FINANCIAL SECTOR DEVELOPMENT AND ECONOMIC DEVELOPMENT IN SUB-SAHARAN AFRICA

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CHAPTER ONE

INTRODUCTION

1.1 Background

Over the last 50 years, the economies of Sub-Saharan Africa have been plagued by three interrelated problems. The most pressing problem was that the region was rife with macroeconomic instability. Inflation, high unemployment, and unstable GDP growth were almost normal economic conditions. Second, Sub-Saharan Africa has had the highest level of income inequality among the world's regions for at least as long as reliable data has existed. The final, and most serious, problem has been the relatively slow rate of economic growth. By international standards, GDP per capita growth in Sub-Saharan Africa has been lower than that of the more successful developing countries.

Over the last 20 years, there has been an extant amount of research on this problem. Understanding why Sub-Saharan Africa is the poorest region and why many countries in the region are not converging with the rich countries has attracted a number of researches. There is no consensus on what is actually responsible for Africa's poor economic performance. Sachs and Warner (1997) as well as Hoeffler (2002) argued that Africa's poor economic performance can be explained by the same variables that account for the growth performance in other developing countries. Their results indicate that there is no systematic unobserved difference between African and non-African countries. This suggests that augmented Solow model can fully account for sub-Saharan Africa's slow growth performance. Therefore, to promote growth in Africa, attention should be given to the fundamental factors of the augmented Solow model, such as investment in physical and human

capital and population growth. However, using the Solow growth model in cross-country studies, a number of authors find negative and significant impact of "African dummy" (see among others, Barro, 1991, 1997; Levine and Renelt, 1992; Sala-I Martin, 1997a, 1997b ; Bloom and Sachs 1998). This implies that in addition to Solow variables other hidden variables may account for success or poor performance of Africa.

In line with this argument, the role of financial markets in the growth process has received recent attention. Theoretical literature suggests that well-functioning and developed financial sectors contribute significantly to output growth. First, it mobilizes savings from domestic and foreign sources, supports efficient allocations of capital (Acemoglu and Zilibotti 1997; Rajan and Zingales 1998), and increases total factor productivity (King and Levine 1993). Second, it eases the exchange of goods and services (Greenwood and Smith 1996). Third, it supports better risk management (Obstfeld 1994). Fourth, it facilitates information and enhances corporate governance (Grossman and Hart 1980; Shleifer and Vishny 1997).

Financial development reduces information asymmetries, transaction and monitoring costs and allows risk diversification while improving the allocation of resources across different investment projects (Levine 1997). In addition, it increases the resilience of the economy by providing a variety of instruments that households and firms can employ to withstand adverse shocks. Sound financial systems can also strengthen the transmission mechanism of monetary and fiscal policies, through more information sharing and diversification of instruments.

Finally, an important aspect of financial development—financial inclusion—reduces inequality of opportunity and mitigates the adverse effects of inequality on the level and durability of growth (Ostry, Berg, and Tsangarides 2014; World Bank 2014a; IMF 2015b). In particular, microeconomic and sociological studies show that women's financial inclusion helps produce better welfare results in society.

Thus, given the strand of theoretical literature on the relationship between financial development and economic growth and development, one would argue that Sub-Saharan Africa countries stand to benefit from the fruits of deepening and development of their financial systems and markets. However, the empirical evidence on finance-growth nexus has mixed results. Some have established positive effects of financial development on economic growth whiles others have established negative effect or decoupling relationship between financial development and economic growth. Similar mixed results have been established in Sub-Saharan African countries (see Misati and Nyamongo, 2012 ; Menyah et al., 2014 ; Salahuddin and Gow, 2016). Perhaps, these mixed results in Sub-Saharan Africa emanate from a non-monotonic relationship between financial development and economic growth. Thus, it is worth studying to explore possibility of non-linear relationship between financial development and economic growth in the aforementioned region in Africa.

1.2 Problem Statement

The relationship between financial development and economic growth is important and intriguing at the same time. The earliest known proponents of the notion that finance could be an engine of growth are Schumpeter and Opie (1934); their view was later endorsed by Gurley and Shaw (1955), McKinnon (1973) and Shaw (1973), among others. Also, the importance of financial development has received renewed attention as the endogenous growth literature evolved from the 1980s onwards (see Greenwood and Jovanovic, 1990; Bencivenga and Smith, 1991; King and Levine, 1993a; etc.).

The theoretical recognition of financial development as growth-enhancing factor stirred up researchers' interest to give empirical credence to the aforementioned theoretical notion on finance-growth nexus. A uniform empirical results on the strand of theoretical relevance of financial development as growth stimulant eluded researchers in the field. Some studies registered positive effect of financial development on economic growth (see King and Levine 1993 ; Levine and Zervos 1998 ; Levine et al. 2000 ; Arestis, and Luintel , 2010) whiles others registered negative effects or decoupling relationship between financial development and economic growth (see Demetriades and Hussein 1996 ; Beck and Levine 2002)

These mixed results have prompted new direction in the theoretical literature of the nature of the relationship between financial development and economic growth. The emerging theoretical literature laid emphasis on non-linear relationship between finance and growth. Some of the emerging literature argues that benefits of finance with respect to economic growth and development depend on stages of economic development, the economic and institutional

environment (see, Greenwood and Jovanovic, 1990 ; Greenwood and Smith, 1997 and Graff and Karmann, 2003).

Given the new direction of the nature of the relationship between financial development and economic growth, a plethora of empirical studies has been conducted in that direction. The early empirical studies were plagued with methodological flaws. These studies use arbitrarily technique of selecting threshold value for establishing the non-linear relationship between financial development and economic growth and others use quadratic term to capture the threshold effect (see Christopoulos and Tsionas's, 2004 ; Rioja and Valev, 2004 ; Arcand et al. , 2012). This methodology has been heavily criticized on the basis of potential selection bias. Thus, the most recent empirical literature has relied on Hansen (1999, 2000) threshold methodology to establish the non-linear relationship between financial development and economic growth (see for instance, Chen et al. 2013 ; Alaabed, and Masih, 2016). Few studies in this direction of literature have been conducted in Sub-Saharan Africa. To the author's best knowledge, all existing studies with the exception of the one conducted by Ibrahim and Alagidede (2017) employed Hansen threshold methodology.

However, the study conducted by Ibrahim and Alagidede (2017) failed to examine the role of institutional threshold variables in moderating the effect of financial development on economic growth. Again, the study failed to explore the role of financial development on poverty and income inequality in Sub-Saharan Africa. Further, the mixed results obtained on the linear relationship between financial development and economic growth could also be attributable to the degree of the strength of the linkage between transmission mechanisms of financial development and

economic growth. None of these studies reviewed so far have looked at the transmission mechanisms through which financial development affect economic growth and development and how weak or strong these mechanisms are related to economic growth and development.

Also, existing literature in Africa and beyond did not exploit the possibility of multiple thresholds of mediating factors. Finally, the mixed results obtained in the existing literature could also be due to deployment of single indicator of financial development or a component of the financial sector to proxy for financial development. A composite index that captures all indicators and facet of financial sector development may produce persistent result contrary to mixed results obtained in the empirical literature.

Thus, this study adds to existing literature by first exploring the nature of the relationship between financial development and economic growth and development in context of scale effect of financial development threshold, stage of economic development threshold, and institutional threshold. The study also exploits the possibility of multiple thresholds for the mediating factors in Sub-Saharan Africa. Again, the study identifies transmission mechanisms through which financial development affects economic growth and development in Sub-Saharan Africa. Further, the study examines how strong or weak these transmission mechanisms identified link up with economic growth and development in Sub-Saharan Africa. Finally, the study uses a composite index to capture degree of financial development and how it affects growth and development in threshold context, and the transmission mechanism context. Aside the composite index, the study also conducts a comparative analysis on the relative importance of stock market development and

banking sector development in the determination of economic growth and development in Sub-Saharan Africa.

1.3 Objectives of the Study

The main objective of the study is to estimate the effects of financial system liberalisation and development on economic growth and development in Sub-Saharan Africa.

The study seeks to achieve the following objectives :

1. To estimate the threshold level of banking sector development that improves economic growth in Sub-Saharan Africa from 1990 to 2019.
2. To examines the threshold conditions of institutional quality and stage of economic development that must be reached to enable banking sector development to impact on economic growth in Sub-Saharan Africa from 1990 to 2019.
3. To estimate the threshold level of stock development market that stimulates economic growth in Sub-Saharan Africa from 1990 to 2019.
4. To examines the threshold conditions of institutional quality and stage of economic development that must be reached to enable stock market development to influence economic growth in Sub-Saharan Africa from 1990 to 2019.
5. To identify the transmission channels through which financial development affects economic growth in Sub-Saharan Africa from 1990 to 2019.

1.4 Research Questions

1. What threshold level of banking sector development improves economic growth in Sub-Saharan Africa from 1990 to 2019 ?

2. What threshold conditions of institutional quality and stage of economic development that must be reached to enable banking sector development to impact on economic growth in Sub-Saharan Africa from 1990 to 2019.
3. What is the threshold level of stock market development that stimulates economic growth in Sub-Saharan Africa from 1990 to 2019 ?
4. What threshold conditions of institutional quality and stage of economic development that must be reached to enable stock market development to influence economic growth in Sub-Saharan Africa from 1990 to 2019.
5. What are the transmission channels through which financial development affects economic growth in Sub-Saharan Africa from 1990 to 2019 ?

1.5 Justification of the Study

Across sub-Saharan Africa, central bankers and policymakers now realize that much bigger and better-functioning credit markets should be a priority outcome for their financial market reform strategies. Despite the recognition of the importance of credit markets, the region have not yet, collectively, made them a serious enough object of inquiry. Thus, there is a fundamental need for much better data and research on credit markets (Napier, 2018). Also, in recent years, development finance has emerged as an increasingly important tool to fight global poverty and reduce income inequality. In many cases, it has become an important complement to ODA and integral to achieving the SDGs. Whereas the Millennium Development Goals (MDGs) were focused on increasing donor assistance to developing countries, the SDGs include a comprehensive set of objectives for every country and emphasize all forms of finance, particularly from the private

sector. Agenda 2030 recognizes that the private sector is not only a source of capital, but also a source of jobs, innovation, technology, knowledge, and practical experience (Ingram and Mosbacher, 2018). Hence, conducting a study in the financial markets and institutions will be relevant to the region and whether the region is on course in line with achieving SDGs objectives in the area of finance.

Also, according the World Bank Report, 2018, economic growth in the region is projected to continue to rise to 3.2 percent in 2018 and to 3.5 in 2019, on the back of firming commodity prices and gradually strengthening domestic demand. However, growth will remain below pre-crisis averages, partly reflecting a struggle in larger economies to boost private investment. However, given demographic and investment trends across the region over the longer term, structural reforms would be needed to boost potential growth over the next decade. Thus, study such as this will be relevant to determine whether financial sector will play a major role in the region's growth.

Finally, policy recommendations will be distilled out of the empirical results which will serve as a guide to various governments in the region to incorporate financial sector reforms and development as policy direction in their annual budget to accelerate the rate of economic growth and reduce the magnitude of poverty and income inequality which are rife in the region.

1.6 Scope of the Study

The study period covers from 1980 to 2018 for selected countries in Sub-Saharan Africa. The study period is chosen based on the fact that most of the countries undergone financial sector reforms and adjustment in the early 80s which have had strong influence on the state of development of financial system of the countries in Sub-Saharan Africa. The countries are selected based on data

availability. Financial development of countries in Sub-Saharan Africa are measured based on the standard indicators developed in the literature. Financial sector development includes the banking sector development and stock market development. The study considers four indicators for banking sector development and four indictors for stock market development. The banking sector indicators are: private credit as a percent of GDP, ratio of liquid liabilities of the financial system (currency plus demand and interest-bearing liabilities of banks and non-bank financial intermediaries) divided by GDP, bank assets divided by GDP and bank index. Stock market indicators are market capitalization to GDP ratio, total value traded as a percentage of GDP, turnover ratio and market index. The study uses annual percentage change in GDP per capita in constant US dollars to measure economic growth for the selected countries in Sub-Saharan Africa. Poverty head count is used to measure the level of poverty of the selected countries in Sub-Saharan Africa. The study also uses Gini coefficient estimates and Palma ratio to measure the degree of income inequality of the selected countries in Sub-Saharan Africa.

1.7 Organisation of the Study

The study is organised into five Chapters. The first chapter is devoted to the introduction of the study. It includes the general background to the study, the development of the research interest, the relevant research objectives and questions, the relevance of the study and the scope of the study. Chapter Two tackles the review of literature which includes review of financial development concepts, economic growth and development, the existing theoretical literature that link financial development and economic growth and the various empirical studies conducted in Sub-Saharan and beyond. Chapter Three reveals the methodology employed to achieve the study objectives. The theoretical model to establish the relevance of financial development and other

growth-determinant variables are discussed thoroughly in this chapter. Also, empirical specification for threshold models, and the transmission mechanism models are stated in this chapter. The estimation techniques used to capture the influence of financial development on economic development in Sub-Saharan Africa are discussed. Chapter Four presents the empirical findings of the study pertaining to the research interest and objectives. Finally, Chapter Five summarises the findings of the study and distills relevant recommendations for policy implementation in Sub-Saharan Africa and beyond.

1.9 Expected Outcomes

It is expected that there will be threshold effect of financial development on economic growth, poverty and income inequality in Sub-Saharan Africa. Also, it is expected that the strength of the linkage between the transmission mechanisms of financial development and economic growth and income inequality will be mixed. That is, some will have weak link with economic growth and poverty whiles others will have a strong link with economic growth and poverty. It is also expected that banking sector development will be more relevant to the determination of growth and poverty relative to the stock market development in Sub-Saharan Africa.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the concepts underlying the thesis topic. It includes concept of financial development, economic growth, poverty and income inequality. Theoretical literature is also reviewed in this chapter. The theories include theories of economic growth, poverty and income inequality. It also includes theoretical linkages between financial development, economic growth, poverty and income inequality. Finally, the chapter reviews empirical literature on the effect of financial development on economic growth, poverty, income inequality, and sectoral output.

2.2 Conceptual Literature

This section of the chapter reviews the concept of financial development, economic growth, poverty and income inequality.

2.2.1 Concept of Financial Development

This section reviews the various definitions of financial development and measurements of financial development in the literature.

2.2.1.1 Definitions of Financial Development

Financial sector is the set of institutions, instruments, markets, as well as the legal and regulatory framework that permit transactions to be made by extending credit. Financial development is viewed as overcoming “costs” incurred in the financial system. That is, it involves the reduction of costs of acquiring information, enforcing contracts, and transaction cost. Thus, it can be inferred from this school of thought that financial development is about easing the process of enforcement of contract, transaction costs and acquiring information from financial intermediaries and markets.

However, reducing the cost of acquiring information, inter alia ignores the other aspects of financial development such as improvement in monitoring individuals and firms and exerting corporate governance after allocating capital. Financial development should therefore involve the improvement in the quality of five key functions ; producing and processing information about possible investments and allocating capital based on these assessments ; monitoring individuals and firms and exerting corporate governance after allocating capital ; facilitating the trading, diversification, and management of risk ; mobilising and pooling savings ; and easing the exchange of goods, services, and financial instruments (Merton 1992, Levine 1997, 2005, Merton and Bodie 2004).

2.2.1.2 Measurement of Financial development

The existing literature for the measurement of financial development comprises two different groups. The first group of studies measure financial development as a result of the observed outcomes of financial development. These studies include size, access and depth of financial systems as a measure of financial development. The second group includes proxies of a country's legal, business, and institutional environment. This group actually measures financial development on the basis of the characteristics of its institutional, business and legal environment. The characteristics and observed outcomes of financial development of the first group and the second group are discussed below.

2.2.1.2.1 Measurement of Financial Development on the Basis of Observed Outcomes

As indicated this first group measure financial development on the basis of observed outcome with respect to the size, access, depth and efficiency of the financial sector**.**

2.2.1.2.1.1 Financial Size and Depth

As regards financial depth, the variable that has received much attention in the empirical literature on financial development is private credit to GDP ratio. More specifically, the variable is defined as domestic private credit to the real sector by deposit money banks as percentage of ~~local currency to GDP. The~~ private credit, therefore, excludes credit issued to governments, government agencies, and public enterprises. It also excludes credit issued by central banks.

An alternative to private credit to GDP is total banking assets to GDP, a variable that is also included in the Global Financial Development Database. It is arguably a more comprehensive measure of size, because it includes not only credit to private sector, but also credit to government as well as bank assets other than credit. However, it is available for a smaller number of economies and has been used less extensively in the literature on financial development.

The recent crisis has highlighted issues in non-bank financial institutions (NBFIs). The coverage of NBFIs by data is much less comprehensive than that of banks. Nonetheless, to acknowledge this point, the Global Financial Development Database includes total assets of NBFIs to GDP, which includes pension fund assets to GDP, mutual fund assets to GDP, insurance company assets to GDP, insurance premiums (life) to GDP, and insurance premiums (non-life) to GDP (Čihák et. al 2013)

For financial markets, Levine and Zervos (1998) indicate that the trading of ownership claims on firms in an economy is closely tied to the rate of economic development. In the database, financial market depth is approximated using a combination of data on stock markets and bond markets. To approximate the size of stock markets, a common choice in the literature is stock market capitalisation to GDP. For bond markets, a commonly used proxy for size is the

outstanding volume of private debt securities to GDP. The sum of these two provides a rough indication of the relative size of the financial markets in various countries.

2.2.1.2.1.2 Financial Access

As regards access to financial institutions, a common proxy variable is the number of bank accounts per 1,000 adults. Other variables in this category include the number of bank branches per 100,000 adults (commercial banks), the percentage of firms with line of credit (all firms), and the percentage of firms with line of credit (small firms). When using these proxies, one needs to be mindful of their weaknesses. For example, the number of bank branches is becoming increasingly misleading with the move towards branchless banking. The number of bank accounts does not suffer from the same issue, but it has its own limitations. In particular, it focuses on banks only, and does not correct for the fact that some bank clients have numerous accounts (Čihák et al. ibid).

Data on access to financial markets are relatively more scant. To approximate access to stock and bond markets, measures of market concentration are used, the idea being that a higher degree of concentration reflects greater difficulties for access for newer or smaller issuers. The variables in this category include the percentage of market capitalisation outside of top 10 largest companies, the percentage of value traded outside of top 10 traded companies, government bond yields (3 month and 10 years), ratio of domestic to total debt securities, ratio of private to total debt securities (domestic), and ratio of new corporate bond issues to GDP (Čihák et al. ibid).

2.2.1.2.1.3 Financial Efficiency

Čihák et al. (2013) asserts that efficiency is primarily constructed to measure the cost of intermediating credit. Efficiency measures for institutions include indicators such as overhead costs to total assets, net interest margin, lending-deposits spread, non-interest income to total

income, and cost to income ratio. Closely related variables include measures such as return on assets and return on equity. While efficient financial institutions also tend to be more profitable, the relationship is not very close. For example, an inefficient financial system can post relatively high profitability if it operates in an economic upswing, while an otherwise efficient system hit by an adverse shock may generate losses.

For financial markets, a basic proxy for efficiency in the stock market is the turnover ratio, that is, the ratio of stock market's annual turnover to its capitalisation. The logic of using this variable is that higher turnover means more liquidity, which in turn allows the market to be more efficient. In the bond market, the most commonly used variable is the tightness of the bid-ask spread (with the United States and Western European markets showing low spreads, and Vietnam, Peru, Qatar, Dominican Republic, and Pakistan reporting high spreads) and the turnover ratio (although the measurement of the latter often suffers from incomplete data).

A range of other proxies for efficiency in financial markets has been used in empirical literature. One of them is price synchronicity, calculated as a degree of co-movement of individual stock returns in an equity market. The variable aims to capture the information content of daily stock prices, as a market operates efficiently only when prices are informative about the performance of individual firms.

2.2.1.2.2 Financial Development Based on Characteristics of the Financial Sector

This section deals with the measurement of financial development based on the institutional and legal environment, and business environment.

