, importance, and its realisation.

CHAPTER 7: META REGRESSION ANALYSIS AND METHODOLOGICAL CONTRIBUTION

7.1 Introduction

Meta-analysis is a statistical technique used to deduce a summary effect from a series of results emanating from individual comparable studies (Glass, 1976). This according to Florax et al., (2002), leads to the combination of different outcomes with similar setting to provide a more objective and methodological rigor in comparison to other approaches such as traditional narrative reviews or vote counting. Stanley (2008) notes that the comprehensive integration and synthesis of findings enables the modelling and estimating of explanatory factors, control and correct for omitted variable bias and filter out the influence of biasing factors. These according to Stanley has more advantage in comparison to primary econometric research and narrative reviews as it has the potential to provide new information that was lacking from the original research due to data limitations (Stanley and Doucouliagos, 2012).

In comparison to other statistical tools, meta-analysis is able to explore heterogeneity amongst estimates as it has greater information and degrees of freedom and has a potential to correct primary econometric research. Meta-analysis integrates inconsistent research findings through a critical and objective structure and at the same time sifting out some of the biases routinely found among reported research results such as misspecification, omitted-variable, and other biases (Bennett et al., 2015). According to Heckman, (2001) the vastness of research topics makes the findings widely dispersed making it impossible to synthesis knowledge and policy application. Meta-analysis with its objective and critical applications is able to synthesise all these research knowledges to enable informed policy (Cumming, 2014).

Meta-analysis has been predominantly used in medical and clinical studies but has penetrated in the social sciences and particularly in economics field as it has been proven to quantitatively synthesise the empirical evidence to a common comparable form (Stanley, 2001). The methodology has been used in economics field in order to provide the same methodological rigor in literature synthesis and analysis as is used in medical sciences (Rosenthal and Di-Matteo, 2001). In economics development

studies, this methodology has been applied to integrate findings on effects of education and skills on economic growth in low-income countries (Hawkes and Ugur, 2012), influence of income inequality on economic growth (Dominics et al., 2008), on entrepreneurship and economic growth (Mrabet and Ellouze, 2014) just to name a few.

Hunter and Schmidt (2004) notes that synthesis of primary studies should take into account all information available from each study to enable appropriate methodological rigour. Effect size is calculated using information provided by each study. Information to be acquired depends on the choice of effect size. This study will make use of Partial Correlation Coefficient (PCC) as its chosen effect size and hence the information that is needed from each study is t-statistic and degrees of freedom through the following formula:

$$r = \frac{t}{\sqrt{t^2 + df}}$$

Where r is the effect size to be calculated from individual studies. The standard error of the effect size is calculated as $\sqrt{\frac{(1-r^2)}{df}}$. The effect size will be used as the dependent variable in the meta regression analysis while independent variable will comprise of characteristics of individual studies like the methods of estimation, type of publication, sources used, sample size, and the standard error of effect size (Beck and Levine, 2004; Ang, 2008). In coding the coefficient estimates, most studies report more than one set of results. We have resorted to use all results proposed in the study but have ignored all results presented for robust purposes and sensitivity analysis.

7.2 Data Characteristics

To be able to assess the relationship between financial development and economic growth, this thesis has used the following dependent and independent variables.

Dependent Variables

We chose studies that use real GDP per capital as the dependent variable. Some studies used other macroeconomic development indicators such as savings,

investment, human capital etc. We could not use these other indicators as they have different units of measurement and are not readily comparable.

Independent Variables

We chose studies which used bank-based or market-based variables as a proxy of financial development. Such indicators include: M1, M2, M3 for banks and turnover ratio, stock market capitalisation ratio, stock value traded for stock market respectively.

This thesis has been able to retrieve a total of 15,097 studies coming from various databases such as JSTOR 766; IDEAS 10; SSRN 2; Econlit 8,818; Web of Science 4,456; Scopus 23; ECONPAPERS 57; Science Direct 912; ProQuest 21; Google scholar 26; National Bureau of Statistics 2; IMF 2; Havard Kennedy 2. The search strategy was developed over time, piloted and then modified to be able to come up with the final version. These studies were then uploaded to EPPI reviewer to screen on title and abstract. As per Figure 5:2 92 studies were excluded on duplicates, 61 studies on date, 464 studies for not being economic studies, 4,280 on country, 33 as they were news, 3,593 excluded for not having financial development, 1 as it was clearly historical, 3,393 if dependent study was not economic growth, 2,595 if not an empirical study, 100 if the study focus on micro level, 6 if study is sub national and 13 if studies are systematic study. 468 studies were included on title and abstract.

To screen on full text; 224 studies were excluded on country, 17 were excluded on duplicates, 33 were excluded if not financial development, 26 were excluded if not economic growth, 47 were excluded if the study was not an empirical study, 1 was excluded for systematic review, 45 studies were excluded for insufficient statistical coefficient. Only 75 studies were included for data extraction and analysis.

We codified variables reflecting study characteristics that may influence the reported estimates of the effect of financial development on economic growth. This followed the methodology proposed by Stanley (2010). The codes enabled the thesis to capture the following information:

- Study characteristics information such as study design, study type, data used (cross sectional, time series, and balanced/unbalanced panel) and units of measurement for dependent and independent variable
- Estimation methods used such as OLS, 2SLS, 3SLS, GMM, Fixed effects, Random effects, endogeneity addressed,
- Control variables
- Key variables used i.e. banks and stock market measurement
- Published vs unpublished studies
- Direction of the link
- Study quality
- Power of studies

The resulting data set contains 75 studies, which are listed in the Appendix; the data set is available in the excel file. Because most studies report multiple estimates obtained from different specifications (for example, using a different definition of financial development), it is difficult to select a representative estimate for each study. For this reason, we collect all estimates, which provides us with 602 unique observations. It seems to be best practice in recent meta-analyses to collect all estimates from all the relevant studies for instance (Disdier and Head, 2008; Doucouliagos and Stanley 2009; Daniskova and Fidrmuc 2012). We also codify variables reflecting study characteristics that may influence the reported estimates of the effect of finance on growth and these variables.

The collected data for this study has been organized through coding for ease of analysis. The variables have been distinguished into quality and moderator variables (all of which are dummy variables). The moderator variables affect the strength of the relationship between the dependent variable and explanatory variables while quality variables give more details on the collected pieces of information. Tables 7.2A and 7.2B show the descriptive statistics for moderator and quality variables respectively.

Table 7.2A Descriptive Statistics of Moderator Variables

Moderator Variable	Definition
Study1	=1 if the estimate belongs to study conducted before 1976 to after 1992; = 0 otherwise
Study2	=1 if the estimate belongs to study conducted before 1976 to before 1992; = 0 otherwise
Study3	=1 if the estimate belongs to study conducted from 1980 to after 2000; = 0 otherwise
Authy1	=1 if the estimate belongs to study published before 2000; = 0 otherwise
Authy2	=1 if the estimate belongs to study published after 2001; = 0 otherwise
Single	=1 if the estimate uses data on single country; = 0 otherwise
Multi	=1 if the estimate uses data on multiple country; = 0 otherwise
Year1	=1 if the estimate belongs to a model that uses yearly data; = 0 otherwise
Year2	=1 if the estimate belongs to a model that uses non-yearly data; = 0 otherwise
Inde1	=1 if the estimate belongs to a model that uses bank-based variables; = 0 otherwise
Inde2	=1 if the estimate belongs to a model that uses market-based variables; = 0 otherwise
Inde3	=1 if the estimate belongs to a model that uses both bank based and market-based variables; = 0 otherwise
Inde4	=1 if the estimate belongs to a model that uses financial reform variables; = 0 otherwise

Inde5	=1 if the estimate belongs to a model that uses only 1 variable of financial development: = 0 otherwise
Method1	=1 if the estimate belongs to a model that is estimated using OLS techniques; = 0 otherwise
Method2	=1 if the estimate belongs to a model that is estimated using panel data techniques; = 0 otherwise
Method3	=1 if the estimate belongs to a model that is estimated using time series data techniques; = 0 otherwise
Method4	=1 if the estimate belongs to a model that is estimated using instrumental variables techniques; = 0 otherwise
Method5	=1 if the estimate belongs to a model that is estimated using other techniques; = 0 otherwise
Paper1	=1 if the estimate is from a study published in a journal; = 0 otherwise
Paper2	=1 if the estimate is from a working paper; = 0 otherwise
Paper3	=1 if the estimate is from a discussion paper; = 0 otherwise
Control	=1 if the study uses control variables; = 0 otherwise

Table 7.2B Descriptive Statistics for Quality Variables

Quality Variable	Definition
CORR	=1 if they have used control variables or run tests to consider correlation; = 0 if they have not
INST	=1 if they have used instrumental variables to consider time invariant; = 0 if they have not
HET	=1 if they have used panel data or instrumental variables to control for heterogeneity; 0 if they have not
APFIN	=1 if they have used appropriate indicator of financial development; 0 if they have not
MORFIN	=1 if they have used more than one indicator of financial development; 0 if they have not

PENDOG	=1 if the study has considered the problem of Endogeneity: 0 if they have not
MENDOG	=1 if they have used methods to address the problem of Endogeneity: 0 if they have not
AMISER	=1 if the study is aware of misspecification error: 0 if they have not
PMISER	=1 if they have used methods to address the problem of misspecification error: 0 if they have not
INCON	=1 if they have used instrumental variables to control for confounding effect; 0 if they have not
POW	=1 if the studies power is greater or equal to 80%; = 0 if they have not
RSTDA	=1 if the study has considered robust standard errors; = 0 if they have not
RELIA	=1 if the study uses reliable data source; 0 if they have not
MISS	=1 if the study does not have missing data; = 0 if they have
AMISS	=1 if the study dealt appropriately with missing data; = 0 if they have not

Table 7.2C Correlation Matrix

	Partial	separtialr	Authy1	Inde3	Method1	CORR	RSTDA
partialr	1.0000						
separtialr	-0.4795***	1.0000					
	(0.0000)						
Authy1	0.0552	0.2436***	1.0000				
	(0.1801)	(0.0000)					
Inde3	-0.0066	-0.0347	-0.0836**	1.0000			
	(0.8724)	(0.4002)	(0.0386)				
Method1	0.1259***	-0.0622	-0.0237	-0.0587	1.0000		
	(0.0022)	(0.1308)	(0.5586)	(0.1473)			
CORR	0.0556	0.1094***	-0.1177***	-0.1101***	-0.0258	1.0000	
	(0.1772)	(0.0078)	(0.0035)	(0.0064)	(0.5244)		

							1.0000
RSTDA	0.0287	-0.1035**	-0.0271	-0.067*	-0.0190	-0.0694*	
	(0.4859)	(0.0118)	(0.5037)	(0.0975)	(0.6392)	(0.0863)	

Values in parentheses are p-values,

*,**,*** denote the significance at 10%, 5%, and 1% respectively

The correlation matrix above in Table 7.2C is a sample of the whole, showing the degree of relation among the chosen variables. Notably, the chosen variables show that there is no multicollinearity given that no two variables have a correlation coefficient of 0.8 and above with respect to another. This correlation matrix is very important in relating the degree of relation among variables. For instance, the response variable partialr negatively correlates with the coefficient of regressors separtialr with the statistical significance at 1. At the same time, partialr positively correlates with all the other variables except for separtialr and studies that uses both bank based and market-based variables (Inde3). The correlation between partial and the selected variables is not very strong in magnitude except for studies that uses OLS techniques (Method1). The correlation between the main independent variable separtialr and studies that consider robust standard errors (RSTDA), studies that used control variables or run tests to consider correlation (CORR) and studies published before 2000 (Authy1) is statistically significant, while studies that uses both bank based and market-based variables (Inde3) and studies that uses OLS techniques (Method1) have a negative and insignificant relationship.

Table 7.2D Correlation between partialr and precision

	partialr	precision
partial	1	
precision	0.106** (0.013)	1

Values in parentheses are p-values,

*,**,*** denote the significance at 10%, 5%, and 1% respectively

Precision measures the random error by explaining how well a repeated sample provides similar outcome in order to determine the strength of the relationship. The pair wise comparisons are made between partialr and precision for 553 sample study

is presented on the above table. It is found that there is significant positive correlation between partial and precision with p-value less than 5%.

Table 7.2E Correlation between partialr, separtialr and precision

	partialr	Separtialr	precision
partialr	1		
separtialr	-0.4795*** (0.0000)	1	
precision	0.1062** (0.0125)	-0.1509*** (0.0004)	1

A correlation between variables in the table above indicates that Separtialr is negatively associated with Partialr and precision with statistically significance at 1% level. Partialr is positively associated with precision with a significant result.

The 2 Tables below gives a descriptive statistic of the variables within the dataset in terms of the number of observations, mean, standard deviation, minimum, as well as the maximum value.

Table 7.2.1F Descriptive Statistics

Descriptive Statistics (only for Moderators)

VARIABLES	(1) N	(2) Mean	(3) Sd	(4) min	(5) Max
Authy1	602	0.0332	0.179	0	1
Authy2	602	0.967	0.179	0	1
Study1	602	0.413	0.493	0	1
Study2	602	0.0266	0.161	0	1
Study3	602	0.5598	0.497	0	1
Single	602	0.5598	0.497	0	1
Multi	602	0.440	0.497	0	1
Year1	602	0.9468	0.224	0	1
Year2	602	0.0531	0.224	0	1
Inde1	602	0.6677	0.471	0	1
Inde2	602	0.1096	0.312	0	1
Inde3	602	0.1744	0.379	0	1
Inde4	602	0.0481	0.214	0	1
Inde5	602	0	0	0	0
Method1	602	0.0166	0.127	0	1
Method2	602	0.9202	0.271	0	1
Method3	602	0.0631	0.243	0	1
Method4	602	0	0	0	0
Method5	602	0	0	0	0
CORR	602	0.2790	0.448	0	1

	602	0.1910	0.393	0	1
INST	602	0.1910	0.393	0	1
HET	602	0.1578	0.364	0	1
APFIN	602	1	0	1	1
MORFIN	602	0.9368	0.243	0	1
PENDOG	602	0.2059	0.404	0	1
AMISER	602	0.0996	0.299	0	1
PMISER	602	0.0996	0.299	0	1
INCON	602	0.0730	0.260	0	1
POW	602	0.3604	0.480	0	1
RSTDA	602	0.0215	0.145	0	1
RELIA	602	1	0	1	1
MISS	602	0.9152	0.278	0	1
AMISS	602	1	0	1	1
Paper1	602	0.7325	0.442	0	1
Paper2	602	0.2674	0.442	0	1
Control	602	0.7441	0.436	0	1

Table 7.2.2F Descriptive Statistics for the dependent and the independent variables

VARIABLES	(1) N	(2) Mean	(3) Sd	(4) Min	(5) Max
K	610	6.536	3.442	1	15
Partial	591	0.463	0.340	-0.871	0.999
Separtialr	591	0.341	0.137	0.0236	1.000

As outlined in Table 7.2.1F and 7.2.2F above, several variables have been identified that have significantly influenced the reported effect of financial development on growth. The average mean of partialr from 591 observations is 0.463 and the amount of variation was found to be 0.340 measure via the standard deviation. Only interesting and unexpected results will be discussed. Both the moderator and quality variables are coded as dummy variables and as such have their minimum variables being 0 and the maximum being 1. The standard deviations for the various variables are relatively low indicating that the various data points are close to the mean of the data set. This metric is important in modelling a proper picture of the spread of the variables to avoid dealing with outliers among the data points which distorts the true interpretation of the means of the variables.

Comparing the publication period study published after 2001 (Authy2) is 96.7% which is higher than before 2000 (Authy1) 3.3% publications. This data shows that the study of financial development and economic growth is a current phenomenon as many researchers were able to measure the effect after the liberalisation of the financial system in the 90's. This is supported when looking at study years adopted for analysis. Studies conducted from 1980 to after 2000 (Study3) is 55.9% which is maximum followed by study conducted before 1976 to after 1992 (Study1) is 41.3%. The standard deviation was estimated to be high among estimates belonging to studies conducted from 1980 to after 2000 (Study3) is 49.7% and estimates belonging to studies conducted before 1976 to after 1992 (Study1) is 49.3% compared to estimates belonging to studies conducted before 1976 to before 1992 (Study2) is 16%. The distinctions are clear. The two dominant periods of Study 1 and 3 have been able to provide an explicit and holistic analysis of how financial development affects growth in SSA.

The estimate belongs to a model that uses yearly data (Year1) of 94.6% is more compared to estimate belongs to a model that uses non-yearly data (Year2) which is only 5.3%. This shows that annual data was preferred to non-annual data as a result of data availability especially for longer time periods. However in other cases non yearly data is preferred as it takes into consideration short term business cycles and crises effects (Beck and Levine, 2004) Depending upon the variable's consideration by each study, it was found that 66.7% of studies used bank-based variables (Inde1), 17.4% used both bank based and market-based variables (Inde3), 10.9% used market-based variables (Inde2) and remaining 4.81% uses financial reform variables (Inde4). The majority of studies using bank based variable is a reflection of the financial landscape of the SSA where the major financial system at play is banks. Majority of 92% estimate belongs to a model that is estimated using panel data techniques (Method2), the remaining 6.31% used time series data techniques (Method3) and 1.66% estimates used OLS techniques (Method1).

Data collected for the study were preponderance of controlling variables (Control) of 74.4%. Among the control variables 27.9% adopted correlation techniques (CORR) while 19.4% used instrumental variables (INST) to take into account time invariant and 92.1% used panel data (Method2). It was also noted that 20.5% of the studies

measured the problem of endogeneity (PENDOG). 9.9% of the studies found misspecification error and used methods to address the problem of misspecification error (PMISER). Only 19.1% used instrumental variables to control for confounding effect (INST). It can also be viewed that 36.4% of studies have adopted power which is greater or equal to 80% (POW). Only one study has taken into account robust standard errors in their research (RSTDA). As can be seen from the data, most studies used control variables to remove the effect of confounders whose presence distorts the true relationship of variables under study (Gujarati and Porter, 2009).

Under data observation, the major studies were adopted to data of single country (Single) which is (55.9%) and (44%) uses data on multiple countries (Multi). This shows the preference of researchers to conduct studies on single studies. This can be due to data availability. The 73% of studies were published in journals (Paper1) while 27% estimates from a working paper (Paper2) were considered for the analysis. This reinforces the fact that the topic under consideration is of high academic interest. Every study has utilized the reliable data sources for the collection of their sample data. It was found that 91.5% of the studies do not have missing data problem (MISS).

We can further evaluate the key variables (partialr and separtialr) for normality using skewness, kurtosis, and histogram.

Table 7.2G Skewness/Kurtosis tests for Normality

Variable	Observations	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2
partialr	591	0.0025	0.0000	31.19	0.0000
separtialr	591	0.0000	0.0000	104.11	0.0000

Kurtosis measure the peakness or flatness of the distribution while skewness measures the degree of asymmetry (Hair et al., 2010). For normality to be assumed, the kurtosis and skewness values should be above 0.05 to ascertain the distribution. With respect to kurtosis of the partialr variable, it is slightly lower than the threshold

and as such, does not meet the normality assumption. The same is true about separtialr. The skewness of the two variables does not imply normality. Moreover, partialr has negative skewness as it has long left tail while separtialr has a positive skewness as it has long right tail as illustrated on histograms below.

These assumptions are further illustrated using histograms. It is a graphical representation of both the skewness and kurtosis of data set.

