

UNIVERSITY OF CAPE COAST

FINANCIAL MARKET DEVELOPMENT AND ECONOMIC GROWTH IN  
SUB -SAHARAN AFRICA

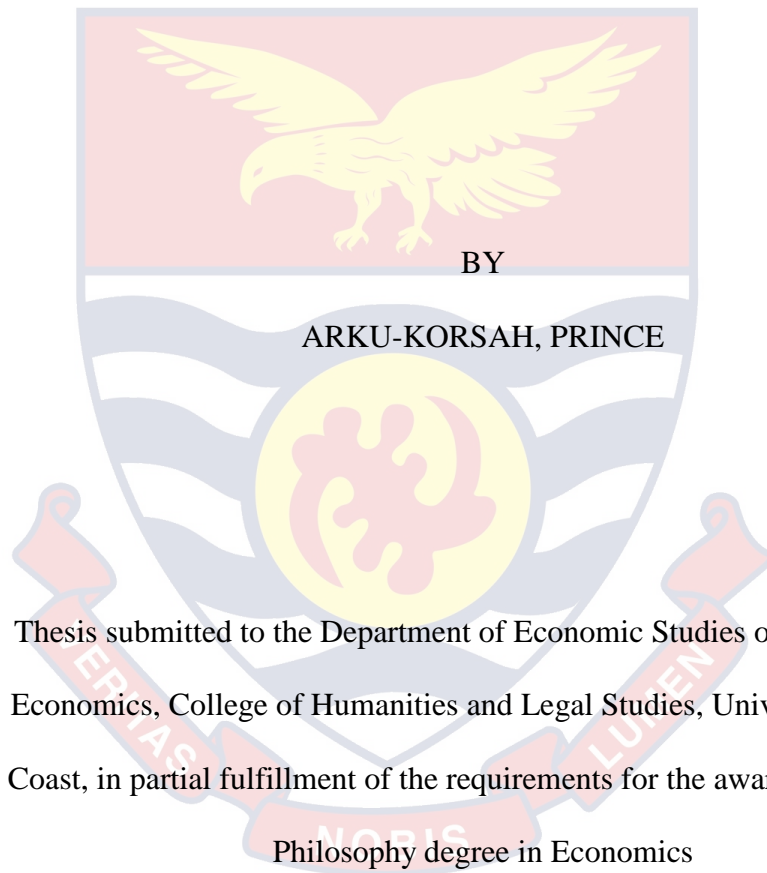


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SUB -SAHARAN AFRICA



Thesis submitted to the Department of Economic Studies of the School of  
Economics, College of Humanities and Legal Studies, University of Cape  
Coast, in partial fulfillment of the requirements for the award of Master of  
Philosophy degree in Economics

JUNE 2020

## DECLARATION

### Candidate's Declaration

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

Candidate's Signature ..... Date .....

Name: .....

### Supervisor's Declaration

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

Principal Supervisor's Signature ..... Date .....

Name: .....

Co-Supervisor's Signature ..... Date .....

Name: .....

## ABSTRACT

There is an overgrowing concern of the relevance of financial market development and economic growth in contemporary times. However, there still remains an unexplored analysis of the underlying determinants of this relationship which moderate from forces of portfolio risks and financial market liberalisation. The study provided insight into financial market development and economic growth in Sub-Saharan Africa using GMM panel regression for moderation role and panel seemingly unrelated regression model for bidirectional estimation and threshold analysis. We considered impulse response functions to examine adjustment path of growth to shocks. Using GMM and panel SUR estimations on 34 SSA countries covering 1996-2016, we found a significant contributing role of industrial production in the stock market–growth nexus and a downward sensitivity of growth in the integration of a liberalised money market. Further, the study found optimal operating thresholds for financial market instruments. The study therefore advocates that value added from industrial production be allocated to stock acquisition to ensure growth and prudential regulations be strengthened in liberalised money market.

## KEYWORDS

Economic Growth

Financial Market Development

Financial Market Liberalisation

Portfolio Risk

Threshold Analysis

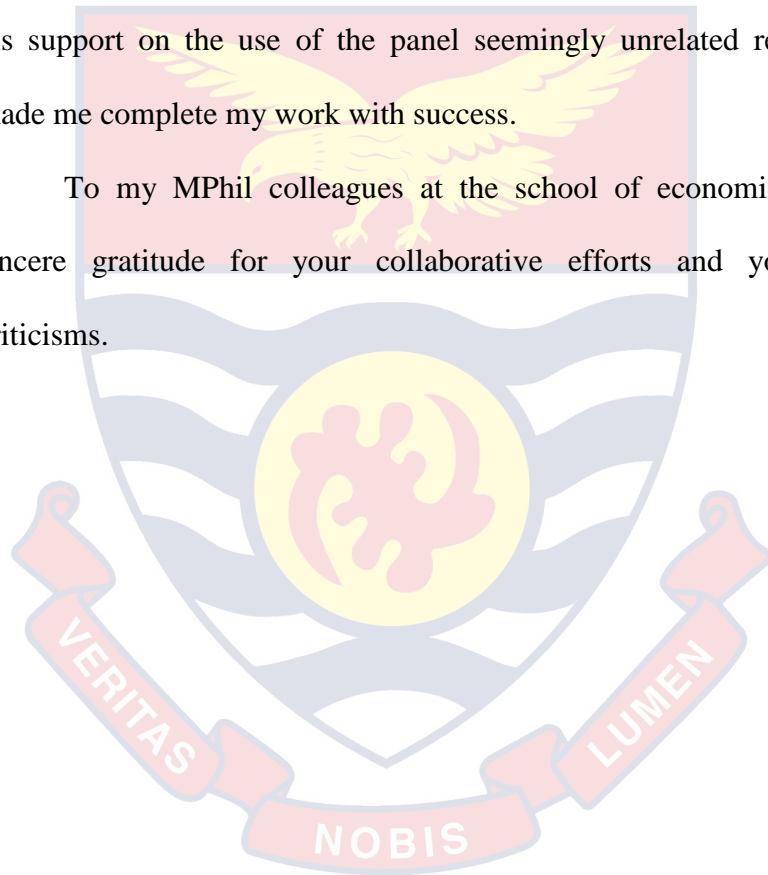


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## DEDICATION

To my family



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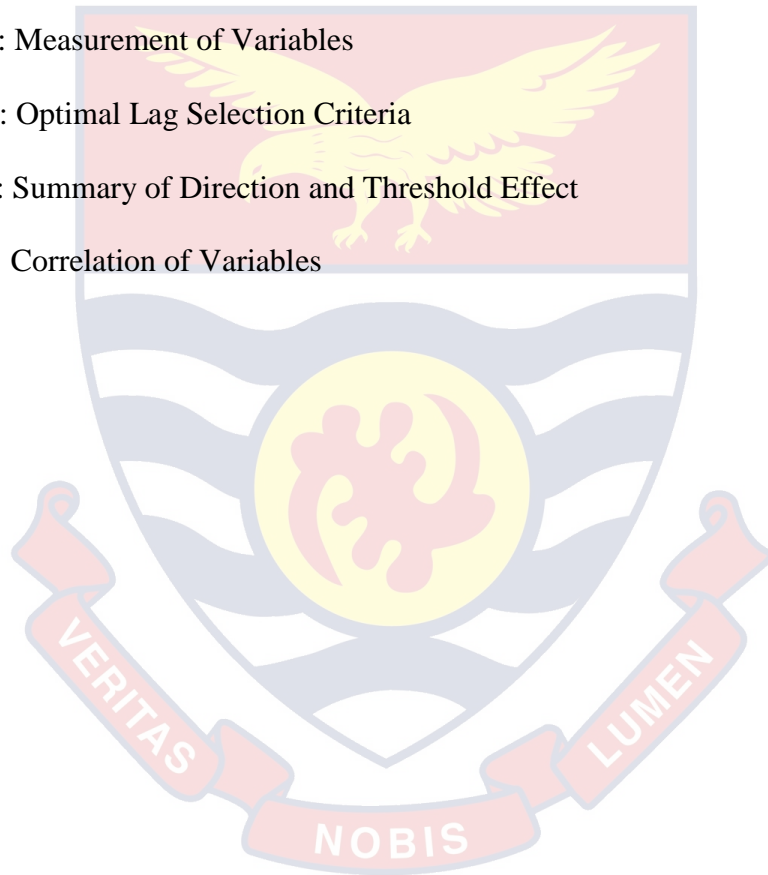
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## LIST OF ABBREVIATIONS

AEL	Average Equity Liberalisation
AML	Average Money Market Liberalisation
FDI	Foreign Direct Investment
FMD	Financial Market Development
FMDI	Financial Market Development Index
GDP	Growth Rate of Gross Domestic Product
GDS	Gross Domestic Savings
GMM	Generalised Method of Moment
HUM	Human Capital
IDP	Industrial Production
INFL	Inflation
LIB	Financial Market Liberalisation
LISTC	Number of listed Companies
PORT	Portfolio Risks
PORTDL	Gross Portfolio Debt Liability
PORTE	Gross Portfolio Equity Assets
STMC	Stock Market Capitalisation
STMC	Stock Market Turnover Ratio
SUR	Seemingly Unrelated Regression
SYNLI	Syndicated Loan Issuance Volume
TRADE	TRADE

## CHAPTER ONE

### INTRODUCTION

#### Background

The outgrowing structure and contributions of the financial market to economic growth in contemporary times have sharply realigned the focus of financial economists in this discipline. This study provided insight on the impact of financial markets development on economic growth in sub-Saharan Africa.