2.2.1.2.2.1 Institutional and Legal Environment

The institutional environment of a developed financial system involves policies, regulations, laws, and supervision. Herger et al. (2007) found that dysfunctional institutions are one of the main hurdles in financial development. Countries with strong institutional environment and investor's safeguard achieve high levels of financial development (La Porta et al. 1997). The constant monitoring of the financial system with certified international audits is recommended to achieve high levels of financial development. Barth et al. (2007) suggested that banks should be rated on international standards, and by international rating agencies. There are many countries that are following the Basel rule to strengthen their capital regulations. These measures can help to improve financial health of an economy**.** Contract enforcement is also considered as one of the most important elements of rule in any country, because it provides protection to both the parties. Capital liberalisation serves in better way if the legal system of a country is strong (De la Torre et al 2008). Capital account openness and domestic financial liberalisation play a significant role in increasing the depth of the financial system (Financial depth refers to the accessibility to money in any form, that is cash or assets, mutual funds, bonds, inter alia). It also helps to increase intermediation between investors and savers. In turn all these help to increase the level of financial mobilisation in the economy (FitzGerald 2007).

2.2.1.2.2.2 Business Environment

The second important element of financial development is considered as business environment. It is important for a better financial system in terms of the availability of skilled workers, physical and technological infrastructure and the cost of doing business. Availability of skilled workers helps to improve the quality of financial services. Outreville (1999) examined the relationship between human development index and financial development in 57 countries and found that

human capital and financial development in 57 countries are positively correlated. The degree of training, research and development, availability of quality management schools, as well as quality education of mathematics and science, all these are important factors for the production of skilled workers. To measure the strength of business environment in an economy, the cost of doing business is considered as one of the significant indicator. This measure also involves cost of starting a business, as well as costs incurred to register for the new business, and finally the time involved closing a business (Beck 2006).

2.3 Theoretical Literature

2.3.1 Theories of Economic Growth

The issues of economic growth in the world of economics have evolved overtime and continue to receive attention in economic research. A number of models have been invented to explain the processes of economic growth. Notably among these models is the traditional neoclassical growth theory that is due to Solow (1956).

2.3.1.1 Solow Growth Model

The Solow model is the starting point for almost all analyses of growth model. Even models that depart fundamentally from Solow's are often best understood through comparison with the Solow model. Thus, understanding the model is essential to understanding theories of growth. The

principal conclusion of the Solow model is that the accumulation of physical capital cannot account for either the vast growth over time in output per person or the vast geographic differences in output per person. Specifically, suppose that capital accumulation affects output through the conventional channel that capital makes a direct contribution to production, for which it is paid its marginal products. Then the Solow model implies that the differences in real incomes that we are trying to understand are far too large to be accounted for by differences in capital inputs. The model treats other potential sources of differences in real incomes as either exogenous and thus not explained by the model or absent altogether. Thus, to answer the central question of growth theory, we must move beyond the Solow model (Romer 2012).

2.3.1.2 Endogenous Growth Models

Given the empirical and policy difficulties associated with the Solow model a number of new models of economic growth have been proposed which attempt to endogenise the growth process. This section presents a review of the basic approaches underlying these models, following Romer (1989c). The two major approaches are to remove the fixed factor constraint of the Solow model by allowing constant returns to reproducible factors or to endogenise technological change by explicitly modeling the introduction of new technologies.

The simplest model which demonstrates the first approach is a model in which capital is linearly related to output as found in Rebelo (1987). In this model the production function takes the very simple form Y = AK where K may be considered a composite of physical and human capital. It is easy to demonstrate that sustained per capita output growth is possible without resorting to exogenous technical change. Assuming maximisation of a utility function exhibiting constant relative risk aversion by an infinitely lived consumer yields a perpetual growth rate of $g = (A-\rho)/\sigma$

, where ρ is the discount rate and $1/\sigma$ is the intertemporal elasticity of substitution. It is apparent that economies where consumers are more patients (lowρ) and more willing to substitute over time (lowρ) will grow faster. However, it does not seem appealing to rely on differences in tastes to explain differences in growth. A more appealing explanation is that factors which affect the marginal product of capital will have sustained growth effects. This approach may be extended to multiple sectors. Rebalo (ibid) shows that sustained growth is possible as long as cores of capital goods are able to be produced without fixed factors.

Romer (1986) resolved this difficulty by adopting Arrow's (1962) learning-by-doing framework. The argument is that knowledge generation may be positively related to the scale of economic activity which is assumed to be proportional to capital accumulation. In order to have sustained growth there must be at least constant returns to reproducible factors. This implies increasing returns overall which would violate a condition for competitive behavior. Romer posits that there may be spillovers so that an individual firm faces constant returns (diminishing returns to capital) but there are increasing returns overall. Romer shows that stable growth paths are feasible in this model without relying on technological change. One implication of Romer's framework is that there will be too little capital accumulation in a private economy due to the external effect.

The above models provide the basic framework for considering endogenous growth in a general equilibrium framework. However, given the broad nature of the results there is still little information for policymakers. A number of models have been developed along the above lines to deal with more specific policy and empirical issues. Many of these issues have also been of concern to developing countries. Among these models is the issue of financial development and economic growth.

2.3.2Financial Development and Economic Growth Nexus

The literature on the relationship between the financial development and growth goes back to the works of Schumpeter (1911), Gurley and Shaw (1960), McKinnon (1973) and Shaw (1973). According to the theory, the banking development is favorable to the economic growth because banks' activity increases the mobilization of the saving, improve the efficiency of the resources allowance, and stimulate the technological innovation. Since the pioneering contributions of Goldsmith (1969), McKinnon (1973), and Shaw (1973) on the role of financial development in promoting economic growth, the relationship between economic growth and financial development has remained an important issue of debate among academics and policymakers (De Gregorio & Guidotti, 1995).

Early economic growth theory argued that economic development is a process of innovations whereby the interactions of innovations in both the financial and real sectors provide a driving force for dynamic economic growth. In other words, exogenous technological progress determines the long-run growth rate, while financial intermediaries are not explicitly modeled to affect the long-run growth rate. However, the emergence of endogenous growth theory in the 1980s (Romer, 1986, 1990; Lucas, 1988; Barro, 1991) has attracted a renewed attention to the relationship between financial development and economic growth. Several studies, therefore, have attempted to explain how the operation of the financial sector may affect the rate of economic growth in the endogenous framework (Greenwood and Jovanovic, 1990; Bencivenga and Smith, 1991; King and Levine, 1993a, b; Roubini and Sala-i Martin, 1992, Pagano, 1993, Bencivenga et al., 1996; Blackburn and Hung, 1998; Deidda, 2006). In these studies, financial intermediaries such as information collection and analysis, risk sharing, liquidity provision are explicitly modeled in

which financial development is generally growth-promoting (Levine, 1997). For example, Lucas (1988) and Romer (1986) literature highlights the positive role played by the financial sector in bolstering growth, in particular by mobilizing savings, allocating resources to the most productive investments, reducing information, transaction and monitoring costs, diversifying risks, and facilitating the exchange of goods and services. This results in a more efficient allocation of resources, more rapid accumulation of physical and human capital, and faster technological progress. For instance, the theoretical work of Greenwood and Jovanovic (1990) shows that financial intermediaries promote investment and growth by enabling a higher rate of return on capital, while the growth itself spurs the expansion of financial institutions, implying a two-way relationship between financial intermediation and economic growth. Likewise, in Bencivenga and Smith (1991), financial intermediaries allow agents to channel savings into investments with high return which boosts growth, but the intermediaries also allow individuals to hold diversified portfolios to mitigate risks associated with their liquidity needs.

Levine (1997) also gives credence to the role that financial sector development plays in economic growth and development. He adds fresh perspectives by arguing that financial systems can accomplish five functions to ameliorate information and transactions frictions and contribute to long-run growth. These functions are: facilitating risk amelioration, acquiring information about investments and allocating resources, monitoring managers and exerting corporate control, mobilizing savings, and facilitating exchange. These functions facilitate investment and, hence, higher economic growth. The functions are thoroughly explained below :

- **Functional Approach**

The costs of acquiring information and making transactions create incentives for the emergence of financial markets and institutions. Put differently, in a Kenneth Arrow (1964)-Gerard Debreu (1959) state-contingent claim framework with no information or transaction costs, there is no need for a financial system that expends resources researching projects, scrutinizing managers, or designing arrangements to ease risk management and facilitate transactions. Thus, any theory of the role of the financial system in economic growth (implicitly or explicitly) adds specific frictions to the Arrow-Debreu model. Financial markets and institutions may arise to ameliorate the problems created by information and transactions frictions. Different types and combinations of information and transaction costs motivate distinct financial contracts, markets, and institutions. In arising to ameliorate transaction and information costs, financial systems serve one primary function: they facilitate the allocation of resources, across space and time, in an uncertain environment (Merton and Bodie 1995, p. 12).

- **Facilitating Risk Amelioration**

In the presence of specific information and transaction costs, financial markets and institutions may arise to ease the trading, hedging, and pooling of risk. Levine (op cit.) considers two types of risk: liquidity and idiosyncratic risk. Liquidity is the ease and speed with which agents can convert assets into purchasing power at agreed prices. Thus, real estate is typically less liquid than equities, and equities in the United States are typically more liquid than those traded on the Ghana Stock Exchange. Liquidity risk arises due to the uncertainties associated with converting assets into a medium of exchange. Informational asymmetries and transaction costs may inhibit liquidity and intensify liquidity risk. These frictions create incentives for the emergence of financial markets and institutions that augment liquidity. Liquid capital markets, therefore, are markets where it is

relatively inexpensive to trade financial instruments and where there is little uncertainty about the timing and settlement of those trades. Before delving into formal models of liquidity and economic activity, some intuition and history may help motivate the discussion. The link between liquidity and economic development arises because some high-return projects require a long-run commitment of capital, but savers do not like to relinquish control of their savings for long periods. Thus, if the financial system does not augment the liquidity of long-term investments, less investment is likely to occur in the high-return projects. Indeed, Hicks (1969, pp. 143-45) argues that the capital market improvements that mitigated liquidity risk were primary causes of the industrial revolution in England. According to Hicks, the products manufactured during the first decades of the industrial revolution had been invented much earlier. Thus, technological innovation did not, spark sustained growth. Many of these existing inventions, however, required large injections and longrun commitments of capital. The critical new ingredient that ignited growth in eighteenth century England was capital market liquidity. With liquid capital markets, savers can hold assets-like equity, bonds, or demand deposits-that they can sell quickly and easily if they seek access to their savings. Simultaneously, capital markets transform these liquid financial instruments into long-term capital investments in illiquid production processes. Because the industrial revolution required large commitments of capital for long periods, the industrial revolution may not have occurred without this liquidity transformation. "The industrial revolution therefore had to wait for the financial revolution" (Valerie Bencivenga, Bruce Smith, and Ross Starr 1966, p. 243). Economists have recently modeled the emergence of financial markets in response to liquidity risk and examined how these financial markets affect economic growth. For example, in Douglas Diamond and Philip Dybvig's (1983) seminal model of liquidity, a fraction of savers receive shocks after choosing between two investments: an illiquid, high return project

and a liquid, low-return project. Those receiving shocks want access to their savings before the illiquid project produces. This risk creates incentives for investing in the liquid, low return projects. The model assumes that it is prohibitively costly to verify whether another individual has received a shock or not. This information cost assumption rules out state-contingent insurance contracts and creates an incentive for financial markets-markets where individuals issue and trade securities-to emerge. In Levine (1991), savers receiving shocks can sell their equity claims on the profits of the illiquid production technology to others. Market participants do not verify whether other agents received shocks or not; participants simply trade in impersonal stock exchanges. Thus, with liquid stock markets, equity holders can readily sell their shares, while firms have permanent access to the capital invested by the initial shareholders. By facilitating trade, stock markets reduce liquidity risk.7 As stock market transaction costs fall, more investment occurs in the illiquid, high return project. If illiquid projects enjoy sufficiently large externalities, then greater stock market liquidity induces faster steady-state growth.

Thus far, information costs-the costs of verifying whether savers have received a shock-have motivated the existence of stock markets. Trading costs can also highlight the role of liquidity. For example, different production technologies may have a wide array of gestation periods for converting current output into future capital, where longer-run technologies enjoy greater returns. Investors, however, may be reluctant to relinquish control of their savings for very long periods. Thus, long-gestation production technologies require that ownership be transferred throughout the life of the production process in secondary securities markets (Bencivenga, B. Smith, and Starr 1995). If exchanging ownership claims is costly, then longer-run production technologies will be

less attractive. Thus, liquidity-as measured by secondary market trading costs-affects production decisions. Greater liquidity will induce a shift to longer-gestation, higher- return technologies.

Besides stock markets, financial intermediaries-coalitions of agents that combine to provide financial services-may also enhance liquidity and reduce liquidity risk. As discussed above, Diamond and Dybvig's (1983) model assumes it is prohibitively costly to observe shocks to individuals, so it is impossible to write incentive compatible state-contingent insurance contracts. Under these conditions, banks can offer liquid deposits to savers and undertake a mixture of liquid, low-return investments to satisfy demands on deposits and illiquid, high-return investments. By providing demand deposits and choosing an appropriate mixture of liquid and illiquid investments, banks provide complete insurance to savers against liquidity risk while simultaneously facilitating long-run investments in high-return projects. Banks replicate the equilibrium allocation of capital that exists with observable shocks. By eliminating liquidity risk, banks can increase investment in the high-return, illiquid asset and accelerate growth (Bencivenga and B. Smith 1991). There is a problem, however, with this description of the role of banks as reducing liquidity risk. The banking equilibrium is not incentive compatible if agents can trade in liquid equity markets; if equity markets exist, all agents will use equities; none will use banks (Charles Jacklin 1987). Thus, in this context, banks will only emerge to provide liquidity if there are sufficiently large impediments to trading in securities markets (Gary Gorton and George Pennacchi 1990). Theory, however, suggests that enhanced liquidity has an ambiguous affect on saving rates and economic growth. In most models, greater liquidity (a) increases investment returns and (b) lowers uncertainty. Higher returns ambiguously affect saving rates due to well-known income and substitution effects. Further, lower uncertainty ambiguously affects savings rates (David Levhari and T. N. Srinivasan

1969). Thus, saving rates may rise or fall as liquidity rises. Indeed, in a model with physical capital externalities, saving rates could fall enough, so that growth actually decelerates with greater liquidity (Tullio Jappelli and Marco Pagano 1994). Besides reducing liquidity risk, financial systems may also mitigate the risks associated with individual projects, firms, industries, regions, countries, etc. Banks, mutual funds, and securities markets all provide vehicles for trading, pooling, and diversifying risk. The financial system's ability to provide risk diversification services can affect long-run economic growth by altering resource allocation and the saving rates. The basic intuition is straightforward. While savers generally do not like risk, high-return projects tend to be riskier than low-re-turn projects. Thus, financial markets that ease risk diversification tend to induce a portfolio shift toward projects with higher expected returns (Gilles Saint-Paul 1992; Michael Devereux and Gregor Smith 1994; and Maurice Obstfeld 1994). Greater risk sharing and more efficient capital allocation, however, have theoretically ambiguous effects on saving rates as noted above. The savings rate could fall enough so that, when coupled with an externality-based or linear growth model, overall economic growth falls. With externalities, growth could fall sufficiently so that overall welfare falls with greater risk diversification. Besides the link between risk diversification and capital accumulation, risk diversification can also affect technological change. Agents are continuously trying to make technological advances to gain a profitable market niche. Besides yielding profits to the innovator, successful innovation accelerates technological change. Engaging in innovation is risky, however. The ability to hold a diversified portfolio of innovative projects reduces risk and promotes investment in growth-enhancing innovative activities (with sufficiently risk averse agents). Thus, financial systems that ease risk diversification can accelerate technological change and economic growth (Robert King and Levine 1993~).

- **Acquiring Information about Investments and Allocating Resources**

It is difficult and costly to evaluate firms, managers, and market conditions as discussed by Vincent Carosso (1970). Individual savers may not have the time, capacity, or means to collect and process information on a wide array of enterprises, managers, and economic conditions. Savers will be reluctant to invest in activities about which there is little reliable information. Consequently, high information costs may keep capital from flowing to its highest value use. Information acquisition costs create incentives for financial intermediaries to emerge (Diamond 1984; and John Boyd and Edward Prescott 1986). Assume, for example, that there is a fixed cost to acquiring information about a production technology. Without intermediaries, each investor must pay the fixed cost. In response to this information cost structure, however, groups of individuals may form (or join or use) financial intermediaries to economize on the costs of acquiring and processing information about investments. Instead of each individual acquiring evaluation skills and then conducting evaluations, an intermediary can do it for all its members. Economizing on information acquisition costs facilitates the acquisition of information about investment opportunities and thereby improves resource allocation.

The ability to acquire and process information may have important growth implications. Many firms and entrepreneurs will solicit capital, financial intermediaries, and markets that are better at selecting the most promising firms and managers will induce a more efficient allocation of capital and faster growth (Jeremy Greenwood and Boyan Jovanovic 1990). Bagehot (1873, p. 53) expressed this view over 120 years ago. ventures than most countries in the mid-1800s, which helped it enjoy comparatively greater economic success. Besides identifying the best production

technologies, financial intermediaries may also boost the rate of technological innovation by identifying those entrepreneurs with the best chances of successfully initiating new goods and production processes (King and Levine 1993~). As eloquently stated by Schumpeter

(1912, p. 74), Stock markets may also influence the acquisition and dissemination of information about firms. As stock markets become larger (Sanford Grossman and Joseph Stiglitz 1980) and more liquid (Albert Kyle 1984; and Bengt Holmstrom and Jean Tirole 1993), market participants may have greater incentives to acquire information about firms. Intuitively, with larger more liquid markets, it is easier for an agent who has acquired information to disguise this private information and make money. Thus, large, liquid stock markets can stimulate the acquisition of information. Moreover, this improved information about firms should improve resource allocation substantially with corresponding implications for economic growth (Merton 1987). However, existing theories have not yet assembled the links of the chain from the functioning of stock markets, to information acquisition, and finally to aggregate long-run economic growth. Debate still exists over the importance of large, liquid, efficient stock markets in enhancing the creation and distribution information about firms. Stock markets aggregate and disseminate information through published prices. Even agents that do not undertake the costly processes of evaluating firms, managers, and market conditions can observe stock prices that reflect the information obtained by others. This public goods aspect of acquiring information can cause society to devote too few resources to information acquisition. The public goods feature of the information thus disclosed may be sufficiently large, that information gains from large, liquid stock markets are small. Stiglitz (1985) argues that, because stock markets quickly reveal information through posted prices, there will be few incentives for spending private resources to acquire information that is almost immediately publicly available.

- **Monitoring Managers and Exerting Corporate Control**

Besides reducing the costs of acquiring information ex ante, financial contracts, markets, and intermediaries may arise to mitigate the information acquisition and enforcement costs of monitoring firm managers and exerting corporate control ex post, i.e., after financing the activity. For example, firm owners will create financial arrangements that compel firm managers to manage the firm in the best interests of the owners.

Also, "outside" creditors-banks, equity, and bond holders-that do not manage firms on a day-to-day basis will create financial arrangements to compel inside owners and managers to run firms in accordance with the interests of outside creditors. The absence of financial arrangements that enhance corporate control may impede the mobilization of savings from disparate agents and thereby keep capital from flowing to profitable investments (Stiglitz and Andrew Weiss 1981, 1983). Because this vast literature has been carefully reviewed (Gertler 1988; and Andrei Shleifer and Robert Vishny, forthcoming), this subsection (1) notes a few ways in which financial contracts, markets, and institutions improve monitoring and corporate control, and (2) reviews how these financial arrangements for monitoring influence capital accumulation, resource allocation, and long-run growth. Consider, for example, the simple assumption that it is costly for outsider investors in a project to verify project returns. This creates important frictions that can motivate financial development.