Figure 7.2A Normality Test for partial.
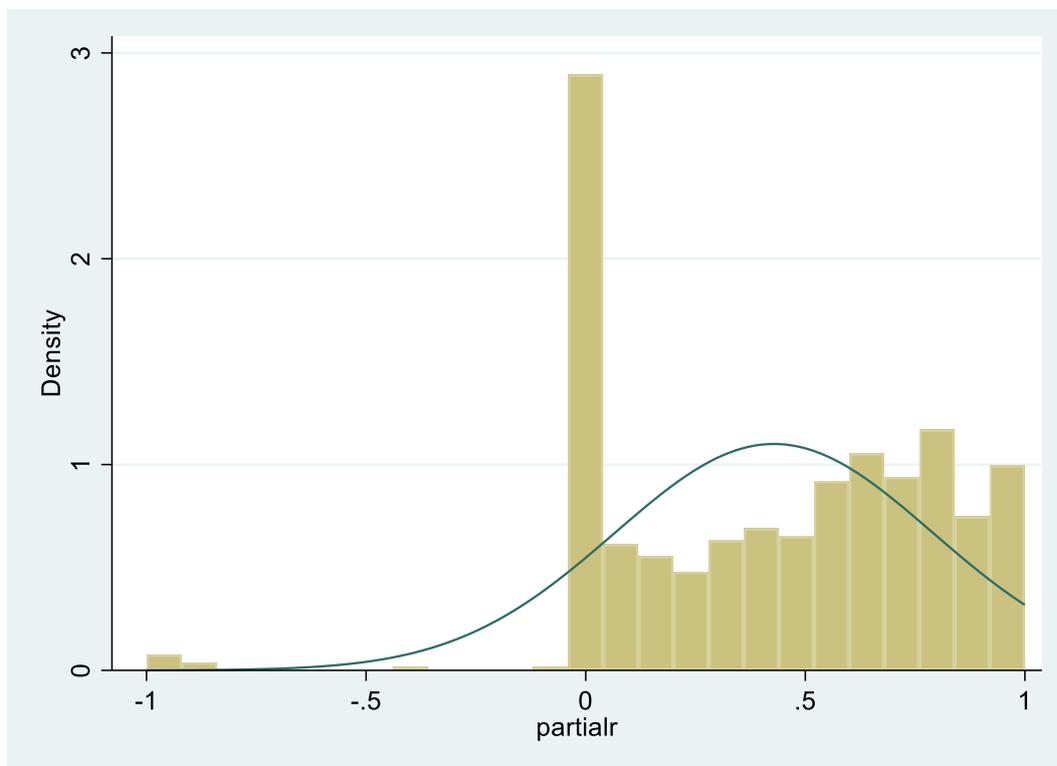
Figure 7.2B Normality Test for Separtialr.
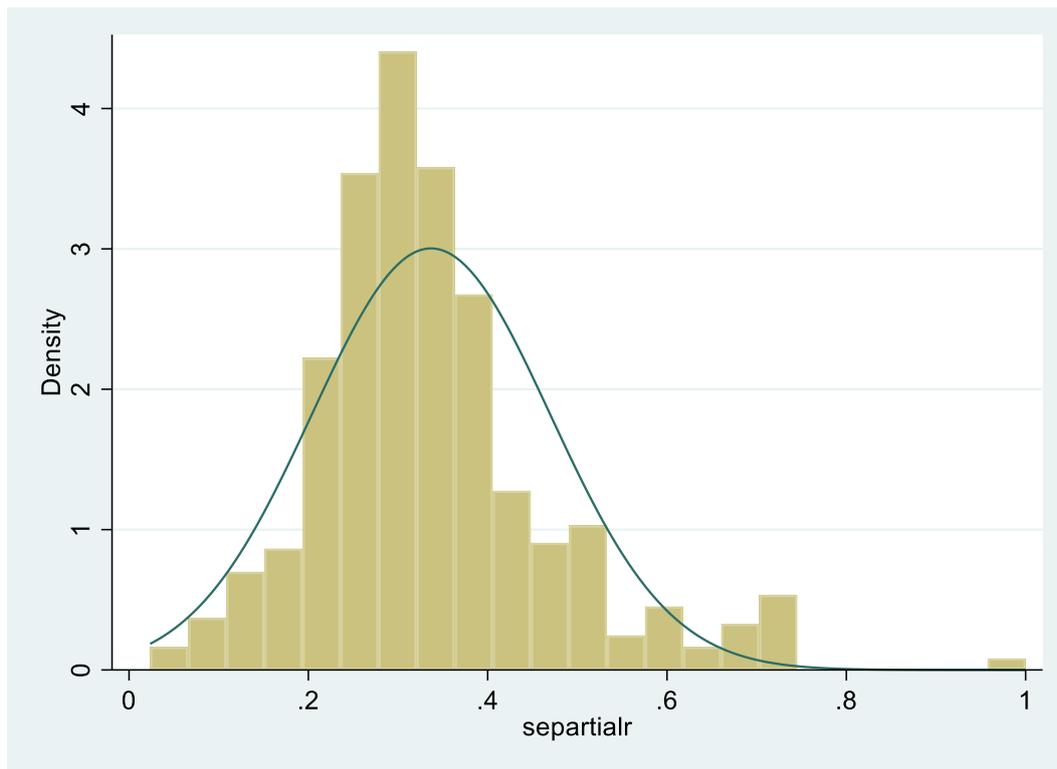
The histograms above show that both partialr and separtialr are not normally distributed. We can see kurtosis in both graphs, they show a Leptokurtic distribution meaning there are peaked curves where there are more higher values than the normal curve.

7.3 Overall Effect Estimates

Effect size calculation is the fundamental step in conducting meta-analysis. It is used to determine the significance of two variables and the presence of a phenomenon (Cohen, 1977). This study will make use of Partial Correlation Coefficient (PCC) to determine the effect size on the relationship between financial development and economic growth. The Partial Correlation Coefficient (PCC) is also used to gauge whether the variables of interest have sufficient strength and determines the direction of the relationship between two variables, as it holds other variables constant. This measure will be used as it can accommodate a large set of estimate and also is a unit less measure (Stanley, 2008). Studies that report different indices will be converted to a common index of correlation before proceeding. As Partial correlations are not

routinely reported directly in primary economic studies, they need to be calculated from the reported regression statistics, and hence studies that provided sufficient statistical information such as the t-statistic, standard error and degree of freedom or sample size were used in analysis.

Effect sizes are computed from their original index thereafter the indices will be converted to correlation index. In the second part, the presence of variation in the true effect sizes in a set of studies distinguished between within study variability and between study variability will be analysed through fixed effect and random effect respectively. Thereafter a Cochrane Q test will be used to test the presence of heterogeneity in fixed effect. Furthermore, the study will also look at the file drawer problem or publication bias which will be checked through funnel plots.

The first step in our analysis will be to include studies that estimate the effect of financial development on economic growth:

$$G_{it} = \alpha + \beta F_{it} + yX_{it} + \delta_t + \eta_i + \varepsilon_{it} \ \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(7.3.1)$$

Where i and t represent country and time subscripts; G represents a measure of economic growth; F represents a measure of financial development; X is a vector of control variables; δ captures a common time specific effect; η_i denotes an observed country specific effect and ε is an error term.

To allow for comparison between different studies, we extract coefficient β from equation 7.3.1 and hence we calculate effect sizes on each individual study through the use of r which is the Partial Correlation Coefficient calculated using the t- statistic and the degrees of freedom. This will be extracted from each study's t-values and degree of freedom through the following formula:

$$r = t/\sqrt{t^2 + df}$$

Where r is the Effect size to be calculated from individual studies, this effect size will be used as the dependent variable in the Meta regression analysis while independent variable will comprise of characteristics of individual studies like the methods of estimation, type of publication, sources used, sample size, etc

The standard error of the Partial Correlation Coefficient is given by:

$\sqrt{(1 - r^2)/df}$

The advantages for using the PCC are that it can accommodate a large set of estimate and also is a unit less measure (Stanley, 2008). The drawback on the other hand is that it is not an economic measure and also it does not follow a normal distribution which causes an asymmetry on its own values. As can be seen from Table 7.2G, Partial correlation is not normally distributed.

Fisher's z-transformation is used to transform a skewed to a normal distribution in order to obtain reliable confidence intervals. This transformation also rectifies the standard errors of r not being independent of the value of r.

Fisher's Z transformation:

$$z = \frac{1}{2}\ln\left(\frac{1+r}{1-r}\right)\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\quad (7.3.2)$$

The t-statistic is similar to PCC in a sense that it can be comparable across estimates and also it can be calculated to estimates that have a significant level.

The drawback for a t-statistic is that it is not an economic measure, and hence it is difficult to interpret. However, as it is a predictable statistical power it requires to be controlled.

As different studies use different sets of control variables, this will create difficulty in comparing results. In this thesis we will include a standard set of control variables typically used in the empirical growth literature by utilising the basic components of Barro's neoclassical growth model (Barro and Sala-i-Martin, 2004). These variables include; measures of international openness, the ratio of government consumption to GDP, population growth, investment ratios, rule of law, Inflation rate and democracy.

The model can be stated as follows:

$G_{it} = \beta_0 + \beta_1 op_{it} + \beta_2 gov_{it} + \beta_3 p_{it} + \beta_4 in_{it} + \beta_5 rl_{it} + \beta_6 ir_{it} + \beta_7 d_{it} + \varepsilon_{it}\dots\dots\dots\dots\dots(7.3.3)$

Where G represents a measure of economic growth; op is the international openness; gov is the ratio of government consumption to GDP; p is the population growth; in is the investment ratios; rl is the rule of law; ir is the Inflation rate and d is the democracy.

These are variables that capture systematic (non-random) differences between studies. In presenting the results of our Meta regression, we will assess the relative importance of control variables by means of inferential tests of statistical significance. The control variables refer to systematic variations in the original studies, these may emerge from the use of different theoretical reasoning, methodological issues or some other characteristics of empirical studies.

Table 7.3 Forest Plot

Study	Effect size with 95% CI	Weight (%)
1	0.60 [0.06, 1.15]	1.74
2	0.76 [0.21, 1.31]	1.72
3	0.42 [-0.29, 1.14]	1.02
4	0.15 [-0.80, 1.11]	0.57
5	0.64 [0.18, 1.10]	2.44
6	0.53 [-0.09, 1.16]	1.33
7	0.54 [-0.09, 1.18]	1.29
8	0.87 [0.21, 1.53]	1.20
9	0.80 [0.05, 1.56]	0.91
10	0.66 [-0.24, 1.57]	0.63
11	-0.00 [-1.55, 1.55]	0.22
12	0.54 [-0.51, 1.58]	0.47
13	-0.00 [-0.51, 0.51]	2.02
14	0.68 [-0.11, 1.47]	0.83
15	0.46 [-0.07, 0.99]	1.84
16	0.00 [-1.39, 1.39]	0.27
17	-0.00 [-0.74, 0.74]	0.94
18	0.00 [-0.74, 0.74]	0.94
19	0.78 [0.09, 1.48]	1.07
20	0.33 [-0.24, 0.89]	1.61
21	0.57 [0.02, 1.12]	1.70
22	0.78 [0.33, 1.22]	2.61
23	0.91 [0.41, 1.42]	2.02
24	0.13 [-0.73, 0.98]	0.71
25	0.82 [0.36, 1.29]	2.37
26	0.80 [0.14, 1.46]	1.20
27	0.66 [0.26, 1.06]	3.25
28	0.65 [0.15, 1.16]	2.05
29	0.32 [-0.30, 0.95]	1.32
30	0.59 [0.02, 1.16]	1.62
31	0.72 [0.24, 1.19]	2.27
32	0.03 [-0.66, 0.72]	1.09
33	0.27 [-0.35, 0.89]	1.36
34	0.55 [0.12, 0.98]	2.76
35	0.72 [-0.21, 1.65]	0.60
36	0.30 [-0.28, 0.87]	1.57
37	-0.27 [-0.87, 0.33]	1.44
38	0.75 [0.17, 1.32]	1.58
39	0.20 [-0.74, 1.15]	0.58
40	0.61 [-0.02, 1.23]	1.32
41	-0.00 [-0.57, 0.57]	1.62
42	0.38 [-0.35, 1.11]	0.97
43	0.40 [-0.82, 1.62]	0.35
44	0.64 [-0.30, 1.59]	0.58
45	0.16 [-0.45, 0.77]	1.40
46	0.82 [0.05, 1.58]	0.89
47	0.35 [-0.33, 1.03]	1.13
48	0.41 [-0.44, 1.27]	0.71
49	0.45 [-0.06, 0.96]	1.99
50	0.55 [-0.03, 1.13]	1.53
51	0.47 [-0.26, 1.19]	0.98
52	0.58 [-0.10, 1.26]	1.13
53	0.45 [-0.51, 1.41]	0.56
54	0.47 [-0.15, 1.10]	1.31
55	0.92 [0.55, 1.30]	3.74
56	0.55 [-0.34, 1.44]	0.66
57	0.03 [-1.10, 1.16]	0.41
58	0.59 [-0.10, 1.28]	1.09
59	0.51 [-0.19, 1.21]	1.07
60	0.40 [-0.44, 1.25]	0.72
61	0.41 [-0.21, 1.03]	1.37
62	0.13 [-1.24, 1.49]	0.28
63	0.35 [-0.15, 0.85]	2.07
64	0.89 [0.47, 1.31]	2.94
65	0.01 [-0.58, 0.60]	1.48
66	0.00 [-1.39, 1.39]	0.27
67	0.76 [0.31, 1.22]	2.53
68	0.00 [-0.98, 0.98]	0.54
69	0.68 [0.07, 1.30]	1.38
70	0.00 [-0.74, 0.74]	0.94
71	0.60 [0.05, 1.15]	1.72
72	0.00 [-0.74, 0.74]	0.94
73	0.00 [-0.80, 0.80]	0.81
74	0.58 [0.11, 1.06]	2.30
75	0.00 [-0.69, 0.69]	1.08
Overall	0.51 [0.43, 0.58]	

Heterogeneity: $I^2 = 0.00\%$, $H^2 = 1.00$

Test of $\theta_i = \theta_j$: Q(74) = 61.69, p = 0.85

Test of $\theta = 0$: z = 13.80, p = 0.00

Fixed-effects inverse-variance model

Forest plots analyses the distribution of estimates by plotting each estimate and its associated confidence interval to arrive to the pooled mean as well as the variation (Lewis and Clarke, 2001). They are important to summarise the results from multiple studies into one finding. They also tell us how important any study is through its weight. The bigger the size of the box the greater the weight, the smaller the size, the smaller the weight. The weights are a percentage value that indicate how much influence the individual study has on the overall effect. There is a relationship between the studies weight and precision. So those who have a relatively good precision such as studies 5, 22, 27, 30, 55 and 74 are assigned more weights compared with those with relatively poor precisions such as studies 4, 14 and 43. Studies with higher weights usually have larger sample sizes compared with studies with smaller sample sizes.

Since the meta-analysis pools the results of individual studies, the pooled summary effects is shown as a diamond with the middle point representing the pooled effect size and the point either side represents the pooled 95% confidence intervals when we have combined and average all the individual studies. Since the confidence intervals do not cross the line of no effect, we can conclude that the overall effect is significant. Moreover, as the p value is 0.00, which is lower that the alpha value making the summary effect statistically significant.

Heterogeneity is the extent to which effect sizes vary within meta-analysis. As we can see in the figure above the effect sizes do not vary that much between the studies since they overlap quite a lot hence there is very low study heterogeneity as the p value is greater than the alpha level. Moreover, we can look at the I^2 also tells us whether the combined studies are homogeneous or heterogeneous. The lower the I^2 the better the meta-analysis as it should be less than 50%. As we see in the forest plot above, the I^2 is low confirming that our studies do not vary that much and hence low heterogeneity.

7.4 Publication Bias

According to Florax, (2001) publication bias is a process where research papers and or their findings are selected based on their statistical significance. It occurs when studies are reported and or published when they meet a specific threshold which can

either have negative outcome, do not report a reasonable statistical significance, or an acceptable margin of effect size (Sterne et al., 2000; Thornton and Lee, 2000). As a result of this inclination, significant result estimates are overrepresented, empirical phenomena can be manufactured causing a biased summary effect if only significant published studies are included in the Meta-analysis leading to a biased conclusion about the relationship between financial development and economic growth.

Quite often, publication bias is termed as a file-drawer problem. It is known to occur at times when referees, researchers and editors tend to have a predilection to publish results which either lends credence to a specific theory or would be significant statistically. Doucouliagos and Stanley (2013), through a meta-analyses survey have scrutinized the level of publication bias within economics. As per their findings, the problem is quite extensive. For instance, it has been revealed by Stanley (2005), that bias tends to increase the price elasticities of water those that have been reported, by four times. On the other hand, as per Havranek et al., (2012), found that following a rectification of publication bias, the underlying price flexibility in terms of gasoline demand was around half of the average estimates published.

According to Card and Krueger, three sources of publication bias has been identified: firstly, reviewers and editors may be predisposed to accept papers consistent with the conventional view; researchers may use the presence of a conventionally expected result as a model selection test, moreover everyone may possess a predisposition to treat "statistically significant" results more favourably (Card and Krueger, 1995a, p. 239). The existence of publication bias possesses a problem but not as much as lack of its correction (De Dominicis et al., 2008).

There are many methods to estimate publication bias such as; Funnel Plot, Classic Fail- safe N, Orwin Fail- safe, Egger's regression and Fill and Trim method. This study has checked for publication bias using funnel plots which is a graphical method designed to check the existence publication bias or systematic heterogeneity. This is a simple scatter plot of effect size estimates from individual studies on horizontal axis against their precision on vertical axis. The graph assumes that the largest studies will be plotted near the average and smaller studies will be distributed evenly on both sides of the average, creating a roughly funnel shaped distribution. The funnel plot

should depict a 'funnel' shape centred on the true population effect size. Where there is deviation from this shape is an indication of the presence of publication bias.

A well-behaved data set is represented by a symmetric inverted funnel shape implying the absence of publication bias. An asymmetric funnel on the other hand indicates a possibility of either publication bias or a systematic difference between smaller and larger studies. Furthermore, the most accurate or precise, estimates will be positioned at the top of a funnel graph as they are least affected by publication selection because their high precision (Stanley, 2008). A vast array of empirical literature studying the effect of finance on growth nexus has found substantial distortions in the magnitude of estimated effects, making it more prone to the possibility of selection or publication bias. Failure to take this distortion into account when conducting meta-analysis may lead to overstating the magnitude of the genuine effect (Simplice, 2013).

The literature related to economic growth is no different. For instance, it has been found by Doucouliagos (2005), that bias within literature pertaining to the link amongst economic growth and economic freedom, and at the same time Doucouliagos and Paldam (2008) identified the bias within research on effectiveness of aid and growth. Publication bias is specifically potent in domains that reveal hardly any disagreement with regards to the right sign of the parameter. As an outcome, estimates that extend support to the current theoretical perspective have more chances of being published, while results that might be insignificant or results that might not be at par with the theory would not be accorded due significance within literature. However, not every research in the domain of economics is wrought with publication bias, as is evidenced through many meta-analyses for instance, (Doucouliagos and Laroche, 2003; Doucouliagos and Ulubasoglu, 2008; Efendic et al., 2011).

Tests that are very popularly utilized for identifying publication bias would depend on research with small samples sizes, which have the propensity to be inclusive of large standard errors; in accordance, the researchers in such kind of studies would require large estimates in terms of effects, to realize the intended level of significance. Therefore, researchers who have small sample sizes might resort to a specification search, involving a model re-estimation with diverse techniques for estimation, control variables or data sets till such time that there is significance within estimates. As

opposed to this, studies that utilize extensive observations have the scope to report smaller effects, considering that standard errors would be lower with high number of observations and thus rendering it easy to realize statistical significance. A graphical technique that is typically utilized to scrutinize probable publication bias would refer to the funnel plot (Stanley and Doucouliagos, 2010).

Figure 7.4A Scatterplot between Precision and Partialr
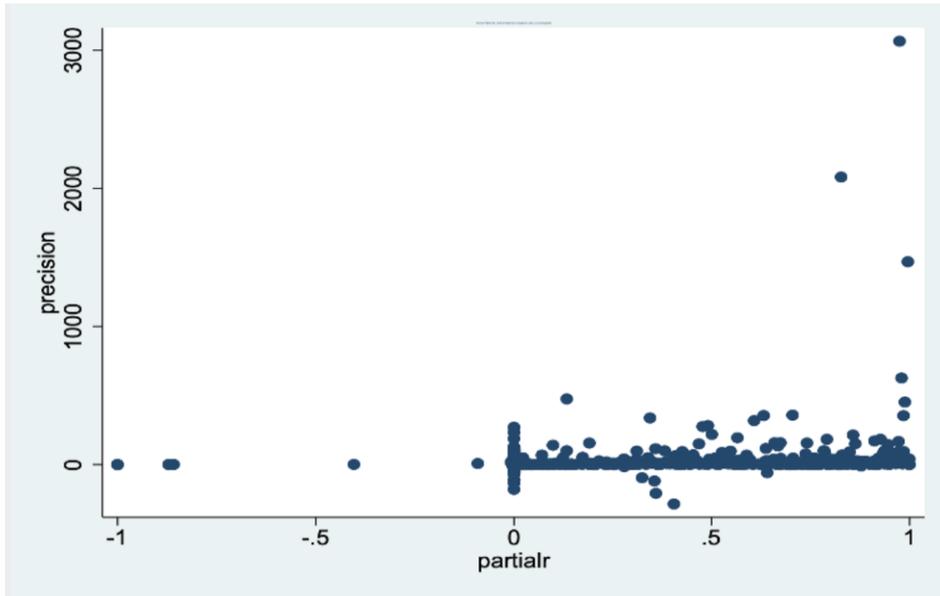
Figure 7.4B Funnel plot for publication bias
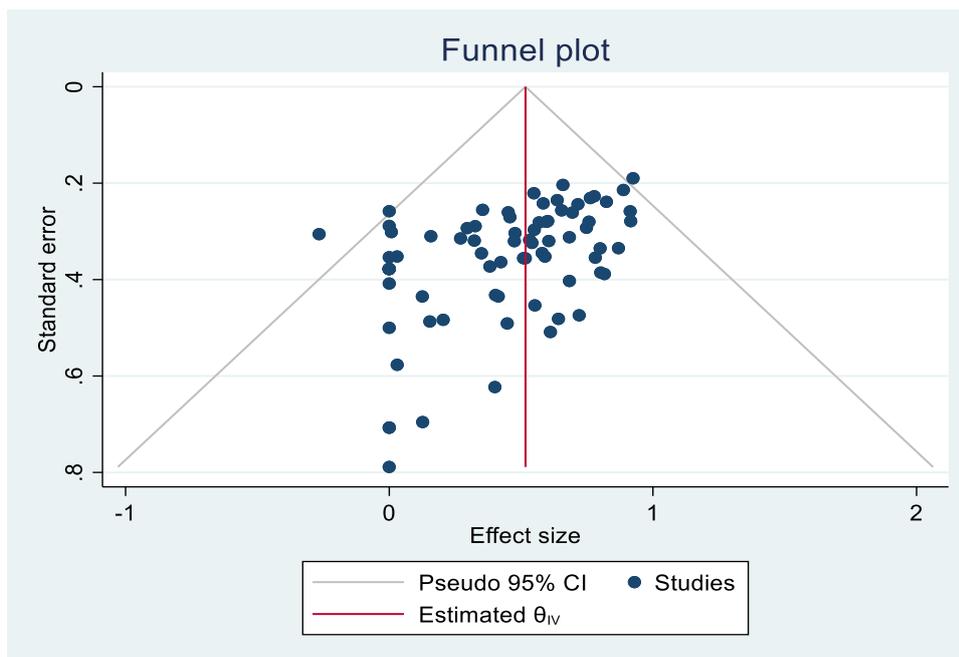
A funnel plot is a scatter diagram of the variability of individual studies, their precision and standard error. With the effect estimates drawn on the horizontal scale and the study size or precision on vertical scale, giving us an idea of the skewedness of the literature. If the funnel is symmetric meaning there is equal distribution throughout the whole inverted funnel, then there is likely no significant publication bias. On contrary, if the plot is asymmetric, it suggests that there is possible publication bias. When looking at the above graph Figure 7.4B, the distribution of data points is asymmetric where smaller studies are mis represented and thus the possibility of publication bias. To be free from bias, there should be as many studies above and below the mean as well as an equal and even distribution of study variabilities (Egger, 1997).