Financial market is a system designed for the purpose of trading financial assets including debt, equity, derivatives and other alternative investments such as hedge funds, venture capital, mezzanine capital, buyout capital and private equity. These financial instruments are classified under money markets (bank loans, treasury bills and mutual funds), capital markets (Stocks, Bonds, and Pension Funds) and derivative markets (Options, Swaps and Futures). The purpose of the money markets provide an avenue for temporary source of funds characterised by larger degree of liquidity and low interest rates following their short term maturity period.

Unlike money markets, the driving purpose of the capital markets is to warehouse surplus funds with longer maturity characterised by high interest rate. Primary market (issuance of new security through initial public offering) and secondary market (issuance of existing tradable security) are the existing markets for trading financial asset. Secondary markets are also classified in terms of organised stock exchanges and over-the counter (OTC) markets. The participants in these forms of financial markets include commercial banks, contractual companies including insurance firms and pension funds,

investment and financial companies such as brokerage firms and individual investors.

Derivative is an asset with payoff determined by the price of other securities. In the derivative markets, instruments traded include options, swaps and futures. The markets for derivatives provide financial analysts, securities analysts and portfolio managers to speculate for gains and hedge for portfolio performance.

The money markets which is mostly characterised by the dominance of banking sector inherently adopts financial management and models in controlling and dealing with shocks which impair bank asset portfolios. Among these include: asset management, capital adequacy management, liability management and recent models such as Value-at-Risk and “stress testing”. Parallel to portfolio management is the duration and hedge ratio models in capital markets which protect capital portfolio from price risk (interest rate fluctuation).

Levine (1997) maintains that financial markets can fulfill five functions to eliminate frictions in transactions through risk elimination, acquiring information about investments and allocating resources, monitoring managers and exerting corporate control, mobilising savings, and augmenting exchange. These functions augment financial market and hence, higher economic growth. Financial market development occurs when financial markets and intermediaries eliminate the effect of information, enforcement, and transactions cost and therefore do a better job at providing the five financial functions (Levine, 2004). According to Ndikumana (2000) the role of the financial markets has craved awareness of both academia and policymakers.



Kuznets (1973, p. 247) opined that a country's economic growth may be defined as a "long-term rise in capacity to supply increasingly varying economic goods to its population, with advanced technology, institutional mechanism preceding this growing capacity." Economists have focused, though not exclusively, on growth in per capita income as the measure for economic growth proxy by GDP. A number of growth theories over the years reveal the sources and determinant of growth of a country (Gurley & Shaw, 1967). The Solow model of growth which emphasises the neo classical production function with decreasing returns to scale treats exogenous savings and population variables as the key determinant of growth (Rebelo, 1991). On the other hand, the endogenous growth theory attributes growth to human capital (Romer 1986; Lucas 1988; Rebelo 1991).

Prior to the year 1990 where Africa recorded only 8 stock exchanges, there has been however, a considerable development in the African financial markets much particularly with the capital market- There are 30 operating stock exchanges in the African continent in recent times. African stock and equity market reveal that total equity market capitalisation in 2013 was US\$ 1.5 trillion, up from US\$ 113 billion in 1992 and US\$ 2 trillion in 2007 (Marwa, 2015). The aggregated recent development in the stock and equity markets in Africa does not bring to an oversight of the challenge and how immature these markets are. In most of these stock markets, effective trading occurs only in some few economies which represent a greater weight in the overall total market capitalisation. A considerable attention to the African financial markets reveals that there have been a high degree of variations in

the stock and equity markets on the basis of size, capitalisation, and performance (Marwa, 2015).

Despite the development in the financial markets of Africa, stock markets still remain illiquid, turnover ratios still remain less than one percent in most markets (Marwa, 2015).

Why the need for a study of financial market development in sub-Saharan Africa? A closer look and perusal of the African Department of IMF (2012) publication on regional economic outlook reveals the remarkable development of financial market development in the region over the few years:

SSA has been considered to be a lead in the financial innovation services from the perspective of mobile telephony which is much prevalent in the East Africa. The ever growing rate of M-Kopa in Kenya has considerably led to the dramatic reduction of transaction costs and has facilitated personal transactions even in the absence of traditional financial infrastructure (IMF, 2012). However, the unanswered question still remains unexplored in literature as to whether the development of these innovations in the context of the moderating roles of portfolio risks factors and financial market liberalisation contribute to economic performance in the region. In the area of microfinance, there has been rapid development through service provision (Svirydzenka, 2016).

Following the development in the finance-growth nexus has induced sharp divergent views among contemporary economists in their reasoning about the direction of financial market and economic growth despite an established common ground for development of existing relationship. There

are four schools of thoughts in the discipline of the finance – growth relationship:

On one hand, some authors have empirically asserted that there is a short run from finance to growth (McKinnon, 1973; Levine et al., 2000; King & Levine, 1993a). On the other hand, other authors fiercely maintain that there is a long run direction from growth to finance (Gurley & Shaw, 1967; Jung, 1986; Boulika & Trabelisi, 2002; Güryay et al., 2007). Strikingly however, Lucas (1988) and Stern (1989) asserted the issue of a relationship. According to Lucas (1988) the role of the financial sector in economic growth is “overstressed.” The fourth rising view of bidirectional hypothesis is held by Greenwood and Jovanovic (1990).

The data unavailability on financial market development variables before the period of 1996 give a substantial reason to focus on the period from 1996 to 2016 by estimating panel regression using GMM, impulse response function to investigate the shocks of variables on adjustment path of growth and variance decomposition over the period of the study.

Going beyond the rising issues in literature and policy making, the study distinctively contributes by addressing thoroughly, the modern variables for modeling financial market development which is based on the GFDD, a model depicted by a 4 x 2 matrix showing financial markets and their criteria of development (Čihák, Demirgüç-Kunt, Feyen, & Levine, 2012). The conceptual framework by which the financial market development variables are included are access, efficiency stability and depth.

The study aims at filling a gap in research by analysing the moderating effect of financial market liberalisation and portfolio risks on the potential

impact of financial market development on economic growth in SSA- a distinguishing feature from other works.

### **Statement of the problem**

Myriads of existing literature have considered finance-growth nexus where it is conceded that there exists an established ground for interdependency through the specification of one equation model and the use of granger causality. However, no attempt seems to have been made to estimate a structural equation model to analyse their interdependence. Because of the limitation of the use of granger causality which rest on only direction, the present study employs the use of panel seemingly unrelated regression model to specify both the direction and the strength on four structural equations which is a distinguishing feature from existing literature.

It is generally acclaimed that global indicators are equivalently influential as domestic indicators in explaining changes in financial system. However, because markets are linked to some form of domestic policy indicators, weaknesses in the macroeconomic environment adversely affect financial market (Acikalin, Aktaş & Unal, 2008). The influence of portfolio risks factors remain a problem since their adverse effects reduce the portfolio value of corporate firms and consequentially, economic growth. There are underlining theoretical orientations to assert that there is a linkage between financial rate of returns and market forces. Among these include: Fama (1991), Chen et al. (1986), Geske and Roll (1983), Boudoukh and Richardson (1993), Mandelker and Tendon (1985). Distinguishingly from other studies, this study considered the moderating role of portfolio risks on the finance-growth nexus.

A number of debates in literature divulge a contradicting view on the growth path through financial Liberalisation. According to McKinnon (1973), the financial Liberalisation through opening of capital accounts and capital inflows may increase the potential for investment which induces economic growth. In contrast other empirical studies argue against financial Liberalisation-an increase in bank competition following financial liberalisation will reduce lending relationship as more opportunities may be opened for borrowers. A reduction in lending relationship will then destroy information capital and heighten information asymmetry, which is a deficient determinant to financial market development and economic growth (Boot, 2000; Stiglitz, 2001). A considerable attention to the market fragility of some SSA immediately after the financial reforms highly demands that investigations be made to examine whether financial market liberalisation is the right conduit for economic performance of SSA economies (Akinsola, 2017).

In spite of the long debated issue of financial market liberalisation and growth, there is a missing subject in the literature as to whether financial market liberalisation augments the finance-growth nexus. This missing subject remains a problem because without knowing whether financial liberalisation augments finance-growth and also on which particular financial market does liberalisation becomes optimal may elicit systemic risk and contagion effect in the financial market (Akinsola, 2017).

The debate of demand-supply hypothesis in existing literature gives this study to establish that previous estimations may have been potentially valid, only that these diverse hypothesis were based on estimations carried at

different set times of the same financial market development variables. So far, with no attempt to specify the effect from the point of the convergence of mutually dependence in the finance-growth, this study employs panel seemingly unrelated regression model to explore the sizable effect of financial market development on economic growth and economic growth on financial market development.