Insiders have incentives to misrepresent project returns to outsiders. Given verification costs, however, it is socially inefficient for outsiders to monitor in all circumstances. With "costly state

verification" (and other assumptions including risk-neutral borrowers and verification costs that are independent of project quality), the optimal contract between outsiders and insiders is a debt contract (Robert Townsend 1979; and Douglas Gale and Martin Hellwig 1985). Specifically, there is an equilibrium interest rate, *r*, such that when the project return is sufficiently high, insiders pay *r* to outsiders and outsiders do not monitor. When project returns are insufficient, the borrower defaults and the lenders pay the monitoring costs to verify the project's return. These verification costs impede investment decisions and reduce economic efficiency. Verification costs imply that outsiders constrain firms from borrowing to expand investment because higher leverage implies greater risk of default and higher verification expenditures by lenders. Thus, collateral and financial contracts that lower monitoring and enforcement costs reduce impediments to efficient investment (Stephen Williamson 1987b; Ben Bernanke and Gertler 1989, 1990; Ernst-Ludwig von Thadden 1995).13 Besides particular types of financial contracts, financial intermediaries can reduce information costs even further. If borrowers must obtain funds from many outsiders, financial intermediaries can economize on monitoring costs. The financial intermediary mobilizes the savings of many individuals and lends these resources to project owners. This "delegated monitor" arrangement economizes on aggregate monitoring costs because a borrower is monitored only by the intermediary, not all individual savers (Diamond 1984). Besides reducing duplicate monitoring, a financial system that facilitates corporate control "also makes possible the efficient separation of ownership from management of the firm. This in turn makes feasible efficient specialization in production according to the principle of comparative advantage" (Merton and Bodie 1995, p. 14). The delegated monitor arrangement, however, creates a potential problem: who will monitor the monitor (Stefan Krasa and Anne Villamil 1992)? Savers, however, do not have to monitor the intermediary if the intermediary holds a diversified portfolio (and agents can

easily verify that the intermediary's portfolio is well diversified). With a well-diversified portfolio, the intermediary can always meet its promise to pay the deposit interest rate to depositors, so that depositors never have to monitor the bank. Thus, well-diversified financial intermediaries can foster efficient investment by lowering monitoring costs. Furthermore, as financial intermediaries and firms develop long-run relationships, this can further lower information acquisition costs. The reduction in information asymmetries can in turn ease external funding constraints and facilitate better resource allocation (Sharpe 1990). In terms of long-run growth, financial arrangements that improve corporate control tend to promote faster capital accumulation and growth by improving the allocation of capital (Bencivenga and B. Smith 1993).

Besides debt contracts and banks, stock markets may also promote corporate control (Michael Jensen and William Meckling 1976). For example, public trading of shares in stock markets that efficiently reflect information about firms allows owners to link managerial compensation to stock prices. Linking stock performance to manager compensation helps align the interests of managers with those of owners (Diamond and Robert Verrecchia 1982; and Jensen and Kevin Murphy 1990). Similarly, if takeovers are easier in well-developed stock markets and if managers of under-performing firms are fired following a takeover, then better stock markets can promote better corporate control by easing takeovers of poorly managed firms. The threat of a takeover will help align managerial incentives with those of the owners (David Scharfstein 1988; and Jeremy Stein 1988). There are disagreements, however, about the importance of stock markets in corporate control. Inside investors probably have better information about the corporation than outsiders. Thus, if well-informed owners are willing to sell their company, less well informed outsiders may demand a premium to purchase the firm due to the information asymmetry (Stewart Myers and

Nicholas Majluf 1984). Thus, asymmetric information may reduce the efficacy of corporate takeovers as a mechanism for exerting corporate control. Stiglitz (1985) makes three additional arguments about takeovers. First, if an acquiring firm expends lots of resources obtaining information, the results of this research will be observed by other market participants when the acquiring firm bids for shares. This will induce others to bid for shares, so that the price rises. The firm that expended resources obtaining information must, therefore, pay a higher price than it would have to pay if "free-riding" firms could not observe its bid. Thus, the rapid public dissemination of costly information will reduce incentives for obtaining information and making effective takeover bids. Second, there is a public good nature to takeovers that may decrease the incentives for takeovers. If the takeover succeeds, and the share price rises, then those original equity holders who did not sell make a big profit without expending resources. This creates an incentive for existing shareholders to not sell if they think the value of the firm will rise following the takeover. Thus, value-increasing takeovers may fail because the acquiring firm will have to pay a high price, which will reduce incentives for researching firms in the hopes of taking them over. Third, current managers often can take strategic actions to deter takeovers and maintain their positions. This argues against an important role for liquid stock markets in promoting sound corporate governance. Moreover, liquid equity markets that facilitate takeovers may hurt resource allocation (Shleifer and Lawrence Summers 1988; and Randall Morck, Shleifer, and Vishny 1990). A takeover typically involves a change in management. Existing implicit contracts between former managers and workers, suppliers, and other stakeholders in the firms do not bind new owners and managers to the same extent that they bound the original managers. Thus, a takeover allows new owners and managers to break implicit agreements and transfer wealth from firm stakeholders to themselves. While new owners may profit, there may be a deterioration in the efficiency of

resource allocation. Overall welfare may fall. To the extent that well-functioning equity markets help takeovers, this may allow hostile takeovers that lead to a fall in the efficiency of resource allocation. Furthermore, liquid stock markets may reduce incentives for owners to monitor managers (Amar Bhide 1993). By reducing exit costs, stock market liquidity encourages more diffuse ownership with fewer incentives and greater impediments to actively overseeing managers (Shleifer and Vishny 1986). Thus, the theoretical signs on the links in the chain from improvements in stock markets to better corporate control to faster economic growth are still ambiguous.

- **Mobilizing Savings**

Mobilization-pooling-involves the agglomeration of capital from disparate savers for investment. Without access to multiple investors, many production processes would be constrained to economically inefficient scales (Erik Sirri and Peter Tufano 1995). Furthermore, mobilization involves the creation of small denomination instruments. These instruments provide opportunities for households to hold diversified portfolios, invest in efficient scale firms, and to increase asset liquidity. Without pooling, household's would have to buy and sell entire firms. By enhancing risk diversification, liquidity, and the size of feasible firms, therefore, mobilization improves resource allocation (Sirri and Tufano 1995). Mobilizing the savings of many disparate savers is costly, however. It involves (a) overcoming the transaction costs associated with collecting savings from different individuals and (b) overcoming the informational asymmetries associated with making savers feel comfortable in relinquishing control of their savings. Indeed, much of Carosso's (1970) history of *Investment Banking in America* is a description of the diverse and elaborate means employed by investment banks to raise capital. As early as the mid-1880s, some investment banks used their European connections to raise capital abroad for investment in the United States. Other

investment banks established close connections with major banks and industrialists in the United States to mobilize capital. Still others used newspaper advertisements, pamphlets, and a vast sales force that traveled through every state and territory selling securities to individual households. Thus, mobilizing resources involved a range of transaction costs. Moreover, "mobilizers" had to convince savers of the soundness of the investments. Toward this end, intermediaries are generally concerned about establishing stellar reputations or government backing, so that savers feel comfortable; about entrusting their savings to the intermediary (De Long 1991; and Naomi Lamoreaux 1994). In light of the transaction and information costs associated with mobilizing savings from many agents, numerous financial arrangements may arise to mitigate these frictions and facilitate pooling.

Specifically, mobilization may involve multiple bilateral contracts between productive units raising capital and agents with surplus resources. The joint stock company in which many individuals invest in a new legal entity, the firm, represents a prime example of multiple bilateral mobilization. To economize on the transaction and information costs associated with multiple bilateral contracts, pooling may also occur through intermediaries as discussed above, where thousands of investors entrust their wealth to intermediaries that invest in hundreds of firms (Sirri and Tufano 1995, p. 83). Financial systems that are more effective at pooling the savings of individuals can profoundly affect economic development. Besides the direct effect of better savings mobilization on capital accumulation, better savings mobilization can improve resource allocation and boost technological innovation (Bagehot 1873, pp. 3-4): Thus, by effectively mobilizing resources for projects, the financial system may play a crucial role in permitting the adoption of better technologies and thereby encouraging growth. This intuition was clarified 100

years later by McKinnon (1973, p. 13): The critical issue is that the financial system can promote specialization.

Even though most financial economists regard significant role that financial development plays in the growth processes of an economy, other scholars noted that financial development, however, may have an adverse effect on economic growth if it increases volatility of the real output (Huang, Fang, & Miller, 2014), raises systemic risk (Allen & Carletti, 2006; Gennaioli, Shleifer, & Vishny, 2012; Wagner, 2007) and/ or induces bubbles and crises (Zeira, 1999). Again, Robinson (1952), Lucas (1988), Stern (1989), Chandavarkar (1992), Stiglitz (1994) and Singh and Weisse (1998) question the importance of the financial system in promoting economic growth. In particular, while Lucas (1988: 6) states that "the importance of financial matters is very badly overstressed", Chandavarkar (1992: 134) notes that "none of the pioneers of development economics even list finance as a factor of development". Singh and Weisse (1998) emphasize the risks of financial collapse and consequent economic recession that may result from a rapid deregulation of once repressed financial systems. These theoretical discussions reveal that there is not a consensus on the role of finance in economic growth and the direction of causal inference between finance and growth.

2.3.3 Theoretical Literature on Threshold Effect of Financial Development on Economic Growth

At the theoretical front, there is a growing consensus that these threshold effects are motivated by the initial levels of per capita income, human capital and financial sector development. One of such theoretical works is Saint-Paul (1992). By relying on the initial level of per capita income,

the author analyzes a mechanism which may give rise to multiple equilibria in financial and economic development where agents can choose between two technologies. The first is flexible and allows productive diversification but at the same time has low productivity. The second technology is rigid, more specialized and productive. The model argues that when financial institutions are less developed, risk diversification is carried out through the selection of less specialized and less productive technologies. With this form of technology, there is less risk exposure and incentives to develop financial markets are limited and can lead to "low equilibrium". In the "high equilibrium", financial markets are well developed with specialized technology. In these economies, agents choose riskier, higher yielding technologies and the impact of finance on growth is higher. However, the transition from the "low equilibrium" to a "high equilibrium" one is mediated by the initial level of income per capita that function as a

threshold variable above which financial sector development is healthy for economic growth. Zilibotti's (1994) model also espouses the initial level of per capita income as a potential threshold variable in finance–growth nexus. The model establishes the idea of "thick" and "thin" markets. There exists positive impact of finance on growth for economies with "thick" markets above the per capita income threshold with low intermediation cost, improved capital allocation and sustained growth. While for economies below the threshold of per capita income, there are "thin" markets with limited capital, the higher cost of financial intermediation prevents investors from using efficiently available capital stock and financial development to have significant impact on economic growth. Greenwood and Jovanovic (1990) also identify the initial level of per capita income as a mediating factor in the relationship between finance and economic growth. They formally model the dynamic interactions between financial development and growth where a country passes through a development cycle from a primitive stage to a developed fast growing

stage. At early stage, growth is slow and the financial sector only mobilizes savings and diversifies risk. However, as the income levels begin to increase, the financial intermediaries become more sophisticated and perform costly functions of monitoring investment and screening for cost effective innovations. Finally, during the maturity state, the country's financial system fully develops with a relatively stable and higher growth. Moreover, during the early stages of financial development, only a few relatively rich individuals have access to financial markets. However, with aggregate economic growth, higher number of people accesses the formal financial system, with spill-over effects on economic growth. The main thrust of their model reveals that the relationship between financial development and growth varies depending on the level of per capita income. Berthelemy and Varoudakis (1996) argue that the initial level of human capital is a crucial threshold variable in finance-growth nexus as far as the human capital accumulation is positively associated with the level of educational development. Their theoretical model exhibits multiple steady state equilibria where economies with low educational development (and human capital) are trapped in low level underdevelopment equilibrium and thus unable to enjoy the benefits of financial sector development. Consequently, these countries have low savings and "quiet" financial sector stemming from weak competition. Conversely, economies with high human capital are characterized by well-developed financial sector development and as such enjoy relatively higher savings and income. By employing the regression tree technique, Berthelemy and Varoudakis (1996) empirically examine whether the initial level of human capital mediates the effect of financial development on economic growth. The authors find that the initial level of human capital proxied by the level of secondary school enrolment is a central threshold variable that influences the unequivocal effect of finance on economic growth. Beyond the level of human capital acting as a threshold variable influencing finance and growth, Acemoglu and Zilibotti's

(1997) study highlight the initial level of financial development as a potential threshold variable mediating the finance and growth nexus. The main thrust of their study is that, projects with relatively higher rates of return require large initial investment. Apart from this, they are frequently indivisible and the financial sector has to maintain a certain minimum size before sufficient funds can be pooled to finance these projects. Acemoglu and Zilibotti (1997) therefore opine that the impact of financial deepening on economic growth may be huge in developed countries with higher income per capita and greater financial development.

2.3.4 Transmission Mechanisms of the Impact of Financial Development on Economic Development

Financial markets provide an economy with certain vital services which comprise e.g. the management of risk and information, or the pooling and mobilization of savings. More ample and efficient, i.e. *deeper* financial systems are associated with a more effective supply of these financial services to the real sector. From a theoretical point of view, linkages between financial and economic development may take different forms. On the one hand, it is argued that the financial sector may influence growth through the *accumulative channel* and the *allocative channel.* The accumulation channel emphasizes the finance-induced positive effects of physical and human capital accumulation on economic growth (e.g. Pagano, 1993; De Gregorio and Kim, 2000). The

allocation channel focuses on the rising efficiency of resource allocation which is caused by financial deepening and which subsequently enhances growth (e.g. King and Levine, 1993). Financial development affects growth through several channels that are important for sub-Saharan Africa. First, it mobilizes savings from domestic and foreign sources, supports efficient allocations of capital (Acemoglu and Zilibotti 1997; Rajan and Zingales 1998), and increases total factor productivity (King and Levine 1993). Second, it eases the exchange of goods and services (Greenwood and Smith 1996). Third, it supports better risk management (Obstfeld 1994). Fourth, it facilitates information and enhances corporate governance (Grossman and Hart 1980; Shleifer and Vishny 1997). Financial development reduces information asymmetries, transaction and monitoring costs and allows risk diversification while improving the allocation of resources across different investment projects (Levine 1997). In addition, it increases the resilience of the economy by providing a variety of instruments that households and firms can employ to withstand adverse shocks. Sound financial systems can also strengthen the transmission mechanism of monetary and fiscal policies, through more information sharing and diversification of instruments. Finally, an important aspect of financial development—financial inclusion—reduces inequality of opportunity and mitigates the adverse effects of inequality on the level and durability of growth (Ostry, Berg, and Tsangarides 2014; World Bank 2014a; IMF

2015b). In particular, microeconomic and sociological studies show that women's financial inclusion helps produce better welfare results in society.

The literature has also shown that financial development helps dampen the impact of adverse shocks by alleviating firms' and households' borrowing constraints (Caballero and Krishnamurty 2001), and promoting diversification and management of risk (Acemoglu and Zilibotti 1997).

2.4 Empirical Studies

2.4.1 Stock Market Development and Economic Growth

In Sub-Saharan Africa, Enisan and Olufisayo (2009) examined the long run and causal relationship between stock market development and economic growth for seven countries in sub-Saharan Africa. The study used stock market capitalization, and total value stock traded to measure stock market development. Nominal GDP per capita was employed to measure economic growth in Africa. The study used autoregressive distributed lag (ARDL) bounds test. The study found that the stock market development is cointegrated with economic growth in Egypt and South Africa. Moreover, the test suggested that stock market development has a significant positive long run impact on economic growth. Granger causality test based on vector error correction model (VECM) showed that stock market development Granger causes economic growth in Egypt and South Africa. However, Granger causality in the context of VAR shows evidence of bidirectional relationship between stock market development and economic growth for Cote D'Ivoire, Kenya, Morocco and Zimbabwe. In Nigeria, there is a weak evidence of growth-led finance using market size as indicator of stock market development.

A study conducted by Boubakari and Jin (2010) also explored the causality relationship between stock market development and economic growth based on the time series data compiled from 5 Euronext countries (Belgium, France, Portugal, Netherlands and United Kingdom) for the period 1995:Q1 to 2008:Q4. The study used stock market capitalization, total value stock traded, and turnover ratios to measure stock market development. Real GDP was employed to measure economic growth in the Euronext. Granger causality test was used to find causality relationship between stock market proxies through market capitalization, total trade value, turnover ratio and

economic growth (GDP and FDI). Causal relations were investigated for each country. The results of the study suggested a positive link between the stock market and economic growth for some countries for which the stock market is liquid and highly active. However, the causality relationship is rejected for the countries in which the stock market is small and less liquid.

In Europe, Cuza (2012) analyzed the dynamics of the stock market in Central and Eastern Europe under the impact of the macroeconomic imbalances, emphasizing the volatility of the foreign capital inflows. The data selected for the study were gleaned from world bank world development indicators from 1995 to 2010. The study used stock market capitalization, total value stock traded, and turnover ratios to measure stock market development. Annual percentage change in GDP was employed to measure economic growth in the Central and Eastern Europe. The study employed Granger Causality test to examine the causality between economic growth and stock market development. Granger Causality analysis showed that market capitalization and stock value traded do not exert any impact on economic growth rates, emphasizing the low level of development of the stock market and its reduce role in the Romanian economy.

A related study has been conducted in Africa by Ogochukwu and Raifu (2017). The study employed various panel estimation techniques. The estimation techniques includes pooled OLS, random effect panel estimation, fixed effect panel estimation, fully-modified OLS and dynamic OLS and panel common correlated effect framework. The study used stock market capitalization, total value stock traded, and turnover ratios were used to measure stock market development. Real

GDP was employed to measure economic growth in Africa. The results indicate that stock market development indicators positively and significantly affect economic growth in Africa.

A study conducted in South Africa by Tinavapi (2017) examined the long-run causal relationship between stock market development (Johannesburg Stock Exchange) and economic growth in South Africa. The study made use of annual time series data, which covers the period from 1975 to 2013. The study used stock market capitalization, and total value stock traded to measure stock market development whiles real GDP per capita was employed to measure economic growth in South Africa. The autoregressive distributed lag (ARDL) methodology was employed with consideration of the existence of a structural break in the series due to the study considering the pre and post-apartheid eras in South Africa. The results obtained from the analysis confirmed that there is a long-run positive relationship between economic growth, stock market capitalization and stock market traded value.

The existing studies reviewed so far shows mixed results on the effect of stock market development on economic growth. This may suggest a non-linear relationship between stock market development and economic growth. To the author's best of knowledge, no study has examined the threshold effect of stock market development on economic growth. This study fills in the gap in literature by estimating the threshold level of stock market development that stimulates economic growth in Sub-Saharan Africa. Again, none of the existing studies deployed a composite index to measure overall development of stock market to determine its effect on economic growth. This study will fill in this gap by constructing a composite index to measure stock market development and determine its effect on economic growth in Sub-Saharan Africa.

2.4.2 Banking Sector Development and Economic Growth

Empirical studies have also been conducted on banking sector development on economic growth in Africa and outside Africa. For example, in emerging and advanced countries, Liang and Reichert (2006) also examined the causality between banking sector development and economic growth. The measured economic growth by annual percentage in real GDP whiles annual growth rate of real stock of liquid liabilities was used to capture banking sector development. The used both panel least squares and Granger causality to examine the relationship between banking sector development and economic growth. The study established positive effect of banking sector development on economic growth in both emerging and advanced countries. Also, demand-leading hypothesis was established in the Granger causality was found in both the advanced and emerging economies.

In a related study Abugamea (2016) investigated the relationship between the banking sector development and economic growth in Palestine over the period 1995-2014. The study employed bank assets to GDP ratio, credit to GDP ratio and interest rate spread to measure banking sector development and used GDP growth and GDP per capita growth to indicate economic growth. The study employed OLS estimator for the estimation of the growth model. The results showed a significant impact of banking size with a negative sign, insignificant impact of credit lending with a marginal one for lag credit and insignificant impact of efficiency on economic growth, respectively. Overall results reveal a weak nexus between
banking sector development and economic growth.

A study was also conducted on a number of developing countries by Mhadhbi et al. (2017) examined the nexus between banking sector development and economic growth. Banking sector development was measured by broad money to GDP ratio, domestic credit provided by the bank to GDP ratio, total bank income to GDP ratio, number of banks and branches per capita and the share of manpower employed in the banking system. The study also used GDP per capita to measure economic growth. Panel Granger causality was employed by the study to examine the direction of causality between banking sector development and economic growth. The study found mixed results in the direction of causality between banking sector development and economic growth. The study established unidirectional causality running from banking sector development to economic growth in some countries whiles observed the reverse in other countries. Also, study established bi-directional causality between banking sector development and economic growth in other countries. Decoupling causality was also established between banking sector development and economic growth in other countries.

The existing works reviewed so far shows mixed results on the effect of banking sector development on economic growth. This may suggest that non-linear relationship between banking sector development and economic growth. To the author's best of knowledge, no study has examined the threshold effect of banking sector development on economic growth. This study fills in the gap in literature by estimating the threshold level of banking sector development to stimulate economic growth in Sub-Saharan Africa.