Figure 7.4A reveals one important aspect of the many studies and authors being considered in this subject of financial development and economic growth. The asymmetric spread of the plotted effect size on each individual study point to a bias. Such an effect may imply that smaller studies with minimal significance (statistically) tend to remain unpublished. The implication of this publication bias is that the effect size (typified by the partial correlation) calculated in this meta-analysis may overestimate the effect created by intervention. A closer visual inspection suggests an imbalance in the reported effects, as the right-hand side of the funnel is overrepresented confirming the presence of a positive effect bias. This finding suggests that positive estimates may be preferably selected for publication. The majority of estimates ranges from 0 to 1. However, visual methods are subjective, and the positive-publication bias may be attributed to other factors, therefore, formal methods of detection and correction of publication bias will be used to assess bias beyond diagrammatic representations.

At the horizontal axis, the funnel plot reveals the standardized effect size extracted from every study (in this case, coefficients from partial correlation); while on the vertical axis, it reveals the partial correlation coefficients. More accurate estimates would be close to the actual underlying effect, whereas imprecise predictions would be more scattered at the bottom of the figure. Thus, if publication selection is absent, the figure is supposed to look like a symmetrical inverted funnel. The funnel plot with regards to the literature on growth and finance is projected through figure 7.4B.

Additionally, this bias is likely to compromise the validity of such a meta-analysis because of the high likelihood of interesting or statistically significant studies being published (those that imply that financial development positively influences economic growth in sub-Saharan Africa) as compared to those that do not report similar findings possibly because of a number of issues most of which have been highlighted above. This meta-analysis highlights the plight of some countries within the Sub-Saharan African region that have not developed economically despite serious efforts in financial development. There then arises a question as to whether the publications in this research topic have overlooked some findings in the smaller studies whose findings may seem to have minimal significance and yet have some pertinent findings requiring due consideration.

Various factors can explain the correlation between the coefficient and the standard error, publication bias is one of them (De Dominicis et al., 2008). For this assumption to be valid, the dimensions of the variables in the original studies should be comparable. Due to the different proxy and dimensions of financial measures used in our primary studies, will lead to different standard errors depending on different variables making it harder to separate publication bias from dimensional effects. To ensure that we have a publication bias, we conduct a robustness check through a statistical test propounded by Egger.

The evidence of a randomly and asymmetrically distribution of estimates around the population parameter on the funnel graph shows that the research does suffer from publication selection bias. To explore more formally, the Funnel Asymmetry Test (FAT) as proposed by Stanley and Jarrell, (1989) will be conducted. This test is based on the t-statistics.

$$t_{ij} = \beta_0 + \beta_1(1/SE_{ij}) + \varepsilon_{ij} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots..(7.4.1)$$

Where t_{ij} is the t-value of the estimated coefficient from estimate I of study j the intercept β_0 and slope β_1 coefficients are to be tested if they are statistically different from zero. There exists publication bias if β_0 is statistically different from zero. β_0 also informs the direction of bias.

The following model has been established by Egger et al., (1997) to detect the existence of publication bias:

Coefficient $t_i = \beta_0 + \beta_1 se_i + u_i$ ………………………………….(7.4.2)

Where coefficient i signifies the regression coefficient of the original regression model i and se_i is the corresponding sample standard error. Where there is no publication selection bias, β_1 will be zero. That is there is no systematic association between the coefficient and the se. That is a non-zero β_1 may denotes the extent to which researchers of empirical studies search for larger coefficients in order to make up for larger standard errors (Doucouliagos and Stanley, 2009).

In order to detect publication selection bias, a conventional t-test on $\prod_{00}$ is run. We are trying to establish that without publication selection bias, the t-statistic and the standard error (se_{ij}) should be inversely related through β_{00} (in the unconditional model) which is considered to be the genuine effect of financial liberalization (Egger et al., 1997; Klomp and de Haan, 2010).

$$H_o: \beta_1 = 0 \ (no \ small \ study \ effect)$$

The test is also known as the test for funnel plot asymmetry and publication bias tests. For the regression-based tests, one can include the moderators to account for between study heterogeneity but since the tests for our study (in the meta regression) indicate no significant heterogeneity across different moderators, a test is done with any moderators first. However, some moderators (Single, PENDOG, MENDOG, and MISS) bring some amount of heterogeneity in the results across different studies (refer to table 7.9A in the meta regression section below). To account for this, the regression is run again count for the heterogeneity induced by these moderators. The results are presented in table 7.4A, column 1 and 2. Both of these regressions are based on fixed effects.

Table 7.4A Regression-based Egger test for small-study effects using Fixed-effects model.

Estimates	Without any moderators (1)	With moderators (2)
β_1	-1.44	-1.49
SE of β_1	0.422	0.448
Z value	-3.41	-3.33
P-Value	0.0006	0.0009

To check whether there is any publication bias, a test is done the results for which are presented in table 7.4A above. The null hypothesis of the test is that there is no small study effect. Since the p-value of the test is close to 0 from both regression models, the null is rejected which leads to conclude that there is a publication bias in the data.

An updated test for the publication bias is also conducted. The test performs updated regression tests for funnel plot for asymmetry in meta-analysis.

Table 7.4B Egger's test for small-study effects

Number of studies = 75   Root MSE   =   0.8279

Std _Eff	Coef.	Std. Err.	t	P>t	[95%Conf. Interval]
slope	.9472969	.1110939	8.53	0.000	.7258871 1.168707
bias	-1.440411	.3493203	-4.12	0.000	-2.136606 -.7442168

Egger test is applied for testing the funnel plot asymmetry. This will help to minimise the standard error of odd ratios which arise due to small effect size. The test for Table 7.4B above is based on two tailed of the null hypotheses of zero slope in a linear regression of φ against SE(φ), weighted by 1/Var(φ). The result shows that the slope of the regression model is 0.95 which is significantly larger than zero (p< 0.001) and bias has the coefficient -1.44 has significant p value, specifies that the data in the funnel plot is indeed asymmetrical. The findings indicate that there are small-study effects. In the funnel plot most of the studies lies outside the funnel and also since p value is less than 0.05 in egger's test hence there is publication bias.

7.5 Weighted Least Square

Weighted Least Squares is the means of accounting for the effect of each data point by weighing each data point on its accrued influence over the parameter estimate. This method is considered an extension of the OLS, but further utilises the Least Square in optimising the fit and contrary to the OLS, WLS assumes a non-constant variance of the error term and hence, the issue of the heteroscedasticity is corrected (Stanley and Jarrell, 1989). Its benefit comes from its efficient method of utilising an inversely proportional weights to the variance, where the variance of the regression model is assumed to not be constant, and hence, the different observation for the cases will no longer have the same reliability since observations with smaller variances will provide more information about the regression function than those with larger variances. In order to take into account this, we use the Weighted Least Square (WLS) method. The WLS method can be used to overcome the problem of heteroscedasticity and to complement publication bias by testing a genuine effect (Stanley, 2005, 2008).

WLS determines the amount of influence over the parameter estimate. Since we know the individual variances, we can calculate the different weights that we will be using $W_i = 1/s^2_i$

The weights are simply the reciprocal of the variance because they are inversely proportion. Small errors lead to larger weights and larger errors will lead to smaller weights since smaller variances provide more information on our model and should be more heavily weighted than those with larger errors. By fitting variance into weights, weights are inversely proportional to error. We extended the WLS-MRA by incorporating the moderator variables to summarise estimated reported regression coefficients and explain observed heterogeneity among reported effect sizes. The methodology permits for excess between-study heterogeneity as well as heteroscedasticity (Stanley and Jarrell, 1989; Stanley and Doucouliagos, 2012).

Weighted Least Squares is calculated by weighting the squared errors with the inverse of each estimates' variance. We calculated WLS by taking the independent variables as moderator in the equation and estimated a general and a specific MRM for each sample. The specification used all moderating variables that can be measured on the

basis of the information obtained from primary studies. This inclusion of all observable moderating factors however may cause issues of over-determination, multicollinearity and also the reduction of degree of freedom. To cater for this problem, a general-to-specific model routine was employed, which involves the exclusion of the moderating variables with high p-values which are insignificant one after the other until we have variables that are statistically significant. However, the limitation, General-to-Specific Model avoids data mining as it proceeds in a structured fashion from a very general statistically valid model to a specific model (Charemza and Deadman, 1997).

The WLS has been noted to be superior to both random-effects MRA as well as Fixed Effect-MRA where there is no publication bias and where there is publication bias WLS-MRA has smaller bias. Where there is no publication bias random-effects MRA is a more viable option as confidence intervals of WLS-MRA are similar to random effects (Doucouliagos and Stanley, 2013). But since we cannot be assured of lack of publication bias, due to the low power in publication bias tests, the use of WLS-MRA is favoured to RE-MRA (Egger et al., 1997; Stanley, 2008).

Table 7.5 Weighted Least Squares (WLS)

VARIABLES	(1) WLS Model 1	(2) WLS Model 2	(3) WLS Model 3
Separtialr	-1.883***	-1.704***	-1.685***
	(0.0511)	(0.0411)	(0.0375)
Authy2			-0.551**
			(0.270)
Study1		-0.0468	-0.407
		(0.0539)	(1.379)
Study3			-0.359
			(1.380)
Single		-0.157**	0.0635
		(0.0679)	(0.0787)
Year2		-0.140	-0.214
		(0.0994)	(0.203)
Inde1		0.0116	-0.300***
		(0.0828)	(0.0966)
Inde2		-0.400***	-0.367***
		(0.0836)	(0.0730)
Inde3		0.432***	0.0701
		(0.0844)	(0.100)
Method1		0.533***	0.530***
		(0.106)	(0.151)
Method3		-0.702***	-0.163
		(0.142)	(0.311)
Paper1		-0.154***	-0.121*
		(0.0107)	(0.0676)
Control		-0.293***	-0.0464

		(0.0920)	(0.135)
CORR			0.392***
			(0.0494)
INST			-0.115
			(0.102)
HET			-0.0817
			(0.0666)
MORFIN			-0.641**
			(0.299)
PENDOG			0.0331
			(0.126)
AMISER			0.00232
			(0.104)
INCON			-0.0791
			(0.252)
RSTDA			0.361***
			(0.0688)
MISS			-0.269
			(0.213)
Authy1		0.321**	
		(0.132)	
Constant	1.078***	1.499***	2.991**
	(0.00712)	(0.128)	(1.431)
Observations	553	553	553
R-squared	0.712	0.946	0.960

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The variance of partialr variable was found to be affecting the explanatory variables which resulted to apply the Weighted least squares model to gain meaning and prediction. Initially the model was estimated with single predictor. In model (1) the measurement of two variables partial and separtialr were collected from 553 observations. The R-squared depicts that 71.2% of the variation on partialr was explained by separtialr which indicates a sufficient model fit. The model (1) represents that separtialr are negatively related to partial brings 1.883-unit impact and it's statistically significant at 1% level.

Model (2) explains 94.6% of the variation on partialr by the selected independent variables. Separtialr variable shows -1.704 and significant effects on partialr. Estimates using data on single country (Single), estimates belonging to a model that uses market-based variables (Inde2), estimates belonging to a model that uses both bank based and market-based variables (Inde3), estimates belonging to a model that is estimated using OLS techniques (Method1), estimates belonging to a model that is estimated using time series data techniques (Method3), if the estimates are from a working paper (Paper1), if the estimates belonging to studies published before 2000

(Authy1), and if the studies use control variables (Control) are statistically significant with p-value less than 5%. These findings imply that the variables are important in explaining the effect of financial development on economic growth.

On the other hand estimates belonging to studies conducted before 1976 to after 1992 (Study1), estimates belonging to a model that uses non-yearly data (Year2), estimates belonging to a model that uses bank-based variables (Inde1), estimates using data on single country (Single), estimates belonging to a model that uses market-based variables (Inde2), estimates belonging to a model that is estimated using time series data techniques (Method3), estimates are from studies published in a journal (Paper1), studies that use control variables (Control) showed negative and significant effect on partialr, while estimates belonging to a model that uses both bank based and market-based variables (Inde3), estimates belonging to a model that is estimated using OLS techniques (Method1) showed positive and significant impact on the dependent variable.

In model (3) the R^2 statistic is 0.960, which is better than the value obtained by model (2). This shows that 96% of the variations were explained by the selected explanatory variable in the model. Separtialr (-1.685) and significant effects on partialr. Estimate belonging to study published after 2001 (Authy2) estimates belonging to a model that uses bank-based variables (Inde1), estimates belonging to a model that uses market-based variables (Inde2), estimates from studies published in a journal (Paper1) and studies that used more than one indicator of financial development (MORFIN) depict negative effect which imply that these variables are weak in explaining the finance growth nexus.

On the contrary, estimates belonging to a model that is estimated using OLS techniques (Method1), studies that used control variables or run tests to consider correlation (CORR), studies that have considered robust standard errors (RSTDA) contribute positive and significant effect on the dependent variable, while estimates belonging to studies conducted before 1976 to after 1992 (Study1), estimates belonging to studies conducted from 1980 to after 2000 (Study3), estimates using data on single country (Single), estimates belonging to a model that uses non-yearly data (Year2), estimates belonging to a model that uses both bank based and market-based

variables (Inde3), estimates belonging to a model that is estimated using time series data techniques (Method3), studies that use control variables (Control), studies does not have missing data (MISS) and others are statistically insignificant in affecting the value of partial.

The observation summary of above three models are the same but the R^2 is different between the models. Both Models have significantly explained the variation on partialr while model (3) had exhibited the maximum variation comparably to other models. Although model 1 just has separtialr as its explanatory variable, yet the R-Squared is reasonably high showing the standard error of separtial explains a great deal of variation in partialr alone. In all the models separtialr has significant negative effect on partial meaning that our main independent variable is negatively affecting our dependent variable partial. Estimates belonging to studies conducted before 1976 to after 1992 (Study1) and estimates belonging to a model that uses non-yearly data (Year2) remained insignificant on both the models implying their insufficiency in explaining the finance growth relationship.

On the other hand, estimates using data on single country (Single), estimates belonging to a model that uses both bank based and market-based variables (Inde3), estimates belonging to a model that is estimated using time series data techniques (Method3), and studies that use control variables (Control) are statistically significant in model 2 while they become insignificant in model 3. This tells us that the adding of other moderator variables does not help in explaining the finance growth nexus unlike the assessment of the quality variables. This is true the other way round for estimates belonging to a model that uses bank-based variables (Inde1) where the inclusion of all variables makes Inde1 important in analysing the relationship as opposed to controlling only the quality variables. The parameter coefficients in model (3) make more sense for this model and has the highest number of control variables, which take care of the omitted variable bias issue. And as it has already been established, these variables don't exhibit any serious concern around the issue of multicollinearity.

7.6 Fixed Effects and Random Effects

Two models can be used to calculate the summary effect: fixed effect and random effect model. Fixed effect model assumes that all reported estimates are drawn from the same population and that the true effect size is the same in all studies, the summary effect is the estimation of this common effect. In that case the only explanations why study results differ are the sampling error and systematic differences due to the research process. Random effect on the other hand assumes that there is variation each studies true effect sizes and is uncorrelated with the explanatory variables (Borenstein et al., 2009).

The goal of a random effect is to assess the mean of a distribution of effects and not the one true effect. Since each study provides information about a different effect, it is important that all these effect sizes are represented in the summary estimate. Fixed effect model is applicable when there is no excess, between-study heterogeneity whereas, Random effect model is appropriate when there is excess, between-study heterogeneity and so where there is heterogeneity, random effect models will be preferred to the fixed effects model, but in contrast if we believe that studies share a common effect, fixed effect will be chosen (Wooldridge, 2010).

Fixed Effects Model

Under the fixed effect model the overriding assumption is that the true effect size for all the selected studies is indistinguishable as the sampling error is the only factor causing the variation of effect size varies between studies which arises from the estimation of the effect size. The fixed effect model is relevant in ascertaining the presence of variation in the true effect sizes in the set of studies distinguished between within study variability (Allison, 2005). The null hypothesis under this fixed effect model is that there is zero summary effect in each study. Table 7.6 below shows the summary of the fixed effect model as estimated.

The fixed effect also assumes that each individual has a distinctive time-invariant characteristic which is separate and uncorrelated from other individual characteristics. As each unit is different therefore the unit's error term and the constant (which

encapsulate individual characteristics). Where the error terms are correlated, the fixed effect model then becomes inappropriate because the inferences deduced may not be correct thus prompting the use of another model (random effects in this case) (Wooldridge, 2010).

The fixed effect is modelled as shown below:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \cdots + \beta_k X_{k,it} + y_2 E_2 + \cdots + y_n E_n + \mu_{it}$$

Where,

Y_{it}; response variable (t denotes time)

β_1; coefficient for IVs

X_{it}; independent variables

y_2; coefficient of binary repressors

E_n; entity n for the binary variables

μ_{it}; white noise

Fixed-effects estimate is calculated by weighing each estimate by the inverse of its variance. The model yields a partial correlation coefficient of -1.71 with a 1% significance. For FE we take within R^2 which is 0.552, F is 0.000 showing that our models are correctly specified. It is assumed that the correlation between error term, u_i and the explanatory variable(s) is not equal to zero for the FE model. Sigma e is around 0.14 for FE and RE models. The sigma ui of FE has increased from 0.26 in the RE model to 0.28 and the remaining error term (sigma e) remains similar as RE.

The FE results lends its assumption on the premise that all studies measure a common effect. This is improbable because of various differences in data set, countries used and methods used hence a RE may provide a better summary effect as it assumes randomness and differences among underlying effects and thus, unobservable. This model accounts for between study heterogeneity to determine the precision of estimates. Moreover, fixed effect models are prone to produce smaller standard errors which might overstate the significance of MRA coefficients as can be seen on Table

7.6 below. Furthermore, the model presupposes the observability of all heterogeneity as all effect sizes stem from a homogeneous population (Stanley and Doucouliagos, 2012).

Random Effects Model

In random effects model, the guiding principle is that unlike in fixed effects model, where the deviation across units are expected to be uncorrelated with the independent variables as well as random within the model. The random effects model is summarized in Table 7.6. First of all, the model is okay and fits the data well given that the p-value of the F test is close to 0. So, every other aspect of the model being considered is reliable because the predictive ability of the model is okay. The model assumes the differences across the units are uncorrelated with the regressors (the correlation is assumed to be zero).

The predictor variable separtialr is significant in the model. In terms of its relation to the response variable (partial) which is the effect size, it is a bit tricky quantifying this relationship because it includes both the within and between entity effects. In this case, we can deduce that having controlled the regressors, separtialr's average effect on the effect size (response variable) is such that whenever separtialr changes with time and between different Authors with one unit, the resultant effect is a negative change in the effect size by about 1.767 units.

Having assessed both fixed and random effects models, there then arises a pertinent question as to which of the models is the best for this study. Picking the best model involves running a Hausman test which presuppositions that the null hypothesis being that the random effects is the preferred model while the alternative being that the fixed effects is the preferred. Essentially, the null hypothesis shows that the unique errors are not correlated with the regressors.

Table 7.6 shows that all the variables on RE are estimated unlike on FE where some variables were omitted as it cannot take into account time constant variables. Sigma ui of FE is slightly larger as some of the components were not estimated since they are constant over time.

Table 7.6 Fixed and Random effect model

VARIABLES	(1) Model FE	(2) Model RE
Separtialr	-1.710***	-1.767***
	(0.0680)	(0.0695)
Authy1		0.227
		(0.236)
Study1		-0.0164
		(0.0858)
Study2		0.0143
		(0.213)
Single		-0.0528
		(0.110)
Year1		-0.00205
		(0.144)
Inde1		-0.0208
		(0.153)
Inde2		0.0504
		(0.176)
Inde3		0.0670
		(0.166)
Method1		0.0161
		(0.267)
Method2		-0.143
		(0.150)
CORR		0.119
		(0.0898)
INST		0.151
		(0.135)
HET		0.0664
		(0.116)
MORFIN		-0.0999
		(0.130)
AMISER		0.189*
		(0.110)
PENDOG		-0.206
		(0.130)
INCON		-0.108
		(0.202)
RSTDA		-0.193
		(0.165)
POW		0.0630
		(0.0947)
MISS	-0.140	-0.311**
	(0.165)	(0.136)
Paper1		0.0458
		(0.0817)
Control		-0.226***

		(0.0815)
Constant	1.174***	1.679***
	(0.155)	(0.343)
Observations	591	591
R-squared	0.552	0.576
P-value of F test	0.000	0.000
Corr(ui,X)	-0.2193	0[@]
Sigma ui	0.28	0.26
Sigma ei	0.14	0.14
Number of Author	75	75

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
@: It is assumed for the RE model

The above table is based on 75 studies as one estimate per study was used to overcome the problem of auto-corelation and independency among estimates (de Dominicis et al., 2008; Doucouliagos and Ulubasoglu, 2006). The F statistic measures whether the coefficients on the regressors are zero and expresses that the model is significant. The goodness of fit R^2 within is used to predict the model fit and it's estimated to be around 55% and 57% for fixed and random effect models respectively. The R^2 reflects the dispersion of the true effect size across the studies that have the same covariate value.

Fixed effect model assumes that all heterogeneity between study period effect sizes can be accounted for by the included moderators. This is estimated to be as -0.2193. Authy1, Study2, Study3, Year1, Inde1, Inde2, Inde3, Method1, Method2, CORR, INST, HET, MORFIN, AMISER, PENDOG, INCON, RSTDA, POW, Paper1, and Control are omitted from the fixed effect model due to issue of multicollinearity indicating no variation over time and induces less desirable results MISS showed negative effect while Control showed a positive and significant effect whereas Separtialr inhibited negative but significant effect on partialr.