The occurrence of 2007 global financial crisis has brought a sharp awareness of its possible contagion effect in the financial market. This becomes very problematic when spillover from the systemic risk adversely and drastically reduces the asset value in the balance sheet of lenders and consequentially affects other macroeconomic variables and economic growth. This revealed problem prompts this study to employ the analysis of threshold in examining the optimal level of financial market development on economic growth.

### **Objectives of the study**

#### **General objective**

The main objective of the study is to examine the impact of financial market development on economic growth in Sub-Saharan Africa.

#### **Specific objectives**

The specific objectives are:

1. Examine the moderating role of portfolio risks on finance-growth relationship.
2. Examine the interactive role of financial market liberalisation on finance-growth nexus.

3. Evaluate the threshold effect of financial market development on economic growth.

### **Research Hypotheses**

- (1).  $H_1$ : There exists a moderating role of financial portfolio risks on finance-growth relationship.
- (2)  $H_1$ : There exists an interactive role of financial market liberalisation on finance-growth nexus.
- (3)  $H_1$ : There is a threshold effect of financial market development on economic growth.

### **Significance of the Study**

The study adds knowledge to policy making where economic advisors to governments of various economies will find it insightful to allocate state resources to the fast growing and developed sectors (financial and real sectors) based not only on direction of financial system and economic growth but much more principally, following the innovations (shocks) that come from market economic forces for economic growth.

Furthermore, this study makes contribution to professionals (Financial and Investment Analysts and Portfolio managers) in the financial markets as they get informed from arbitrage point of view, the mispricing of financial assets for profitable rate of return. The study also brings to light economies which have stable and efficient financial system. Such knowledge apparently will help in knowing which country and sectors to invest.

On the basis of the gap identified the study adds to literature; the critical and most driven issue in the discourse of financial market development and economic growth is not a subject of direction but the moderating forces of

portfolio risks and financial market liberalisation that augment the finance-growth nexus and the optimal threshold of financial market instrument operations.

### **Scope of the study**

Acknowledging existing studies in this discipline which have been done in various dimensions; regional blocs, Income level countries, and specific country levels, this present study also probes into the impact of financial market development on economic growth on regional dimension. The scope of this study is limited to 34 selected Sub Saharan African countries with readily available financial market development variables from the updated GFDD. On the basis of this scope, panel data spanning from the period 1996-2016 are collected from World Bank Indicators, African Development Bank and IMF's Annual Report on Exchange Rate.

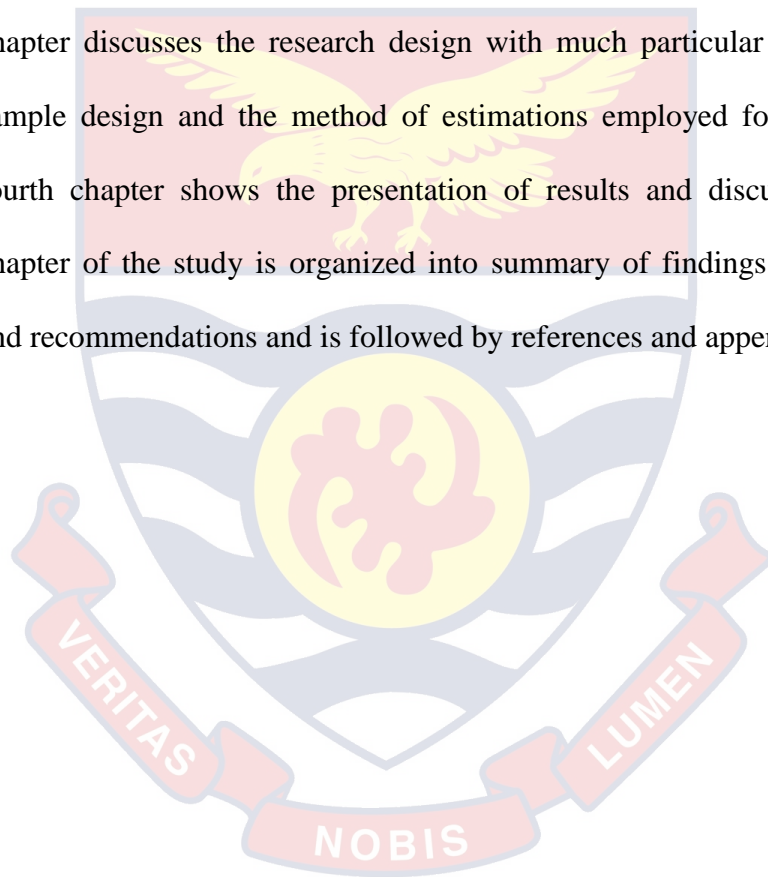
### **Limitations of the study**

The scope of this study and its relation with the choice variable of interest, financial market development indicators subjects the study to the limitation of missing values of these variables due to the rudimentary structure of the sub- Saharan African financial markets. Such limitation may result in conclusion and recommendations somewhat different in other matured financial markets. The second limitation rests on the over reliance of the sources of data; the reliability and validity of the findings to much extent is contingent on how credible selected variables from WDI, IMF, IMF AREAER and AfDB are.



## Structure and Organisation of the study

This immediate chapter of the study covers sections including background of the study, statement and justification of the problem, objectives of the study, research questions and hypotheses, significance of the study, scope of the study and the study's limitation. The second chapter considers the review of existing theoretical and empirical literature in the area of growth, portfolio risks, financial market liberalisation and financial market. The third chapter discusses the research design with much particular attention on the sample design and the method of estimations employed for the study. The fourth chapter shows the presentation of results and discussions. The last chapter of the study is organized into summary of findings with conclusion and recommendations and is followed by references and appendices.



## CHAPTER TWO

### LITERATURE REVIEW

#### Introduction

This chapter on an inception discusses the conceptual framework on which the study is built using diagrammatic representation. The conceptual framework reveals the impact of financial market development on growth by integrating moderating variables. Followed by, are the theoretical underpinnings of the study and lastly, is the empirical review of existing and other related works.

#### Conceptual framework

In studying financial finance-growth nexus, the study adapts the index pyramid of IMF (2012) in examining the dimensions and interplay of the main variables of the study: financial market development, economic growth, portfolio risks, financial market liberalisation and real sector. A consideration at the framework posits that economic growth of an economy is contingent on two levels of discussion as reflected as the proximate cause –financial market development and real sector. From the framework, the proximate cause of financial market development contributes to economic growth through the application of the five functions of the financial market as hypothesised by intermediation theory (Diamond 1984).

According to the framework, interdependency is observed between the financial market development and real sector. Such dependency is seen on how trade from the real sector affects stock market in the financial market and vice versa. Multicollinearity resulting from this interdependency is resolved by the study through the use of the dynamic panel regression model.

Portfolio theory asserts that firm specific and market risks affect the financial market development through the money and capital markets. Notably from the framework shows that while financial liberalisation affects growth through financial market development, financial portfolio risks influence economic growth through the direction of financial market development and the real sector.

Acknowledging the fact that financial market development is modelled on a 4x2 matrix reveals that, the four phases, depth, access, efficiency and stability potentially affect financial market development through the money market, capital market and the derivative market. However, due to the unavailability of data on stability, the study limits the drivers of financial market development to only depth, access and efficiency.

To adapt to the IMF framework (IMF, 2012) they study sought to include the moderating variables. Further, the four phases of financial institutions and financial market measures are the same in the money market and capital market from the World Bank financial sector development indicators.

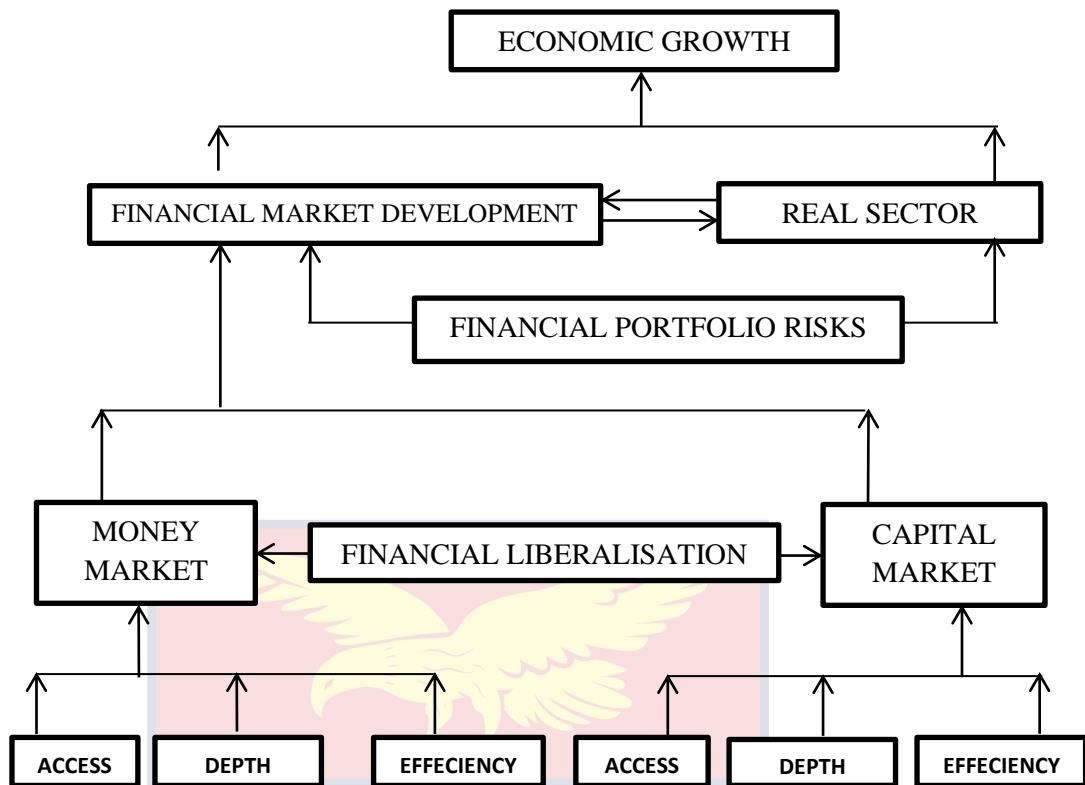


Figure 1: Conceptual framework on financial market development-growth nexus

Source: Arku-Korsah (2020)