2.4.3 Threshold Effect of Financial Development on Economic Growth

The literature reviewed so far have shown mixed results and this has prompted new direction in the theoretical literature of the nature of the relationship between financial development and economic growth. The emerging theoretical literature laid emphasis on non-linear relationship between finance and growth. Given the new direction of the nature of the relationship between financial development and economic growth, a plethora of empirical studies has been conducted in this direction. Alaabed and Masih (2016) examined the threshold effect of financial development on economic growth in Malaysia. The study used domestic credit to GDP ratio and GDP growth rate to measure financial development and economic growth respectively. Hansen (2000) threshold estimator was employed by the author to estimate the non-linear relationship between financial development and economic growth in Malaysia. A threshold is estimated, after which credit expansion negatively impacts GDP growth. While the post-threshold negative relationship is found to be statistically significant, the estimated positive relationship at lower levels of financial development is insignificant.

In the process of examining the mediation role of institutional quality on the relationship between financial development and economic growth, Gazdar and Cherif (2015) investigates the effect of institutional quality on the finance-growth nexus. To this end, an empirical model with linear interaction between financial development and institutional quality was estimated. The study considered four indicators for banking sector development and four indictors for stock market development. The banking sector indicators are banking institution credit to private sector as a percent of GDP, the ratio of liquid liabilities of the financial system (currency plus demand and interest-bearing liabilities of banks and non-bank financial intermediaries) divided by GDP, the ratio of the total assets of deposit money banks divided by GDP and bank index which is an index

of banking sector development that aggregates the information contained in the individual indicators. The stock market indicators include market capitalization which is equal to the ratio of value of domestic equities to GDP, total value traded which is equal to the total value of domestic equities traded in each country's major stock exchanges as a percentage of GDP, turnover ratio which is equal to the total value of domestic shares traded divided by market capitalization and market index which is an index of stock market development that aggregates the information contained in the individual indicators. The study employed GMM estimator to perform estimation of the model. The findings show that, while most indicators of financial development have a significantly negative effect on economic growth, the sign of the coefficients of interaction variables are significantly positive. This provides strong evidence that institutional quality mitigates the negative effect of financial development on economic growth. For the subcomponents of our institutional index, the findings show a development of the banking sector in a country with an important score in Law and Order, Bureaucracy and Investment Profile facilitate growth. Also, countries, with an important score of investment profile, can benefit from stock market development in terms of economic growth.

To examine the mediating role stage of development, Chen et al. (2013) examined the non-linearity between financial development and economic growth in China. The study used total bank deposits to GDP ratio, total bank loan to GDP ratio, as indicators of financial development whiles GDP was used indicator of economic growth. The study deployed a threshold model to investigate whether provinces with high level of personal income can exploit financial development efficiently. The results show that finance has a strong positive influence on growth in high-income provinces, but a strong negative impact on growth in low-income provinces. The results are robust to an

alternative financial development measure. Furthermore, we find that China's state sector, notorious for inefficiency and low productivity, accounts for a large proportion of industrial output in low-income provinces, causing bank loans to have a negative impact on economic growth.

Some scholars have also made an attempt in Sub-Saharan to examine non-linear relationship between financial development and economic growth. Ibrahim and Alagidede (2017) study investigated whether the impact of finance on economic growth is conditioned on the initial levels of countries' income per capita, human capital and financial development for 29 sub-Saharan Africa countries over the period 1980–2014 using a sample splitting and threshold estimation technique. The study measured financial development based credit to private sector as a ratio of GDP and domestic credit as a ratio of GDP whiles real GDP per capita was used to proxy economic growth. The findings of the study suggests that, while financial development is positively and significantly associated with economic growth, below a certain estimated threshold, finance is largely insensitive to growth while significantly influencing economic activity for countries above the thresholds. The main conclusion drawn is that higher level of finance is a necessary condition in long run growth and so are the overall level of income and human capital.

Samargandi et al. (2014) examined the relationship between financial development and economic growth in a panel of 52 middle-income countries over the 1980–2008 period. The study used bank credit to GDP ratio, credit to private sector to GDP ratio, M2 to GDP ratio, and M3 to GDP ratio as indicators financial development whiles annual percentage change in real GDP as measure of economic growth. The study used pooled mean group estimations in a dynamic heterogeneous panel setting. The results show that there is an inverted U-shaped relationship between finance and

growth in the long run. In the short run, the relationship is insignificant. This suggests that too much finance can exert a negative influence on growth in middle-income countries. The finding of a non-monotonic effect of financial development on growth is confirmed by estimating a threshold model.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter reveals the methodology employed to achieve the study objectives. The theoretical model to establish the relevance of financial development and other growth-determinant variables are discussed thoroughly in this chapter. Also, empirical specification for threshold models, and the transmission mechanism models and sectoral models (agricultural and industrial sectors) are stated in this chapter. The estimation techniques used to capture the influence of financial development on economic development in Sub-Saharan Africa are discussed.

3.2 Framework and Methodology for the Threshold levels of Financial Development, Stages of Development and Institutional Variables

This section deals with the framework for financial development, stages of development and institutional variables threshold effect on economic growth, poverty and income inequality and their estimation processes.

3.2.1.1 Conceptual Framework for Financial Development and Economic Growth

In the theoretical literature, models have been developed to explain the process of long-run growth of an economy. Solow Growth model is the fundamental neoclassical growth theory that a number of competing models are based on. The premise of the Solow Growth model is that, capital accumulation is the fundamental factor for short run variations in the level of output but cannot account for a sustained growth of output. Thus, in the long-run, economic growth of an economy is exogenously determined by technology (Solow, 1956). A number of issues have been raised about the adequacy of the model especially in explaining long-run growth of an economy. First, the model is based on the assumption that there is diminishing return to capital such that growth of the economy is proportional to growth of technology, which is exogenously determined. Moreover, the model treats the causes of technical progress as exogenous. This assumption has been relaxed in alternative models which treat the fundamental factor believed to be responsible for long-run growth (technology) as endogenous to the growth processes giving rise to the currently dominant "endogenous growth models" (Barro and Salai Martin 1995; Romer, 1986, 1990, 1994). Thus, the fundamental factors that account for variations in the level of technology constitute potential factors for explaining long-run growth of an economy. For instance, government policies that can exert significant (positive or negative) effect on the level of technology, which in turn stimulates long run growth in the economy, are among potential growth-enhancing factors. Therefore, to examine the relationship between financial development (FD) and

economic growth, this study presents the theoretical model within the framework of the neoclassical endogenous growth model.

Starting with the neoclassical production, the production function is specified as follows:

$$Y = AF(K, L) \quad \ldots\ldots 3.1.1$$

where Y, A, K, and L denote level of output, level of technical progress, stock of domestic capital and labour respectively.

Since this study concerns itself with economic growth, the augmented aggregate production function has to be converted to growth rate of per capita output equation. To achieve this, first, this study employs Cobb-Douglas production technology with constant returns to scale.

$$Y = AK^{\alpha_1} L^{1-\alpha_1} \quad \ldots\ldots 3.1.2$$

where Y, A, K, and L denote level of output, level of technical progress, stock of domestic capital and labour respectively.

In most of the cross-sectional and panel empirical studies on economic growth (see for instance Barro 1996; Omri and Kahouli 2014), output per capita, rather than the aggregate output is employed in order to account for differences in population across countries. Thus, equation (3.1.2) is transformed to obtain the per capita output function.

$$\frac{Y}{L} = AK^{\alpha_1} \frac{L^{1-\alpha_1}}{L} \quad \ldots\ldots 3.1.3$$

$$\frac{Y}{L} = A\left(\frac{K}{L}\right)^{\alpha_1} \quad \ldots\ldots 3.1.4$$

Denoting $\frac{Y}{L}$ by y, $\frac{K}{L}$ by k and inserting these variables in equation (3.1.4) gives equation (3.1.5)

$$y = Ak^{\alpha_1} \quad \text{.....3.1.5}$$

Taking natural logarithm and time derivative of each variable yields growth rate of output per capita function.

$$Lny = LnA + \alpha_1 Lnk \quad \text{.....3.1.6}$$

$$\frac{\dot{y}}{y} = \frac{\dot{A}}{A} + \alpha_1 \frac{\dot{k}}{k} \quad \text{.....3.1.7}$$

Let $g_y = \frac{\dot{y}}{y}$ $g_k = \frac{\dot{k}}{k}$ $g_A = \frac{\dot{A}}{A}$

Making the relevant substitutions, equation 3.1.8 is derived

$$g_y = g_A + \alpha_1 g_k \quad \text{.....3.1.8}$$

Greenwood and Jovanovic (1990) has provided extensive transmission mechanisms through which FD affects growth in an economy. Therefore, to examine the relationship between financial development (FD) and economic growth as well as the magnitude effect, this study presents the theoretical model within the framework of the neoclassical endogenous growth model, augmented by FD.

The augmented growth equation is specified in equation 3.1.9

$$g_y = g_A + \alpha_1 g_k + \alpha_2 FD \quad \text{.....3.1.9}$$

Equation (3.1.9) simply shows that growth rate of output per capita depends on domestic capital and financial development. Theoretical literature suggests that well-functioning and developed financial sectors contribute significantly to output growth. First, it mobilizes savings from domestic and foreign sources, supports efficient allocations of capital (Acemoglu and Zilibotti 1997; Rajan and Zingales 1998), and increases total factor productivity (King and Levine 1993).

Second, it eases the exchange of goods and services (Greenwood and Smith 1996). Third, it supports better risk management (Obstfeld 1994). Fourth, it facilitates information and enhances corporate governance (Grossman and Hart 1980; Shleifer and Vishny 1997).

3.2.1.2 Methodology for the Threshold Effect of FD on Economic Growth

From the theoretical framework, both FD and domestic capital are the key determinants of economic growth hence the empirical model could derive:

$$g_y = g_A + \alpha_1 g_k + \alpha_2 FD \quad \text{.....3.1.9}$$

To control for other variables that affect economic growth, this study follows the methodology employed by Omir and Kahouli (2014) :

$$g_A = \beta_O + \beta_1 gHC + \beta_2 INF + \beta_3 OPEN + \beta_4 GOV + \beta_5 IQ + \beta_6 ICT + \varepsilon \quad \text{.....3.1.10}$$

where HC is human capital, INF represents inflation, OPEN is trade openness and GOV as government expenditure/GDP ratio, ICT is Information and Communication Technologies (ICT) and IQ is institutional quality.

Substituting equation 3.1.10 into equation 3.1.19 in a panel data form gives equation 3.1.11

$$g_{y_{it}} = \gamma_O + \gamma_1 FD_{it} + \gamma_2 g_{k\,it} + \gamma_3 gHC_{it} + \gamma_4 CPI_{it} + \gamma_5 OPEN_{it} + \gamma_6 GOV_{it} + \gamma_7 IQ + \gamma_8 ICT + \gamma_9 g_{yit-1} + \varepsilon_{it}$$

.....3.1.11

i-represents the number of countries included in the study and t shows the period of study which is from 1980-2018.

The emerging theoretical literature laid emphasis on non-linear relationship between finance and growth. Some of the emerging literature argues that benefits of finance with respect to economic growth and development depend on stages of economic development, the economic and

institutional environment (see, Greenwood and Jovanovic, 1990 ; Greenwood and Smith, 1997 and Graff and Karmann, 2003). This thesis therefore hypothesizes that there is a threshold level of FD, stage of economic development, ICT and institutional environment beyond which financial development would have a significant effect on the economic growth of the host country. Thus, the study modifies the model by accounting for threshold effect of financial development, stage of economic development, ICT and institutional environment on economic growth, by adjusting equation 3.1.10 to account for the threshold effect following the newly developed dynamic panel threshold estimator by Bick (2010) and Kremer et al. (2013) which is an extension of threshold models developed by Hassen (1999, 2000) and Caner and Hansen (2004). This estimator allows the user to investigate the potential existence of a discrete shift in a dynamic framework.

To assess the threshold level of financial development, first let X be a vector of threshold variables which include stage of development, ICT and institutional quality ; thus X = (IQ, ICT, g_{yt-1}). The structural equation of interest with multiple potential thresholds is given by :

$$g_{y_{it}} = \partial_0 + \Gamma' X_{it} + \partial_1 FD_{it} + \partial_2 g_{k_{it}} + \partial_3 HC_{it} + \partial_4 CPI_{it} + \partial_5 OPEN_{it} + \partial_6 GOV_{it} + \varepsilon_{it} \;\; q_i \le \gamma \quad ..3.1.12$$

$$g_{y_{it}} = \partial_0 + \Gamma' X_{it} + \partial_1 FD_{it} + \partial_2 g_{k_{it}} + \partial_3 HC_{it} + \partial_4 CPI_{it} + \partial_5 OPEN_{it} + \partial_6 GOV_{it} + \varepsilon_{it} \;\; q_i > \gamma \quad ..3.1.13$$

where q_i is called the threshold variable, and is used to split the sample into two groups, which may be called "regimes".

To write the model in a single equation, define the dummy variable $d_i(\gamma) = \{q_i \le \gamma\}$ where $\{.\}$ is the indicator function and set $FD_{it}(\gamma) = FD_{it} d_i(\gamma)$, so that 3.1.12 – 3.1.13 equal

$$g_{y_{it}} = \lambda_0 + \Gamma' X_{it} + \lambda_1 I(FD_{it} \le \gamma) + \lambda_2 I(FD_{it} > \gamma) + \lambda_3 g_{k_{it}} + \lambda_4 HC_{it} + \lambda_5 CPI_{it} + \lambda_6 OPEN_{it} + \lambda_7 GOV_{it} + \varepsilon_{it}$$

……3.1.14

where I is an indicator function for the two regimes related to the level of FD.

Equation 3.1.14 allows all of the regression parameters to switch between the regimes. To analyse the threshold levels of stages of development, ICT, economic and institutional environment, equation 3.1.14 is modified to account for the role of stages of economic development, ICT and economic and institutional environment. This is done by interacting the stage of development, ICT and economic and institutional variables with financial development variable (Hansen, 1999).

$$g_{y_{it}} = \tau_0 + \Gamma' X_{it} + \tau_1 FD_{it} I(X \le \gamma) + \tau_2 FD_{it} I(X > \gamma) + \tau_3 g_{k_{it}} + \tau_4 (HC)_{it} + \tau_5 (CPI)_{it} + \tau_6 (OPEN)_{it} + \tau_7 (GOV)_{it} + \varepsilon_{it}$$

……3.1.15

3.2.1.3 Measurement and Expected Results

According to Haller (2012), economic growth can be conceptualized as the increase in national income per capita, and it involves the analysis, especially in quantitative terms, of this process, with a focus on the functional relations between the endogenous variables; in a wider sense, it involves the increase of the GDP, GNP and national income, therefore of the national wealth, including the production capacity, expressed in both absolute and relative size, per capita, encompassing also the structural modifications of economy. In this study, economic growth is operationalized as annual percentage change in per capita GDP. Financial development involves the improvement in the quality of five key functions ; producing and processing information about possible investments and allocating capital based on these assessments ; monitoring individuals and firms and exerting corporate governance after allocating capital ; facilitating the trading, diversification, and management of risk ; mobilising and pooling savings ; and easing the exchange of goods, services, and financial instruments (Merton 1992, Levine 1997, 2005, Merton and Bodie

2004). The study uses a composite index of banking sector development and stock market development as measurement of financial development. The composite index was constructed based on three indicators of banking sector development and three indicators of stock market development. The banking sector indicators are: private credit as a percent of GDP, ratio of liquid liabilities of the financial system (currency plus demand and interest-bearing liabilities of banks and non-bank financial intermediaries) divided by GDP and bank assets divided by GDP. Stock market indicators are market capitalization to GDP ratio, total value traded as a percentage of GDP, and turnover ratio. We construct a conglomerate index of banking sector development (BANKINDEX) using a formula, which is similar to the algorithm developed by Demirgu¨ç-Kunt and Levine (1996). Specifically the construction of BANKINDEX follows a two-step procedure. First, for each country i and each time t, transformed variables of private credit, liquid liabilities and bank assets ratios are computed. We define the transformed value of each variable X as follows: $X_{it}^{t} = (X_{it} - \overline{X}) / \overline{X}$ where X is the average value of variable X across all countries in the panel over the period of observation for each one. Second, we take a simple average of the transformed value of private credit, liquid liabilities and bank assets ratios obtained in order to provide the overall bank index (BANKINDEX). Also, the stock market index is constructed in a similar fashion. The overall financial development is the arithmetic mean of bank index and stock market index. It is expected that financial development index will have threshold level beyond which financial development will exert effect on economic growth (Greenwood and Jovanovic, 1990). Institutional quality variable is composite index of political stability and absence of violence, voice and accountability, control of corruption, rule of law, regulatory quality and government effectiveness. It is expected that a certain threshold value of institutional quality should be met before financial development will exert significant effect on economic growth

(Greenwood and Jovanovic, ibid). ICT is measured by broadband fixed subscription per hundred people. It is also expected a threshold level of ICT development should be attained to transmit the development of the financial sector to economic growth (Greenwood and Jovanovic, ibid). Inflation measures how much more expensive a set of goods and services has become over a certain period, usually a year (Oner, 2017). Inflation is measured as annual percentage change in consumer price index; an increase in this variable has a negative effect on growth. Higher inflation is associated with lower growth because lower real balances reduce the efficiency of factors of production, and because there may be a link between government purchases and the use of the inflation tax (Fisher 1983; Bruno and Easterly, 1998). Stenses (2006) defines trade openness in relation to barriers to international trade imposed by governments. In this study openness of the Africa economy is measured by the addition of import and export as a ratio of GDP. The openness of an economy has been shown in the literature to have significant and positive impact on growth (Edward, 1998). This is especially so for countries which are able to export more as it generates the needed foreign exchange and employment in the export sector which in the long run contributes to economic growth. Human capital development which is denoted HC and is estimated using the ratio of secondary school enrolment and tertiary enrolment to total population seeks to assess the effect of human capital on growth. It is expected that an improvement in human capital development would lead to an increase in growth (Boreinszten el. at., 1998). Government expenditure could be productive or non-productive. Productive government spending includes spending on property rights enforcement as well as activities that enter directly into the production function (Barro 1990). Non-productive government expenditure has no direct effect on private-sector productivity but does lead to a higher income tax rate. Since individuals retain a smaller fraction of their returns from investment, they have less incentive to invest, and the economy tends

to grow at a lower rate. Institutional quality variable is composite index of political stability and absence of violence, voice and accountability, control of corruption, rule of law, regulatory quality and government effectiveness. It is expected that a certain threshold value of institutional should be met before financial development will exert significant on economic growth.

3.2.4 Estimation Technique

Equation (3.1.1.5) allows all of the regression parameters to switch between the regimes. At the first stage, the sum of square errors (SSE) is to be computed for a given threshold. At the second stage, the estimation of $\hat{\gamma}$ is to be made by minimizing the sum of squares.

An F test is then used, first, to determine if there exists a threshold effect and to test the null hypothesis, such that:

$$F = \frac{SSE_0 - SSE_1(\hat{\gamma})/1}{SSE_1/n(T-1)} = \frac{SSE_0 - SSE_1(\hat{\gamma})}{\hat{\sigma}^2}$$

If the null hypothesis is rejected, there exists a threshold effect. Though, the existence of nuisance will result in the F test statistic to follow non-standard distribution, Hansen (1999, 2000) suggested a "bootstrap" method to compute the asymptotic distribution of test statistics using likelihood ratio test in order to test the significance of threshold effect. A bootstrap procedure attains the first-order asymptotic distribution, so p-values constructed from the bootstrap are asymptotically valid.

Furthermore, Hansen (1999) argued that the best way to form confidence intervals for γ is to form 'no-rejection region' using the likelihood ratio statistic for tests on γ. Hence, to test the hypothesis

$$\begin{cases} H_0 : \gamma = \gamma_0 \\ H_1 : \gamma \neq \gamma_0 \end{cases}$$

We calculate the following test statistic:

$$LR_1(\gamma) = \frac{SSE_0 - SSE_1(\hat{\gamma})}{\hat{\sigma}^2}$$

Once again, the null hypothesis is rejected when $LR_1(\gamma_0)$ is too large and the p-value is less than the significance level.

3.3 Framework and Methodology for the Transmission Mechanisms of Financial Development

Levine and Ross (1997) identified total factor productivity and capital growth as the transmission mechanisms through which financial development affects economic growth. Thus, the study assesses whether financial development has strong link with theoretical transmission mechanisms (total factor productivity and capital growth) identified by Levine and Loss(1997) in Sub-Saharan Africa.