The Random effect model assumes that all heterogeneity between study period having different effect sizes can be computed. The random-effects model assumes that the observed effect equals the true mean effect plus conventional random sampling errors and an additional term that causes the true effect to vary randomly and normally around the true mean effect, thereby creating random heterogeneity. The random-

effects weighted average allows the true effect to randomly vary from study to study hence the distributed mean is derived. The estimated σ^μ 0.26 and σ^e 0.14 assumes that the correlation of v and x is zero. The study estimated that separtialr has negative effect at 1 percent significant level meaning that our main independent variable is negatively affecting our dependent variable partial.

Normatively, the fixed effect model attempts to show that within the study variability, there is some variation in the true effect sizes as contextualized in this case and that this variability may bias the predictor variables thus causing a need to control for it. The coefficient of regressors given by separtialr negatively correlates with the effect size. More precisely, a unit change in the regressors reduces the effect size by 1.71 and 1.76 units for the fixed effect and the random effect models respectively. Given that the p-value of the model is <0.05, it implies that the model is significant.

Fixed effect panel model has its challenges, they normally produce smaller standard errors and hence they overstate the estimated MRA coefficients' significance. This thesis has resolved this problem by calculating cluster-robust standard errors within a fixed-effects panel model context.

To summarise, weighted least square model, random effect model and fixed effect model are widely used to estimate the actual parameter by reducing the bias or misspecification from the sample obtained. The observation summary at the top is the same as for the between-effects model, although this time it is the number of observations that is relevant. The R^2, the performance of estimator is more or less same for within fixed-effects and random effect estimator. In both the model separtialr had a negative effect on partialr irrespective of assumption.

7.7 Cluster Analysis

Under cluster analysis, each study is seen as a separate cluster and therefore the number of estimates of each study becomes the number of observations of each cluster (Doucouliagos and Ulubasoglu, 2008; Doucouliagos et al., 2010).

The central idea of cluster analysis is to divide the objects/respondents into some distinct clusters. The cluster table identifies 2 reasonably groups which share relatively homogenous characteristics with the studies of the same group and share relatively heterogeneous characteristics with the members of the other group. In each cluster there is homogenous within but distinct from other. The aim of cluster analysis is to achieve maximum homogeneity of objects within the clusters and maximum heterogeneity between the clusters. The first group includes 55.07% of studies collection of effect size while cluster 2 has 44.93%.

Table 7.7A Cluster Analysis

Cluster	Frequency
Cluster 1	162 (26.91)
Cluster 2	440 (73.09)
Total	**602 (100.0)**

		Cluster			
		Cluster 1		Cluster 2	
		Count	Column N %	Count	Column N %
Authy1	0	146	90.12%	436	99.09%
	1	16	9.88%	1	0.91%
Authy2	0	16	9.88%	2	0.91%
	1	146	90.12%	435	99.09%
Study1	0	133	82.10%	220	50%
	1	29	17.90%	220	50%
Study2	0	162	100.0%	424	96.36%
	1	0	0.0%	16	3.64%
Study3	0	29	17.90%	236	53.64%
	1	127	82.10%	204	46.36%
Single	0	162	100.0%	103	23.41%
	1	0	0.0%	337	76.59%
Multi	0	162	100.0%	337	76.59%
	1	0	0.0%	103	23.41%

Year1	0	11	6.79%	21	4.77%
	1	151	93.21%	419	95.23%
Year2	0	151	93.21%	419	95.23%
	1	11	6.79%	21	4.77%
Inde1	0	27	16.67%	173	39.32%
	1	135	83.33%	267	60.68%
Inde2	0	150	92.59%	386	87.73%
	1	12	7.41%	54	12.27%
Inde3	0	147	90.74%	350	79.55%
	1	15	9.26%	90	20.45%
Inde4	0	162	100.0%	411	93.41%
	1	0	0.0%	29	6.59%
Inde5	0	162	100.0%	440	100.0%
		0	0.0%	0	0.0%
Method1	0	162	100.0%	430	97.73%
	1	0	0.0%	10	2.27%
Method2	0	162	100.0%	48	10.91%
	1	0	0.0%	392	89.09%
Method3	0	162	100.0%	402	91.36%
	1	0	0.0%	38	8.64%
Method4	0	162	100.0%	440	100.0%
Method5	0	162	100.0%	440	100.0%
CORR	0	49	30.25%	385	87.50%
	1	113	69.75%	55	12.50%
INST	0	94	58.02%	393	89.32%
	1	68	41.98%	47	10.68%
HET	0	83	51.23%	424	96.36%
	1	79	48.77%	16	3.64%
APFIN	1	162	100.0%	440	100.0%
MORFIN	0	7	4.32%	31	7.05%
	1	155	95.68%	409	92.95%
PENDOG	0	76	46.91%	402	91.36%

	1	86	53.09%	38	8.64%
MENDOG	0	76	46.91%	406	92.27%
	1	86	53.09%	34	7.73%
AMISER	0	129	79.63%	413	93.86%
	1	33	20.37%	27	6.14%
PMISER	0	129	79.63%	413	93.86%
	1	33	20.37%	27	6.14%
INCON	0	118	72.84%	440	100.0%
	1	44	27.16%	0	0.0%
RSTDA	0	157	96.91%	432	98.18%
	1	5	3.09%	8	1.82%
RELIA	1	162	100.0%	440	100.0%
MISS	0	50	30.86%	1	23%
	1	112	69.14%	439	99.77%
AMISS	1	162	100.0%	440	100.0%
Paper1	0	95	58.64%	66	15.00%
	1	67	41.36%	374	85.00%
Paper2	0	67	41.36%	374	85.00%
	1	95	58.64%	66	15.00%
Paper3	0	162	100.0%	440	100.0%
Control	0	15	9.26%	139	31.59%
	1	147	90.74%	301	68.41%

The table above represents unit representation in each cluster groups where each cluster is a single individual and a summary of measurement is accounted for each cluster to determine the size of the number of clusters. However, where the clusters differ in size, it might lead to the reduction of the precision of the effect estimate.

Under the estimate that belongs to the study published, we would be able to find that 162 are in first group and 440 from second group.

Comparing the estimates that belongs to study conducted between the years in first group it was found that estimate belonging to studies conducted from 1980 to after

2000 (Study3) with 127 followed by studies conducted before 1976 to after 1992 (Study1) had samples of 29 followed by no estimate of studies conducted before 1976 to before 1992 (Study2) representing homogeneity character. This shows the prevalence of researches interested to study on the two periods of liberalisation and the combined period of repression and liberalisation of Study3 and Study1 respectively. On the same vein, in the second cluster, estimate belonging to studies conducted before 1976 to after 1992 (Study1) had the highest sample of the group with 220 followed by estimate belonging to studies conducted from 1980 to after 2000 (Study3) with 204, while estimate of studies conducted before 1976 to before 1992 (Study2) had only 16 samples.

The estimate from data on single country 337 units was found to be more in cluster 2 while remaining estimate from data was found on multiple country having 103 units. This informs us that many researchers have embarked on analysing single countries. This might be as a result of lack of sufficient information on multi country data. Annual data estimated models (Year1) were predominant to both clusters of 419 units for cluster 2 and 151 for cluster 1 respectively, whereas estimates belonging to a model that uses non-yearly data (Year2) were 11 and 21 units for cluster 1 and cluster 2 respectively. This shows the fact that many studies preferred to use yearly data unlike non yearly data. The use of higher frequency data ie non yearly data provides more data and hence more precision, however, many researches might decide to use low frequency data ie annual data as it might be difficult to attain non yearly data spanning long periods of time.

Among the variable used in the model it was found that estimate belongs to a model that uses bank based variables (Inde1) 135 sample in cluster 1 and remaining 267 in cluster 2. Estimate belongs to a model that uses both bank based and market based variables (Inde3) had the spilt of 15 units in cluster 1 and 90 units in cluster 2. Estimate belongs to a model that uses market based variables (Inde2) found that 12 units are in cluster 1 and 54 are in cluster 2. This shows the prevalence of bank based financial landscape in SSA as is reflected in higher units of Inde1 followed by a combination of both bank and market based Inde3. The lower units of market based is an indication of the fact that market based financial system is not highly developed in the region.

Depending upon the techniques adopted for study estimates that belong to a panel data techniques model (Method2) has majority weightage of 392 studies on cluster 2 with nil on cluster 1, followed by 38 studies of time series data techniques estimator (Method3) and 10 studies using OLS techniques (Method1) with all falling under cluster 2. Here we can observe that many studies have utilised panel data techniques in their analysis. This can be as a result of its effectiveness in detecting and measuring effects than pure cross country studies, can provide more informative data, controlling for possibly correlated, time invariant heterogeneity without observing it (Burdisso and Sangiacomo, 2016).

Among studies that uses control variables it was found that 147 studies come under cluster 1 and 301 studies were found under cluster 2. The use of control variables is very paramount in research as it limits the influence of confounding and other extraneous variables in the model. By controlling the relevant variables that are not of interest to the study's aim but that can equally influence its outcome, you are more able to establish a correlation or causal relationship between the variables of interest. To be able to control this effect, the confounder must be included in the multiple regression so that the effect is attributed to the primary variables of interest (Gujarati and Dawn, 2009).

The variables that take into account correlation (CORR) lies in cluster 2 of 55 units and 113 units in cluster 1. It is as well noted that in cluster 2, 385 units did not use control variables or run tests to consider correlation. Studies run test to for correlation as its effect obscures the effects of other variables affecting their relationship. To ensure internal validity of research, confounding variables must be accounted for as failure to do so may cause confusion as to the findings from the data. (Tchetgen, 2014) In the same way 47 units estimated using instrumental variables (INST) to take into account time invariant lie in cluster 2 and 68 in cluster 1. We also see 16 sample studies which have used instrumental variables to control for heterogeneity (HET) come under cluster 2 and 79 under cluster 1.

To take into account heterogeneity and time invariant variables, studies used panel data or instrumental variables. The use of panel cointegration tests allows for heterogeneity among cross section units. These tests include both first- and second-

generation panel cointegration tests; residual - based test and error correction-based test (Pedroni, 1999). Between the studies covering appropriate indicator of financial development (APFIN) 162 were found in cluster 1 and 440 in cluster 2. Under which 155 samples used more than one indicator of financial development comes under cluster 1 and 409 in cluster 2. 38 studies considered the problem of endogeneity (PENDOG) appear in cluster 2 while 86 in cluster 1. Of which 34 in cluster 2 used methods to address the problem of endogeneity (MENDOG) and 86 in cluster1. We also see 27 studies are aware of misspecification error (PMISER) in cluster 2 and 33 in cluster 1.

Majority of 440 studies uses reliable data source (RELIA) comes in cluster 2 and remaining 162 studies comes under cluster 1. This shows that majority of studies used reliable data sources produced/collected by government agencies, multilateral organisations such as International financial statistics, World Development Indicators, World Bank social development indicators etc. It can be noted that only 8 studies have taken into account robust standard errors (RSTDA) denoted in cluster 2 and only 5 in cluster 1. The studies selected for the analysis were properly collected and cautious about missing data hence 112 studies of non-missing data falls on cluster 1 and 439 under cluster 2 and made sure that the studies were appropriately handled.

Table 7.7B: Linear Regression Models with Clustered Errors

VARIABLES	Cluster Model 1	Cluster Model 2
Separtialr	-1.883***	-1.685***
	(0.536)	(0.0827)
Authy2		0.551*
		(0.293)
Study1		0.407**
		(0.165)
Study3		0.0477
		(0.141)
Single		0.0635
		(0.117)
Year1		0.214
		(0.179)
Inde1		-0.300**
		(0.137)
Inde2		-0.367***
		(0.0439)
Inde3		0.0701

		(0.0669)
Method1		0.530**
		(0.241)
Method3		-0.163
		(0.447)
CORR		0.392***
		(0.124)
INST		-0.115
		(0.166)
HET		-0.0817
		(0.105)
MORFIN		-0.641***
		(0.222)
PENDOG		0.0331
		(0.237)
AMISER		0.00232
		(0.209)
INCON		-0.0791
		(0.338)
RSTDA		0.361***
		(0.133)
MISS		-0.269
		(0.215)
Paper1		-0.121
		(0.120)
Control		-0.0464
		(0.236)
Multi		
Constant	1.078***	1.819**
	(0.0261)	(0.762)
Observations	553	553
R-squared	0.712	0.960

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Clustered Standard Errors has been used to overcome the problem of heteroscedastic and the correlation of the error terms. The econometric error term may be correlated among each other across time and/or space. This can bias our estimators of the standard errors of the betas if they are not adjusted. Clustering standard errors is used to adjust this bias (Wooldridge, 2010). We have chosen to cluster the standard errors by authors as if they have done multiple papers on the same topic there would be some kind of correlation on the estimates that will prevail, making the error term of the model to be correlated with each other. Furthermore, Precision has been taken as a measure of heteroscedasticity. A simple regression to see the variation of partialr just

on the basis of standard error of partial was conducted in Model 1, following on an extension of the analysis was done by adding more controls which are the moderators and quality variables in Model 2.

Table 7.7B shows the regression results when errors are clustered at different study levels. Model 2 shows that covariates explain about 96% variation in the study effect sizes while the remaining about 4% is explained by other factors which is statistically considerable. Of all the moderators listed in this particular study, if the estimates belonging to studies published before 2000 (Authy1), estimates belonging to studies conducted before 1976 to before 1992 (Study2), estimates belonging to a model that uses bank-based variables (Inde1), estimates belonging to a model that uses market-based variables (Inde2), estimates belonging to a model that is estimated using OLS techniques (Method1), studies that used control variables or run tests to consider correlation (Corr), studies that used more than one indicator of financial development (MOFRIN), and studies that considered robust standard errors (RSTDA) are significant in predicting the study effect sizes meaning that they are important in explaining the finance growth relationship.

On the contrary, estimates belonging to studies conducted from 1980 to after 2000 (Study3), estimates using data on single country (Single), estimates belonging to a model that uses yearly data (Year1), estimates belonging to a model that uses both bank based and market-based variables (Inde3), estimates belonging to a model that is estimated using time series data techniques (Method3), studies that used instrumental variables to consider time invariant (INST), studies that used panel data or instrumental variables to control for heterogeneity (HET), studies that considered the problem of Endogeneity (PENDOG), studies that are aware of misspecification error (AMISER), and others are statistically insignificant meaning they are not important in explaining the finance growth nexus. The chosen moderators form an important criterion of analysing the effect sizes (response variable) of the various studies. They therefore form an important basis of understanding the relationship between financial development and economic growth in this SSA.

Moreover, the coefficient of the main regressor given by separtialr negatively correlates with the effect size across all the models. To be specific, a unit increase in

the coefficient of separtialr decreases the effect size of the studies by 1.685 units for Model 2. The estimates belonging to studies published before 2000 (Authy1), estimates belonging to studies conducted before 1976 to before 1992 (Study2), studies that have used control variables or run tests to consider correlation (Corr), estimates belonging to a model that is estimated using OLS techniques (Method1), and studies that have considered robust standard errors (RSTDA) positively impact the effect size meaning that our main independent variable is negatively affecting our dependent variable partial.

Whereas we note, estimates belonging to a model that uses bank-based variables (Inde1), estimates belonging to a model that uses market-based variables (Inde2), and studies that have used more than one indicator of financial development (MOFRIN) impact the partialr negatively. Other covariates such as estimates belonging to studies published before 2000 (Authy1), estimates belonging to studies conducted before 1976 to before 1992 (Study2), estimates belonging to studies conducted from 1980 to after 2000 (Study3), estimates using data on single country (Single), estimates belonging to a model that uses yearly data (Year1), estimates belonging to a model that uses bank-based variables (Inde1), are among many others omitted from Model 1 regression due to collinearity.

7.8 Robustness Checks

In order to ensure the validity of the chosen MRA model, A Hausman test is used to differentiate and determine the choice between the fixed and random effect model. Here we are trying to determine which model results are reliable that is we have parameter estimates that are not only unbiased but are efficient and consistent. The null hypothesis underlying the hausman test is that the random effect model is the appropriate estimator, a rejection of that means that the random effects are probably correlated with one or more of the regressors in which case the fixed effect model is the appropriate estimator.

Furthermore, to be able to determine whether a multilevel model is required a Breusch-Pagan Lagrange Multiplier test is conducted.

Table 7.8A Hausman Test

	(b) Fixed	(B) Random	(b-B) Difference	sqrt (diag (v_b-v_B)) S.E.
separtialr	-1.706202	-1.661278	-.0449241	.0162424

Test: Ho: difference in coefficients not systematic

chi2(3)=   7.65

Prob>chi2 =   0.0057

The Hausman test is used for testing the model misspecification. This test will help us to choose whether to use fixed effects model or a random effects model. The null hypothesis that is assumed to be random effects model; the alternate hypothesis is that the model is fixed effects. The study assumes that the random effects estimator that the partialr effects are uncorrelated with the explanatory variables and the extra orthogonality conditions are satisfied. Essentially, the null hypothesis shows that the unique errors are not correlated with the regressors.

The random effects model assumes the partialr effects is a random draw that is uncorrelated with the predictors and the overall error term. The output obtained from fixed and random effect model are tested for the model specification. The chi-square test reported p value is small (less than 0.05) leading us to reject the null hypothesis. Therefore, partialr effects are correlated with the predictor variables. Since the random effects estimator is found inconsistent, it gives way for the fixed effects estimator as the only appropriate estimator.

P value indicates that if H_0 is true, the probability of obtaining a chi-square value of as much as 7.65 or greater is virtually zero (or 0.0057). Given that the p-value of the Hausman test is small enough, we reject the null hypothesis and thus conclude that given significance level that the fixed effects model is the better of the two. However, this test alone may not be enough to settle at this decision with high level of certainty. As such, more diagnostic tests are important to assess which is the better model.

For this paper, we also run the Breusch-Pagan Lagrange multiplier (LM) test to choose between a random effects regression and an OLS regression. The null hypothesis in this case is that variances across entities is zero that is, there are no panel effects. The result in Table 7.8B shows that the random effects are more appropriate to OLS regression.

Table 7.8.1B Breusch and Pagan Lagrangian multiplier test for random effects
    Estimated results:

	Var	Sd = sqrt(Var)
Partial	0.1154925	0.3398418
E	0.0203982	0.1428223
U	0.0683797	0.2614952

Test: $Var(u) = 0$

chibar2(01) =   1474.13

Prob > chibar2 =   0.0000

Breusch and Pagan Lagrange multiplier test for random effects helps us to determine if heteroscedasticity is present. The null hypothesis is that the variance belongs to study published between years, specific effects equals zero. This is no significant difference across units. Deducing from the above table, LM test shows that there is year specific effects. Here we reject the null hypothesis as the chi square is greater than 0.05 we reject the null hypothesis implying that heteroscedasticity is present in the data. For this reason, the standard errors that are presented in the output table of the regression may be unreliable. The result in Table 7.8.1B further shows that we reject the null hypothesis given the low p-value and thus conclude that there exist random effects. The existence of random effects shows that the random effects could still be considered as a potentially relevant model in estimation. The heteroscedasticity test is done for the fixed effect model as well in table 7.8.2B. The results show that there is a presence of heteroscedasticity in the fixed effect model due to low p-value.

7.8.2B Modified Wald test for groupwise heteroskedasticity in fixed effect regression model

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

chi2 (75) = $2.8*10^{32}$
Prob>chi2 =   0.0000

The test results stated above in 7.8.2B state that the model has some issue relating to heteroscedasticity since the p-value is close to zero leading to rejection of the null hypothesis.

7.9 Meta Regression Analysis

Meta-Regression Analysis (MRA) is a multivariate empirical analysis that utilises multiple regression analysis to systematically and comprehensively review and analyse all comparable evidence to determine reasons of variations among reported regression estimates and genuine effects. Here, the variation obtained in model specification is estimated to ascertain misspecification bias (Heckman, 1979; Stanley and Jarrell, 1989). Misspecification bias among econometric estimates was the reason, MRA was initially brought to the field (Stanley and Jarrell, 1989). Meta regression analysis is analogous to a linear regression which considers the effect sizes on study-level covariates (moderators). Particularly, this regression analysis assesses whether between-study heterogeneity can be explained by moderators presented in the model and that differences among effect sizes are not as a result of sampling error alone (Borenstein et al., 2009).

To determine whether the results systematically vary across different contexts in which researchers estimate the effect, we employ Multivariate Meta Regression. This will be used to explain research heterogeneity.

$$ES_{ij} = \beta_0 + \Sigma_{BK}Z_{Ki} + \beta_1 SE_i + \Sigma\delta_j SE_i K_{ji} + \mathcal{E}_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5.2.4)$$

Where ES_{ij} is the effect of individual estimate and the study respectively, Z is a vector of controls that moderate the reported estimates, K is the number of regressors, and SE is estimates standard error. The differences in the reported results may stem either from heterogeneity across authors or over time.

We see the dependent variable is the estimated partial correlations between financial development and economic growth. The definition of individual variables that are used in meta-regressions is provided in Table 7.2A All the independent variables used are dummies.

Control variables are divided into two broad categories: variables that are moderators and variables that are suggestive of the quality of the variables. The following moderator variables have been included in the multiple meta regression analysis to capture the differences in regressions included in the reported growth regressions. They have been chosen for inclusion as they have been informed by the theoretical, empirical and methodological aspects. Furthermore, they have proven significant from other studies undertaking meta-analysis when analysing the effect on economic growth (Doucouliagos and Ulubasoglu, 2008; Doucouliagos and Paldam, 2007, 2009; Abreu et al., 2005).