After the revelation of the path breaking work of Joseph Schumpeter in 1911 which relates to economic development, there has been the emergence of a number of studies both theoretical and empirical in the discipline of financial market development and economic growth. This literature review on an inception considers the phenomena of financial market development and economic growth from theoretical perspective and spurs it with empirics of works.

## Theoretical Review

### Intermediation Theory

The traditional theory of financial intermediation which is modelled on the assumption of perfect and complete market hypothesis reveals the interaction of savers (surplus units) and borrowers (deficit units) through an

intermediary such as banks, insurance companies, investment firms etc. The theory of Diamond (1984) recognises the existence of information asymmetry which induces information and contract cost in the discipline of finance. The theory maintains that financial intermediaries will ameliorate the challenges of asymmetric information through their functions. In their functions as asset and portfolio diversification, these intermediaries eliminate the problem of unsystematic risks. Such diversified portfolio induces economies of scale necessary for growth.

A much concern in dealing with asymmetry by these intermediaries is reflected in the information advantage they have over borrowers which position them to extensively engage in monitoring, screening and credit rating in ensuring that depositors' funds are safe and allocated to augment investment, a necessary channel for economic growth (Diamond 1984; Greenwood & Jovanovic 1990).

### **Supply leading hypothesis**

A group of authors hypothesised that measures that are enacted to develop the financial system will induce financial market to affect economic growth (McKinnon 1973; Levine et. al, 2000). These authors maintained that the financial markets in their capacity engage in a five level functions in the financial system which are necessary for boosting long run growth:

### **Mobilization of savings**

The challenges of information asymmetry and high transaction cost associated with individual savings and lending, has induced the role of financial institutions to mitigate these two aforementioned challenges through size and maturity transformation. Through these forms of transformation,

borrowers have access to funds to invest in productive sectors necessary for economic growth. Efficient financial markets that mobilise the savings of individuals can substantially influence economic growth by increasing savings. Theoretically, given the limitation on the free flow of capital from one country to another, savings play a critical role in determining the level of capital, which can mobilise and enable labour, natural resources to ensure growth of output in an economy (Wolday & Tekie, 2014). The greater proportion of savings mobilization appearing as deposits in the balance sheet of financial institutions reveal the important role of savings in the well-established investment accounting for growth in these sectors which profoundly contribute to growth of economies.

#### **Facilitating risk amelioration**

The capacity of financial system necessitates financial institutions in employing various forms of risk management including asset, hedging and the use of risk models such as “stress testing”, duration and portfolio rebalancing to maintain the value of their assets. The financial market’s ability to provide risk diversification services can affect economic growth by altering resource allocation.

#### **Acquiring information and allocating resources**

A characterized world of inefficiencies makes it difficult to acquire and disseminate information. Left to the individual investors, cost associated with acquiring information cannot be financed. Out of this reason, the existence of financial system becomes very important in pooling resources to finance information coalition and sharing at a lower cost. Through information coalition, financial intermediaries are able to identify the best production

technologies and those entrepreneurs with the best chances of successfully initiating new goods and production processes (Blackburn & Hung, 1998).

### **Monitoring and exerting corporate control**

The persistent challenge of information asymmetry in investment environment which to an extent exposes shareholders and management to a greater depth of agency conflict align financial markets to take necessary action to address such friction through documentation of legal and regulatory framework of corporate governance. The institutionalization of corporate governance through corporate charter has become very relevant in understanding the role of financial agents in accounting for economic growth to a larger extent: responsibilities and accountability of the board; financial affairs and auditing; code of ethics. Financial intermediaries through the financial system can enforce and effectively monitor how borrowed funds are used by documenting debt contract and covenant taking it form in subordination of subsequent debt and provision of sinking fund by deficit units- such institutionalization places parameter restriction on the use and allocation of funds in profitable investment necessary for growth.

### **Facilitating exchange of goods and services**

The existence of financial system with its development has employed arrangements that reduce transaction cost to increase innovations and financial technologies for growth. Such arrangements increase the pace for funds from surplus units to deficit units for investments. According to Greenwood and Smith (1997) the modelling of the linkages of exchange, specialization and innovation divulges the interaction of specialization and transactions- the institutionalization of financial arrangements necessary for lowering of

transaction cost facilitates an in depth level of specialization-arrangements emanating from this linkage of exchange propels productivity.

### **Demand leading hypothesis**

Other authors maintain that when economic growth is attained through policy credibility, the forces of economic growth that will demand the services and the product of financial market will cause the financial system to expand in the long run. This hypothesis is held by Goldsmith (1969) and Jung (1986). Robinson (1952) posits that as much as economic growth is enhanced through productivity and a sustained good policy implementation, financial development will follow and thus, proceeded to recommend that government should take keen interest in promoting economic growth.

### **Bidirectional hypothesis**

The supply and demand led hypotheses have not remained unchallenged as considerable number of researchers also maintains that the finance-growth nexus follows two phases with short run reflecting the supply led phenomenon and demand led taking the long run effect. Blackburn and Huang (1998); Khan (2001); Demetriades and Hussein (1996). Patrick (1966) hypothesised the two way causality stage of development; in the short run analysis, finance precedes growth by establishing real capital accumulation. In the long run of growth stage of the economy, financial services will be demanded to increase the financial system and its development. In making reference to agriculture in its immense contribution to GDP, he argued that financial markets development through the financial functions undoubtedly encourage technological development with its improvement in the channels of production before modern economic growth gets underway.



According to Patrick (1966) in the long run as economic growth gets underway, the relevance of financial markets preceding growth is overshadowed by the stimulation of the output sector-the output sector does not respond significantly to the contributions from the financial market but with its advanced development, preceding financial markets through its demand for financial instruments that consequentially cause financial market to develop.

Despite the contradicting hypothesis, the development of financial market is keen in every economy as postulated by various growth models – neo classical and endogenous growth theories.

### **Capital Asset Pricing Theory (CAPM)**

The traditional theory of CAPM by Sharpe (1964) which is a modified theory of Markowitz model explains the factors that influence the returns on a portfolio of financial asset. The capital market line explains that the returns (profitability) is contingent on the risk premium ( $r_m - r_f$ ) and the portfolio

standard deviation ( $\sigma_p$ ). The model of CML given as  $r_p = r_f + \left( \frac{r_m - r_f}{\sigma_m} \right) \sigma_p$

elucidates that given a portfolio of a risk free and risky assets, returns ( $r_p$ ) will be positive if portfolio standard deviation ( $\sigma_p$ ) exceeds the market risk ( $\sigma_m$ ).

The security market line on the other hand explains the return on individual security than on the portfolio. The SML given as  $r_s = r_f + (r_m - r_f)\beta$  explains that the returns on a security ( $r_s$ ) will be positive if there exist a positive risk premium ( $r_m - r_f$ ) and a positive security risk measure  $\beta$ . The underlying

principle of CAPM is that the market of securities rewards return based on the degree of risk.

Whereas the CAPM is a major component of security profitability in financial theory, it has been criticised as being limited in explaining the returns of financial market securities. It has failed in recognising and explicitly modelling macroeconomic variables such as unanticipated inflation, and industry production that could affect the return on an asset.

From existing empirical literature, it has been noted that essentially the basis of CAPM hinges on a static equilibrium analysis. However, such static model is applied in a practical investment environment and businesses with dynamic form. This, therefore results in a skeptical thought about the relevance of CAPM as a reliable model in investment return valuation (Naylor & Tapon, 1982).