3.3.1.1 Methodology for Total Factor Productivity as Transmission Mechanism of Financial Development

To specify the empirical model for total factor productivity, the study follows empirical model specified by Filip (2016).

$$TFP_{it} = f(FCF\_G_{it}, LF\_T_{it}, HD_{it}, BS_{it}, FDII\_G_{it}, R\&D(-1)_{it}, E_{it}) \text{ ……...3.6.1}$$

where TFP is total factor productivity, FCF_G is gross fixed capital formation as percentage of GDP which measures capital intensity, LF_T is Labour force with tertiary education which measures education quality, HD is the length of hospital stay which measures low health, BS is broadband fixed subscription per hundred person which measures ICT technology, FDII is inward inflow of foreign direct investment as a percentage of GDP which measures technology transmission, R & D is research and development which measures knowledge, and E is annual energy supply.

The argument made by Levine and Ross (1997) defined a role financial development plays in productivity improvement. Thus, equation 3.1 is adjusted to accommodate financial development :

$$TFP_{it} = f(FCF\_G, LF\_T, HD, BS, FDII\_G, R\&D(-1), E, R, FD) \quad \ldots\ldots\ldots\ldots\ldots\ldots 3.6.2$$

Assuming a linear functional form between total factor productivity and its determinants, equation 3.3 is specified below :

$$TFP_{it} = \alpha + \beta FCF\_G_{it} + \chi LF\_T_{it} + \delta HD_{it} + \phi BS_{it} + \varphi FDII\_G_{it} + \gamma R\&D(-1)_{it} + \eta E_{it} + \lambda R_{it} + \mu FD_{it} + \varepsilon_{it}$$

$$\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.6.3$$

3.4.1.2 Measurement and Expected Signs

Total factor productivity is measured based on King and Levine (1997) approach. It is measured as the difference between Real Per Capita GDP Growth and 0.3*Real Per Capita Capital Stock Growth. It is expected that financial development will proffer positive effects on total factor productivity in Sub-Saharan Africa. Capital intensity is operationalized through gross fixed capital formation. Gross fixed capital formation (formerly gross domestic fixed investment) includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases;

and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings (World Bank op cit). It is expected that capital intensity will exert significant effect on total factor productivity in the long run. Labour quality is operationalized through labour force with tertiary education. It is measured as the share of the total labor force that attained or completed tertiary education as the highest level of education. Also, it is expected that labour quality will stimulate total factor productivity in the region. Likewise improvement in the heath of workers will increase factor productivity. Broadband fixed subscription per hundred persons is used to measure ICT technology. Fixed broadband subscriptions refers to fixed subscriptions to high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This includes cable modem, DSL, fiber-to-the-home/building, other fixed (wired)-broadband subscriptions, satellite broadband and terrestrial fixed wireless broadband. This total is measured irrespective of the method of payment. It excludes subscriptions that have access to data communications (including the Internet) via mobile-cellular networks. It should include fixed WiMAX and any other fixed wireless technologies. It includes both residential subscriptions and subscriptions for organizations. It is also expected that this will positively influence total factor productivity in SSA. Technology transmission is also operationalized with the use of inward inflow of FDI as a percentage of GDP. Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP. It is expected that inward inflow of FDI will stimulate total

factor productivity in SSA. It is also expected that technology transmission will have positive influence on total factor productivity. Research and development is used a measurement of knowledge. It is measured as gloss domestic expenditures on research and development (R&D), expressed as a percent of GDP. They include both capital and current expenditures in the four main sectors: Business enterprise, Government, Higher education and Private non-profit. R&D covers basic research, applied research, and experimental development. It is expected that knowledge will have strong positive influence on total factor productivity. Energy use refers to use of primary energy before transformation to other end-use fuels, which is equal to indigenous production plus imports and stock changes, minus exports and fuels supplied to ships and aircraft engaged in international transport. It is also expected that energy supply will have positive influence on total factor productivity. Infrastructure is operationalized as length of roads.

3.3.2.1 Capital growth as Transmission Mechanism of Financial Development

Serven (2003) identified the level of performance of the financial sector to play significant role in physical capital accumulation. Thus, this section examines the influence of financial development on capital accumulation.

To specify the empirical model for capital growth, the study follows empirical model specified by Awounang and Filip (2016).

$$CKit = \gamma + \alpha 1\sigma TDEit + \alpha 2\sigma CPIBit + \alpha 3\sigma INFit + \alpha 4\sigma TCERit + \beta 1lnTGit + \beta 2lnOCit + \beta 3lnPFI + \beta 4lnSTIit + \beta 5lnIDEit + \beta 6ASPit + \mu i + \eta t + \xi it \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.7.1$$

3.3.2.2 Measurement and Expected signs

CK is measured by growth rate (first log difference) of the stock of physical capital per capita. σTDE, σCPIB, σINF, σTCER are measured respectively, the volatility of terms of trade, GDP growth, inflation rate and the real effective exchange rate. This choice is dictated by the fact that they are the most unstable aggregates in the studied countries (Easterly et *al*., 2000, Hausmann et *al*., 2005). LnTG, LnOC, lnPFI, lnIDE and lnSTI are measured respectively the logarithms of the size of government, trade openness, financial development, foreign direct investment and industrial structure. The first three elements do not have to prove themselves in determining the evolution of the stock of physical capital. In other words, it is the role of the state, the role of technology transfer, and finally the level of performance of the financial sector to determine the evolution of physical capital (Serven, 2003; Addison and Wodon 2007; Cavalcanti et al, 2011). As for the last two, they are still more characteristic of sub-Saharan African countries: on the one hand, the small amount of local investment makes the level of FDI extremely important for the accumulation of physical capital (Abdul et al, 2007); on the other hand, a significant share of GDP comes from agricultural sector, which requires a relatively small amount of capital in relation to industrial sector. Thus, the study asserts that the predominance of the agricultural sector, measured by the share of GDP from the industrial sector (STI) is negatively bond to the accumulation of physical capital (Shioji and Khai, 2011). ASP refers to ln (100+ inflation rate) is an index of price stability which also helps to understand the level of risk for investors (Cavalcanti et al, 2011).

3.3.3 Estimation Technique

It is possible it may take some time for financial sector development to cause changes in the roots through which financial development affects economic growth. Thus, the study employed panel

cointegration technique to assess the long run relationship between financial development and total factor productivity and capital accumulation.

Kao (1997) has demonstrated that integrated panel data regression though the estimator is consistent, the t-statistic diverges so that inferences about the regression coefficient are wrong with the probability that goes to one asymptotically. Thus, this study carries out panel unit root tests on the dependent and independent variables to avoid spurious regression. The study follows the approach of Im, Pesaran, and Shin (IPS) (1995), who developed a panel unit root test for the joint null hypothesis that every time series in the panel is non-stationary. The main extension by Im et al. (1997) was to allow for heterogeneity in the value of ρ_i under the alternative hypothesis. Panel cointegration test was followed after the unit root test. Panel cointegration techniques have become increasingly popular for a number of reasons. As with time series cointegration, estimates from a cointegrated panel are robust to a variety of problems that often plague empirical work, including endogeneity, correlation among regressors (capital intensity and financial development), omitted variables, and measurement error (Banerjee, 1999; Phillips and Moon, 2000; and Baltagi and Kao, 2000). This study employs Pedroni (2001) test which creates room for the individual linear trends and effects in the heterogeneous system. The method incorporates seven tests grouped into two broad categories, namely "within dimensions" and "between dimensions. This test clearly helps in establishing a long run relationship between financial development and total factor productivity. Estimation of the model are done with panel error correction which gives better understanding of the adjustments dynamics since most economic relationships are dynamic by nature. Different estimators are used to estimate a vector cointegration panel data. Estimators such as fully modified OLS (FMOLS) estimates is used. FMOLS modifies least squares to explicate serial correlation

effects and for the endogeneity in the regressors that arise from the existence of a cointegrating relationship (Phillips and Hansen,1990). Also, panel GARCH model is employed to capture the volatility of the macroeconomic variables that affect capital growth.

3.4 Sources of Data

The study employs an unbalanced data for 47 countries in Sub-Saharan Africa for the period 1980-2018.These countries and the period were chosen based on data availability. Data is sourced mostly from World Bank's world development indicators and UNCTAD investment databases. Country risk data are sourced from political risk service (PRS) data.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF EMPIRICAL RESULTS ON FINANCIAL DEVELOPMENT THRESHOLD LEVELS AND MODERATION ROLE OF STAGES OF ECONOMIC DEVELOPMENT AND INSTITUTIONAL VARIABLES

4.0 Introduction

This chapter discusses the empirical results that relate to threshold effects of financial development and moderation role of stage of economic development and institutional variables in the relationship between financial development and economic growth in Sub-Saharan Africa.

4.2 Threshold Effects of Financial Development on Economic Growth

This section presents and discusses the empirical results that relate to threshold effects of financial development as well as the moderation of role of stage of economic development and institutional variables on the relationship between financial development and economic growth in Sub-Saharan Africa.

4.2.1 The Threshold Level of Banking Sector Development

This section of the chapter discusses threshold level of banking sector development that affect economic growth or switches the direction of effect on economic growth in Sub-Saharan Africa (some selected countries). Broad money to GDP ratio which measures size of financial intermediaries relative to the size of the economy and bank credit to GDP ratio which is considered to be an indicator for financial intermediaries' activity (Demirgu¨ç-Kunt & Levine, 1996) were used as indicators of banking sector development and their corresponding threshold values were estimated accordingly. Also, threshold levels of institution and economic development that moderate the relationship between banking sector development (broad money to GDP ratio and credit to GDP ratio) and economic growth are also estimated.

4.2.1.1 The Threshold Level of Broad Money to GDP Ratio (Size of Banks)

To determine the number of thresholds, the study sequentially estimates the model with one and two thresholds. Also, to check the robustness of the estimates, the study estimated five different models, each with a different institutional quality indicator. Although, the existence of nuisance will result in the F-test statistic to follow non-standard distribution, Hansen (1999, 2000) suggested a “bootstrap” method to compute the asymptotic distribution of test statistics using the likelihood ratio test to test the significance of threshold effects. A bootstrap procedure attains the first-order asymptotic distribution, so p-values constructed from the bootstrap are asymptotically valid. The study therefore uses 300 bootstrap replications to test for a single and double threshold effects (see appendix A for the detailed results).

In model 1 where the study controls for political stability as institutional quality indicator, this study documents the following finding. In the test for a single threshold (with H0: linear model;

H1: single threshold model), the F1 statistic of 17.72 (bootstrap p-value = 0.1000) is larger than its critical value at 10% significance level of 17.45. Therefore, the null hypothesis of no threshold effects is weakly rejected. The F2 statistic in the test for a double threshold (with H0: single threshold model; H1: double threshold model) is also statistically significant at the 10 percent level of significance. The implication from the above results is that there are two thresholds in the first model (See threshold effect test table in Table 4.2.1 for the threshold test results).

Table 4.2.1.1 Threshold Estimate of the Five Models

	Model 1				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	5.9638	4.8702	9.0633	17.72	0.1000
Threshold 2	7.5966	7.1692	8.4825	24.16	0.0933
	Model 2				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	5.9638	4.8702	9.0633	18.21	0.1200
Threshold 2	7.5966	7.1692	8.4825	23.25	0.0367
	Model 3				
Model	**Threshol**d	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	5.9638	4.8702	9.0633	14.60	0.1667
Threshold 2	7.5966	7.1692	8.4825	24.68	0.0433
	Model 4				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**

Threshold 1	5.9638	4.8702	9.0633	12.97	0.2367
Threshold 2	7.5966	7.1692	8.4825	28.40	0.0433
	Model 5				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	5.9638	4.8702	9.0633	16.77	0.1000
Threshold 2	7.5966	7.1692	8.4825	24.79	0.0633

To determine the threshold values, the study estimates the double-threshold model. The threshold estimate is the broad money to GDP ratio by which an increase in this ratio may affect the economic growth in Sub-Sahara Africa. The results indicate that the threshold values are 7.60% and 5.96% for broad money to GDP. The broad money to GDP value of 7.60% means that a broad money to GDP ratio above this value in the selected countries in Sub-Saharan Africa will reduce economic growth. Also, a value between 5.96% and 7.60% indicate that broad money to GDP exerts insignificant effect on economic growth in Sub-Saharan Africa. However, values below 5.96% stimulate economic growth in Sub-Saharan Africa (Table 4.2.1 for the threshold values).

Some studies have identified broad money to GDP ratio to have a non-linear relationship with economic growth. Samargandi et al. (2014) found a minimum threshold beyond which financial development reduces economic growth of selected middle income countries. Although there is by now a large literature showing that finance plays a positive role in promoting economic development (Levine, 2005), there are also a few papers that question the robustness of the finance-growth nexus. In fact, an increase in financial deepening (size of banks), as captured by broad

money to GDP ratio, may not result in increased growth because of corruption in the banking system or political interference. These may divert financial resources to unproductive or even wasteful activities. The recent financial crisis also raised concerns that some countries may have financial systems which are "too large" compared to the size of the domestic economy. The idea that there could be a threshold above which financial development hits negative social returns is hardly new.

Table 4.2.1.2 : Fixed Effects Model Estimation Results (Dependent Variable: GDP per Capita Growth, 1990-2019)

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Explanatory variables					
Trade to GDP ratio	0.0564*** [4.18]	0.0585*** [4.30]	0.0617*** [4.57]	0.0592*** [4.41]	0.0615*** [4.55]
Inflation	-0.0001 [-0.33]	-0.0004 [-0.85]	-0.0003 [-0.67]	-0.0067 [0.97101]	-0.0002 [-0.60]
Human capital	-0.0033 [-0.11]	0.0052 [0.18]	0.0093 [0.32]	-0.0127 [-0.42]	0.0156 [0.54]
Government Expenditure to GDP ratio	0.2286** [2.22]	0.2284** [2.20]	0.2040** [1.97]	0.1976* [1.92]	0.2179 [2.10]
Capital to GDP ratio	0.0629 [1.18]	0.0573 [1.07]	0.0595 [1.11]	0.0664 [1.24]	0.0557 [1.04]
Political Stability	0.6535*** [3.87]	-	-	-	-
Corruption	-	-0.9813** [-2.00]	-	-	-
Law and Order	-	-	1.1435* [1.87]	-	-
Democratic Accountability	-	-	-	1.3257*** [3.53]	-
Bureaucratic Quality	-	-	-	-	-0.9875 [-1.52]
M2 to GDP ratio Threshold (0)	1.3101* [1.82]	1.2040* [1.65]	1.4543** [2.01]	1.7551** [2.42]	1.3396** [1.85]
M2 to GDP ratio Threshold (1)	-2.7235*** [-5.93]	-2.7635* [-5.95]	-2.5873*** [-5.58]	-2.5496*** [-5.54]	-2.7142***

					[-5.85]
M2 to GDP ratio	0.0351	0.0099	0.0320	0.0248	0.0187
Threshold (2)	[0.0351]	[0.19]	[0.63]	[0.49]	[0.37]
Constant	-12.7219***	-5.0541**	-11.1543***	-10.9929***	-6.6350***
	[-5.39]	[-2.00]	[-4.24]	[-5.01]	[-2.96]
No. of Observations	840	840	840	840	840
No. of Groups	28	28	28	28	28
F-test	0.0000	0.0000	0.0000	0.000	0.000
R^2	0.0650	0.0606	0.0537	0.0618	0.0526

*denotes statistically significant at the10 percent,** denotes statistically significant at the 5 percent and ***denotes statistically significant at the1 percent

Minsky (1974) and Kindleberger (1978) emphasized the relationship between finance and macroeconomic volatility and wrote extensively about financial instability and financial manias. More recently, in a paper that seemed controversial then, and looks prophetic now, Rajan (2005) discussed the dangers of financial development suggesting that the presence of a large and complicated financial system had increased the probability of a "catastrophic meltdown." In an even more recent paper, Gennaioli, Shleifer, and Vishny (2010) show that in the presence of some neglected tail risk financial innovation can increase financial fragility even in the absence of leverage. Besides increasing volatility, a large financial sector may also lead to a suboptimal allocation of talents. Tobin (1984), for instance, suggested that the social returns of the financial sector are lower than its private returns and worried about the fact that a large financial sector may "steal" talents from the productive sectors of the economy and therefore be inefficient from society's point of view.

4.2.1.1.1 Threshold Conditions of Institutional Quality and Economic Growth for M2 to GDP

The emerging theoretical literature laid emphasis on non-linear relationship between finance and growth. Some of the emerging literature argues that benefits of finance with respect to economic growth depend on stages of economic development, the economic and institutional environment (see, Greenwood and Jovanovic, 1990 ; Greenwood and Smith, 1997 and Graff and Karmann, 2003). Quality of institutions and stage of economic development are all examples of absorptive capacity factors examined previously by the literature. Thus, this study defines the institutional quality and stage of economic development in terms of political stability, control of corruption, rule of law, democratic accountability, bureaucratic quality and GDP per capita growth. Hence, this sub-section discusses the threshold levels needed for institutional quality and stage of economic development in Sub-Saharan Africa countries that interact with M2 to GDP ratio to yield the desired results on economic growth.

Table 4.2.1.1.1 Threshold Estimate of the Five Models

	Political Stability				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	3.0000	2.7500	3.1667	18.14	0.0333
	Corruption				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	1.0833	1.0234	1.1885	14.66	0.1067
Threshold 2	1.1754	1.0234	1.1885	37.10	0.0133
	Law and Order				
Model	**Threshol**d	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	1.0000	-	-	12.29	0.0767
	Democratic Accountability				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	4.9850	4.9583	5.0000	2.70	0.6400
	Bureaucratic Quality				

Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	0.0000	-	-	17.78	0.0367
	GDP per capita Growth				
Model					
Threshold 1	10.1026	-	-	228.30	0.0000
Threshold 2	-9.6652	-10.5414	-8.7240	64.0510	0.0000

Table 4.2.1.1.2 Fixed Effects Model Estimation Results (Dependent Variable: GDP Growth, 1990-2019)

	Political Stability	**Corruption**	**Law and Order**	**Democratic Accountability**	**Bureaucratic Quality**	**GDP per capita Growth**
Explanatory variables						
Trade to GDP ratio	0.0513*** [3.76]	0.0633*** [4.66]	0.0617*** [4.57]	0.0538*** [3.92]	0.0541*** [3.95]	0.0452*** [3.88]
Inflation	0.0001 [0.17]	-0.0003 [-0.82]	-0.0003 [-0.67]	-0.0003 [-0.75]	-0.0002 [-0.55]	-0.0001 [-0.32]
Human capital	-0.0203 [-0.68]	0.0229 [0.78]	0.0093 [0.32]	-0.0122 [-0.40]	0.0146 [0.50]	0.0032 [0.13]
Government Expenditure to GDP ratio	0.2423** [2.33]	0.2424** [2.35]	0.2040** [1.97]	0.2230** [2.12]	0.2207** [2.10]	0.1731* [1.95]
Capital to GDP ratio	0.0678 [1.26]	0.0910* [1.70]	0.0595 [1.11]	0.0827 [1.52]	0.0618 [1.14]	0.0391 [0.85]
Political Stability	0.3682** [2.03]	-	-	-	-	0.3472** [2.35]
Corruption	-	-0.3300 [-0.64]	-	-	-	
Law and Order	-	-	1.1435* [1.87]	-	-	
Democratic Accountability	-	-	-	1.0652*** [2.59]	-	
Bureaucratic Quality	-	-	-	-	0.3978 [0.56]	
M2 to GDP ratio	-0.5629***	0.0995	1.4543**	0.0209	0.3096***	-0.8647***
Threshold (0)	[-3.69]	[1.28]	[2.01]	[0.40]	[3.72]	[-9.26]

M2 to GDP ratio Threshold (1)	0.0692 [1.36]	1.1719*** [6.87]	-2.5873*** [-5.58]	0.0865 [1.43]	0.0199 [0.39]	0.0672 [1.54]
M2 to GDP ratio Threshold (2)		-0.0255 [-0.50]	0.0320 [0.63]	-		1.1596*** [13.65]
Constant	-10.60*** [-4.31]	-8.0488*** [-3.20]	-11.1543*** [-4.24]	-10.7876*** [-4.82]	-9.3117*** [-4.13]	-9.6769*** [-4.75]
No. of Observations	840	840	840	840	840	840
No. of Groups	28	28	28	28	28	28
F-test	0.0000	0.0000	0.0000	0.000	0.000	0.000
R^2	0.0452	0.0590	0.0537	0.0270	0.0246	0.2781

*denotes statistically significant at the10 percent,** denotes statistically significant at the 5 percent and ***denotes statistically significant at the1 percent

The Role of Political Stability

The study finds single threshold value of 3.00 for political stability. When political stability is less than 3.00, the negative coefficient of -0.56 implies a negative relationship between M2 to GDP ratio and economic growth. However, this directional effect reverses and becomes statistically insignificant when political stability is greater or equal to 3.00. All the threshold values can be found in Appendix A.2. The results are presented in Table 4.2.1.1.2.