When analysing different study characteristics various variables are coded and controlled in order to determine the source of heterogeneity. Information such as study design were differentiated into OLS, panel data, time series, instrumental data and other techniques. Further, average data has been demonstrated to remove any fluctuations in the growth studies, thus to control for this, yearly and non-yearly data were coded. According to Beck and Levine, (2004) the use of annual data instead of averaged data may result in relationship breakdown. Moreover, they have stressed the need of using low frequency data to lessen the effect of business cycle and crises. In order to assess time period effects, studies were coded in reference to different time periods. 3 time periods were investigated; studies conducted before 1976 to after 1992 (Study1). This was a period covering both the financial repression and liberalisation. Study2 and Study3 covered the period of financial repression and liberalisation respectively. It is also noted that prior 1980's studies suffered from endogeneity as opposed from neoclassical growth models which emphasize on the role of economic

system in producing an endogenous outcome to economic growth (Romer, 1994). To account for this endogeneity, we not only classified studies conducted between different time periods but also controlled for studies that considered the problem of endogeneity.

During initial stages of economic development, banks are dominant players in financial intermediation in developing countries as the financial sector develops, hence is the efficiency of stock market. Both of these channels of financial depth fulfil different allocation mechanisms. The use of financial development variables to capture the measure of financial depth varies significantly and will determine its implication on the depth and intermediation in the mobilization of resources for growth and eventual development. To control for these differences, this thesis has coded estimates that have used bank based or market-based variables.

Dataset characteristics is another aspect that has been controlled. To explore whether financial development effects vary as a result of differences in the number of countries, studies utilising single countries versus multiple countries were coded appropriately. Journal characteristics was also taken into account. Studies were coded to capture whether studies are published in journal or in a working paper. Journals are considered to be of higher quality as they undergo an explicit process of peer review (Walter, 2004; Jefferson and Wager, 2002). Moreover, quality dimensions were controlled in order to ascertain the quality bias of included primary studies. Aspects captured include model specification, confounding effects, power of studies, robust standard errors, missing data and reliability of data.

Meta-analysis is done using the fixed effect estimation method, and the results are presented in table 7.9A below.

Table 7.9A Meta Regression

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3
Authy1	0.283		0.140
	(0.224)		(0.262)
Study1	0.0714		
	(0.583)		
Study3	0.218		0.175
	(0.585)		(0.136)
Single	0.199*		0.248*
	(0.117)		(0.139)
Year1	0.180		
	(0.152)		
Inde1	0.0271		0.0525
	(0.164)		(0.168)
Inde3	0.0238		0.0479
	(0.177)		(0.171)
Inde4	0.315		0.375
	(0.266)		(0.259)
Method1	0.222		0.172
	(0.357)		(0.355)
Method2	-0.211		-0.133
	(0.237)		(0.242)
Paper1	0.0156		0.0482
	(0.103)		(0.109)
Control	0.0574		-0.0799
	(0.124)		(0.150)
CORR		0.261**	0.172
		(0.104)	(0.119)
INST		-0.143	0.00360
		(0.147)	(0.187)
HET		-0.0229	0.0232
		(0.131)	(0.145)
MORFIN		0.00822	0.0694
		(0.134)	(0.196)
PENDOG		-0.619**	-0.680**
		(0.275)	(0.326)
MENDOG		0.705**	0.634*
		(0.331)	(0.363)
AMISER		-0.00708	0.0999
		(0.126)	(0.144)
INCON		-0.423**	-0.283
		(0.205)	(0.257)
POW		-0.192**	
		(0.0947)	
RSTDA		0.0529	0.105
		(0.189)	(0.210)
MISS		-0.334*	-0.439**

		(0.177)	(0.210)
Study2			-0.134
			(0.583)
Year2			-0.122
			(0.177)
Constant	0.114	0.811***	0.614
	(0.662)	(0.217)	(0.445)
Adjusted R-Squared	6.17%	24.39%	17.19%
I-Squared residual	98.08%	95.83%	79.42%
Observations	75	75	75

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In order to identify the sources of heterogeneity and their effect on the dependent variable we estimate Meta Regression Analysis (MRA). This is the key reason for MRA conception in identifying misspecification biases in social sciences (Stanley and Jarrell, 1989). Unlike other analyses that have used all sets of estimates, we have resorted to use the average-set by taking an average of all effect sizes reported by each study using the optimal weights. Although this method fails to take into account within-study variations, the use of average set deals with the problem of auto-corelation with each other (Stanley, 2001). Moreover, where Meta regression is employed to model heterogeneity, primary studies used are independent from each other, however, we find more than one estimate on some studies leading to independency among estimates (de Dominicis et al., 2008). To deal with this issue, we have resorted to use one average estimate from each study (Doucouliagos and Ulubasoglu, 2006).

The three models that are estimated are based on the nature of covariates. The first model is based on the moderators, while the second model has quality variables as its covariates. The third model includes both of these kind of covariates into account. The regressions consider fixed effects. The R^2 index is commonly used to quantify the percentage of variation explained by the model. Here the R^2 deal with true effect sizes instead of observed data points. That is R^2 uses the amount of residual heterogeneity variance. Model (1) explains 6.17% heterogeneity, model (2) explains 24.39% of heterogeneity while model (3) explains 17.19% of heterogeneity. The above table is based on 75 studies. The results for each of the models are presented with the aim to

compare the results of effect size consistency and exact measurement between models.

The proportion of residual between-study variation due to heterogeneity, as opposed to sampling variability, is calculated as I^2 which tells us what proportion of the variance of observed effects is due to variance in true effects rather than sampling error. The output exposed that I^2 equivalent, which states that after inclusion of the predictor, 98.08% of the variability in the data can be attributed to the remaining between-study heterogeneity for model 1, while this estimate stands at 95.83% for model 2. Stanley, (2017) notes that where I^2 is higher than 80% reported estimates become unreliable and hence heterogeneity needs to be taken into account.

When exploring whether financial development effects vary with the number of countries used, the variable using data on single country (Single) is significant and positive in both models 1 and 3 which informs us that studies utilising single countries does indeed explain the difference on the finance growth nexus unlike the studies using multiple countries. Same is true for studies that considered the problem of Endogeneity (Pendog) except for it has a negative coefficient meaning it has weak effect on the dependent variable.

We proceed by investigating whether the finance growth relationship is dependent on the quality variables. For model 2, studies whose power is greater or equal to 80% (POW) is statistically significant while having a negative effect on the dependent variable. This informs us that power of studies is important in explaining the growth effects however its effect is weak. Studies that have used control variables or run tests to consider correlation (Corr) is statistically significant in model 2 with positive coefficient. However, it turns out to be insignificant after the inclusion of quality variables in model (model 3). Same is true for studies that used instrumental variables to control for confounding effect (INCON).

We also found the period of study does play an important role in the growth effects. Study 3 which is the period of financial development is noted to report larger effects albeit insignificant than estimates belonging to studies conducted before 1976 to after 1992 (Study1), Study2 which represents the repression period report negative lower

effects. This is reminiscent to the fact that the period of financial liberalisation (Study3) was conducive to economic growth hence larger effects as the policies were able to induce allocative efficiency. The period of financial repression (Study2) reported lower effects as expected due to the fact that the repressive economy hindered economic growth.

Many variables including estimates belonging to studies published before 2000 (Authy1), estimates belonging to a model that uses yearly data (Year1), estimates belonging to a model that uses bank-based variables (Inde1), estimates belonging to a model that uses both bank based and market-based variables (Inde3), estimates belonging to a model that uses financial reform variables (Inde4) suggest that the results are positive albeit insignificant implying that none of these variables can explain the difference between studies regarding the reported relationship between the finance growth nexus.

When assessing whether different econometric techniques lead to differences in outcomes, we found that estimates belonging to a model that is estimated using OLS techniques (Method1) and estimates belonging to a model that is estimated using panel data techniques (Method2) for both Model 1 and Model 3 are not statistically significant indicating that these variables cannot explain differences between studies in the reported relationship between financial development and economic growth.

Moreover, the goodness of fit of the model represented by Adjusted R- Squared is rather low indicating not only the presence of heterogeneity but also weak models in explaining the effects of finance on economic growth. Our finding is in alignment with Bunman et al., 2013 who found the positive albeit weak effect of the finance growth nexus as well as Simplice 2013 who found a genuine effect whose strength has been distorted by endogeneity-based estimations, publication bias and effects of financial activity. Moreover, our outcome is in contrast with Valickova et al., 2013 and Arestis et al., 2015, who found a significant positive and statistically significant effect of finance growth relationship.

When comparing our empirical finding with studies outside SSA, we note the similarities with both publication bias and genuine effect. Studies done by Anwar and

Iwasaki, (2023) found a significant finance growth effect in Asia however, the effect was found to be stronger in South Asia than in East Asia. Moreoever, they found publication bias using both linear and nonlinear techniques. Intharak et al, 2022 finds the significance role of bank, stock, and bond market development in enhancing economic growth in Thailand. However, they found significant publication bias. Other studies finding similar results are Guo and He (2020) who found a positive role of the banking sector enhances the economic growth in China better than stock market. As well they found the presence of publication bias is significant at 1% statistical level. Ono and Iwasaki (2022) who found a positive effect on growth when studying European markets and Iwasaki, (2022) who found that finance growth nexus is positive in Latin America region. When looking at global growth effects, Heimberger, (2022) found not only evidence for publication bias but as well positive growth effects of globalisation.

Table 7.9B Fixed Effects Meta Regression Analysis

Meta-analysis summary   Number of studies =   75

Fixed-effects model   Heterogeneity:

Method: Inverse-variance   I2 (%) =   0.00

                           H2 = 1.00

Author Name	Study	Effect size	[95% conf.		% Weight
Abdulsalam et al (2015)	1	0.601	0.055	1.147	1.74
Adejare (2013)	2	0.758	0.209	1.306	1.72
Adeninyi et al (2015)	3	0.423	-0.29	1.137	1.02
Adjasi and Biekpe (2006)	4	0.154	-0.8	1.108	0.57
Adu et al (2013)	5	0.637	0.176	1.098	2.44
Adusei (2013)	6	0.533	-0.091	1.156	1.33
Adusei (2013)	7	0.541	-0.094	1.176	1.29
Adusei (2014)	8	0.869	0.213	1.526	1.2
Abdullahi and Abu (2011)	9	0.802	0.047	1.558	0.91
Akinboade, (2000)	10	0.661	-0.245	1.567	0.63
Alimi, (2015)	11	0	-1.546	1.546	0.22
Allen and Ndikumana (1998)	12	0.539	-0.507	1.585	0.47
Djeto and Malamud (2010)	13	0	-0.506	0.506	2.02
Aziakpono, (2008)	14	0.683	-0.106	1.473	0.83
Meshel et al (2014)	15	0.458	-0.073	0.988	1.84

Marcelo and Tomás (2009)	16	0	-1.386	1.386	0.27
Ekpeno, (2015)	17	-0.001	-0.742	0.739	0.94
Batuo and Mlambo (2012)	18	0	-0.741	0.741	0.94
Anokye (2009)	19	0.782	0.087	1.476	1.07
Fowowe (2008)	20	0.326	-0.241	0.893	1.61
Fowowe (2011)	21	0.568	0.017	1.12	1.7
Taofik and Mohammed (2013)	22	0.777	0.332	1.223	2.61
Ikikii and Nzomoi (2013)	23	0.914	0.408	1.42	2.02
Mabutho and Holden (2014)	24	0.126	-0.727	0.978	0.71
Iyoboyi (2013)	25	0.824	0.356	1.292	2.37
Abdul et al (2010)	26	0.8	0.143	1.457	1.2
Kagochi et al (2013)	27	0.659	0.259	1.058	3.25
Kagochi (2013)	28	0.654	0.151	1.157	2.05
Arabi and Mohammed (2014)	29	0.323	-0.303	0.948	1.32
Kangni and Kodzo (2010)	30	0.589	0.024	1.155	1.62
Pierre and Moyo (2015)	31	0.716	0.238	1.193	2.27
Maduka and Onwuka (2013)	32	0.03	-0.66	0.72	1.09
Serge (2015)	33	0.271	-0.346	0.887	1.36
Misati and Nyamongo (2012)	34	0.549	0.116	0.982	2.76
Sreerama et al (2012)	35	0.72	-0.209	1.65	0.6
Ndlovu (2013)	36	0.296	-0.279	0.871	1.57
Ngongang (2015)	37	-0.266	-0.865	0.333	1.44
Nurudeen (2009)	38	0.748	0.175	1.321	1.58
Nyasha and Odhiambo (2015)	39	0.205	-0.743	1.152	0.58
Nyasha and Odhiambo (2015)	40	0.605	-0.022	1.232	1.32
Fofana (2006)	41	0	-0.566	0.566	1.62
Obiyo and Lenee (2011)	42	0.382	-0.349	1.112	0.97
Nwezeaku and Akujuobi (2013)	43	0.401	-0.82	1.622	0.35
Odhiambo (2004)	44	0.642	-0.302	1.585	0.58
Odhiambo (2008)	45	0.158	-0.45	0.766	1.4
Odhiambo (2008)	46	0.816	0.055	1.578	0.89
Odhiambo (2009)	47	0.35	-0.327	1.027	1.13
Odhiambo (2009)	48	0.413	-0.439	1.266	0.71
Odhiambo (2010)	49	0.451	-0.059	0.962	1.99
Onuonga (2014)	50	0.55	-0.031	1.132	1.53
Raheem and Oyinlola (2015)	51	0.469	-0.256	1.195	0.98

Osamonyi and Kasimu (2013)	52	0.58	-0.096	1.256	1.13
Osinubi and Amaghionyeodiwe (2003)	53	0.448	-0.515	1.41	0.56
Owusu and Odhiambo (2013)	54	0.475	-0.153	1.102	1.31
Owusu and Odhiambo (2014)	55	0.925	0.553	1.297	3.74
Owusu and Odhiambo (2014)	56	0.552	-0.336	1.441	0.66
Polat et al (2013)	57	0.03	-1.1	1.161	0.41
Rafindadi and Yusof (2013)	58	0.591	-0.1	1.281	1.09
Rafindadi and Yusof (2013)	59	0.51	-0.188	1.207	1.07
Rafindadi and Yusof (2014)	60	0.403	-0.444	1.25	0.72
Saibu et al (2009)	61	0.411	-0.205	1.026	1.37
Simwaka et al, (2012)	62	0.127	-1.237	1.49	0.28
Sunde (2012)	63	0.354	-0.146	0.855	2.07
Tachiwou (2010)	64	0.888	0.468	1.308	2.94
Tswamuno et al (2007)	65	0.008	-0.583	0.599	1.48
Walle (2014)	66	0	-1.386	1.386	0.27
Olufemi et al (2020)	67	0.763	0.31	1.215	2.53
Thobeka and Karabo (2019)	68	0	-0.98	0.98	0.54
Maganya (2018)	69	0.683	0.071	1.295	1.38
Amematekpor (2018)	70	0	-0.741	0.741	0.94
Hui et al (2020)	71	0.596	0.047	1.145	1.72
Daniel et al (2019)	72	0	-0.741	0.741	0.94
Theophilus and TorbiraLezaas (2021)	73	0	-0.8	0.8	0.81
Dagim and Adisu (2019)	74	0.584	0.11	1.058	2.3
Kore and Ireen (2020)	75	0	-0.693	0.693	1.08
	Theta	0.507	0.435	0.579	

Table 7.9B above gives a summary of each study, 75 groups of studies were considered which are included in the meta-analysis model. For each study, the effect size is tested for zero level difference. The range of the confidence interval is calculated for the observed effect size. The table shows the summary of effect size, confidence interval and weights assigned for the studies. The table represents the study-specific proportions with 95% exact confidence intervals and overall pooled estimates. Chi square statistic test comparing the variance and test of significance testing if the estimated proportion is equal to zero. The P-value is 0.000 indicating

presence of significant heterogeneity. The variance in the I^2 assesses the part of variance that is observed that reflects differences in effect size and it is close to 0%.

The table displays weights for each pooled study that varies positive to their sample size and negatively to the confidence interval. The lower and upper limits of its prediction interval represent the variation of effect size for each individual study. Study 55 showed positive and significant effect size which is assigned with maximum weight which is telling us that our main independent variable is affecting the dependent variable positively as hypothesised. Study 3 on the other hand is statistically insignificant even though it has a positive effect size. The same pattern can be seen in study 58, in spite of showing a positive effect size, we nevertheless cannot rely on it as it is statistically insignificant as the confidence interval contains zero.

Table 7.9C: Tests for Theta and Homogeneity after Fixed effect model

Test Type	Test statistic value	P-value of the test
Test for Theta (Ɵ=0)	z-value=13.80	0.0000
Test of Homogeneity	Chi-Squared value=61.69	0.8459

Table 7.9C shows the results for the tests conducted to check the statistical significance of overall theta after the fixed effect model is run. Also, the table contains information about the heterogeneity test. As can be seen, the p-value for the test where theta is zero is really low suggesting the rejection of null. This indicates that overall, the effect size is statistically significant. On the other hand, the heterogeneity test shows a very high p-value which suggests the non-rejection of the null hypothesis. Hence, it can be concluded that the studies don't have any significant heterogeneity across themselves.

7.10 Heterogeneity Test in fixed effect model

Statistically, heterogeneity refers to the variation in the true effects that underlie a particular study. More precisely, the degree of variation in the observed effects may be more pronounced as compared to when such a variation happened by chance. In a typical meta-analysis, the consistency of effects across studies is pivotal in getting

trustworthy results otherwise it becomes difficult to generalize the findings of such a meta-analysis. Heterogeneity could arise from a number of factors for instance diversity in the methodology employed by the various authors and studies and as such, pointing to varying degree of bias (Borenstein et al., 2009). This paper employs the Cochran's Q test in measuring heterogeneity and the report is as shown in the table below.

To ascertain the robustness of the fixed effects result, a homogeneity test is conducted. The null hypothesis that all studies share the same effect size is evaluated against the alternative which presupposes different effect sizes. The Q statistic which measures study homogeneity of the estimated effect sizes is conducted. The result of the Q test is presented in table 7.10C indicating the appropriateness of using the fixed effect method in meta-analysis as the assumption of a homogenous distribution of effect sizes is valid for finance and economic growth.

Heterogeneity is the discrepancies in the value of a reported estimate. In our study examining the effect of finance on growth, the variation of estimated effect will depend on many factors among which can be time period of studies, measures of financial development, functional form used, econometric technique employed, data span, countries included among others (Beck and Levine, 2004; Ang, 2008; Yu et al., 2012). If these discrepancies are not accounted, it can result in biased MRA estimates. To address these variations, any variable that is likely to effect reported estimates must explicitly be modelled by coding them using a multivariate or multiple MRA.

Table 7.10A Heterogeneity Measure

Measure	Value	Df	p-value
Cochran's Q	61.69	74	0.846
	[95% Conf. Interval]		
H	0.913	1.000	1.161
I²	00.00%		25.8%

H = relative excess in Cochran's Q over its degrees-of-freedom

I² = proportion of total variation in effect estimate due to between-study heterogeneity (based on Q)

Where Q is the statistical heterogeneity

Df is the degree of freedom.

Table 7.10A reveals that there is considerable homogeneity in the study because the p-value is really high (84.6%). This finding suggests that there is no significant degree of variation in the effect of the specific studies considered in this paper. This metric points to the fact that the variability across the selected studies can largely be attributed to merely chance. As such, fixed effect meta-analysis is appropriate to be conducted because the variation in the effect may not impact the study. However, a random effect meta-analysis can also be performed (there is always a type I error with the statistical tests) so that any level of heterogeneity will be considered unexplainable because such variation is due to chance.

In order to evaluate the heterogeneity between effect sizes to see why there are divergent results, various methods can be used. This will advise whether heterogeneity is a feature of underlying data generation process or is a result of the research design process. So here we are trying to assess whether there is an underlying distribution of finance growth population parameter values and whether this distribution is negative in certain respect and positive on others.

In the presence of heterogeneity, any effect size measure will not adequately elucidate the true nature of the economic phenomenon. As economics field is not an experimental science where knowledge is acquired through direct observation of subjects, modelling and methods used plays a large part in reported outcomes making heterogeneity a likely occurrence. To accommodate for this occurrence testing for heterogeneity is widely accepted.

Cochran's Q-test, calculated as the differences between the weighted sum of squared and individual study effects together with the pooled effect across studies, with the weights represented are the ones used in the pooling method. Having a chi-squared distribution with degrees of freedom L− 1, one fewer than there are estimates being summarized (Gavaghan et al., 2000). However, Q-test suffers from low power hence may conclude no heterogeneity in cases where there is heterogeneity (Sidik and Jonkman, 2007; Sutton and Higgins, 2007). It is therefore recommended to proceed with accounting for heterogeneity for all cases (Stanley and Doucouliagos, 2012).

In order to ascertain the source of heterogeneity and to quantify their influence on the reported effect sizes, multivariate meta regression model is estimated for each sample. As indicated from Table 7.11 we estimate a general and specific MRM for each sample to obtain a parsimonious model, We use all moderating variables to calculate general specification, however we encountered challenges of over determination and multicollinearity when including all observable moderating factors. We therefore conduct general to specific model where the most insignificant variable was iteratively removed from the regression, while checking for model misspecification.

The use of Q test and the I squared test was used to assess the presence of heterogeneity. This test can analyse the presence or absence of heterogeneity; however, the test has been noted to have low power as a test of heterogeneity (Gavaghan et al., 2000), while Higgins et al, 2003, notes the opposite saying that the test has much power where the number of included studies is relevant. To consider the variation in findings and weakness in the test, Higgins and Thomas, (2002) proposed the use of Squared Index to quantify the amount of heterogeneity. Table 7.10A also confirms that there is no heterogeneity as I^2 value is 0% as indicated in Table 7.10B.