#### **Arbitrage Pricing Theory (APT)**

The APT theory explains security returns by integrating into the model external shocks from some identified portfolio risks factors including industrial production, quality premium and inflation that could affect return (Chen, Roll & Ross; 1986). This theory (APT) being modelled a  $r_s = r_e + \alpha F_1 + \beta F_2 + \dots + \xi F_n + \varepsilon$  shows that return on security ( $r_s$ ) depends on the expected return ( $r_e$ ) and financial risks factors ( $F_1, F_2, F_3$ ) with their sensitivities to changes in security return as  $(\alpha, \beta, \xi)$ . The systematic forces (the macroeconomic variables and their sensitivities) and the idiosyncratic forces affecting the profitability of the asset in the APT model are of the component  $\alpha F_1 + \beta F_2 + \dots + \xi F_n$  and  $\varepsilon$  respectively. Unlike CAPM which explains the profitability of asset from the reasoning of degree of risk,

the APT models the same profitability from the principle of arbitrage- taking advantage of differentials in asset prices on the conditions of zero net investment and a riskless gain.

### **Neo Classical Growth Theory**

The neo classical theory is modelled on a decreasing return to scale of choice variable capital by considering production function, capital accumulation, technological process and population in explaining the long run growth. The imperative role of the financial services which is seen in the Solow (1956) model places emphasis on the gross domestic savings as a form of capital accumulation and concluded that the capacity of a country's economic growth is sustained if the majority of its resources is mobilized through savings (exogenous factor). To Solow, the steady state equilibrium expressed as  $k^* = \left(\frac{s}{n + \delta}\right)^{\frac{1}{1-a}}$  where  $(k^*, s, n, \delta)$  being capital per worker at steady state, exogenous savings, population growth and depreciation respectively meant that, the level of savings is the driven factor for cross-country output per capital and income per capita differential.

### **Endogenous Growth Theory**

Recognising the weakness of the neo classical theory that the differences in capital accumulation could not satisfactorily account for differences in output per worker, per capita income and the failure of exogenous saving to correctly predict the magnitude of effect on income per capita made the Solow theory of growth highly criticized by the endogenous growth theory. The endogenous theory considers human and physical capital as the determinant of long run growth with constant or increasing returns to scale. It contrasts the neo classical theory that economic growth is best

explained by exogenous factors than endogenous variables. According to Romer (1986) intermediaries make use of innovations and human capital (education, training and experience) through research and development to affect growth.

## **Empirical review**

### **Empirical views on finance-portfolio risk relationship**

Empirical researches have dominantly proven a negative relationship between financial market returns and inflation (Geske & Roll, 1983). Increased discount rate's effect would be zeroed sum only if firms' cash flows increase at the same rate. On the other hand, in the case that contracts are nominal and cannot adjust accordingly, the effect will be negative. Therefore, in this context, the effect of nominal interest rates on stock prices is also expected to be negative (Chen et al., 1986).

By employing a bivariate error-correction model, Ajayi and Mougoue (1996) examine the relationship between stock prices and exchange rates. They study both the short-run and long-run relationships between the two variables in eight major industrial markets. Their results show that an increase in domestic stock prices has a negative short-run effect on the domestic currency value.

### **Empirical views on financial market liberalisation and growth process**

The discussion on liberalising financial markets started with McKinnon (1973) and Shaw (1973) whose work criticised financial repression of government policies. McKinnon (1973) and Shaw (1973) held these policies responsible for the low growth rates in many developing countries during the 1950s and 1960s.

Considering further, there have been a number of assertions of positive relationship of both banking liberalisation and the capital market liberalisation on economic growth. It is claimed that introducing market principles and competition in banking markets increases interest rates on deposits, which leads to higher saving rates. This, in turn, increases the amount of resources available for investment.

In contrast, financial markets rivalry through financial liberalisation may also imply a reduction in profit margins and an increased financial fragility of financial intermediaries such as banks. According to Hellmann et al. (2000) liberalisation reduces the franchise value of banks, which makes them susceptible to financial disruption and stimulates risk taking in order to try to increase profits under the pressure of falling interest rate margins. Reduced margins may also stimulate banks to economise on screening and monitoring efforts, and they may be more willing to opt for a gambling strategy when allocating loans by putting less emphasis on risk and more on profit. Thus, financial liberalisation may trigger crises if it leads to excessive risk taking under the pressure of increased competition (Demirgüç-Kunt & Detragiache, 1998).

### **Empirical views on finance-growth direction**

Parallel to the unending divergent views from the theoretical relationship of finance and growth is the continuous debate in the empirical studies. A survey of a number of empirical works divulges different results of the direction phenomenon, ranging from unidirectional to two-way causality and even to the extent of inconclusive result in some few empirical studies.

Using a data span from 1974 to 1998 (real interest rate, real capital per capita and the ratio of total commercial bank deposits to nominal GDP at market prices as proxies for financial development), Craigwell et al. (2001) found a one way relationship from finance to growth for Barbados. Comparative to Craigwell et al. (2001) study is a study by Iyare and Moore (2011) on Barbados, Jamaica, Singapore and Trinidad and Tobago from 1960 to 2003 with proxies of financial market development as savings, trade openness, investment and real interest rate which reveals a positive two way association between financial market development and economic growth.

A review of these two studies, Craigwell et al. (2001) and Iyare and Moore (2011) on Barbados could infer the potential disparity of their findings from : (1) limited time span which could not adequately explore long run effect of growth to finance – the fourteen years (1960-1974) data structure missing from the former study possibly could have impact on changing the results of Craigwell et al. (2001) study. Time dimension therefore, to an extent can be considered as relevant to the outcome of these two aforementioned studies ; (2) the choice indicators for financial market development may not fully explain and capture the impact of direction which can result in potential endogeneity from unobserved variables for measuring financial market development in Craigwell et al. (2001) study; (3) the neighbouring effect (spatial externality) from countries in the latter study- the structure of financial market development from Jamaica, Singapore and Trinidad and Tobago may have had a spillover effect on Barbados which considerably resulted in a two way causality as contradicted by a unidirectional study in Craigwell et al. (2001).

Hassan, Sanchez and Jung-Suk (2011) in their study of SSA and other countries employed domestic credit to private sector, domestic credit provided by banking sector and broad money supply as financial market development proxies for 1980-2007 time series span could find a one –way causality from growth to financial measures. Strikingly however, in the study of SSA by Stringberg (2017) employed firms using banks to finance investment, bank cost to income ratio, bank credit to bank depositors and stock market total value traded as financial measure with time span 2000-2014 ended an inconclusive result which contradicts the findings of Hassan, Sanchez and Jung-Suk (2011) in exploring the directional relationship.

Owing to the differences in their findings is the possible choice variables as Stringberg (2017, p. 1) documented, “however, seeing as financial sector development is diverse and dynamic, these measurements and regression done here will not provide a comprehensive picture of the state of financial sector development in SSA.” Notably from both empirical and data exploration, variables such as bank cost to income ratio and stock market total value traded on SSA level analysis highly suffer from missing values due to rudimentary existing market for these measures. Owing to this inefficient measures (choice variables) of finance apparently will not have any short and long run association with growth.

Despite the number of contradicting findings, there has been some evidence of similarity; both the studies of Hassan, Sanchez and Jung-Suk (2011) and Hakeem and Oluitan (2013) reveal a common ground of one-way causality direction from growth to finance on SSA economies. Key proxies for financial market development in both studies document that broad money

supply and domestic credit from deposit banks play an important role in the direction of both studies.

### **Empirical views on the role of financial market development indicators**

Further look at empirical works indicates that varied views of the finance-growth nexus is not only observed in direction but notably, also in the roles of financial market development indicators on economic growth;

In a recent study conducted using private credit, and bank security issuance, banking augment growth in emerging markets (Jedidia, Boujelbene, & Helali, 2014). Contrary to the findings of this study on the role of banking on growth is found in the study of Cecchetti and Kharroubi, (2012) who for consistent survey observed that banking has a negative impact on economic growth. Such divergence on the role of finance indicators has raised questions in literature as to whether there is a frontier beyond which banking or private sector credit no longer promotes economic growth (Arcand, Berkes, & Panizza, 2015). The varying roles of financial indicators could result from the structure of different economies- weakness in macroeconomic variables may confound on the effectiveness of private credit in an economy but substantially contribute immensely in other economies if found that these macroeconomic variables are credible.

In the context of stock markets which from a generic view through their liquidity and diversification structure, augment growth. According to Shen and Lee (2006) maintained that stock market capitalisation has a positive impact on economic growth, which is conditioned only at a particular threshold to realize such positive impact (Levine & Zervos, 1998). However, other studies particularly in the recent study of Abid, Bahloul and Mroua



(2016) asserts that stock market returns to GDP in the Middle East and North African region proves to be insignificant on growth. However, in the same study, it was found that stock market contribute significantly in the North African region. From the findings of the aforementioned studies, it can be expected that stock market returns performance is contingent on income level countries- positive performance in high and middle income economies with low and negative performance in economies with low income level. Spurring the arguments, with a selected 14 African countries, Adjasi and Biekpe (2006) also established that stock market development has no contribution to economic growth for low and lower middle-income countries in their sample. However, the contribution to economic growth for the upper middle-income countries is significant and positive in their sample.