The implication of this threshold result is that in a regime where the region is politically unstable, deepening of the size of the banking sector is counter-productive to economic growth in Sub-Saharan Africa.

The Role of Control of Corruption

The study finds double threshold effects of control of corruption as institutional quality. When control of corruption < 1.08, the result shows insignificant relationship between M2 to GDP ratio

and economic growth. When $1.08 \leq$ control of corruption < 1.18, the positive coefficient of 1.17 suggests that economic growth is positively related to M2 to GDP ratio. Finally, when control of corruption ≥ 1.18, the positive coefficient of 0.6845 (see the fixed effect estimation Table in Appendix A.2), suggests that economic growth is insignificantly related to M2 to GDP ratio as shown in table 4.1.3.

Therefore, the study suggests that with the current absorptive capacity of selected host countries the best level of control of corruption is between 1.08 and 1.18, and beyond 1.18, the benefit of M2 to GDP ratio to economic growth will disappear. M2 to GDP ratio is expected to have positive impact on economic growth but such impact should be stronger at the moderate level of control of corruption and become less important when the country intensify its activities towards control of corruption. The result is contrary to the findings of Gazdar and Cherif (2015) who found insignificant role played by control of corruption in moderating the relationship between banking sector development and economic growth in MENA countries.

The Role of Law and Order

The study finds no threshold effect of law and order as institutional quality. This implies that any level of law and order may enhance M2 to GDP ratio to stimulate economic growth in Sub-Sahara Africa. The results is contrary to the findings of Gazdar and Cherif (2015) who found significant role played by law and order in moderating the relationship between banking sector development and economic growth in MENA countries.

The Role of Democratic Accountability

The study also finds no threshold effect of democratic accountability as institutional quality. This implies that any level democratic accountability may enhance M2 to GDP ratio to stimulate economic growth in Sub-Sahara Africa. The results is contrary to the findings of Gazdar and Cherif (2015) who found significant role played by democratic accountability in moderating the relationship between banking sector development and economic growth in MENA countries.

The Role of Bureaucratic Quality

The study finds single threshold effect of bureaucratic quality as institutional quality. When bureaucratic quality is < 0, the result shows positive relationship between M2 to GDP ratio and economic growth. When bureaucratic quality is ≥ 0, the result shows insignificant relationship between M2 to GDP ratio and economic growth. Therefore, the study suggests that with the current absorptive capacity of selected host countries the best level of bureaucratic quality is below 0, and beyond 0, the benefit of M2 to GDP ratio to economic growth will disappear. M2 to GDP ratio is expected to have positive impact on economic growth but such impact should be stronger at the worst level of bureaucratic quality and become less important when the country intensify its activities towards improving bureaucratic quality. The result is consistent with the findings of Gazdar and Cherif (2015) who also found threshold level of bureaucratic quality. However unlike

this current study results, their findings suggest that moving beyond the threshold enhances the banking sector development to promote economic growth in MENA countries.

The Role of Economic Development

To determine the threshold values, the study estimates the double-threshold model. The results indicate that the threshold values are 10.10% and -9.67% for GDP per capita growth. GDP per capita growth value of 10.10% means that GDP per capita growth below -9.67% as well as 10.10% makes M2 to GDP ratio to reduce economic growth in SSA. Also, a value between above 10.10% indicates that broad money to GDP exerts insignificant effect on economic growth in Sub-Saharan Africa. However, values above -9.67% but not exceeding 10.10% stimulate economic growth in Sub-Saharan Africa (Refer to Table 4.2.1.1.1 and Table 4.2.1.1.2 for the threshold values and direction of effect). Therefore, the study suggests that with the current absorptive capacity of selected host countries the best level of economic growth is between -9.67% and 10.10%, and beyond 10.10%, the benefit of M2 to GDP ratio to economic growth will disappear. M2 to GDP ratio is expected to have positive impact on economic growth but such impact should be stronger at the single digit level of economic growth and become less important when the country grows at double digits. The results coincide with theoretical expectation of Saint-Paul (1992). By relying on the initial level of per capita income, the author analyzes a mechanism which may give rise to multiple equilibria in financial and economic development where agents can choose between two technologies. The first is flexible and allows productive diversification but at the same time has low productivity. The second technology is rigid, more specialized and productive. The model argues that when financial institutions are less developed, risk diversification is carried out through the selection of less specialized and less productive technologies. With this form of technology,

there is less risk exposure and incentives to develop financial markets are limited and can lead to "low equilibrium". In the "high equilibrium", financial markets are well developed with specialized technology. In these economies, agents choose riskier, higher yielding technologies and the impact of finance on growth is higher. However, the transition from the "low equilibrium" to a "high equilibrium" one is mediated by the initial level of income per capita that function as a threshold variable above which financial sector development is healthy for economic growth. Thus, for financial deepening in the banking sector to spur economic growth in Sub-Saharan Africa, some level of economic development must be reached to create enabling environment for banking sector to contribute to the growth process of the region.

4.2.1.2.1 : Threshold Level of Credit to GDP ratio (Financial intermediation activity of Banks)

In all the five models, the study found single threshold for credit to GDP ratio. Thus, the choice of institutional quality indicator does not matter for the number of threshold of credit to GDP ratio. To determine the threshold values, the study estimates the single-threshold model. The threshold estimate is the credit to GDP ratio by which an increase in this ratio may affect the economic growth in Sub-Sahara Africa. The results indicate that the threshold value is 1.86% for credit to GDP ratio. The credit to GDP value of 1.86% means that a credit to GDP ratio below this value in the selected countries in Sub-Saharan Africa will reduce economic growth. However, values above 1.86% shows that the negative influence of credit to GDP on economic in SSA disappears.

Some studies have identified credit to GDP ratio to have a non-linear relationship with economic growth. Ibrahim & Alagidede (2017) found a minimum threshold beyond which credit to GDP

ratio improves economic growth of 29 countries in SSA. The threshold was estimated at 8.10% of credit to GDP ratio. Their findings indicated that in regime 1 where the initial private credit is less than the threshold, their findings show that private credit is flatly insignificant. This contrasts with this study finding where private credit below the threshold reduces economic growth in Sub-Sahara Africa. The differences in results may emanate from differences in the measurement of economic growth. Whiles this current study uses percentage change in GDP per capita, study by Ibrahim & Alagidede (2017) uses GDP per capita as measurement of economic growth. Thus, our finding is more robust since percentage change in GDP per capita is standard measurement for economic growth for cross countries. In regime 2, the authors found that for countries with initial private credit to GDP above 8.10%, a unit-percentage increase in private and domestic credit significantly increases growth by 0.505% and 0.211% respectively. Their findings are slightly similar to this currentt finding as this study also established that creditt to GDP ratio above the threshold has positive effect on economic growth however the effect is insignificant. As explained earlier the differences in results emanate from differences in measurement in economic growth.

Table 4.2.1.2.1 : Threshold Estimate of the Five Models

	Model 1				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	1.8551	1.6267	1.9354	33.31	0.0433
	Model 2				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	1.8551	1.6267	1.9354	**33.68**	**0.0500**
	Model 3				

Model	Threshold	Lower	Upper	F-statistic	P-value
Threshold 1	1.8551	1.6267	1.9354	**31.54**	**0.0467**
	Model 4				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	1.8551	1.6267	1.9354	**29.58**	**0.0833**
	Model 5				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	1.8551	1.6267	1.9354	32.36	**0.0933**

Table 4.2.1.2.2 : Fixed Effects Model Estimation Results (Dependent Variable: GDP per capita Growth, 1990-2019)

Explanatory variables					
Trade to GDP ratio	0.0446*** [3.30]	0.0462*** [3.38]	0.0499*** [3.69]	0.0478*** [3.54]	0.0496*** [3.66]
Inflation	0.0001 [0.17]	0.0001 [0.13]	0.0001 [0.25]	0.0001 [0.17]	0.0001 [0.33]
Human capital	-0.0082 [-0.28]	0.0013 [0.04]	0.0075 [0.25]	-0.0100 [-0.33]	0.0126 [0.43]
Government Expenditure to GDP ratio	0.2704*** [2.64]	0.2702*** [2.61]	0.2444** [2.37]	0.2374** [2.30]	0.2580** [2.49]
Capital to GDP ratio	0.0282 [0.52]	0.0239 [0.44]	0.0281 [0.51]	0.0353 [0.65]	0.0236 [0.43]
Political Stability	0.6551*** [3.85]	-	-	-	-
Corruption	-	-0.9923** [-2.05]	-	-	-
Law and Order	-	-	1.2431** [2.03]	-	-
Democratic Accountability	-	-	-	1.1342*** [3.02]	-
Bureaucratic Quality	-	-	-	-	-0.8117 [-1.29]
Credit to GDP ratio Threshold (0)	-11.8692*** [-5.69]	- 12.0732*** [-5.74]	- 11.6595*** [-5.55]	-11.2987*** [-5.38]	- 11.8269*** [-5.62]

Credit to GDP ratio Threshold (1)	0.0810 [1.09]	0.0397 [0.54]	0.0563 [0.76]	0.0419 [0.57]	0.0465 [0.64]
Constant	-11.8346*** [-5.00]	-4.1668* [-1.69]	-10.3942 [-3.99]	-9.4903 *** [-4.36]	5.9624*** [-2.69]
No. of Observations	840	840	840	840	840
No. of Groups	28	28	28	28	28
F-test	0.0000	0.0000	0.0000	0.000	0.000
R^2	0.0513	0.0524	0.0433	0.0488	0.0446

*denotes statistically significant at the10 percent,** denotes statistically significant at the 5 percent and ***denotes statistically significant at the1 percent

Overall, our evidence suggests that below banks' financial intermediary activity threshold, financial intermediary activities is deterrent to economic growth and as economies develop their financial sector above the threshold, economic activity positively and significantly respond to further increases in finance. Our data is thus akin with the call that financial services fuel growth by increasing the rate of capital accumulation as well as facilitating the efficiency with which countries employ capital.

4.2.1.2.2 : Threshold Conditions of Institutional Quality and Economic Growth for Credit to GDP

Table 4.2.1.2.2.1 : Threshold Estimate of the Five Models

	Political Stability				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	3.0000	2.7500	3.1667	18.14	0.0333
	Corruption				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	1.0234	1.0000	1.1754	30.57	0.0567
Threshold 2	1.1754	1.0833	1.1885	50.42	0.0000
	Law and Order				

Model	Threshold	Lower	Upper	F-statistic	P-value
Threshold 1	2.5000	2.2103	2.5417	9.01	0.0833
	Democratic Accountability				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	0.6667	0.5000	1.0000	6.70	0.2700
	Bureaucratic Quality				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	0.0000	-	-	17.67	0.0633
	GDP per capita Growth				
Model					
Threshold 1	10.1026	-	-	64.0510	0.0000
Threshold 2	-9.6652	-10.5414	-8.7240	228.30	0.0000

Table 4.2.1.2.2.2 : Fixed Effects Model Estimation Results (Dependent Variable: GDP per capita Growth, 1990-2019)

	Political Stability	Corruption	Law and Order	Democratic Accountability	Bureaucratic Quality	GDP Growth
Explanatory variables						
Trade to GDP ratio	0.0514*** [3.79]	0.0660*** [4.96]	0.0609*** [4.45]	0.0554*** [4.06]	0.0554*** [4.07]	0.0492*** [4.07]
Inflation	-0.0001 [-0.36]	-0.0003 [-0.82]	-0.0003 [-0.62]	-0.0003 [-0.75]	-0.0003 [-0.64]	-0.0038 [-0.55]
Human capital	-0.0311 [-1.04]	0.0159 [0.55]	0.0039 [0.13]	-0.0174 [-0.57]	0.0043 [0.40]	0.0032 [0.13]
Government Expenditure to GDP ratio	0.2411** [2.33]	0.2186** [2.17]	0.2060** [1.97]	0.2097** [2.01]	0.2102** [2.01]	0.2512** [2.74]
Capital to GDP ratio	0.0647 [1.19]	0.0878* [1.66]	0.0771 [1.40]	0.0550 [1.00]	0.0618 [1.14]	0.0616 [1.27]
Political Stability	0.4422** [2.49]	-	-	-	-	0.3710** [2.41]
Corruption	-	-0.1105 [-0.22]	-	-	-	
Law and Order	-	-	2.3599*** [3.38]	-	-	
Democratic Accountability	-	-	-	1.0456*** [2.65]	-	
Bureaucratic Quality	-	-	-	-	0.1877 [0.70]	
Credit to GDP ratio Threshold (0)	-0.9220*** [-3.78]	0.3062** [2.38]	0.1895** [2.34]	-1.8898 [-2.46]	0.4839*** [4.01]	-1.7616*** [-8.75]

Credit to GDP ratio Threshold (1)	0.1549** [2.07]	2.8787*** [8.79]	0.0310 [0.40]	0.0813 [1.09]	0.0522 [0.70]	0.0833 [1.25]
Credit to GDP ratio Threshold (2)	-	-0.0024 [-0.03]	-	-		1.4893*** [11.72]
Constant	-11.3166*** [-4.68]	-8.7873*** [-3.62]	-15.5163*** [-5.56]	-10.6184*** [-4.82]	-8.5868*** [-3.87]	-10.9156*** [-5.17]
No. of Observations	840	840	840	840	840	840
No. of Groups	28	28	28	28	28	28
F-test	0.0000	0.0000	0.0000	0.000	0.000	0.000
R^2	0.0386	0.0822	0.0222	0.0285	0.0243	0.2096

*denotes statistically significant at the10 percent,** denotes statistically significant at the 5 percent and ***denotes statistically significant at the1 percent

The Role of Political Stability

The study finds single threshold value of 3.00 for political stability. When political stability is less than 3.00, the negative coefficient of -0.56 implies a negative relationship between credit to GDP ratio and economic growth. However, this directional effect reverses and becomes significantly positive when political stability is greater or equal to 3.00 (All the threshold values and direction of effect can be found in Table 4.2.1.2.2.1 and Table 4.2.1.2.2.2)

The implication of this threshold result is that in a regime where the region is politically unstable, credit to GDP ratio is counter-productive to economic growth in Sub-Saharan Africa.

The Role of Control of Corruption

The study finds double threshold effect of control of corruption as institutional quality. When control of corruption is < 1.08, the result shows significant positive relationship between credit to GDP ratio and economic growth with a magnitude of 0.31. Also, when 1.08 ≤ control of corruption < 1.18, the positive coefficient of 2.88 suggests that economic growth is positively

related to credit to GDP ratio. Finally, when control of corruption ≥ 1.18, the negative coefficient of -0.0024 , suggests that economic growth is insignificantly related to credit to GDP ratio as shown in Table 4.2.1.2.2.2. Therefore, the study suggests that with the current absorptive capacity of selected host countries the best level of control of corruption is between 1.08 and 1.18, and beyond 1.18, the benefit of credit to GDP ratio to economic growth will disappear. Credit to GDP ratio is expected to have positive impact on economic growth but such impact should be stronger at the moderate level of control of corruption and become less important when the country intensify its activities towards control of corruption. The result is contrary to the findings of Gazdar and Cherif (2015) who found insignificant role played by control of corruption in moderating the relationship between banking sector development and economic growth in MENA countries.

The Role of Law and Order

The study finds single threshold value of 2.50 for law and order. When law and order is less than 2.50, the positive coefficient of 0.19 implies a positive relationship between credit to GDP ratio and economic growth. However, this positive effect disappears when law and order is greater or equal to 2.50.

The implication of this threshold result is that in a regime where the region law and order is low, credit to GDP ratio is productive to economic growth in Sub-Saharan Africa. The results coincides with the findings of Gazdar and Cherif (2015) who found significant role played by law and order in moderating the relationship between banking sector development and economic growth in MENA countries.

The Role of Democratic Accountability

The study also finds no threshold effect of democratic accountability as institutional quality. This implies that any level of democratic accountability may enhance credit to GDP ratio to stimulate economic growth in Sub-Sahara Africa. The results is contrary to the findings of Gazdar and Cherif (2015) who found significant role played by democratic accountability in moderating the relationship between banking sector development and economic growth in MENA countries.

The Role of Bureaucratic Quality

The study finds single threshold effect of bureaucratic quality as institutional quality. When bureaucratic quality is < 0, the result shows positive relationship between M2 to GDP ratio and economic growth. When bureaucratic quality is ≥ 0, the result shows insignificant relationship between credit to GDP ratio and economic growth. Therefore, the study suggests that with the current absorptive capacity of selected host countries the best level of bureaucratic quality is below 0, and beyond 0, the benefit of credit to GDP ratio to economic growth will disappear. Credit to GDP ratio is expected to have positive impact on economic growth but such impact should be stronger at the worst level of bureaucratic quality and become less important when the country intensify its activities towards improving bureaucratic quality. The result is consistent with the findings of Gazdar and Cherif (2015) who also found threshold level of bureaucratic quality. However unlike this current study results, their findings suggest that moving beyond the threshold enhances the banking sector development to promote economic growth in MENA countries.

The Role of Economic Development

To determine the threshold values, the study estimates the double-threshold model. The results indicate that the threshold values are 10.10% and -9.67% for GDP per capita growth. GDP per capita growth value of 10.10% means that GDP per capita growth below -9.67% as well as 10.10% makes credit to GDP ratio to reduce economic growth in SSA. Also, a value above 10.10% indicates that credit to GDP exerts insignificant effect on economic growth in Sub-Saharan Africa. However, values above -9.67% but not exceeding 10.10% stimulate economic growth in Sub-Saharan Africa. Therefore, the study suggests that with the current absorptive capacity of selected host countries the best level of economic growth is between -9.67% and 10.10%, and beyond 10.10%, the benefit of credit to GDP ratio to economic growth will disappear. Credit to GDP ratio is expected to have positive impact on economic growth but such impact should be stronger at the single digit level of economic growth and become less important when the country grows at double digits. The result is consistent with Zilibotti's (1994) argument that the initial level of per capita income serve as a potential threshold variable in finance–growth nexus. The model establishes the idea of "thick" and "thin" markets. There exists positive impact of finance on growth for economies with "thick" markets above the per capita income threshold with low intermediation cost, improved capital allocation and sustained growth. While for economies below the threshold of per capita income, there are "thin" markets with limited capital, the higher cost of financial intermediation prevents investors from using efficiently available capital stock and financial development to have significant impact on economic growth.

4.2.2 : The Threshold Level of Stock Market Development

This section of the chapter discusses threshold level of stock market development that affects economic growth or switches the direction of effect on economic growth in Sub-Saharan Africa

(some selected countries). Stock market capitalisation to GDP ratio which measures size of market relative to the size of the economy, stock traded to GDP ratio and stock turnover which are considered to be indicators stock market liquidity were used as indicators of stock market development and their corresponding threshold values were estimated accordingly. Also, threshold levels of institution and economic development that moderate the relationship between sock sector development (Stock market capitalisation to GDP ratio, , stock traded to GDP ratio and stock turnover) and economic growth are also estimated.

4.2.2.1 : The Threshold Level of Stock Market Capitalisation

To determine the number of thresholds, the study sequentially estimates the model with one and two thresholds. Also, to check the robustness of the estimates, the study estimated five different models, each with a different institutional quality indicator.

In model 1 where the study controls for political stability as institutional quality indicator, this study documents the following findings. In the test for a single threshold (with H0: linear model; H1: single threshold model), the F1 statistic of 7.43 (bootstrap p-value = 0.3067) is smaller than its critical value at 10% significance level. Therefore, the null hypothesis of no threshold effects is not rejected. The F2 statistic in the test for a double threshold (with H0: single threshold model; H1: double threshold model) is statistically significant at the 10 percent level of significance. The implication from the above results is that there are two thresholds in the first model. See threshold effect test table in Appendix A.1 for the threshold test results.

To determine the threshold values, the study estimates the double-threshold model. The threshold estimate is the stock market capitalisation by which the improvement in market capitalisation may affect the economic growth in Sub-Sahara Africa. The results indicate that the threshold values

are 68.44% and 33.95% for the market capitalisation. The stock market capitalisation value between 33.95% and 68.44% means that stock market capitalisation has insignificant effect on economic growth. However, values above 68.44% stimulate economic growth in Sub-Saharan Africa (refer to Table 4.2.2.1.1 for the threshold values).