The classification of I^2 values by Higgins et al (2003) is as follows:

Table 7.10B Interpretations of the Values of I – Squared

I^2 Values	Interpretations
(0%, 25%)	There is no heterogeneity.
(25%, 50%)	There is a low heterogeneity.
(50%, 75%)	There is a moderate heterogeneity.
(75%, 100%)	There is a high heterogeneity.

To check whether there is heterogeneity across the studies and whether there are outliers or not, Galbraith plot, presented below is also used. This is a graphical representation of the study data that assesses the extent of heterogeneity between studies. Moreover, it represents the accuracy of each study versus their standardize

effects. The *y*-axis shows the effect size divided by its standard error while the x-axis we plot the inverse of the standard error of study effect estimate. Each single dot represents a study, where a regression line cuts through the middle of the plot. 2 lines which are parallel to the regression line at 2-standard-deviation distance are created where most dots are expected to fall if there is no heterogeneity. In the absence of heterogeneity, it is expected that 95% of the studies lie within the 95% of the confidence interval. We note that there is no heterogeneity since most of the studies lie within the 95% confidence interval.

Figure 7.10 Galbraith Plot
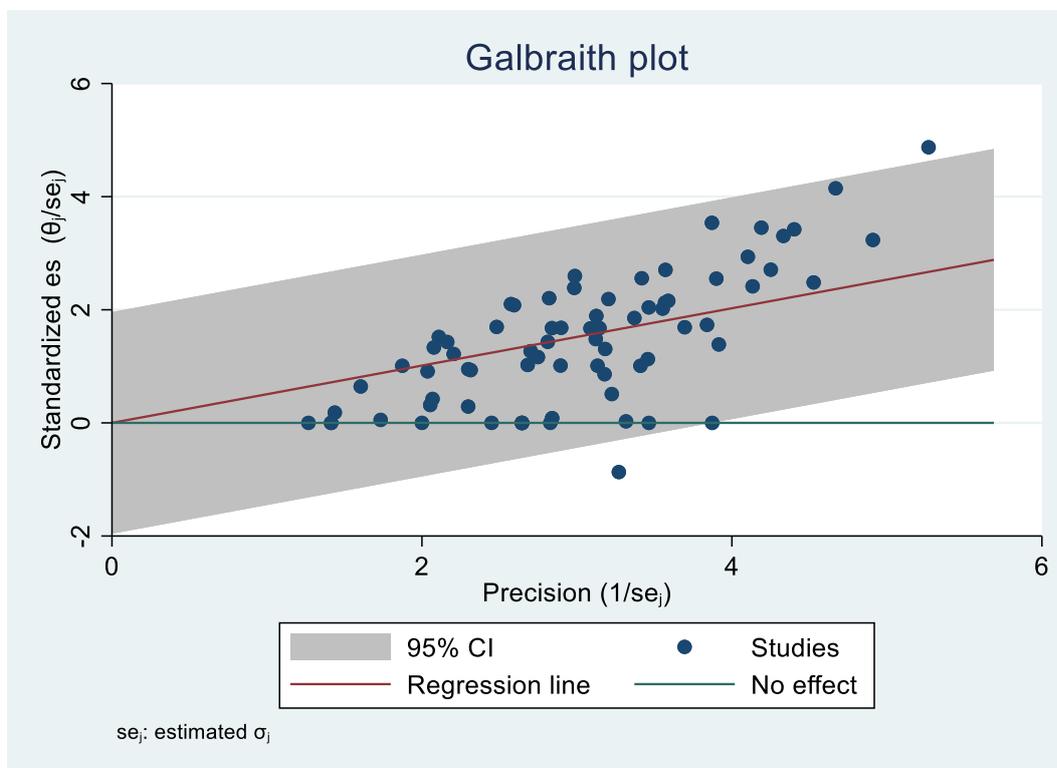
7.11 Heterogeneity of Time and Geographical Dimension

This section analyses the geographical and temporal dimensions, focusing on regional differences within SSA as well as time differences, to provide more nuanced insights into the relationship between financial development and economic growth. We recognise that Sub-Saharan Africa (SSA) is a region marked by significant economic and social disparities; therefore, it is even more important to grasp a richer, more contextualised understanding of the relationship between financial development and

economic growth in SSA, which will ultimately contribute to policy dialogues that are deeply rooted in the region's specific temporal and geographical realities.

This meta-analysis seeks to split the sample on both temporal and geographical dimensions in order to provide a comprehensive perspective on this relationship within SSA. On the temporal front, this section seeks to comprehend how the relationship between financial development and economic growth in Sub-Saharan Africa (SSA) has evolved over time, especially during periods of financial liberalisation as opposed to repression. In addition, this analysis seeks to illustrate how the findings of earlier studies may differ from those of more recent publications especially due to the effect of econometric advancements and how they influenced studies conducted at that time period.

On the geographical dimension, the analysis aims to disentangle the complexities of this relationship in various sub-regions of SSA, namely West, South, and East Africa, as well as studies encompassing multiple SSA countries. Given that countries within these regions are at varying phases of financial development and economic growth, and are influenced by diverse cultural, historical, and institutional legacies, it is necessary to account for these heterogeneities in order to draw nuanced conclusions.

7.11.1 Geographical Dimension

Table 7.11.1A

West Africa		Number of studies	23	

Study	Effect size	95% Conf Interval		% Weight
1	0.601	0.055	1.147	4.46
2	0.779	0.202	1.355	4
3	0.49	-0.345	1.326	1.9
5	0.674	0.17	1.179	5.23
6	0.514	-0.084	1.113	3.71
8	0.727	0.193	1.261	4.66
19	0.64	0.077	1.203	4.19
20	0.37	-0.288	1.028	3.07
22	0.74	0.318	1.162	7.47

25	0.821	0.352	1.291	6.03
30	0.568	0.028	1.109	4.54
32	0.014	-0.678	0.707	2.77
38	0.636	0.153	1.119	5.7
41	0.001	-0.876	0.877	1.73
42	0.285	-0.254	0.823	4.58
51	0.394	-0.196	0.984	3.81
53	0.395	-0.45	1.24	1.86
54	0.528	-0.185	1.241	2.62
55	0.909	0.543	1.274	9.95
56	0.471	-0.255	1.196	2.53
60	0.403	-0.444	1.25	1.85
61	0.451	-0.29	1.193	2.42
64	0.749	0.401	1.098	10.93
Theta	0.613	0.497	0.728	

When examining the aggregate effect size for West Africa, as presented in Table 7.11.1A, the effect size of 0.613 demonstrates the strongest correlation between financial development and economic growth. When compared to the aggregate effect size for all studies conducted in Table 7.9B with an effect size of 0.507, the positive impact on the region is moderate to strong. As the magnitude of the effect in West Africa is significantly greater than that of the entire SSA. This suggests that financial development may have a greater impact on economic growth in West Africa than in the rest of SSA.

The confidence interval of 0.435, 0.579 for all studies is relatively narrow, indicating a reasonable level of confidence in this result, in contrast to the confidence interval of 0.497, 0.728 for West Africa studies, which demonstrates that it is also relatively narrow, particularly where it overlaps with the SSA interval. This indicates that, despite the fact that both are consistently positive, the true effect size for West Africa may still lie within the range of effect sizes for SSA as a whole, or vice versa. Consequently, the disparity might not be statistically significant. The greater impact of financial development on economic growth in West Africa compared to sub-Saharan Africa as a whole suggests that other variables—possibly cultural, regulatory, or infrastructural—are amplifying the impact of financial development in West Africa.

When examining Table 7.11.1A, it is apparent that the effect sizes of the 23 studies conducted in West Africa span a wide range. Almost all fall within the moderate-to-strongly positive range, but a few have weaker or negligible effects. This may suggest that the relationship between financial development and economic growth in West Africa is more consistent than in East Africa. The study with the greatest weight (10.93%) has an effect size of 0.749%, which is greater than the West Africa average and significantly greater than the SSA average. This study has a substantial effect on the average effect size in West Africa.

Variability in effect sizes suggests that West African policies may need to be tailored to specific national or subregional conditions. A more nuanced comprehension of the relationship between financial development and economic growth in West Africa may require additional research due to the high level of variability and occurrences of negative lower confidence limits in the confidence intervals. Studies that substantially deviate from the mean—either with small effect sizes or wide confidence intervals—deserve a closer look to determine what unique factors may be driving these results.

Table 7.11.1B

East Africa	Number of studies	12		
Study	Effect size	95% Conf Interval		% Weight
10	0.661	-0.245	1.567	3.75
23	0.775	0.373	1.177	19.04
28	0.66	0.161	1.159	12.37
29	0.311	-0.288	0.91	8.58
35	0.401	-0.091	0.894	12.68
45	0.315	-0.968	1.598	1.87
46	0.662	0.059	1.264	8.48
48	0.507	-0.602	1.617	2.5
50	0.522	-0.034	1.078	9.96
58	0.623	-0.135	1.381	5.36
62	0.376	-0.334	1.085	6.11
69	0.664	0.088	1.239	9.29
Theta	0.576	0.401	0.752	

When examining the aggregate effect size for East Africa, as presented in Table 7.11.1B, the effect size of 0.576 indicates a moderate-to-strong positive effect and is slightly greater than the effect size of 0.507 for the SSA as a whole. This indicates that financial development may have a somewhat larger impact on economic growth in East Africa than in the rest of SSA. We also see that the confidence intervals for East Africa and SSA overlap, meaning we cannot confidently say that the difference in effect sizes is statistically significant. This may be an indication of specific socioeconomic factors in East Africa that amplify the effects of financial development on economic growth.

The effect sizes in the East African studies are quite varied, ranging from as low as 0.311 to as high as 0.775. This could indicate substantial heterogeneity in the relationship between financial development and economic growth across different contexts within East Africa. Notably, several of the studies have confidence intervals that span into negative territory. This indicates that some studies found results that were not significantly different from zero, suggesting no effect or even potentially a negative effect. The study with the highest weight (19.04%) shows a relatively strong positive effect (0.775), which would pull the average effect size up. Conversely, studies with low weights but negative lower bounds may not be impacting the overall meta-analysis effect size (Theta) as much.

The variation in effect sizes may be a consequence of country-specific factors like varying degrees of financial infrastructure, regulations, and economic policies. The heterogeneity could also reflect differing socio-economic conditions, including income levels, education, and the distribution of wealth. East Africa is a diverse region with various languages, traditions, and business practices, which might have a role in shaping the financial sector's effect on economic growth. The data suggests that while the overall effect of financial development on economic growth in East Africa is positive, there is significant variability in how this relationship manifests across different studies. This could be due to a multitude of factors, ranging from economic and regulatory conditions to cultural influences. Policymakers and researchers should be attentive to this diversity when interpreting the results and planning future actions.

Table 7.11.1C

South Africa   Number of studies   16

Study	Effect size	95% Conf Interval		% Weight
12	0.582	-0.587	1.75	1.99
14	0.523	0.038	1.008	11.56
15	0.695	-0.207	1.597	3.34
24	-0.223	-0.917	0.471	5.64
26	0.735	0.138	1.332	7.62
31	0.724	0.241	1.208	11.62
36	0.267	-0.244	0.778	10.4
39	0.149	-0.532	0.83	5.86
40	0.568	0.001	1.136	8.44
44	0.529	-0.168	1.226	5.6
47	0.346	-0.301	0.993	6.5
49	0.559	-0.094	1.213	6.36
57	0.022	-0.936	0.979	2.96
59	0.573	-0.256	1.401	3.96
63	0.484	-0.282	1.25	4.63
65	0.014	-0.866	0.893	3.51
Theta	0.441	0.277	0.606	

The effect sizes in the Southern African region range from strongly negative to strongly positive. The overall aggregate effect size (0.441) is smaller than the SSA average (0.507). This information indicates a moderate relationship between financial development and economic growth in Southern Africa. Notably, some Southern African studies demonstrate negative effect sizes. This is a departure from the majority of studies in SSA, suggesting that regional factors may influence the relationship between financial development and economic growth. In addition, other studies demonstrate a substantially positive effect size. This suggests that the impact of financial development on economic growth within the Southern African region varies across contexts.

Studies with relatively higher weights demonstrate moderate to strong positive effect sizes, but this is insufficient to bring the aggregate effect size for SSA to or above the average. In addition, numerous studies have confidence intervals that exceed zero,

indicating that the effect of financial development on economic growth in this region is uncertain. Some studies demonstrate negative effect sizes, indicating that, under certain circumstances, financial development could have a negative impact on economic growth in certain regions of Southern Africa.

Southern Africa consists of diverse economies with differing levels of economic development. The complexity and maturation of financial markets in SSA differ from those in other sub-Saharan African regions, which may explain the smaller effect size. The region may have distinctive financial and economic policies that influence the relationship between financial development and economic growth in a manner distinct from that of other SSA regions. Studies with negative or extremely large effect sizes should be investigated further to determine what regional factors may be influencing their results.

Table 7.11.1D

SSA Countries   Number of studies   23

Study	Effect size	95% Conf Interval		% Weight
4	0.137	-0.705	0.98	2.23
7	0.53	-0.088	1.149	4.14
9	0.716	0.073	1.359	3.83
13	0	-0.506	0.506	6.18
16	0	-0.62	0.62	4.12
17	-0.001	-0.812	0.811	2.4
18	0	-0.741	0.741	2.88
21	0.649	0.002	1.297	3.78
27	0.798	0.233	1.362	4.97
33	0.284	-0.366	0.934	3.74
34	0.606	0.115	1.097	6.57
37	-0.11	-0.908	0.687	2.49
43	0.194	-0.356	0.744	5.23
52	0.562	-0.082	1.205	3.82
66	0	-0.807	0.807	2.43
67	0.773	0.484	1.062	18.91
68	0	-1.128	1.128	1.24
70	0	-0.98	0.98	1.65
71	0.628	0.049	1.208	4.71
72	0	-0.693	0.693	3.3

73	0	-0.693	0.693	3.3
74	0.666	0.121	1.211	5.34
75	0	-0.761	0.761	2.74
Theta	0.407	0.281	0.533	

The aggregate effect size for studies spanning multiple countries in SSA is 0.407. This is considerably less than the aggregate effect size for SSA. indicating that the effect of financial development on economic growth may be less pronounced when viewed as a whole. The effect sizes in these multi-country studies range from strongly negative to strongly positive, indicating a heterogeneous impact of financial development on economic growth across various combinations of SSA countries. Numerous studies have zero effect size, indicating that there is no correlation between financial development and economic growth in multi-country contexts. A significant number of studies have confidence intervals that include zero, indicating that estimates of effect magnitude are less precise and consistent.

The study with the largest weight (18.91%) also has a robust effect size of 0.773, but it is not enough to significantly increase the aggregate effect size. The cross-national research reflects the complex economic, political, and cultural factors that influence the relationship between financial development and economic growth. The smaller aggregate effect magnitude may suggest that regional blocs within SSA differ substantially. The variation in effect sizes suggests that while financial development may positively influence economic growth in some SSA nations, it may have minimal or even negative effects in others. Given the high variability, policy recommendations should not generalise the impact of financial development across all SSA nations. Country- or region-specific factors should be taken into account.

7.11.2 Time Dimension

To analyse how studies have characterised the relationship through time and ascertain whether earlier studies find a different relationship vis a vis more recent ones, this section has grouped the time dimension in two parts: in the first part, the section looked at the different periods of liberalisation on one hand and the whole period encompassing both repression and liberalisation period. This was the case as there

were no studies that covered only the period of repression. Liberalisation period covered from 1981 to 2022 while pre and post liberalisation period covered from 1960 to 2022 excluding the liberalisation period.

The second section examines how the advancement of econometrics has affected the methods and complexity of research insights to determine how they may affect the studies conducted. This timeline is divided into three distinct periods. 1998-2005: Rise of Panel Data, Time Series Techniques, and Early Micro-level Insights; 2006-2012: Emphasis on Causality, Endogeneity, and Advanced Panel Techniques; and 2013-present: Emphasis on Causality, Endogeneity, and Advanced Panel Techniques. Integrating Big Data, Machine Learning, and Robustness into Econometric Analysis, 2013-2021. The choice of this part was predicated on the fact that it was very difficult to categorise on studies date as there is quite an overlap making it a challenge to pin down categories. By using publication date, it was easy to ascertain whether and to what magnitude researchers' findings were influenced by availability and maturity of econometric techniques in an attempt to ascertain whether earlier studies found different relationship through time.

Table 7.11.2A

Liberalisation Period

Study	Effect size	95% Conf Interval		% Weight
1	0.601	0.055	1.147	2.52
2	0.779	0.202	1.355	2.26
7	0.53	-0.088	1.149	1.97
8	0.727	0.193	1.261	2.63
9	0.716	0.073	1.359	1.82
14	0.523	0.038	1.008	3.2
15	0.695	-0.207	1.597	0.92
17	-0.001	-0.812	0.811	1.14
18	0	-0.741	0.741	1.37
21	0.649	0.002	1.297	1.79
23	0.775	0.373	1.177	4.65
24	-0.223	-0.917	0.471	1.56
25	0.821	0.352	1.291	3.41
27	0.798	0.233	1.362	2.36

30	0.568	0.028	1.109	2.57
31	0.724	0.241	1.208	3.21
33	0.284	-0.366	0.934	1.78
34	0.606	0.115	1.097	3.12
36	0.267	-0.244	0.778	2.88
37	-0.11	-0.908	0.687	1.18
38	0.636	0.153	1.119	3.22
39	0.149	-0.532	0.83	1.62
40	0.568	0.001	1.136	2.34
42	0.285	-0.254	0.823	2.59
43	0.194	-0.356	0.744	2.48
49	0.559	-0.094	1.213	1.76
50	0.522	-0.034	1.078	2.43
52	0.562	-0.082	1.205	1.81
53	0.395	-0.45	1.24	1.05
56	0.471	-0.255	1.196	1.43
58	0.623	-0.135	1.381	1.31
59	0.573	-0.256	1.401	1.09
60	0.403	-0.444	1.25	1.05
62	0.376	-0.334	1.085	1.49
64	0.749	0.401	1.098	6.18
67	0.773	0.484	1.062	8.98
68	0	-1.128	1.128	0.59
69	0.664	0.088	1.239	2.27
70	0	-0.98	0.98	0.78
71	0.628	0.049	1.208	2.24
72	0	-0.693	0.693	1.56
73	0	-0.693	0.693	1.56
74	0.666	0.121	1.211	2.53
75	0	-0.761	0.761	1.3
Theta		0.536	0.449	0.622

The aggregate effect size for the liberalisation period is 0.536, indicating that financial development had a moderately positive impact on economic growth during this period. Across these studies, effect sizes range from strongly negative to strongly positive, reflecting a diversity of outcomes during the liberalisation period in various SSA countries. Several studies exhibit an effect size of zero, suggesting no relationship in those contexts. Moreover, some studies have negative effect sizes, indicating potential negative effects of financial liberalisation in particular contexts. Some studies are allocated a substantial weight (e.g., 8.98%), while others are assigned a negligible

weight (e.g., 0.59%). This indicates that studies have varying degrees of reliability or relevance.

According to the data, the liberalisation period had varied effects throughout SSA. Financial liberalisation can increase access to capital, facilitate entrepreneurship, and stimulate development, but it can also be accompanied by risks such as financial volatility. The heterogeneous effect sizes suggest that liberalisation's impact was not uniform. This could be a result of various implementation strategies, the readiness of individual nations for liberalisation, or the variety of obstacles encountered during the period. Variability among the studies, particularly among those with negative effect sizes, indicates the need for in-depth analyses of particular contexts. It is essential to comprehend what went wrong in instances where liberalisation did not positively impact economic growth.

Table 7.11.2B

Pre and Post Liberalisation

Study	Effect size	95% Conf Interval		% Weight
3	0.49	-0.345	1.326	1.92
4	0.137	-0.705	0.98	1.89
5	0.674	0.17	1.179	5.27
6	0.514	-0.084	1.113	3.74
10	0.661	-0.245	1.567	1.63
12	0.582	-0.587	1.75	0.98
13	0	-0.506	0.506	5.23
16	0	-0.62	0.62	3.49
19	0.64	0.077	1.203	4.23
20	0.37	-0.288	1.028	3.09
22	0.74	0.318	1.162	7.53
26	0.735	0.138	1.332	3.76
28	0.66	0.161	1.159	5.39
29	0.311	-0.288	0.91	3.74
32	0.014	-0.678	0.707	2.79
35	0.401	-0.091	0.894	5.52
41	0.001	-0.876	0.877	1.74
44	0.529	-0.168	1.226	2.76
45	0.315	-0.968	1.598	0.81
46	0.662	0.059	1.264	3.69

47	0.346	-0.301	0.993	3.21
48	0.507	-0.602	1.617	1.09
51	0.394	-0.196	0.984	3.85
54	0.528	-0.185	1.241	2.64
55	0.909	0.543	1.274	10.04
57	0.022	-0.936	0.979	1.46
61	0.451	-0.29	1.193	2.44
63	0.484	-0.282	1.25	2.28
65	0.014	-0.866	0.893	1.73
66	0	-0.807	0.807	2.06
Theta	0.476	0.36	0.592	

The majority of studies in Table 7.11.2B demonstrate a positive effect size, indicating a positive correlation between financial development and economic growth in SSA during the combined period. The aggregate effect size (Theta) of 0.47 indicates a moderately positive association between finance and growth over the entire period. Numerous studies have confidence intervals that exceed zero, indicating that their results are not statistically significant. This indicates that the effect of financial development on economic growth has not been conclusively demonstrated in these studies. However, there are studies with confidence intervals that do not cross zero, indicating that financial development had a statistically significant impact on growth in certain contexts or time periods.