### **Empirical views on growth theory**

The interest in human capital grew as the endogenous growth theory developed. Romer (1989, 1990), Uzawa (1965), and Lucas (1988) each created models where the output level is defined as human capital. In the discipline of growth theory, Mankiw, Romer and Weil (1992) surveyed a cross country analysis to examine if Solow model was consistent with international variations in standard of living. They considered two separate regressions for Non-oil, intermediate and OECD countries with sample observations ninety eight, seventy five and twenty two respectively on a time span from 1960 to 1985. On the regression with exogenous savings, it was found that the saving function predicted the direction on growth as exactly postulated by Solow theory. Upon the second regression analysis with augmented human capital inclusion, it was observed that the variation of growth was much explained by

human capital than savings could. This latter finding was consistent with the endogenous growth theory that asserts that variations of cross country growth are best explained by endogenous factor (human capital) than exogenous factor (savings).

### **Conclusion**

The overview of the literature for the study revealed a number of considerable points. The conceptual framework showed various relationships among which included real sector and financial market development, the influence from portfolio risks to financial market development and real sector.

On the theoretical review, it was established that portfolio risks affect the financial market in determining the impact of finance –growth nexus. This theoretical concern was justified by the empirical review which asserted that inflation, interest rate and exchange rate negatively affect the stock prices in the financial market and consequentially reducing the growth rate.

The liberalisation and growth relationship remained inconclusive in the empirical review. It is upon which the study identified the gap of the moderating role of financial market liberalisation in the inconclusive liberalisation-growth relationship.

Further, the study upon its review of the finance-growth direction notified a missing gap of determining the strength of interdependence of the finance-growth established by the use of granger causality.

Following the gap revealed, the next chapter of the study employs different methodology and variables in achieving the objectives of the study.

## CHAPTER THREE

### RESEARCH METHODOLOGY

#### Introduction

Following the literature review, this chapter presents a description of the research process by considering the philosophical approach behind the study, research design and other methodologies relevant for the purpose of the study.

#### Research Design and Approach

This study inclines to the approach of quantitative analysis. Quantitative approach probes to comprehend behaviour by adopting a mathematical and statistical modelling, through a systematic process to establish a cause and effect among variables and delineate a subject of reality in numerical terms. Employing quantitative approach in this study provides the basis for validity of measurement and its generalizability in the prognosis of behavior of selected variables of the study. From a philosophical point of view, we adopt the positivist approach throughout the study. Positivism may be seen as a method to social research that probes to apply the natural science model of research as the point of departure for investigations of social phenomena and explanations of the social world (Denscombe, 2010b). The motivation for adopting the positivist paradigm of research is to place the study at the point of objectivity where this study will be value free-independent of the researchers' interest.

## Model Specification

### Theoretical Model

With an underlying orientation on the debate of growth in the literature section of the study in determining whether an endogenous human capital or exogenous saving is the determinant of growth at the steady state growth rate (SSGR), the study employs the Cobb–Douglas production function with constant returns and Hicks neutral technical progress:

$$Y_{it} = A_{it}F(L_{it}, K_{it})$$

$$Y_{it} = A_0 e^{gT} k_{it}^{\alpha} \dots\dots\dots(1)$$

$$L_{it} = f(HUM_{it}) \quad \text{and} \quad K_{it} = f(FMD_{it})$$

A modified form of the Hicks-neutral production technology to integrate the augmented effect of financial market development:

$$Y_{it} = A_{it}F(L_{it}(HUM_{it}), K_{it}(FMD_{it}))$$

$$Y_{it} = A_0 e^{(g_0 + g_1 HUM_{it})T} k_{it}^{(a_0 + a_1 FMD_{it})} \dots\dots\dots(2)$$

$$FMD_{it} = f(PORT_{it}, LIB_{it})$$

Linearizing the integrated output function:

$$\ln Y_{it} = \ln A_0 + (g_0 + g_1 HUM_{it})T + (a_0 + a_1 FMD_{it}) \ln k_{it} \dots\dots\dots(3)$$

The variables  $Y$ ,  $L$ , and  $K$ , which are output, labour and capital stock represent the annual growth rate of GDP as a proxy for economic growth, human capital and financial market development respectively in the empirical model. Specifically, the labour and capital stock are modelled as  $X_{it}$  independent variables in the dynamic panel model of the empirical model specification in equation 4. The parameter  $A$  is the constant parameter shift which represents the constant term  $\varphi_0$  of the empirical model of the dynamic panel. The parameters  $g_0$  and  $a_0$  are the intercept effects and  $g_1$  and  $a_1$  are

the slope effects of the human capital and financial market development respectively. T represents the time span for the study.

## Empirical Model Specification

### Dynamic Panel Model

Acknowledging the fact that there have been a number of studies in this discipline informed this study to unravel other existing works as guide in choosing variables and models which are conforming to theory. The study chooses panel data regression over cross-country regression to overcome cross-country regression shortfall which manifests in likely omitted variable bias and to further explore the behavior of our variables of interest across the sample groups (countries). The econometric form of the general dynamic model relevant for the purpose of the study is specified as;

$$Y_{it} = \varphi_0 + \beta Y_{it-1} + \gamma X_{it} + \delta_i + \varepsilon_{it} \dots \dots \dots (4)$$

$Y_{it}$  is annual percentage growth rate of GDP,  $Y_{it-1}$  being the lagged value of annual GDP growth rate.  $X_{it}$  is the model explanatory variables.  $\delta_i$  captures the unobserved country heterogeneity effects, and  $\varepsilon_{it}$  is the error term.

### Panel Seemingly Unrelated Regression Model

In the nature of an economic phenomenon where an objective is to explain the whole structural system of equations, there may be more than one multiple equations. In dealing with this phenomenon is to establish a set of simultaneous equation model in which one or more of the regressors in one or more equations are itself the regressand variable in association with another equation in the whole structural system. Although each equation exists independently from another equation in the whole system, however, they may

be related indirectly if the random error components associated with at least some of the different equations are correlated with each other (contemporaneous correlation of error terms in different equation) and the assumption of no serial correlation of variables in the same equation.

The specification of the seemingly unrelated regressions (SUR) model is in the reflection of the  $g$ th of  $G$  equations for the  $i$ th of  $N$  countries given by:

$$Y_{itg} = X'_{itg}\beta_g + u_{itg}, \quad g = 1, 2, \dots, G, \quad i = 1, \dots, N, \quad t = 1, 2, \dots, T \dots \dots \dots (5)$$

Where  $x_{itg}$  are regressors that are assumed to be exogenous and  $\beta_g$  are  $K_g \times 1$  parameter vectors. On the basis of equational independencies, stacking all  $G$  system of equations for the  $i$ th cross-sectional unit yields:

$$\begin{bmatrix} Y_{i1} \\ \vdots \\ Y_{iG} \end{bmatrix} = \begin{bmatrix} X'_{i1} & 0 & 0 \\ 0 & \ddots & 0 \\ 0 & 0 & X'_{iG} \end{bmatrix} \begin{bmatrix} \beta_1 \\ \vdots \\ \beta_G \end{bmatrix} + \begin{bmatrix} u_{i1} \\ \vdots \\ u_{iG} \end{bmatrix} \dots \dots \dots (6)$$

Which takes the form  $Y_{it} = X_{it}\beta + u_{it}$ , where  $Y_{it}$  and  $u_{it}$  are  $G \times 1$  vectors with  $g$ th entries  $Y_{it,g}$  and  $u_{it,g}$ ,  $X_{it}$  is  $G \times K$  matrix with  $g$ th row  $[0 \dots X'_{itg} \dots 0]$  and  $\beta = [\beta_1' \dots \beta_G']'$  is a  $K \times 1$  vector where  $K = K_1 + \dots + K_G$ .

**Method of Analysis and Estimation Techniques**

**GMM Model Specification**

Following the general dynamic panel model, the Generalised Method of Moment is employed as a method of analysis for regression classification and objectives 1 and 2. Equations 7 include regression involving the financial market development index which was created using the principal component analysis. Equations 8 to 9 specify objectives 1 and 2 which capture the moderating role of financial portfolio risks on finance-growth relationship and

the interactive role of financial market liberalisation on finance-growth nexus respectively.