Table 4.2.2.1.1 Threshold Estimate of the Five Models

	Model 1				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	68.4426	56.6489	74.7735	9.66	0.0567
Threshold 2	33.9529	29.4362	34.4257	7.43	0.3067
	Model 2				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	2.4285	1.3905	3.0500	8.37	0.1633
	Model 3				
Model	**Threshol**d	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	2.4285	1.3905	3.0500	7.34	0.3033
	Model 4				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	2.4285	1.3905	3.0500	7.12	0.2867
	Model 5				

Model	Threshold	Lower	Upper	F-statistic	P-value
Threshold 1	2.4285	1.3905	3.0500	7.33	0.2933

Table 4.2.2.1.2 Fixed Effects Model Estimation Results (Dependent Variable: GDP Growth, 1993-2015)

	Model 1	Model 2	Model 3	Model 4	Model 5
Explanatory variables					
Trade to GDP ratio	-0.0059 [-0.78]	-0.0005 [-0.07]	-0.0008 [-0.10]	-0.0018 [-0.23]	-0.0007 [-0.10]
Inflation	-0.1327*** [-5.33]	-0.1024*** [-4.22]	-0.1146*** [-4.69]	-0.1099*** [-4.54]	-0.1152*** [-4.50]
Human capital	-0.0370 [-1.54]	0.0170 [0.79]	0.0094 [0.43]	-0.0048 [-0.21]	0.0105 [0.48]
Government Expenditure to GDP ratio	-0.0451 [-0.55]	-0.0803 [-0.99]	-0.0705 [-0.85]	-0.0825 [-1.01]	-0.0702 [-0.85]
Capital to GDP ratio	-0.0404 [-1.11]	-0.0214 [-0.58]	-0.0183 [-0.48]	-0.0063 [-0.17]	-0.0175 [-0.46]
Political Stability	-0.4021*** [-2.66]	-	-	-	-
Corruption	-	-0.8047*** [-2.75]	-	-	-
Law and Order	-	-	-0.1077 [-0.25]	-	-
Democratic Accountability	-	-	-	0.5901* [1.86]	-
Bureaucratic Quality	-	-	-	-	-0.0107 [-0.02]
Stock Market Capitalisation Threshold (0)	0.0039 [0.12]	2.2293*** [2.96]	2.1367*** [2.78]	2.0826** [2.74]	2.1526*** [2.78]

Stock Market Capitalisation Threshold (1)	0.0867*** [3.31]	-0.0067394 [-0.64]	-0.0012 [-0.11]	-0.0024 [-0.23]	-0.0012 [-0.11]
Stock Market Capitalisation Threshold (2)	-0.0111 [-1.04]	-	-	0.0248 [0.49]	-
Constant	10.3789*** [3.68]	6.1334*** [2.67]	4.5426* [1.65]	2.6479 [1.1]	4.1475* [1.79]
No. of Observations	208	208	208	840	840
No. of Groups	8	8	8	28	28
F-test	0.0000	0.0000	0.0000	0.000	0.000
R^2	0.0450	0.0887	0.0625	0.1031	0.0645

Stock markets may influence the acquisition and dissemination of information about firms. As stock markets become larger (Sanford Grossman and Joseph Stiglitz 1980) and more liquid (Albert Kyle 1984; and Bengt Holmstrom and Jean Tirole 1993), market participants may have greater incentives to acquire information about firms. Intuitively, with larger more liquid markets, it is easier for an agent who has acquired information to disguise this private information and make money. Thus, large, liquid stock markets can stimulate the acquisition of information. Moreover, this improved information about firms should improve resource allocation substantially with corresponding implications for economic growth (Merton 1987).

4.2.2.2 : Threshold Conditions of Institutional Quality and Economic Growth for Stock Market Capitalisation

Table 4.2.2.2 Threshold Estimate of the Five Models

	Political Stability				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**

Threshold 1	**4.8333**	**4.5625**	**5.1526**	**9.22**	**0.0000**
	Corruption				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**1.6667**	**1.6250**	**1.6759**	**3.62**	**0.4000**
	Law and Order				
Model	**Threshol**d	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**5.0000**	**4.5000**	**5.3063**	**4.83**	**0.3600**
	Democratic Accountability				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**2.8333**	**2.5944**	**2.9167**	**9.05**	**0.0767**
	Bureaucratic Quality				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**1.0000**	**0.6361**	**1.1667**	**9.04**	**0.0133**
	GDP per capita Growth				
Model					
Threshold 1	**-2.9681**	**-3.2614**	**-2.8987**	**228.30**	**0.0000**
Threshold 2	**4.2778**	**4.2369**	**4.3090**	**63.04**	**0.0000**

Table 4.2.2 Fixed Effects Model Estimation Results (Dependent Variable: GDP Growth, 1993-2015)

	Political Stability	**Corruption**	**Law and Order**	**Democratic Accountability**	**Bureaucratic Quality**	**GDP G**
Explanatory variables						

Trade to GDP ratio	-0.0023 [-0.30]	0.00077 [0.10]	-0.0045 [-0.57]	-0.0019 [-0.25]	0.0008 [0.10]	0.0035 [0.60]
Inflation	-0.0831*** [-2.97]	-0.0961*** [-3.93]	-0.10821*** [-4.43]	-0.0972*** [-4.04]	-0.1102*** [-4.34]	-0.082 [-4.28]
Human capital	-0.0010 [-0.04]	0.0103 [0.47]	0.0125 [0.56]	-0.0158 [-0.68]	-0.0068 [-0.30]	-0.000 [-0.02]
Government Expenditure to GDP ratio	-0.1589* [-1.92]	-0.1009 [-1.24]	-0.0945 [-1.15]	-0.0933 [-1.15]	-0.0726 [-0.89]	-0.059 [-0.94]
Capital to GDP ratio	-0.0301 [-0.81]	-0.02763 [-0.74]	-0.0497 [-1.30]	-0.0404 [-1.07]	-0.0210 [-0.78]	-0.024 [-0.88]
Political Stability	-0.3309** [-2.20]	-	-	-	-	-0.260 [-2.33]
Corruption	-	-0.4584 [-1.37]	-	-	-	
Law and Order	-	-	0.0490 [0.11]	-	-	
Democratic Accountability	-	-	-	1.0035*** [2.97]	-	
Bureaucratic Quality	-	-	-	-	0.7679* [1.65]	
Stock Market Capitalisation Threshold (0)	-0.4618*** [-3.13]	0.0556* [1.65]	0.0006 [0.06]	0.0858*** [2.82]	0.0991*** [2.92]	-0.354 [-8.40]
Stock Market Capitalisation Threshold (1)	-0.0032 [-0.30]	-0.0066* [-0.62]	-0.1818** [-2.26]	-0.0105 [-0.98]	0.0522 [0.70]	-0.010 [-1.34]
Stock Market Capitalisation Threshold (2)	-	-	-	-		0.1446 [7.15]
Constant	9.0107*** [3.18]	5.6485** [2.35]	5.2270* [1.90]	2.4657 [1.06]	3.4153 [1.46]	6.2670 [2.96]
No. of Observations	208	208	208	208	208	208
No. of Groups	8	8	8	8	8	8
F-test	0.0000	0.0000	0.0000	0.000	0.000	0.000
R^2	0.0386	0.0659	0.0455	0.0699	0.0576	0.4399

*denotes statistically significant at the10 percent,** denotes statistically significant at the 5 percent and

***denotes statistically significant at the1 percent

The Role of Political Stability

The study finds single threshold value of 4.83 for political stability. When political stability is less than 4.83, the negative coefficient of -0.46 implies a negative relationship between market **capitalisation** and economic growth. However, this adverse effect becomes insignificant when political stability is greater or equal to 4.83. All the threshold values can be found in Appendix A.2. The results are presented in Table 4.1.2.

The implication of this threshold result is that in a regime where the region is politically unstable, market capitalisation is counter-productive to economic growth in Sub-Saharan Africa.

The Role of Control of Corruption

The study also finds no threshold effect of control of corruption as institutional quality. This implies that any level of control of corruption may enhance **market** capitalisation to stimulate economic growth in Sub-Sahara Africa.

The Role of Law and Order

The study also finds no threshold effect of law and order as institutional quality. This implies that any level of law and order may enhance **market** capitalisation to stimulate economic growth in Sub-Sahara Africa. The results is consistent with the findings of Gazdar and Cherif (2015) who found insignificant role played by democratic accountability in moderating the relationship between stock market development and economic growth in MENA countries.

The Role of Democratic Accountability

The study finds single threshold effect of democratic accountability as institutional quality. When democratic accountability < 2.83, the result shows positive relationship between market capitalisation and economic growth. When democratic accountability ≥ 2.83, the result shows insignificant relationship between market capitalisation and economic growth. Therefore, the study suggests that with the current absorptive capacity of selected host countries the best level of democratic accountability is below 2.83, and beyond 2.83, the benefit of market capitalisation to economic growth will disappear. The results is contrary to the findings of Gazdar and Cherif (2015) who found insignificant role played by democratic accountability in moderating the relationship between stock market development and economic growth in MENA countries.

The Role of Bureaucratic Quality

The study finds single threshold effect of bureaucratic quality as institutional quality. When bureaucratic quality < 1, the result shows positive relationship between market capitalisation and economic growth. When bureaucratic quality ≥ 1, the result shows insignificant relationship between market capitalisation and economic growth. Therefore, the study suggests that with the current absorptive capacity of selected host countries the best level of bureaucratic quality is below 1, and beyond 1, the benefit of market capitalisation to economic growth will disappear. Market capitalisation is expected to have positive impact on economic growth but such impact should be stronger at the low level of bureaucratic quality and become less important when the country

intensify its activities towards improving bureaucratic quality. The result is not consistent with the findings of Gazdar and Cherif (2015) who found no threshold level of bureaucratic quality.

The Role of Economic Development

To determine the threshold values, the study estimates the double-threshold model. The results indicate that the threshold values are -2.97% and 4.28% for GDP per capita growth. GDP per capita growth value of -2.97% means that GDP per capita growth below -2.97% makes market capitalisation to reduce economic growth in SSA. Also, a value between -2.97 and 4.28% indicate that market capitalisation reduces economic growth but this negative effect becomes less pronounced as compared to the first regime. However, values above 4.28% stimulate economic growth in Sub-Saharan Africa. Refer to Appendix A.1 for the threshold values. Therefore, the study suggests that with the current absorptive capacity of selected host countries the best level of economic growth is 4.28% or higher for market capitalisation to increase economic growth. Market capitalisation is expected to have positive impact on economic growth but such impact should be stronger at the level of economic growth that exceeds 4.28%. Zilibotti's (1994) model also espouses the initial level of per capita income as a potential threshold variable in finance–growth nexus. The model establishes the idea of "thick" and "thin" markets. There exists positive impact of finance on growth for economies with "thick" markets above the per capita income threshold with low intermediation cost, improved capital allocation and sustained growth. While for economies below the threshold of per capita income, there are "thin" markets with limited capital, the higher cost of financial intermediation prevents investors from using efficiently available capital stock and financial development to have significant impact on economic growth.

Stock traded

Threshold Level of Stock traded

In all the five models, the study found double and single threshold for stock traded. Thus, the choice of institutional quality indicator does matter for the number of threshold of stock traded. Thus, the study used political stability as indicator for institutional quality for our baseline model for purpose of interpretation which we found double threshold. To determine the threshold values, the study estimates the double-threshold model. The threshold estimate is the stock traded by which an increase in this ratio may affect the economic growth in Sub-Sahara Africa. The results indicate that the threshold values are 0.80 and 0.82 for the stock traded. The stock traded value below 0.80 means that stock traded has negative effect on economic growth. However, values between 0.80 and 0.82 stimulate economic growth in Sub-Saharan Africa. On the contrary, value above 0.82 shows that stock traded has insignificant effect on economic growth. Refer to Appendix A.1 for the threshold values.

Table 4.2.1 Threshold Estimate of the Five Models

	Model 1				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**0.8041**	**0.6594**	**0.8083**	**7.97**	**0.1700**

Threshold 2(1)	**0.8083**	**0.7218**	**0.8156**	**9.81**	**0.0767**
Threshold 2(1)	**0.8159**	**0.7356**	**0.8191**	**9.81**	**0.0767**
	Model 2				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**0.7516**	**0.7356**	**0.7558**	**6.92**	**0.2167**
	Model 3				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**0.8041**	**0.6504**	**0.8083**	**7.87**	**0.2100**
	Model 4				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**0.8041**	**0.6676**	**0.8083**	**8.61**	**0.1800**
Threshold 2(1)	**0.8083**	**0.7218**	**0.8156**	**9.35**	**0.1000**
Threshold 2(2)	**0.8159**	**0.7356**	**0.8191**	**9.35**	**0.1000**
	Model 5				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**0.8041**	**0.6676**	**0.8083**	**8.56**	**0.1833**

Table 4.2.2 Fixed Effects Model Estimation Results (Dependent Variable: GDP Growth, 1993-2015)

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Explanatory variables					
Trade to GDP ratio	-0.0026 [-0.35]	-0.0019 [-0.26]	-0.00279 [-0.36]	-0.0030 [-0.40]	-0.0029 [-0.37]
Inflation	-0.1277***	-0.1009***	-0.1174***	-0.1099***	-0.1217***

	[-5.18]	[-4.17]	[-4.80]	[-4.67]	[-4.74]
Human capital	-0.0128	0.0024	-0.0068	-0.0181	-0.0089
	[-0.57]	[0.11]	[-0.31]	[-0.80]	[-0.40]
Government Expenditure to GDP ratio	-0.0269	-0.0661	-0.0569	-0.0259	-0.0564
	[-0.33]	[-0.81]	[-0.69]	[-0.32]	[-0.68]
Capital to GDP ratio	0.0010	-0.0130	-0.0049	0.0102	-0.0030
	[0.03]	[-0.35]	[-0.13]	[0.27]	[-0.08]
Political Stability	-0.2365	-	-	-	-
	[-1.63]				
Corruption	-	-0.8632***	-	-	-
		[-2.86]			
Law and Order	-	-	0.0794	-	-
			[0.18]		
Democratic Accountability	-	-	-	0.6151**	-
				[2.00]	
Bureaucratic Quality	-	-	-	-	0.2451
					[0.58]
Stock traded Threshold (0)	-2.5149***	-2.7489***	-2.9932***	-2.6229***	-3.0193***
	[-2.67]	[-2.74]	[-2.90]	[-2.80]	[-3.03]
Stock traded Threshold (1)	8.4724***	-0.0385	-0.0179	8.2498***	-0.0158
	[3.32]	[-1.80]	[-0.84]	[3.24]	[-0.74]
Stock traded Threshold (2)	-0.0220	-	-	-0.0223	-
	[-1.09]			[-1.11]	
Constant	6.9957**	7.2467***	5.1310*	2.6331	5.0568**
	[2.50]	[3.17]	[1.89]	[1.13]	[2.19]
No. of Observations	208	208	208	840	840
No. of Groups	8	8	8	28	28
F-test	0.0000	0.0000	0.0000	0.000	0.000
R^2	0.1075	0.0843	0.0625	0.1465	0.0769

Liquidity risk arises due to the uncertainties associated with converting assets into a medium of exchange. Informational asymmetries and transaction costs may inhibit liquidity and intensify liquidity risk. These frictions create incentives for the emergence of financial markets and institutions that augment liquidity. Liquid capital markets, therefore, are markets where it is relatively inexpensive to trade financial instruments and where there is little uncertainty about the timing and settlement of those trades. The link between liquidity and economic development arises

because some high-return projects require a long-run commitment of capital, but savers do not like to relinquish control of their savings for long periods. Thus, if the financial system does not augment the liquidity of long-term investments, less investment is likely to occur in the high-return projects. Indeed, Hicks (1969, pp. 143-45) argues that the capital market improvements that mitigated liquidity risk were primary causes of the industrial revolution in England. According to Hicks, the products manufactured during the first decades of the industrial revolution had been invented much earlier. Thus, technological innovation did not, spark sustained growth. Many of these existing inventions, however, required large injections and long-run commitments of capital. The critical new ingredient that ignited growth in eighteenth century England was capital market liquidity. With liquid capital markets, savers can hold assets-like equity, and bonds which they can sell quickly and easily if they seek access to their savings. Simultaneously, capital markets transform these liquid financial instruments into long-term capital investments in illiquid production processes. Because the industrial revolution required large commitments of capital for long periods, the industrial revolution may not have occurred without this liquidity transformation (Valerie Bencivenga, Bruce Smith, and Ross Starr 1966, p. 243). In the same vein meeting some threshold level of liquid stock market will attract more investors to commit their capital to long term projects which eventually propels level of economic activities and development in countries located in the region of Sub-Saharan Africa.

Estimating the Threshold Conditions of Institutional Quality and Economic Growth for Stock traded

Table 4.2.1 Threshold Estimate of the Five Models

	Political Stability				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**7.5000**	**7.4583**	**7.5417**	**2.58**	**0.6667**
	Corruption				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**1.6667**	**1.6250**	**1.6759**	**3.76**	**0.3467**
	Law and Order				
Model	**Threshol**d	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**5.0000**	**4.5000**	**5.3063**	**4.83**	**0.3600**
	Democratic Accountability				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**2.8333**	**2.7721**	**2.9167**	**6.35**	**0.1667**
	Bureaucratic Quality				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**1.0000**	**0.6361**	**1.1667**	**9.1125**	**0.1900**
	GDP per capita Grow**t**h				
Model					
Threshold 1	**5.1980**	**4.4723**	**5.2493**	**57.29**	**0.0000**
Threshold 2(1)	**5.2493**	**5.1783**	**5.2809**	**57.29**	**0.0000**
Threshold 2(2)	**-2.9681**	**-3.2614**	**-2.8987**	**56.68**	**0.0000**

Table 4.2.2 Fixed Effects Model Estimation Results (Dependent Variable: GDP Growth, 1993-2015)

	Political Stability	Corruption	Law and Order	Democratic Accountability	Bureaucratic Quality	GDP G
Explanatory variables						
Trade to GDP ratio	-0.0021	0.0013	-0.0033	-0.0018	-0.0001	0.0036
	[-0.27]	[0.17]	[-0.43]	[-0.24]	[-0.02]	[0.60]
Inflation	-0.1228***	-0.0932***	-0.1068***	-0.0951***	-0.1000***	-0.100
	[-4.81]	[-3.84]	[-4.37]	[-3.93]	[-3.89]	[-5.07]
Human capital	0.0007	0.0135	0.0145	-0.0173	0.0011	0.0169
	[0.03]	[0.64]	[0.68]	[-0.76]	[0.05]	[0.329]
Government Expenditure to GDP ratio	-0.0933	-0.1066	-0.0824	-0.0859	-0.1272	-0.058
	[-1.12]	[-1.30]	[-0.99]	[-1.04]	[-1.51]	[-0.90]
Capital to GDP ratio	-0.0241	-0.0245	-0.0446	-0.0374	-0.0257	-0.043
	[-0.64]	[-0.66]	[-1.17]	[-0.98]	[-0.69]	[-1.50]
Political Stability	-0.3195**	-	-	-	-	-0.192
	[-2.05]					[-1.66]
Corruption	-	-0.7173**	-	-	-	
		[-2.24]				
Law and Order	-	-	-0.0912	-	-	
			[-0.20]			
Democratic Accountability	-	-	-	0.9224***	-	
				[2.75]		
Bureaucratic Quality	-	-	-	-	0.2981	
					[0.69]	
Stock traded Threshold (0)	-0.0172	0.6263*	-0.0211	2.3572**	1.1452**	-12.82
	[-0.82]	[1.86]	[-0.98]	[2.56]	[2.55]	[-7.67]
Stock traded Threshold (1)	0.0252	-0.0384*	-4.3629**	-0.0219	-0.0166	-0.025
	[0.71]	[-1.77]	[-2.00]	[-1.06]	[-0.78]	[-1.60]
Stock traded Threshold (2)	-	-	-	-		5.3272
						[7.90]
Constant	7.8792***	6.1718***	5.3364*	2.4621	4.7475	5.2947
	[2.74]	[2.67]	[1.95]	[1.04]	[2.05]	[2.38]
No. of Observations	208	208	208	208	208	208
No. of Groups	8	8	8	8	8	8
F-test	0.0000	0.0000	0.0000	0.000	0.000	0.000
R^2	0.0522	0.0781	0.0622	0.0713	0.0669	0.4091

*denotes statistically significant at the10 percent,** denotes statistically significant at the 5 percent and

***denotes statistically significant at the1 percent

The Role of Political Stability

The study found no threshold effect for political stability, corruption, law and order, democratic accountability and bureaucratic quality. This implies that any level of **political stability, corruption, law and order, democratic accountability and bureaucratic quality** may enhance stock traded to stimulate economic growth in Sub-Sahara Africa. The results are consistent with the findings of Gazdar and Cherif (2015) who found insignificant role played by law and order, democratic accountability and bureaucratic quality in moderating the relationship between stock market development and economic growth in MENA countries.