The effect sizes vary significantly from 0 to 0.909%. This variability might be a result of various methodologies, data sources, timeframes, or specific economic conditions during the periods studied. The variation suggests that the relationship between finance and growth in SSA may be influenced by a number of other conditions or factors. Some studies have a greater percentage of weight than others. Taking into account the weights, studies such as #55, which has an effect size of 0.909 and a weight of 10.04%, imply that there were periods or conditions in SSA where the relationship between finance and growth was particularly strong. On the other hand, studies with low weights, effect sizes close to zero, or wide confidence intervals may be viewed as less influential or less conclusive.

The finance-growth relationship in Sub-Saharan Africa appears to be positive, albeit variable across studies, for the period encompassing both pre- and post-liberalization.

Diverse study findings highlight the significance of context, timing, and potentially national policies and conditions in determining the finance-growth nexus. While liberalisation may have enhanced financial development and its impact on growth in some contexts, other factors also played crucial roles, and a nuanced, case-by-case analysis would provide a deeper understanding of this relationship's dynamics.

Table 7.11.2C

1998 - 2005		Number of studies 4		
Study	Effect size	95% conf Interval		Weight
10	0.661	-0.245	1.567	22.52
12	0.582	-0.587	1.75	13.54
44	0.529	-0.168	1.226	38.07
53	0.395	-0.45	1.24	25.88
Theta	0.531	0.101	0.961	

From 1998 to 2005, significant advancements were made in the econometric and statistical techniques used in research. The popularity of panel data methodologies, time series analysis, and early micro-level insights increased. These methodologies permitted more nuanced and comprehensive analyses of the relationships between variables.

In the late 1990s and early 2000s, panel data became increasingly popular in econometric analysis. Researchers recognised the benefits of accounting for individual heterogeneity and the dynamic nature of relationships, leading to the widespread implementation of Fixed Effects, Random Effects, and early GMM for dynamic panels. While the time series was concentrating on the complexities of non-stationarity (Arellano and Bond, 1991), cointegration and error correction models gained widespread acceptance (Edwards, 2004). The micro-level insights gradually shifted towards micro econometrics, with a greater emphasis on individual or company-level datasets. Techniques that account for individual heterogeneity became prevalent.

All four studies conducted during this time period have positive effect sizes, indicating a positive relationship between financial development and economic growth in Sub-Saharan Africa during this time period. This period's average effect size (Theta) is 0.531, which is a moderately high value. However, the wide confidence interval of 0.101 to 0.96 suggests that this effect magnitude is subject to considerable variation and uncertainty. Compared to the others, Study #44, with the maximum weight of 38.07%, appears to be especially influential or robust. This may suggest that the methodologies or data sources utilised in this study were deemed especially reliable or pertinent. Influenced by the rise of sophisticated econometric methodologies, the studies from 1998 to 2005 reveal a generally positive relationship between finance and growth in SSA.

Table 7.11.2D

2006 - 2012		Number of studies	26	
Study	Effect size	95% conf Interval		Weight
4	0.137	-0.705	0.98	1.96
9	0.716	0.073	1.359	3.37
13	0	-0.506	0.506	5.44
14	0.523	0.038	1.008	5.93
16	0	-0.62	0.62	3.63
18	0	-0.741	0.741	2.54
19	0.64	0.077	1.203	4.4
20	0.37	-0.288	1.028	3.22
21	0.649	0.002	1.297	3.33
26	0.735	0.138	1.332	3.91
30	0.568	0.028	1.109	4.77
34	0.606	0.115	1.097	5.79
35	0.401	-0.091	0.894	5.74
38	0.636	0.153	1.119	5.98
41	0.001	-0.876	0.877	1.81
42	0.285	-0.254	0.823	4.8
45	0.315	-0.968	1.598	0.85
46	0.662	0.059	1.264	3.84
47	0.346	-0.301	0.993	3.33
48	0.507	-0.602	1.617	1.13
49	0.559	-0.094	1.213	3.27
61	0.451	-0.29	1.193	2.54
62	0.376	-0.334	1.085	2.77

63	0.484	-0.282	1.25	2.37
64	0.749	0.401	1.098	11.47
65	0.014	-0.866	0.893	1.8
Theta	**0.468**	0.35	0.586	

From 2006 to 2012, there was an increased focus on establishing causality in empirical relationships, as opposed to mere associations. Researchers became more cognizant of endogeneity issues, in which omitted variables, reverse causality, or errors can lead to biased results. Innovative panel data techniques evolved into sophisticated instruments for addressing these obstacles. The majority of studies conducted during this time period demonstrate a positive effect size, indicating a positive correlation between financial development and economic growth. The average effect size (Theta) for this period is 0.468, indicating a modestly positive correlation. Although the confidence interval between 0.35 and 0.586 is narrower than the previous interval, there is still some ambiguity regarding the effect size, albeit with less variance. Endogeneity issues can significantly distort results. The presence of studies with wide confidence intervals (like Study #45) may indicate difficulties in addressing endogeneity, whereas the presence of studies with narrower intervals (like Study #64) may indicate success in addressing these issues.

Dynamic panel data methods, instrumental variable approaches, and panel cointegration tests enable researchers to establish long-run relationships, control for individual heterogeneity, and address possible endogeneity concerns. It is possible that the prevalence of positive effect sizes during this time period reflects the capacity of these advanced techniques to reveal the true finance-growth nexus. Studies like #64 have a substantially higher weight (11.47%), indicating that they may have utilised techniques or data sources that the research community deemed essential. For the period 2006-2012, the majority of studies support a positive relationship between finance and growth in SSA. This period's methodological advancements, particularly in addressing causality and endogeneity, likely contributed to a more precise and nuanced comprehension of the relationship between financial development and economic growth. The narrower interval of confidence in Theta compared to the preceding period indicates a slightly more consistent and certain understanding of the finance-growth relationship during these years.

Table 7.11.2E

2013 - 2021   Number of studies   44

Study	Effect size	95% conf Interval		Weight
1	0.601	0.055	1.147	2.57
2	0.779	0.202	1.355	2.3
3	0.49	-0.345	1.326	1.1
5	0.674	0.17	1.179	3.01
6	0.514	-0.084	1.113	2.14
7	0.53	-0.088	1.149	2
8	0.727	0.193	1.261	2.68
15	0.695	-0.207	1.597	0.94
17	-0.001	-0.812	0.811	1.16
22	0.74	0.318	1.162	4.3
23	0.775	0.373	1.177	4.74
24	-0.223	-0.917	0.471	1.59
25	0.821	0.352	1.291	3.47
27	0.798	0.233	1.362	2.41
28	0.66	0.161	1.159	3.08
29	0.311	-0.288	0.91	2.14
31	0.724	0.241	1.208	3.28
32	0.014	-0.678	0.707	1.6
33	0.284	-0.366	0.934	1.81
36	0.267	-0.244	0.778	2.93
37	-0.11	-0.908	0.687	1.21
39	0.149	-0.532	0.83	1.65
40	0.568	0.001	1.136	2.38
43	0.194	-0.356	0.744	2.53
50	0.522	-0.034	1.078	2.48
51	0.394	-0.196	0.984	2.2
52	0.562	-0.082	1.205	1.85
54	0.528	-0.185	1.241	1.51
55	0.909	0.543	1.274	5.74
56	0.471	-0.255	1.196	1.46
57	0.022	-0.936	0.979	0.83
58	0.623	-0.135	1.381	1.33
59	0.573	-0.256	1.401	1.12
60	0.403	-0.444	1.25	1.07
66	0	-0.807	0.807	1.18
67	0.773	0.484	1.062	9.15
68	0	-1.128	1.128	0.6
69	0.664	0.088	1.239	2.31
70	0	-0.98	0.98	0.8

71	0.628	0.049	1.208	2.28
72	0	-0.693	0.693	1.59
73	0	-0.693	0.693	1.59
74	0.666	0.121	1.211	2.58
75	0	-0.761	0.761	1.32
Theta	**0.539**	0.451	0.626	

This 2013 to 2021 era was characterised by a revolutionary shift towards utilising Big Data and AI in empirical research. The sheer volume, velocity, and diversity of data transformed the game, enabling researchers to capture more intricate relationships and nuances in the finance-growth nexus. The majority of studies have positive effect sizes, indicating a positive correlation between financial development and economic growth. This period's average effect magnitude (Theta) is 0.539, indicating a moderate-to-strong positive correlation. Notably, the confidence interval between 0.451 and 0.626 is comparatively narrower, demonstrating greater precision and consistency in the study results compared to earlier time periods.

Several studies (e.g., #24, #37) display effect sizes that are close to zero or even modestly negative. In such cases, researchers may have examined the robustness of the finance-growth relationship under specific conditions or accounted for other variables that may have obscured the primary relationship. It is also conceivable that the use of ML revealed that the relationship is more complex and dependent on certain conditions or factors, resulting in findings that are more nuanced or varied. For example, Study #67 carries a substantially high weight (9.15%). It may indicate that this study utilised particularly sophisticated methods, large data sets, or provided ground-breaking insights that were highly regarded by the research community.

For the period 2013-2021, the majority of studies support a positive relationship between finance and growth in SSA. The consistent positive effect sizes across studies and the relatively narrow confidence interval in Theta indicate a maturation of the field, where advanced tools and massive datasets lead to more stable conclusions regarding the finance-growth relationship.

Table 7.11.3 Meta Regression including Time and Geographical Dimension

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5
Authy1	0.317*	0.325*	0.225	0.240	0.269
	(0.178)	(0.181)	(0.192)	(1.587)	(1.594)
Study2			-0.133		
			(0.556)		
Study3	0.279	0.222	0.177*	0.278	0.145
	(0.554)	(0.576)	(0.0991)	(0.556)	(0.603)
Single	0.0466	0.0554	-0.142	0.0479	-0.126
	(0.104)	(0.108)	(0.144)	(0.109)	(0.153)
Year2	-0.186	-0.186	-0.150	-0.184	-0.137
	(0.135)	(0.136)	(0.135)	(0.140)	(0.143)
Inde1	-0.00982	-0.00757	0.0518	-0.00987	0.0819
	(0.149)	(0.150)	(0.157)	(0.153)	(0.168)
Inde3	0.0872	0.0761	0.179	0.0856	0.182
	(0.168)	(0.172)	(0.182)	(0.171)	(0.187)
Inde4	0.369	0.370	0.433	0.368	0.454
	(0.302)	(0.303)	(0.303)	(0.305)	(0.308)
Method1	0.129	0.114	0.282	0.128	0.294
	(0.314)	(0.319)	(0.349)	(0.318)	(0.355)
Method2	-0.246	-0.251	-0.167	-0.247	-0.180
	(0.184)	(0.186)	(0.190)	(0.186)	(0.193)
Paper2			-0.124		
			(0.107)		
Control	-0.0475	-0.0394	-0.146	-0.0465	-0.143
	(0.105)	(0.108)	(0.125)	(0.108)	(0.127)
West Africa			0.262*		0.286*
			(0.143)		(0.149)
East Africa			0.179		0.151
			(0.176)		(0.190)
South Africa			0.207		0.212
			(0.149)		(0.152)
Study1	0.0939	0.0851		0.0913	0.0795
	(0.552)	(0.554)		(0.556)	(0.568)
Paper1	0.109	0.107		0.109	0.137
	(0.0889)	(0.0896)		(0.0950)	(0.119)
Pre and post Liberalisation		-0.0626			-0.150
		(0.171)			(0.192)
_2012				-0.0757	0.0198
				(1.581)	(1.594)
_2021				-0.0800	-0.00612
				(1.582)	(1.600)
Constant	0.414	0.471	0.525*	0.493	0.406
	(0.628)	(0.648)	(0.282)	(1.696)	(1.750)
Observations	74	74	74	74	74

The purpose of the meta-analysis table 7.11.3 above is to examine the effect of financial development and economic growth in Sub-Saharan Africa (SSA). Five distinct models, each with different sets of variables, have been employed. The research incorporates both moderator and quality variables. In addition, it differentiates the effect by geographical and temporal dimensions, enabling a

comprehensive understanding. Model 1 presents all the descriptive and quality variables, Model 2 adds the pre and post time dimension, Model 3 adds the 3 regions of West, East and South Africa to encompass the geographical dimension, Model 4 incorporates the other part of time dimension which signify the effect of econometric advancements and how they influenced studies conducted at that time period and lastly Model 5 includes all moderator variables. 2012 denotes the time period from 2006 to 2012, 2021 denotes the time period from 2013 to 2021, the reference category is the time period 1998 to 2005.

In Models 2 and 5, the Pre and post Liberalisation' term is negative, indicating a decline after liberalisation. In many Sub-Saharan African (SSA) countries, the introduction of financial liberalisation policies was anticipated to stimulate economic growth by removing financial restrictions, promoting competition, and encouraging foreign investments. Nonetheless, the meta-analysis suggests that post-liberalisation effects may not have universally translated into positive development outcomes for SSA. In Models 2 and 5, the negative coefficient for 'Pre and post Liberalisation' may indicate multiple phenomena, including inefficiencies introduced by rapid liberalisation, capital flight, increased income inequality, and susceptibility to external disruptions after liberalisation. This necessitates well-managed and phased liberalisation strategies.

The years '2012' and '2021' illustrate the impact of econometric advancements. Models 4 and 5 produce inconsistent results during 2012, making it difficult to discern a distinct trend. In contrast, the 2021 period is consistently negative in both models, albeit to differing degrees. This could be a result of modifications to the methodologies, data availability, or economic dynamics during the study period. The deployment of evolving econometric methods can alter the findings of research. Advanced econometric techniques can capture complexities previously neglected. The period '2012' indicates mixed effects, implying that studies conducted between 2006 and 2012 may have been influenced by diverse econometric techniques. Nonetheless, the year '2021' consistently demonstrates a negative influence. This may be the result of more stringent methodologies that capture nuances or other macroeconomic factors in play between 2013 and 2021.

In Models 3 and 5, West Africa displays a positive and statistically significant coefficient, indicating that financial development has a more positive effect on economic growth in this region. This may suggest that countries in this region, such as Nigeria, Ghana, and Côte d'Ivoire, have profited from their financial sector developments. In the past few decades, these nations have witnessed significant banking sector reforms, the growth of microfinance institutions, and the expansion of stock exchanges, which may be attributed to region-specific policies, the influence of regional bodies such as ECOWAS, or perhaps unique economic drivers such as resource wealth. The coefficients for East and South Africa are consistently positive across all models in which they appear. While the magnitude is lesser than that of West Africa, the positive trend suggests that financial development in these regions will have a positive impact on their economies as a whole.

Across the five models, the use of various data types (single or multi-country data) has no consistent effect. However, the majority of the coefficients for the 'Single' variable are positive, suggesting that studies using data from a single country may report a more positive impact of financial development on growth. The coefficients of variables encoding the time of study publication ('Authy1') or study period ('Study1', 'Study2', and 'Study3') are typically variable across models. This emphasises the significance of contemplating the study's time frame and context. The application of various estimation techniques (OLS, panel data techniques, etc.), as indicated by 'Method1', 'Method2', etc., yields inconsistent results. This may imply that the effect of financial development on growth may vary depending on the estimation method adopted. The magnitude of the constant term across models is predominantly positive but varies. This represents the average effect when all variables are zero or when taking into account the reference categories.

The meta-analysis results indicate that the relationship between financial development and economic growth in SSA is complex. The effect varies based on the region within SSA, the time period, the methodological approaches of the examined papers, and the study quality. The positive coefficients for West Africa, East Africa, and South Africa indicate that financial development has generally contributed to the economic growth of these regions. However, the time dimension adds complexity, particularly

post-liberalization, necessitating a more in-depth examination of country-level dynamics and policies.

7.12 Multi-Level Regression Model

Multi-level model which is also called hierarchical model is a statistical model that take account different levels or hierarchy of analysis nested within one another. The model can better explore complex grouping structures alongside individual differences as well as accommodating both fixed and random effects (Leyland and Goldstein, 2001). Where Meta regression is employed to model heterogeneity, OLS is used to estimate the equation. Where the primary studies used are independent from each other, OLS is consistent. However, we find more than one estimate on some studies leading to independency among estimates (de Dominicis et al., 2008).

To deal with this issue, some studies have resorted to use one estimate from each study followed by the use of OLS (Doucouliagos and Ulubasoglu, 2006). However, a more appropriate way to undertake this challenge is to estimate using a hierarchical model or more commonly known as multi-level model where all available information from each study is used. Multilevel models describe the presentation of data hierarchies whereby residual components are accounted for at each level in the hierarchy. The two-level model allows for grouping of individual paper outcomes withing each author and this includes the residuals at the individual study level and author level. This is expected to produce correct inferences by correcting the standard errors of the regressors that are underestimated.

The equation used is as follows:

$$partialr_{ij} = \beta_0 + \sum_{k=1}^{K} \beta_{k1} X_{kij} + \sum_{k=1}^{K} u_{k1j} X_{kij} + u_j + e_{ij}$$

Where i and j represent individual estimates and the study respectively. K is number of regressors. u_{k1j} is the study level error term which allows each study to have varying slope which is known as a random slope model.

Table 7.12 Multi-level Regression Analysis

VARIABLES	Multilevel Model 1	Multilevel Model 2	Multilevel Model 3
Separtialr	-1.664***	-1.664***	-1.758***
	(0.0656)	(0.0654)	(0.0683)
Authy1			0.212
			(0.214)
Study1			-0.0237
			(0.0794)
Study2			0.000970
			(0.196)
Single			-0.0837
			(0.0747)
Year1			0.00617
			(0.133)
Inde1			-0.0136
			(0.141)
Inde2			0.0524
			(0.162)
Inde3			0.0646
			(0.153)
Method1			0.0409
			(0.243)
Method2			-0.144
			(0.138)
CORR			0.123
			(0.0821)
INST			0.159
			(0.124)
HET			0.0687
			(0.107)
MORFIN			-0.0985
			(0.120)
PENDOG			-0.209*
			(0.119)
AMISER			0.188*
			(0.101)
INCON			-0.117
			(0.184)
RSTDA			-0.176
			(0.153)
MISS			-0.288**
			(0.126)
Paper1			0.0468
			(0.0752)
Control			-0.215***

			(0.0749)
Multi		0.0693	
		(0.0567)	
Constant	1.035***	1.009***	1.676***
	(0.0398)	(0.0461)	(0.315)
Observations	591	591	591
Number of groups	75	75	75

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Multi-level model was used to control for potential dependence of estimates as multiple estimates were used per study. The use of multi-level model therefore controls for the presence of within study dependence (Doucouliagos and Stanley, 2009). Multilevel model above accounts for data hierarchy, by allowing residue component at each level. We have data at study level and author level. This is done to correct the standard error, where standard errors are underestimated, that would mean that the p values may seem low, which would indicate their significance but actually they are really high, so this is going to help us to see if the low p value that we are getting on standard error or partialr is indeed actually that low by correcting it. Using this model, we first started with the simple model (Model 1), we then add Multi (Model 2) before adding other variables (Model 3).

Model 1 provides a fundamental comprehension of the relationship between financial development and economic growth, with few additional nuances. As predictors, Model 1 contains the variable Separtialr and the constant term. This is a baseline model, providing a straightforward analysis without the intricacies of other moderators or quality variables. Model 2 is augmented by the addition of the Multi variable, but the coefficient and significance of Separtialr remain essentially unchanged, indicating that the addition of the multi-country study variable does not modify the fundamental relationship. The coefficient for Separtialr remains statistically significant and negative at -1,664 with an extremely small standard error of 0.0654. Even when multi-country studies are accounted for, this reaffirms the negative relationship between financial development and economic growth in sub-Saharan Africa.

Multi has a coefficient of 0.0693 and a standard error of 0.0567. While the coefficient is positive, at conventional levels it is not statistically significant. The coefficient

suggests that the effect size of studies employing data from multiple countries may be marginally larger (more positive or less negative) than studies employing data from a single country. However, because the difference is not statistically significant, we cannot assert with certainty that it is not due to coincidence. Multi-country research may encompass broader trends and a greater variety of interactions between financial development and economic growth than single-country research. The fact that Multi has a positive coefficient may suggest that studies with a broader SSA perspective may find a less negative (or even positive) correlation between financial development and economic growth. However, because this observation lacks statistical significance, it should be interpreted with caution.

Model 3 is the most exhaustive version. It highlights the significance of methodological rigour in studies, by addressing endogeneity, misspecification errors, and incorporating control variables. Model 3 incorporates all variables from Models 1 and 2, as well as numerous study characteristics, financial indicators, estimation methods, publication type, and quality indicators. Separtialr value marginally differs from the first two models, but its significance remains. This may imply that despite accounting for various methodologies, time periods, and other variables, the fundamental finding of a negative relationship remains consistent. Invariably significant across all three variants, inferring that it is a significant predictor of the impact of financial development on economic growth in SSA. As its coefficient is negative, it is expected that as Separtialr increases by one unit, the dependent variable will decrease by the same amount (e.g., by 1.664 in Model 1), all else being equal. This suggests a stable and substantial negative relationship between the independent variable and the dependent variable, regardless of other variables.

The modest change in the coefficient of Separtialr from Model 2 to Model 3 (from -1.664 to -1.758) indicates that when other factors (study characteristics, quality indicators, etc.) are considered, the relationship may be stronger and more negative. The constant term (or intercept) indicates the average impact of financial development on economic growth when all other variables are set to zero. It is significant in every paradigm. Across all three models, the number of observations is 591, and the number of groups is 75, indicating that these 591 estimates are derived from 75 distinct study categories. In Model 3, variables representing the quality and rigour of the studies

(PENDOG, AMISER, MISS, and Control) have significant coefficients. This suggests that the quality and methodology of the research can impact the reported relationship between financial development and economic growth. PENDOG's significance is marginal. It is anticipated that a one-unit increase in PENDOG will result in a 0.209% decrease in the dependent variable.