$$GDP_{it} = \gamma GDP_{it-1} + \delta_1 GDS_{it} + \delta_2 TRADE_{it} + \delta_3 FDI_{it} + \delta_4 IDP_{it} + \delta_5 GE_{it} + \delta_6 HUM_{it} + \delta_7 MS_{it} + \delta_8 PRVCR_{it} + \delta_9 FMDI + \varepsilon_{it} \dots\dots\dots(7)$$

$$GDP_{it} = \gamma GDP_{it-1} + \beta_1 FMD_{it} + \beta_2 PORT_{it} + \beta_3 GDS_{it} + \beta_4 TRADE_{it} + \beta_5 GE_{it} + \beta_6 HUM_{it} + \beta_7 MS_{it} + \beta_8 PRVCR_{it} + \beta_9 FMD_{it} PORT_{it} + \mu_{it} \dots\dots\dots(8)$$

$$GDP_{it} = \gamma GDP_{it-1} + \alpha_1 FMD_{it} + \beta_2 LIB_{it} + \alpha_3 GDS_{it} + \alpha_4 TRADE_{it} + \alpha_5 GE_{it} + \alpha_6 HUM_{it} + \alpha_7 MS + \alpha_8 PRVCR_{it} + \alpha_9 FMD_{it} LIB_{it} + \eta_{it} \dots\dots\dots(9)$$

$$FMD = f(STMC, STMT, SYNLI, LISTC, PORTE, PORTDL) \dots\dots\dots(10)$$

$$LIB = f(FDI, AEL, AML) \dots\dots\dots(11)$$

$$PORT = f(IDP, INFL) \dots\dots\dots(12)$$

Where annual growth rate of GDP is proxied for economic growth; FMD represents the three dimensions (Access, Depth, and Efficiency) for measuring financial market development. STMC, STMT, SYNLI, LISTC, PORTE and PORTDL represent stock market capitalisation, stock market turnover ratio, syndicated loan issuance volume, number of listed companies per million people, gross portfolio equity asset and gross portfolio debt liability in order arrangement ; INF and IDP represent inflation rate and industrial production which are respectively used in explaining the moderating mechanism of systematic and idiosyncratic portfolio risks factors on the effect of financial variables on growth; LIB represents all variables in measuring financial market liberalisation in the scope of the study – FDI, AEL and AML capturing foreign direct investment, average equity liberalisation and average money market liberalisation respectively; GE and TRADE represent government final expenditure and net export respectively in the real sector; GDS, HUM, PVRCR and MS designate the gross domestic savings, human

capital formation, credit to private sector and broad money supply respectively.

**Panel SURE: System OLS**

The panel seemingly unrelated regression model uses the system ordinary least square in obtaining the parameters in the system of simultaneous equations. From the matrix specification in equation (6) results in the derivation of the SURE parameters:

$$\begin{bmatrix} \hat{\beta}_1 \\ \vdots \\ \hat{\beta}_G \end{bmatrix} = \begin{bmatrix} \left[ \sum_{i=1}^N \sum_{t=1}^T X_{it1} X'_{it1} \right]^{-1} \sum_{i=1}^N \sum_{t=1}^T X_{it1} Y_{it1} \\ \vdots \\ \left[ \sum_{i=1}^N \sum_{t=1}^T X_{itG} X'_{itG} \right]^{-1} \sum_{i=1}^N \sum_{t=1}^T X_{itG} Y_{itG} \end{bmatrix} \dots\dots (13)$$

From equation (13) the derivation of the parameters shows that systems OLS is the same as separate equation-by-equation OLS.  $Y_{it}$  is the endogenous financial market development and the annual growth rate of GDP and  $X_{it}$  represents the exogenous variables.

**Variable definition**

To probe into documenting the impact of the exogenous dimensions of development of financial market on economic growth, this study takes much cognizance of the dependent variable as annual percentage growth rate of Gross domestic and the dimensions of financial market development as independent variables.

**Dependent Variable**

Annual growth rate of gross domestic product is employed as a proxy for economic growth. It is specified as annual percentage growth rate of gross domestic product. The reason for using this variable as a proxy for economic



growth is to measure the economic output from country level to correspond to the country level values of the financial market variables.

## Independent Variables

### Stock market capitalisation

Stock market capitalisation is described as the value of all listed shares in a stock market as a percentage of GDP. The computation of this variable

uses a deflation method as  $\left( \frac{0.5 \left( \frac{F_{it}}{Pe_{it}} + \frac{F_{it-1}}{Pe_{it-1}} \right)}{\frac{GDP_{it}}{Pa_{it}}} \right)$  with stock market

capitalisation capturing  $F_{it}$ ,  $Pe$  being described as end-of period CPI, and  $Pa$  denoting average annual CPI. This measure is used to indicate depth dimension of financial market development. The reason underpinning the use of this indicator is the advanced growth in the stock market relative to its ability to effectively allocate resources, absorb and diversify portfolio risks and principally, the enactment of corporate governance and legal framework which seeks to increase the value of firms necessary for economic output. In that regard, the a priori sign for this variable is said to be positive

### Stock market turnover ratio

Stock market turnover ratio is described as the value of shares traded during the period per the average market capitalisation for the period. Description of the stock market turnover ratio is estimated using

$\left( \frac{0.5 \left( \frac{M_{it}}{Pe_{it}} + \frac{M_{it-1}}{Pe_{it-1}} \right)}{\frac{Pa_{it}}{T_{it}}} \right)$  where  $T$  reflects the amount of stocks traded,  $M$  denotes

stock market capitalisation and  $Pe$  being described as end-of period CPI. This

measure is used to indicate the efficiency of the financial market development, as more stocks traded means a growing financial market. The liquidity and marketability of firms' stocks in the stock market determines the turnover ratio- an increase in the turnover ratio of stocks in effect contributes to growth through the advancement of the financial market-the ease of liquidating shares on the secondary markets stimulates demand for shares and stocks which consequentially induces increase in price per share and rate of return. An increase in the rate of return as investment from theoretical perspective causes a positive impact on national output (GDP). With stock market turnover complementing value of stock traded, economic growth is said to be achieved. Thus, a prior sign of this variable is expected to be positive.

#### **Number of listed companies per 1,000,000 people**

This measure is used to indicate access dimension of financial market development. Number of listed domestic companies describes the domestically registered companies listed on the country's stock exchange at the year end. An increase in the number of listed companies on the stock exchange of a country encourages competition among listed firms. Such competition ensures greater and complicating innovation to reap economies of scale in the financial market which substantially contributes to growth. From the description and the role of this variable, a positive direction is expected towards economic growth.

#### **Syndicated loan issuance volume**

It describes the total volume of newly issued syndicated loans by private entities divided by GDP in current USD. A syndicated loan is a commercial loan provided by a group of lenders and structured, arranged, and

administered by one or several commercial or investment banks known as arrangers. Syndicated credits are traded on secondary markets which increase the depth of liquidity level of the market. The role of syndicated loan is to facilitate credit risk sharing between various institutions without the disclosure and marketing burden that bond issuers face. This diversification of risk sharing encourages the flow of financial credits with a greater supervision to ameliorate risk burden on lenders.

Elimination of risk as one of the financial functions contributes to financial development and a positive externality on economic growth (Greenwood, 1986). Contrary to this argument, in the absence of effective supervision and prudential regulation by arrangers, will cause a greater depth of asset reduction in the balance sheet of syndicated loan lenders in the event default. Asset reduction reduces the net asset value (NAV) of lenders and low productivity which in the long run negatively affect growth. Thus, this variable on growth is expected to be varied.

#### **Gross portfolio equity asset**

This class of portfolio includes traded shares, stocks and other foreign securities receipts which form ownership of firm's diversified portfolio. A diversified portfolio with negative correlation of assets absorbs idiosyncratic risk which affects the returns of firms in the financial market. This indicator reflects the depth level of measuring financial market development. With highly traded and ownership of shares and stocks positively affects financial markets-from ethical code of conduct and legal framework in the corporate environment establish effective allocation of equity to increase the wealth of shareholders and corporate firms which contributes to growth of economy in

the form of increased production from equity allocation. It is therefore expected that this variable will positively affect economic growth.

### **Gross portfolio debt liabilities**

The ratio of gross portfolio debt liabilities accounts for the component of bonds, debentures, notes, etc., and money market or negotiable debt instruments. The innovation and increase demand for negotiable instrument due to its short term nature helps not only to diversify but to principally mitigate interest rate risk. Such argument of mitigating interest rate risk is not far reached in the bonds market which employs duration, portfolio rebalance and weighting to sustain the returns of firms. This variable indicates the depth indicator measuring financial market development in this study. However, according to Modigliani-Miller proposition II, a levered (debt) portfolio increases uncertainty about the percentage of stock returns which contribute to financial distress. A varied sign of gross portfolio debt liabilities therefore is expected towards economic growth.

### **Moderating variables**

The financial market is influenced by the movement of idiosyncratic and market risks including industrial production, inflation, exchange rate and risk premium (Ross, 1976). According to Bumann et., al 2012 there are three broad measures of financial market liberalisation including capital account liberalisation (FDI), equity account liberalisation (Equity market liberalisation) and the banking sector liberalisation (Money market liberalisation) which affect the financial market through stock prices.

## **Industrial Production**

In the absence of credit rationing, information asymmetry and demand inefficiency, an efficient and a matured financial market considerably contributes immensely to the growth of industrial production. The growth in the moderating factor propels growth through increased production and technology at affordable prices. How accessible firms and industries can obtain funds from the financial markets at lower interest rate determines the depth of industrial stimulation (Ahad, Ahmad Dar, & Imran, 2017).

## **Inflation**

The moderating variable, inflation from theoretical argument and much precisely from the Keynesian theory posits that in the short run analysis where aggregate supply curve is upward sloping rather than vertical, the 'dynamic adjustment of the short-run aggregate demand and aggregate supply curves yields an 'adjustment path' which exhibits an initial positive relationship between inflation and growth, however, turns negative towards the latter part of the adjustment path. A varied sign towards growth is expected for this variable.