The Role of Economic Development

To determine the threshold values, the study estimates the double-threshold model. To determine the threshold values, the study estimates the double-threshold model. The results indicate that the threshold values are 5.20% and -2.97% for GDP per capita growth. GDP per capita growth value of 5.20% means that GDP per capita growth below 5.20% as well as -2.97% stock traded reduces economic growth in SSA. Also, a value above 5.20% indicates that stock traded exerts insignificant effect on economic growth in Sub-Saharan Africa. However, values above -2.97% but not exceeding 5.20% stimulate economic growth in Sub-Saharan Africa. Refer to Appendix A.1 for the threshold values. Therefore, the study suggests that with the current absorptive capacity of selected host countries the best level of economic growth is between -2.97% and 5.20%, and beyond 5.20%, the benefit of stock traded to economic growth will disappear. Stock traded is expected to have positive impact on economic growth but such impact should be stronger at the

moderate single digit level of economic growth. Greenwood and Jovanovic (1990) also identify the initial level of per capita income as a mediating factor in the relationship between finance and economic growth. They formally model the dynamic interactions between financial development and growth where a country passes through a development cycle from a primitive stage to a developed fast growing stage. At early stage, growth is slow and the financial sector only mobilizes savings and diversifies risk. However, as the income levels begin to increase, the financial intermediaries become more sophisticated and perform costly functions of monitoring investment and screening for cost effective innovations. Finally, during the maturity state, the country's financial system fully develops with a relatively stable and higher growth. Moreover, during the early stages of financial development, only a few relatively rich individuals have access to financial markets. However, with aggregate economic growth, higher number of people accesses the formal financial system, with spill-over effects on economic growth. The main thrust of their model reveals that the relationship between financial development and growth varies depending on the level of per capita income.

Stock turnover

In all the five models, the study found double and single threshold for stock turnover. Thus, the choice of institutional quality indicator does matter for the number of threshold of stock turnover. Thus, the study used political stability as indicator for institutional quality for our baseline model for purpose of interpretation which we found double threshold. To determine the threshold values, the study estimates the double-threshold model. The threshold estimate is the stock turnover by which an increase in this ratio may affect the economic growth in Sub-Sahara Africa. The results indicate that threshold values are 0.80 and 0.82 for the stock turnover. The stock turnover value

below 1.09 means that stock turnover has positive effect on economic growth. However, values between 1.09 and 1.67 decrease economic growth in Sub-Saharan Africa. On the contrary value above 1.67 shows that stock turnover has insignificant effect on economic growth. Refer to Appendix A.1 for the threshold values.

Table 4.2.1 Threshold Estimate of the Five Models

	Model 1				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**1.0948**	**0.6676**	**1.2138**	**14.10**	**0.0200**
Threshold 2	**1.6717**	**1.5286**	**1.6814**	**14.28**	**0.0200**
	Model 2				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**0.9544**	**0.9379**	**0.9577**	**12.84**	**0.0367**
	Model 3				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**1.0948**	**1.0887**	**1.2138**	**14.53**	**0.0267**
Threshold 2	**1.6717**	**1.4966**	**1.6814**	**14.14**	**0.0733**
	Model 4				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**1.0948**	**1.0887**	**1.2138**	**14.75**	**0.0400**
Threshold 2	**1.6717**	**1.4966**	**1.6814**	**12.04**	**0.1000**
	Model 5				

Model	Threshold	Lower	Upper	F-statistic	P-value
Threshold 1	**1.0948**	**1.0887**	**1.2138**	**13.34**	**0.0300**
Threshold 2	**1.6717**	**1.4966**	**1.6814**	**13.20**	**0.0733**

Table 4.2.2 Fixed Effects Model Estimation Results (Dependent Variable: GDP Growth, 1993-2015)

	Model 1	Model 2	Model 3	Model 4	Model 5
Explanatory variables					
Trade to GDP ratio	-0.0020 [-0.28]	-0.0022 [-0.30]	-0.0011 [-0.16]	-0.0023 [-0.31]	-0.0012 [-0.16]
Inflation	-0.1098*** [-4.46]	-0.0727*** [-2.94]	-0.0886*** [-3.77]	-0.0876*** [-3.74]	-0.0888*** [-3.57]
Human capital	-0.0144 [-0.70]	0.0091 [0.46]	-0.0058 [-0.29]	-0.0159 [-0.75]	0.0002 [0.01]
Government Expenditure to GDP ratio	-0.1787** [-2.26]	-0.1717** [-2.12]	-0.1658** [-2.10]	-0.1754** [-2.22]	-0.16356** [-2.06]
Capital to GDP ratio	-0.0394 [-1.12]	-0.0409 [-1.13]	-0.0483 [-1.36]	-0.0312 [-0.87]	-0.0454 [-1.27]
Political Stability	-0.2972** [-2.08]	-	-	-	-
Corruption	-	-0.6688*** [-2.36]	-	-	-
Law and Order	-	-	-0.6369 [-1.54]	-	-
Democratic Accountability	-	-	-	0.6060** [2.00]	-
Bureaucratic Quality	-	-	-	-	-0.2064 [-0.52]

Stock Turnover (0)	1.4305***	1.5339***	1.5152***	1.4594***	1.4321***
	[3.83]	[3.72]	[3.98]	[3.90]	[3.78]
Stock Turnover (1)	-2.5637***	0.0181	-2.5699***	-2.3514***	-2.4980***
	[-3.85]	[0.65]	[-3.82]	[-3.53]	[-3.69]
Stock Turnover (2)	0.0027	-	0.0056	0.0083	0.0117
	[0.10]		[0.20]	[0.30]	[0.42]
Constant	10.0651***	7.3994***	8.9110***	4.8775**	6.7919***
	[3.70]	[3.28]	[3.36]	[2.20]	[3.05]
No. of Observations	208	208	208	840	840
No. of Groups	8	8	8	28	28
F-test	0.0000	0.0000	0.0000	0.000	0.000
R^2	0.1115	0.0811	0.0911	0.1455	0.1294

Contrary to stock traded, sock turnover as a measure of liquidity shows that low level of liquidity a stimulant to economic growth in Sub-Sahara Africa whilst moderate level of liquidity adversely affects economic growth in the region unless there is excess liquidity to scrap off adverse effect of stock market liquidity on economic growth in the region. Thus, the choice of liquidity indicator matters for the threshold regime that will be growth stimulant.

Estimating the Threshold Conditions of Institutional Quality and Economic Growth for Stock turnover

Table 4.2.1 Threshold Estimate of the Five Models

	Political Stability				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**7.5000**	**7.4583**	**7.5417**	**3.68**	**0.4467**
	Corruption				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**1.6667**	**1.6250**	**1.6759**	**7.12**	**0.1267**
	Law and Order				

Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**3.3333**	**3.1658**	**3.5000**	**5.16**	**0.2233**
	Democratic Accountability				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**3.5000**	**3.4167**	**3.5260**	5.39	**0.2967**
Threshold 2(1)	**2.8333**	**2.7721**	**2.9167**	**7.22**	**0.0400**
Threshold 2(2)	**2.2500**	**1.9583**	**2.2743**	**7.22**	**0.0400**
	Bureaucratic Quality				
Model	**Threshold**	**Lower**	**Upper**	**F-statistic**	**P-value**
Threshold 1	**1.0000**	**0.6361**	**1.1667**	**5.50**	**0.1467**
	GDP per capita Growth				
Model					
Threshold 1	**5.1980**	**5.0030**	**5.2493**	**44.52**	**0.0000**
Threshold 2	**2.4094**	**1.6156**	**2.4191**	**59.03**	**0.0000**

Table 4.2.2 Fixed Effects Model Estimation Results (Dependent Variable: GDP Growth, 1993-2015)

	Political Stability	**Corruption**	**Law and Order**	**Democratic Accountability**	**Bureaucratic Quality**	**GDP Gr**
Explanatory variables						

Trade to GDP ratio	-0.0033 [-0.43]	0.0012 [0.15]	-0.0047 [-0.61]	-0.0016 [-0.21]	-0.0009 [-0.12]	-0.0046 [0.458]
Inflation	-0.1216*** [-4.69]	-0.0961*** [-3.93]	-0.1084*** [-4.40]	-0.1012*** [-4.22]	-0.0905*** [-3.38]	-0.0889* [-4.26]
Human capital	-0.0078 [-0.35]	0.0057 [0.28]	-0.0005 [-0.03]	-0.0320 [-1.41]	0.0032 [0.15]	-0.0043 [-0.25]
Government Expenditure to GDP ratio	-0.1009 [-1.22]	-0.1170 [-1.45]	-0.1283 [-1.55]	-0.1030 [-1.28]	-0.1296 [-1.56]	-0.0689 [-1.05]
Capital to GDP ratio	-0.0292 [-0.78]	-0.0050 [-0.13]	-0.0281 [-0.75]	-0.0508 [-1.35]	-0.0362 [-0.96]	0.0029 [0.10]
Political Stability	-0.4031** [-2.32]	-	-	-	-	-0.1590 [-1.31]
Corruption	-	-0.4208 [-1.37]	-	-	-	
Law and Order	-	-	0.1986 [0.44]	-	-	
Democratic Accountability	-	-	-	0.7925** [2.40]	-	
Bureaucratic Quality	-	-	-	-	0.2720 [0.65]	
Stock Turnover (0)	-0.0092 [-0.29]	0.2126*** [2.82]	0.0808** [2.10]	0.1736 [1.29]	0.1627*** [2.50]	-0.04157 [-1.66]
Stock Turnover (1)	0.0616* [1.67]	-0.0010 [-0.03]	-0.0461 [-1.12]	1.1703*** [3.71]	-0.0033 [-0.11]	0.146627 [4.89]
Stock Turnover (2)	-	-	-	0.0286 [1.01]		0.755325 [8.74]
Constant	9.0187*** [3.08]	5.0161** [2.10]	4.9310* [1.79]	3.8844* [1.68]	4.7725** [2.06]	4.975755 [2.16]
No. of Observations	208	208	208	208	208	208
No. of Groups	8	8	8	8	8	8
F-test	0.0000	0.0000	0.0000	0.000	0.000	0.000
R^2	0.0396	0.0723	0.0256	0.0542	0.0612	0.3625

*denotes statistically significant at the10 percent,** denotes statistically significant at the 5 percent and ***denotes statistically significant at the1 percent

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The Role of Political Stability

The study found no threshold effect for political stability. **This implies that any level of** political stability **may enhance stock turnover to stimulate economic growth in Sub-Sahara Africa.**

The Role of Control of Corruption

The study also finds no threshold effect of control of corruption as institutional quality. This implies that any level of control of corruption may enhance **stock** turnover to stimulate economic growth in Sub-Sahara Africa.

The Role of Law and Order

The study also finds no threshold effect of law and order as institutional quality. This implies that any level of law and order may enhance **stock** turnover to stimulate economic growth in Sub-Sahara Africa. The results is consistent with the findings of Gazdar and Cherif (2015) who found insignificant role played by law and order in moderating the relationship between stock market development and economic growth in MENA countries.

The Role of Democratic Accountability

The study finds double threshold effect of democratic accountability as institutional quality. When democratic accountability < 3.5, the result shows insignificant relationship between **stock** turnover and economic growth. Also, when democratic accountability is beyond 3.5, the positive coefficient of 1.17 suggests that economic growth is positively related to **stock** turnover. Finally, when control

of corruption ≥ 2.25, the result shows insignificant relationship between st**ock** turnover and economic growth (-see the fixed effect estimation Table in Appendix A.2)

Therefore, the study suggests that with the current absorptive capacity of selected host countries the best level of democratic accountability is 3.5. **Stock** turnover is expected to have positive impact on economic growth but such impact should be stronger at the higher level of democratic accountability. The results is contrary to the findings of Gazdar and Cherif (2015) who found insignificant role played by democratic accountability in moderating the relationship between stock market development and economic growth in MENA countries.

The Role of Bureaucratic Quality

The study also finds no threshold effect of bureaucratic quality as institutional quality. This implies that any level of bureaucratic quality may enhance st**ock** turnover to stimulate economic growth in Sub-Sahara Africa. The results is consistent with the findings of Gazdar and Cherif (2015) who found significant role played by democratic accountability in moderating the relationship between stock market development and economic growth in MENA countries.

The Role of Economic Development

To determine the threshold values, the study estimates the double-threshold model. The results indicate that the threshold values are 5.20% and 2.41% for GDP per capita growth. GDP per capita growth value of 5.20% means that GDP per capita growth below 5.20% as well as 2.41% makes stock turnover to reduce economic growth in SSA. Also, a value between above 5.10% indicates that stock turnover exerts positive significant effect on economic growth in Sub-Saharan Africa. Also values above 2.41% stimulate economic growth more than values above 5.10% in Sub-Saharan Africa. Refer to Appendix A.1 for the threshold values. Therefore, the study suggests that with the current absorptive capacity of selected host countries the best level of economic growth is between 2.41 and 5.20%, and beyond 5.20%. Greenwood and Jovanovic (1990) also identify the initial level of per capita income as a mediating factor in the relationship between finance and economic growth. They formally model the dynamic interactions between financial development and growth where a country passes through a development cycle from a primitive stage to a developed fast growing stage. At early stage, growth is slow and the financial sector only mobilizes savings and diversifies risk. However, as the income levels begin to increase, the financial intermediaries become more sophisticated and perform costly functions of monitoring investment and screening for cost effective innovations. Finally, during the maturity state, the country's financial system fully develops with a relatively stable and higher growth. Moreover, during the early stages of financial development, only a few relatively rich individuals have access to financial markets. However, with aggregate economic growth, higher number of people accesses the formal financial system, with spill-over effects on economic growth. The main thrust of their model reveals that the relationship between financial development and growth varies depending on the level of per capita income.

CHAPTER SEVEN

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

7.1 Introduction

This chapter summarizes and concludes the findings of the study. Appropriate policy recommendations are distilled out of the empirical results for implementation.

7.2 Summary of the Findings

The study examined the nature of the relationship between financial development and economic growth in Sub-Saharan Africa. The Hansen threshold regression model was used to examine the nature of the relationship between financial development and economic growth as well as the mediating role of absorptive capacity of the selected countries in Sub-Saharan Africa. Also, Pedroni panel cointegration approach was used to assess the transmission channels through which financial development affects economic growth of the selected countries in Sub-Saharan Africa. The following are the summary of the findings.

7.2.1 Threshold Effects of Size of Banking Sector and Absorptive Capacity on Economic Growth

To determine the threshold values, the study estimates the double-threshold model. The threshold estimate is the broad money to GDP ratio by which an increase in this ratio may affect the economic growth in Sub-Sahara Africa. The results indicate that the threshold values are 7.60% and 5.96% for broad money to GDP. The broad money to GDP value of 7.60% means that broad money to GDP ratio above this value in the selected countries in Sub-Saharan Africa will reduce

economic growth. Also, a value between 5.96% and 7.60% indicate that broad money to GDP exerts insignificant effect on economic growth in Sub-Saharan Africa. However, values below 5.96% stimulate economic growth in Sub-Saharan Africa. Although there is by now a large literature showing that finance plays a positive role in promoting economic development (Levine, 2005), there are also a few papers that question the robustness of the finance-growth nexus. In fact, an increase in financial deepening (size of banks), as captured by broad money to GDP ratio, may not result in increased growth because of corruption in the banking system or political interference. These may divert financial resources to unproductive or even wasteful activities. The recent financial crisis also raised concerns that some countries may have financial systems which are "too large" compared to the size of the domestic economy. The idea that there could be a threshold above which financial development hits negative social returns is hardly new.

In relation to the absorptive capacity, the study finds single threshold value of 3.00 for political stability. When political stability is less than 3.00, the negative coefficient of -0.56 implies a negative relationship between M2 to GDP ratio and economic growth. However, this directional effect reverses and becomes statistically insignificant when political stability is greater or equal to 3.00. The implication of this threshold result is that in a regime where the region is politically unstable, deepening of the size of the banking sector is counter-productive to economic growth in Sub-Saharan Africa.

The study finds double threshold effects of control of corruption as institutional quality. When control of corruption < 1.08, the result shows insignificant relationship between M2 to GDP ratio and economic growth. When 1.08 $\leq$ control of corruption < 1.18, the positive coefficient of 1.17 suggests that economic growth is positively related to M2 to GDP ratio. Finally, when control of

corruption $\geq$ 1.18, the positive coefficient of 0.6845 (see the fixed effect estimation Table 4.2.1.1.3), suggests that economic growth is insignificantly related to M2 to GDP ratio.

Therefore, the study suggests that with the current absorptive capacity of selected host countries the best level of control of corruption is between 1.08 and 1.18, and beyond 1.18, the benefit of M2 to GDP ratio to economic growth will disappear. M2 to GDP ratio is expected to have positive impact on economic growth but such impact should be stronger at the moderate level of control of corruption and become less important when the country intensify its activities towards control of corruption.

The study finds no threshold effect of law and order as institutional quality. This implies that any level of law and order may enhance M2 to GDP ratio to stimulate economic growth in Sub-Sahara Africa.

The study also finds no threshold effect of democratic accountability as institutional quality. This implies that any level democratic accountability may enhance M2 to GDP ratio to stimulate economic growth in Sub-Sahara Africa.

The study finds single threshold effect of bureaucratic quality as institutional quality. When bureaucratic quality is < 0, the result shows positive relationship between M2 to GDP ratio and economic growth. When bureaucratic quality is $\geq$ 0, the result shows insignificant relationship between M2 to GDP ratio and economic growth. Therefore, the study suggests that with the current absorptive capacity of selected host countries the best level of bureaucratic quality is below 0, and

beyond 0, the benefit of M2 to GDP ratio to economic growth will disappear. M2 to GDP ratio is expected to have positive impact on economic growth but such impact should be stronger at the worst level of bureaucratic quality and become less important when the country intensify its activities towards improving bureaucratic quality.

To determine the threshold values, the study estimates the double-threshold model. The results indicate that the threshold values are 10.10% and -9.67% for GDP per capita growth. GDP per capita growth value of 10.10% means that GDP per capita growth below -9.67% as well as 10.10% makes M2 to GDP ratio to reduce economic growth in SSA. Also, a value above 10.10% indicates that broad money to GDP exerts insignificant effect on economic growth in Sub-Saharan Africa. However, values above -9.67% but not exceeding 10.10% stimulate economic growth in Sub-Saharan Africa. Therefore, the study suggests that with the current absorptive capacity of selected host countries the best level of economic growth is between -9.67% and 10.10%, and beyond 10.10%, the benefit of M2 to GDP ratio to economic growth will disappear. M2 to GDP ratio is expected to have positive impact on economic growth but such impact should be stronger at the single digit level of economic growth and become less important when the country grows at double digits. The results coincide with theoretical expectation of Saint-Paul (1992). By relying on the initial level of per capita income, the author analyzes a mechanism which may give rise to multiple equilibria in financial and economic development where agents can choose between two technologies. The first is flexible and allows productive diversification but at the same time has low productivity. The second technology is rigid, more specialized and productive. The model argues that when financial institutions are less developed, risk diversification is carried out through the selection of less specialized and less productive technologies. With this form of technology, there is less risk exposure and incentives to develop financial markets are limited and can lead to

"low equilibrium". In the "high equilibrium", financial markets are well developed with specialized technology. In these economies, agents choose riskier, higher yielding technologies and the impact of finance on growth is higher. However, the transition from the "low equilibrium" to a "high equilibrium" one is mediated by the initial level of income per capita that function as a threshold variable above which financial sector development is healthy for economic growth. Thus, for financial deepening in the banking sector to spur economic growth in Sub-Saharan Africa, some level of economic development must be reached to create enabling environment for banking sector to contribute to the growth process of the region.