Similarly, AMISER is marginally significant. A one-unit increase in AMISER predicts a 0.188-unit increase in the independent variable. MISS is significant at the 0.05 significance level. A one-unit increase in MISS is anticipated to result in a 0.288-unit decrease in the dependent variable. Study1, Study2, and Study3 classify the estimates according to the time periods during which they were conducted. Model 3 reveals that none of these variables have a significant effect, indicating that the study period does not significantly affect the observed relationship. Authy1 describes studies published prior to the year 2000. Its coefficient is not significant, indicating that publication schedule up to the year 2000 does not appear to significantly affect the estimated effect. Single and Multi-distinguish studies according to whether they concentrate on a single nation or multiple nations. Neither exhibits a significant effect, indicating that the number of countries a study focuses on has little influence on the correlation between financial development and growth. Year1 represents research utilising annual data. It is not significant, indicating that data frequency has no appreciable effect on the observed relationship.

Moreover, Inde1 through Inde3 do not have significant coefficients. This suggests that whether a study focuses on bank-based, market-based, or a combination of these financial development indicators, the estimated relationship with economic growth is not significantly affected. Method1 and Method2 distinguish OLS and panel data methodologies. None of the coefficients are significant, indicating that the choice between these two estimation methods does not significantly affect the reported relationship. CORR, INST, HET, MORFIN, PENDOG, AMISER, INCON, RSTDA, and MISS are variables that represent various aspects of study quality. Only PENDOG (which indicates endogeneity, a prevalent issue in econometrics in which an independent variable is correlated with the error term) and MISS (absence of missing data) have significant coefficients. These variables indicate that the quality and rigour

of the research methodology can influence the reported relationship between financial development and economic growth.

Studies that employ control variables (Control) exhibit coefficients with statistical significance. This suggests that control variables in studies may contribute to a more nuanced understanding of the relationship, emphasising the need to account for potential confounding factors when examining this relationship. Since studies with control variables appear to report distinct results, policymakers should interpret the findings of studies without controls with caution. Variables such as APFIN, MORFIN, and HET reveal the rigour with which financial development indicators were selected and how heterogeneity was taken into consideration. MISS, and AMISS indicate the study's capacity deal with missing data. The MISS variable, which reflects studies with no missing data, they demonstrate a significant coefficient. This suggests that comprehensive data in studies may result in a more nuanced comprehension of the relationship. The significance of the MISS variable highlights the need for exhaustive datasets. Policymakers should invest in the collection and dissemination of robust financial data to facilitate more accurate analyses and, consequently, more effective policy formulations.

Conclusion

This chapter has used a statistical technique to provide more objective and rigour outcomes by comprehensively integrating and synthesising the findings to be able to deduce a summary effect from individual comparable studies. The thesis has used Partial Correlation Coefficient (PCC) as its chosen effect size and the moderators and quality variables as the covariates. The thesis went on to ascertain whether there is file drawer problem by using both formal and informal means and the resulting outcome was that there was publication bias. WLS was conducted to see the effect that the independent variables had on the dependent variable partialr. It was noted across all models, separtialr has a negative coefficient meaning it is negatively affecting our main dependent variable partial and are all statistically significant at 1%. Also we see inde2 and method1 remains significant even if we include other variables.

Fixed and Random effect have also been estimated to determine which model is the best fit. Hausman test was used to determine this. The resulting outcome is that the p value is very low, leading the choice of Fixed effect. However, after including the control variables, the issue of multicollinearity kicked in, and the high p value leading to the keeping of the Random effect model as well. Cluster analysis was also done to take care the issue of how the error terms would be correlated and to correct the standard error of the estimates. Meta regression analysis was also conducted to investigates whether covariates explain any of the heterogeneity of treatment effects between studies. We found some variation among Individual estimates whilst the overall effect found are smaller than outcomes found by many other studies. Furthermore, Multilevel analysis was also analysed to account for any data hierarchy. The result of these two models was that there exists a genuine effect, albeit weak effect, meaning that financial development does indeed cause a weak effect on economic growth in Sub Saharan Africa.

CHAPTER 8 – DISCUSSION AND CONCLUSIONS

The relationship between financial development and economic growth has not reached a consensus. Various contradictory results have been noted. By covering only, a small fraction of the available studies, drawing inferences from only a limited set of information, basing their conclusion on the subjectivity of the researcher and producing a wide variation in effect sizes, these studies at best resulted in ambiguous and inconclusive findings. To be able to summarise all available research relevant to the question at hand and a quantitative and objective study design this thesis has resorted to conducting systematic literature review which uses an exhaustive search strategy which applies explicitly stated criteria in an attempt to include all studies to enable transparency, replicable, accountable and updateable findings (Gough et al., 2012).

To analyse whether financial development enhances economic growth in Sub Saharan Africa, the thesis will answer four key objectives. Firstly, to analyse the factors that affect the estimates of the relation between financial development and economic growth. Secondly, to analyze the effect of publication bias in order to ascertain whether there poses an inherent selection bias towards various outcomes. Thirdly, to assess the quality of studies by analysing the methodological rigour of the study design. Fourthly, to utilise a multi-level model to analyse variance among variables at different levels of the hierarchy while simultaneously analysing the relationship within and between levels in order to differentiate studies between various authors.

The thesis went on to deliberate the state, functioning and the effectiveness of both banks and stock markets in Sub Saharan Africa in their effort to enhance economic growth. Although banks are more dominant over stock markets in the continent, they are still shallow and underdeveloped. Stock markets on the other hand had witnessed growth, however the industry is still underdeveloped, undercapitalised and institutionally weak to enhance efficiency in effecting growth. More is needed to be done to ensure both bank and stock market expand and operate efficiently.

The economic growth of the region has also been analysed to see not only how different financial markets have played their part to support growth but also how the

economic fundamentals has affected the livelihood of the population as well as their productivity. Since the abandonment of repressive policies, many countries started to see substantial growth as they opened up and freed their markets. This, however, was short lived as currency depreciation, high levels of inflation, fiscal deficit hindered a sustained growth. Moreover, lack of funding hampered infrastructure developments such as electricity, roads etc which was a catalyst to hinder growth. High dependencies on natural resources and shrinking commodity prices was another factor that saw rampant poverty in many countries as inequality widened leaving majority of the population in poverty.

The empirical literature of SSA was also analysed. Studies included in this thesis were examined to ascertain trends and patterns. Positive outcome was evident from most studies while a few studies presented negative results, and a few found mixed and little support. The inconsistent results can be attributed by financial indicators used in the analysis, level of countries development, time examined, statistical methods used, and nature of institutions and structural characteristics of the economies studied. All these have a bearing on the findings of the finance growth nexus. To be able to attain a conclusive and reliable outcome, this thesis is assessing meta-analysis to consider whether the finance growth relationship constitutes a genuine effect.

Chapter 3 analyses the theoretical and conceptual views to ascertain the mechanisms and dynamics of how finance affects growth. The theoretical view on one hand has expounded various divergent views to explain the finance growth nexus, The theoretical models have been expounded to first understand the evolution of the debate and the consequent progression of models preceding and building from one another, furthermore, different opposing views were analysed in their critique and expansion from prior hypothesis to be able to explain better the finance growth nexus. As the analytical apparatus increased so was the progression and expansion of research methodologies.

The conceptual framework on the other hand analysed the pathways within which finance enhances growth. The chapter started by developing a static logic model to graphically explain the mechanisms through which financial development enhances growth. Capital accumulation and total factor productivity were propounded to be the

two transmission channels which affects growth. Furthermore, a more in-depth analysis of how the bank and market-based structures affect the economy. Lastly, the chapter ended by discussing the proxy's used to measure financial development by looking at both the commercial banks and stock market to see how the size, activity and efficiency of financial variables affects growth.

Chapter 4 analyses the overall methods that are being utilised by this thesis to highlight their basis and reasoning behind their use. The chapter started by expounding the concept of systematic review method where the history, benefits and challenges were reiterated. Following that, the discussion of meta-analysis was discussed. This discussion brought forth the understanding of it origin, pro and cons and how this methodology was applied in this study. This was then followed by the blended approach which combined the two approaches as well as an explanation of the gap in economics field in placing more weight on quantitative synthesis and analysis of data and little weight on comprehensive systematic review.

Characteristics of studies retrieved for analysis were diagrammatically presented in chapter 5. This synthesis was helpful to uncover what is going on with the data. On analysing the data, it is evident that many studies grouped countries together, very few studied single countries. Moreover, countries with larger economies such as Nigeria and South Africa were studied more readily than countries with smaller economies. To coincide with the financial structure of African economies, majority of studies used bank-based ratio as opposed to stock market ratios, many studies were published in journals as well as made their analysis in the periods of financial repression and liberalisation.

Chapter 6 illustrated the concept of quality and its role in validating research studies. The chapter started by analysing the importance of the term as well as how it has been used in different fields of study. The chapter was followed by how this thesis went on to structure the quality instrument to not only be used for this particular study but also in the economics field in general. Here the development was highlighted to include the 8 elements of internal validity and the 3 elements of external validity respectively. Furthermore, the chapter explained the rational of choosing the quality domains which will thereafter be coded and included as part of the moderator variables. The

developed tool was pilot tested to ensure its adequacy and comprehensiveness before delving into the categorisation and explanation of how the tool is actualised. Finally, the discussion of the tool was illustrated to enhance the understanding, importance, and its realisation.

In chapter 7 the thesis utilised all the above discussion encompassing the theoretical, empirical, conceptual and literature analysis to provide a methodological outcome to answer the research question posed in chapter 1. The thesis used a statistical procedure to summarise results of multiple separate studies in order to come up with a single quantitative summary to demonstrate magnitude of effects by reviewing, synthesis and analysing the accumulated evidence on the impact of financial development on economic growth. By using a blended approach of both systematic review and meta-analysis, this thesis has been able to provide an objective statistical estimate that can be integrated, repeated and verified providing the highest quality of evidence as they produce more reliable and impartial evidence.

The thesis seeks to achieve the following four objectives which include; analysing the factors that affect the estimates of the relation between financial development and economic growth, analysing the effect of publication bias in order to ascertain whether there poses an inherent selection bias towards various outcomes, analysing whether financial development enhances economic growth in Sub Saharan Africa and lastly to assess the quality of studies by analysing the methodological rigour of the study design; By pooling a total of 75 studies having 602 estimates in order to provide a rigorous, explicit and comprehensive outcomes, this thesis found that there exist a genuine effect on the relationship between financial development and economic growth.

The thesis then analysed whether the variables are correlated or whether there are any multicollinearity issues or not by generating and assessing the correlation matrix. It was found that no multicollinearity existed among the variables as no two-correlation coefficient of any two variables were more than 0.8. Moreover, when the correlation between partial and precision was undertaken in Table 7.1D, it was found that here is significant positive correlation between partial and precision with p-value less than 5%. In extending the correlation analysis between the three variables in Table 7.1E, it was

noted that there is negative but statistically association between separtialr with partial and precision, while partialr is positively and significantly associated with precision.

When considering the publication bias, this thesis used two graphical representations to depict and check the existence of systematic heterogeneity. Using the scatterplot between precision and partial in Figure 7.4A and funnel plot in Figure 7.4B. Using the scatter plot, the thesis was able to note the imbalance in the reported effects which suggested the presence of a positive effect bias. Moreover, the funnel plot also confirmed the presence of publication bias as the figure depicted an inverted funnel.

The bias is likely to compromise the validity of meta-analysis results as some minimal significant findings in smaller studies may have been overlooked. To be able to provide a more formal method of detection of bias beyond diagrammatic representations, Egger test using fixed effect and Egger test for small study effect of Table 7.4A and 7.4B were analysed respectively. Both the formal tests confirmed the presence of publication bias. Our results suggest that the literature analysed is not free from publication bias. It is in alignment with Arestis et al., (2015), Bisjam et al., (2018) and Simplice 2013 who find evidence of publication bias, but contrary with Valickova et al 2013 who did not find evidence of publication bias.

To be able to correct the issue of heteroscedasticity prevalent in OLS and to utilise the least square in optimising the model fit, Weighted Least Square was deployed. This method has been noted to be superior to both random-effects MRA as well as Fixed Effect-MRA where there is no publication bias and where there is publication bias WLS-MRA has smaller bias. When we look across all models, separtialr exhibit negative coefficient meaning it is negatively affecting our main dependent variable partial and is statistically significant at 1%. R-squared is increasing as expected as more variables are added. We see inde2, method1and paper1 are both statistically significant for both model 1 and model2 although model2 and paper1 negatively affects partial.

Although it is acceptable practice to choose Fixed effect over Random effect model as FE model is safer and more consistent, this thesis ran both analyses to see which one fits the data more accurately. Having observed a low p value on the Hausman test, RE

model is rejected and FE model chosen. However, where control variables were included in the model, although it showed the issue of multicollinearity, we found that the null hypothesis was high and hence we can keep the RE. Another reason we kept the RE is the difference observed in the coefficient estimates of separtiar in Table 7.6. If the coefficients are similar, that is a tell sign that heterogeneity is uncorrelated with exponential variables. We can also see that a lot of variables in the FE model are dropped, because if a variable across different authors are not changing in their values, FE would eliminate them.

Cluster analysis was also conducted to can take care the issue of how the error terms would be correlated. This analysis helps us correct the standard error of the estimates so that we can have better and more reliable results. Here each study is seen as a separate cluster and therefore the number of estimates of each study become the number of observations of each cluster and so Table 7.7A help us to see how each variable has been divided into each cluster. When dealing with cluster regression of Table 7.7B, the thesis added another layer of correction which is dividing different rows into different clusters on the basis of Author. As the same Author may have the error term which is correlated with each other, cluster helps us to correct the issue of correlation because that can distort the standard errors.

On the first instance of undertaking the cluster regression, we ran the simple regression where partial has been regressed on its standard error and then extending the analysis by adding more controls which are our moderator and quality variables. By taking the weights it helped us to take care of the problem of heteroscedastic and the correlation of the error terms. Precision was also taken as a measure of heteroscedasticity. This is an improvement from the Weighted least squares. We have chosen to use authors to take into account correlation on the estimates where same authors have done multiple papers on the same topic which will make the error term correlated with each other. Table 7.7B notes the regression results when errors are clustered at different study levels. We see separtialr negatively correlates with the effect size across all models.

Robustness checks were conducted using Hausman test and Breusch and Pagan Lagrangian multiplier test for random effects. Hausman test in table 7.8A helps us to choose either the Fixed Effect or Random Effect. The null hypothesis assumed to be

the preferred model is random effects; the alternate hypothesis is that the model is fixed effects. Given that the p-value of the Hausman Test is small enough that is less than 5%, we reject the null hypothesis and thus conclude at the given significance level that the fixed effects model is the better model. However, this test alone may not enough to settle at this decision with high level of certainty. As such, more diagnostic tests are important to assess which is the better model.

To further analyse this, this thesis also run the Breusch-Pagan Lagrange multiplier (LM) test to choose between a random effects regression and an OLS regression. The Breusch and Pagan helps us know whether there is heteroscedasticity in the variables. Since the p value is really low, that means we do have a problem of heteroscedasticity in the model which needs to be corrected using robust standard errors. Moreover, the low p value shows that there exist random effects as we reject the null hypothesis. The existence of random effects shows that the random effects could still be considered as a potentially relevant model in estimation. The heteroscedasticity test is done for the fixed effect model as well. The results show that there is a presence of heteroskedasticity in the fixed effect model due to low p-value.

Meta Regression analysis was further conducted to determine whether the results systematically vary across different contexts in which researchers estimate the effect. Moderator variables were included in the regression to capture the differences in regressions included in the reported growth regressions. Three models were estimated in Table 7.9A, Model 1 accounted for moderators, Model 2 analysed the quality variables while the Model 3 combined all covariates. By using fixed effects and utilising a traditional approach of averaging the values for different variables across different authors, Model (1) explained 6.17% heterogeneity, model (2) explained 24.39% of heterogeneity while model (3) explained 17.19% of heterogeneity.

The meta-analysis shows that some factors affected the reported results and constituted the sources of heterogeneity. When exploring whether financial development effects vary with the number of countries used, the variable using data on single country (Single) is significant and positive in both models 1 and 3 which informs us that studies utilising single countries does indeed explain the difference on the finance growth nexus. When investigating the growth effects of quality variables,

we found studies whose power is greater or equal to 80% (POW) is statistically significant while having a negative effect on the dependent variable. This informs us that power of studies is important in explaining the growth effects however its effect is weak. Studies that have used control variables or run tests to consider correlation (Corr) is statistically significant in model 2 with positive coefficient. However, it turns out to be insignificant after the inclusion of quality variables in model (model 3). Same is true for studies that used instrumental variables to control for confounding effect (INCON).

Most of other variables that could explain the heterogeneity of results of the finance growth nexus did not result in significant outcomes. On average we found that there is positive albeit weak effect of financial development and economic growth. This is supported by the low goodness of fit which indicates weak models in explaining the relationship among the variables of interest. Our finding is in alignment with Bunman et al., (2013) who found the positive but weak effect of the finance growth nexus as well as Simplice (2013) who found a genuine effect whose strength has been distorted by endogeneity-based estimations, publication bias and effects of financial activity. It is in contrast with Valickova et al., (2013), Arestis et al., (2015) who found a significant positive and statistically significant effect of finance growth relationship. This finding implies that finance alone is not sufficient to bring about substantial economic growth. Other policies such as fiscal and monetary policies, institutional reforms etc combined by liberalisation policies could be used to effectively enhance economic growth.

Following on, the effect size is tested for zero level difference in Table 7.9B. Most of them are found to be positive, the ones that are negative are actually even not statistically significant. Study 13 is small but is as well statistically insignificant, we also see study 17, 37, are all negative and statistically insignificant. As mentioned, we also see studies with positive Effect Sizes but are statistically insignificant like study 3,4,6,7,10 and the like. However, it can be noted that there are more positive studies which are statistically significant which means that financial development affects economic growth. If we also look at the theta, which is the overall estimate we see that it has a positive sign and also statistically significant.

Heterogeneity tests are conducted to ascertain the variation and or consistency of effects across studies. Accounting for these discrepancies is paramount as it might result in biased MRA. Table 7.10A reveals that there is considerable homogeneity in the study because the p-value is really high (84.6%). Galbraith plot was also used to determine whether there are outliers in the studies or not. In the absence of heterogeneity, it is expected that 95% of the studies lie within the confidence level. It is noted that most of the studies lie within the confidence interval band indicating that we don't have a lot of heterogeneity across. This is in accord to the findings of the Cochran's Q-test.

The findings from the meta-analysis of Table 7.11.3 which incorporates the time and geographical dimensions highlight the intricate nature of the connection between financial development and economic growth in SSA. This relationship is influenced by various factors, including regional distinctions within SSA, chronological phases, the methodologies employed in the research papers under review, and the overall quality of these studies. The upward-trending coefficients for West Africa, East Africa, and South Africa suggest a generally favourable impact of financial development on their economic progression. Yet, the temporal perspective, especially in the post-liberalization era, introduces nuances, emphasizing the need for a detailed exploration of specific country dynamics and their associated policies.

This thesis however was not without limitations. Firstly, in spite of utilising an explicit, comprehensive and systematic strategy of identifying and extracting studies that have embarked on the finance growth nexus in SSA, many smaller and poorer countries were not included in the literature. As expected, many researchers confined their research in analysing the finance growth literature on more larger economies, where smaller countries were studied, it was noted by one or two papers at most. This skewness in literature may lead in inconclusive results. More studies are needed to cater for smaller and poorer economies.

Secondly, this thesis confined its focus on financial landscape of banking and stock market as they are the most studied in the region. Although banking sector is predominant in the financial sector, other smaller and innovative financial services are being used to propel economic growth in the region. Mobile banking has been a

pioneer in making huge strides and leapfrogging banking technology and innovation as it filled the infrastructure gap and shortcomings of the traditional banking. Insurance has also been a catalyst in loss mitigation, promoting trade and enhance financial stability to enable sustainable economic growth. Lack of these additional financial services may lead to inconclusive findings.

The third limitation of this thesis lies in the fact that most studies conducted in the region might have not found their way in publishable outlets. This has posed a great challenge in retrieving them as studies that could be picked from the established sources can be utilised in our analysis. Being a developing nation, various institutions and government departments might have researched on the relationship but have failed to make them available in the public domain. This is a common problem of developing countries as they do not prescribe to systematic and intentional ways to share information to due cost implication and lack of competent and motivated personnel. This lack of data might have caused inconclusive outcomes.

The main conclusions concerning policy implications and future research can be summarised as follows. Firstly, many countries have failed to reap the rewards of financial development as they have not been able to operate effectively, this is due to the following: the reluctance of the banking sector to channel funds to the private sector is due to risks associated with non- performing loans. This has led banks to shift their funding mandate to sovereign paper due to their liquidity and less risky assets. Furthermore, weak legal and institutions frameworks hinder banks recourse to enforce payments, poor infrastructure in roads and IT deters banks penetration beyond the city centres moreover, lack of effective credit registers hampers banks efforts in tracking customers with poor credit histories and lack of sufficient security has hampered the private sector to get sufficient credit (EIB, 2018; Nyantakyi and Sy, 2015).

Other constraints in the banking system include high margins between the lending and deposit rates. Although the trend is going down, the banking markets in SSA is marked by high lending rate contrasted with low deposit rate, furthermore, the sector is highly inefficient and suffers from inadequate level of competition culminating to high levels of credit (Tyson, 2021). SSA has the lowest bank account ownership in comparison

with other developing regions and as well they have the lowest percentage in accessing bank loans. More efforts need to be done by the African government to ensure they create a conducive environment and finding other sources of funding in order to eliminate crowding the private sector. Moreover, more research needs to be done to find innovative ways to leapfrog the infrastructure shortcomings and reach the unbankable. Moreover, the development of financial systems and structure is not the only solution to achieve economic growth in SSA, the combination of financial development in a country together with other fundamentals such as institutional efficiency, removing of corruption, fiscal and monetary policies as well as political stability may enhance the economic development of SSA countries. More future research is needed to determine the contribution of each reform measure.

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