## **Foreign direct investment**

From theoretical perspective, there have been opposing views on the relationship between foreign direct investment and growth. FDI on the other hand increasingly affects growth when it extension from developed to less developed economy increases production through enhancing labour productivity and the advancement of technology. On the other hand, FDI may affect growth negatively, as it may deteriorate competition and may affect the

development path of the country in its own interests. A varied sign towards growth is expected.

### **Average equity liberalisation**

Liberalisation of equity market gives investors the edge of allocating resources in domestic and foreign equity securities where opportunities in off shore market are derived to enhance portfolio performance. Implication of portfolio performance through this liberalisation induces investment returns which potentially contribute to growth level. However, the absence of ethical codes of conducts including corporate governance, insider law, and market timing will correspondingly dysfunction financial market operations to reduce returns of corporate firms which consequentially impair growth level. On the basis of this thought, a varied sign is expected towards growth level.

### **Average money market liberalisation**

Lenders and borrowers to satisfy their short term financial needs through money market instruments including commercial paper, repos, and treasury bills. Where market trading of these instruments offers potential growth opportunity through reduction in cost of capital and ameliorating of information asymmetry to increase portfolio returns, it is notably known that there is a high sensitivity in this market towards risk which deteriorates the balance sheet of lenders in the absence of prudential regulation. Deterioration of worth of lenders reduces the rate of investment and impairs the economic growth in the long run. On the basis of this argument, a varied sign is expected of average money market liberalisation towards the growth level.

### **Control variables**

Other relevant variables of interest include: credit to private sector and broad money supply as proxies for financial institutions, ratio of gross domestic savings to GDP (GDS), government final expenditure, trade and the human capital formation (HUM) for which the ratio of tertiary enrollment to the population of the age group corresponding to tertiary level of education is used as a proxy. The stock of knowledge from human capital with base reference from secondary school enrollment translates into innovation, research and development which positively affect growth (Sharma & Keshob, 2016). However, the base reference for human capital in this study considers the tertiary enrollment because comparatively, stock of knowledge in the tertiary for innovation, research and development exceeds the stock of knowledge in the secondary level of education. The fraction of savings designated to investment potentially determines the steady state growth rate as postulated by the Solow growth theory and empirically asserted by Pagano (1993).

### **Data**

Recognizing the variables of interest as secondary nature, the study gathered data from relevant and reliable sources. All data measuring financial market development were gathered from available list of countries from the recent global financial market development database from the period of 1996-2016. All other variables of the study were obtained from WDI of the World Bank's and the African Development Indicators of the African Development Bank's database in 1996-2016. Potential limitation of the study observed from insufficient financial market development data particularly, the stock market

capitalisation and syndicated loan issuance variables necessitated the study to eliminate countries with insufficient data by focusing on a balanced panel of 34 SSA countries for the 21 year period (1996-2016).

**Diagnostic tests**

**Panel unit root test**

Panel stationarity test is employed to all the variables of the study to examine the order of integration and avoid the biases associated with using non-stationary variables. We apply Fisher’s type test on the heterogeneous panel data: Choi (2001) test. The rationale for adopting the Fisher’s type is a reflection of the limitations from the Im, Pesaran and Shin (2003) tests (IPS) and the Levin, Lin and Chu (2002) test (LLC). According to Choi (2001) the inflexibilities from the IPS and LLC limit their use empirically: (1) both tests demand an indefinite number of groups- all groups are assumed to have the same type of non-stochastic component; (2) the time series factor in the panel expected to be equal for all the cross-section units and to consider the case of unbalanced panels further simulations are required, (3) both the IPS and LLC tests argue that none of the groups have a unit root under the alternative hypothesis.

In resolve the restrictions of LLC and IPS panel unit root tests, Fisher employs the amalgamation of *p*-values from a unit root test applied to each group in the panel data.

According to Choi, (2001) the postulated model of Fisher is:

$$y_{it} = \eta_{it} + \rho_{it} ; i=1,2,3...N \quad , \quad t=1,2,3...T \quad \dots\dots\dots(16)$$

The observed data  $y_{it}$  comprises the stochastic term  $\rho_{it} = \delta_i \rho_{i(t-1)} + u_{it}$  and the non-stochastic term  $\eta_{it} = \tau_{i0} + \tau_{i1}t + \dots + \tau_{im_i}t^{m_i}$



Each time series factor  $y_{it}$  can assume varying sample size and varying specifications of the stochastic and non-stochastic terms which is contingent on the cross-sectional unit factor  $\mathbf{z}$ . The component  $u_{it}$  is said to be integrated of order zero and may exhibit heteroskedasticity.

According to Choi, (2001) the null hypothesis of the postulated test is:

$$H_0 : \delta_i = 1 \quad \forall i$$

Implication of the null suggests that all the time series variables are nonstationary and suffer from unit root. The two possible research hypotheses are

$$H_1 : |\delta_i| < 1 \quad \text{for at least one } i \text{ for finite } N \text{ and}$$

$$H_1 : |\delta_i| < 1 \quad \text{for some } i \text{'s for finite } N$$

Implication of the first alternative hypothesis establishes that some series are nonstationary while others are stationary. The second alternative hypothesis implies a strong assertion held in the LLC test that all series are stationary which empirically is inflexible.

The advantage the Fisher type test holds over the (IPS) test and the LLC test is found to be that it does not demand a strong balanced panel data as proposed by IPS and it is possible to use varying lag lengths in the individual ADF regression which hardly is treated in the LLC type test.

### **The Sargan Test**

In an econometric model, particularly in a dynamic panel model where instrumentation is required, there is likely the problem of over-identification which may arise when the order condition for identification is satisfied in inequality: the number of instruments excluded from the equation exceeds the

number of included endogenous variables. To check for the validity of over identifying restrictions, we run the Sargan test which is a j test statistic. With the null hypothesis of the Sargan test indicating that overidentifying restrictions are valid, shows that the failure to reject the null gives a consistent estimates. Notably, rejection of their null may be indicative that the exclusion restrictions for these instruments may be inappropriate.

### **Correlations**

The objectives of the study necessitated the inclusion of financial market development indicators as the independent variables. Because of the nature of the financial market development variables selection and particularly, the problem of multicollinearity, the study sought to conduct correlation analysis of the financial market development indicators and moderating variables to ascertain reliability of the results. According to appendix F, it is indicated that though correlation exist in some financial market development variables, the level of correlation is at low positive level except (below 0.600) except the correlation between gross portfolio and stock market capitalisation having a moderate correlation of 0.652. It is observed from the same appendix F that were low or no correlation among the moderating variables and the financial market development variables. This no and low correlation established the basis for interacting the moderating and financial market development variables for the objectives 1 and 2.

### **Panel Endogeneity**

In this dynamic panel,  $Y_{it} = \Phi Y_{it-1} + \gamma X_{it} + \delta_i + \mu_{it}$  where  $\mu_{it} = \mu_i + \varepsilon_{it}$  follows a one way component error, the problem of endogeneity exists where there is correlation between the lag of the dependent variable and

the individual heterogeneity. That is,  $\text{corr}(Y_{it-1}, \mu_i) \neq 0$  and apparently will cause coefficient bias and invalid results. In resolving the issue of endogeneity, the study uses the second difference GMM approach which inherently uses the method of differencing to remove the individual heterogeneity in the error term. Further, it also uses the change of the first difference ( $\Delta Y_{it-1}$ ) as a strong internal instrument that highly correlates with  $Y_{it-1}$  but orthogonal to  $\mu_i$ .

### Panel estimations and multivariate distributions

#### Panel Vector Auto Regression

In carrying out forecast estimations of financial market variables on economic growth, the study uses the vector auto regression process which treats all variables as endogenous in response of the first difference nature of stationarity of the financial market development variables in appendix B of the study. VAR specification for the study comprises seven component variables including six proxy measures of financial market development indicators (STMC, STMT, LISTC, PORTE, PORTDL and, SYNLI) and economic growth (GDP) for the regional forecasting. The specification of standard VAR model is expressed as

$$Y_{it} = \phi + \sum_{s=1}^m A_s Y_{i,t-s} + e_{it} \dots\dots\dots (16)$$

Where  $Y_{it}$  is a  $7 \times 1$  column vector of seven variable components of proxy measures (GDP, STMC, STMT, LISTC, PORTE, PORTDL, SYNLI);  $\phi$  and  $A_s$  are, respectively,  $7 \times 1$  and  $7 \times 7$  matrices of coefficients; m is the lag length; and  $e_{it}$  is a  $7 \times 1$  column vector of forecast errors (innovations). By

the specification of VAR, the elements of the innovation  $e_{it}$  have zero means and constant variances  $(0, \Sigma)$ , and are individually serially uncorrelated. The  $ij$ th component of  $A_s$  describes the effect that a change on the  $j$ th variable would have on the  $i$ th variable in  $s$  periods.

Because selection of many lags induces the loss of degrees of freedom leading to statistical insignificant coefficients and the selection of few lag length results in specification errors, the study finds it important to carry out the optimal lag selection criteria to ascertain the optimal lag length for the VAR model using the Akaike Information Criterion (AIC), Hannan-Quinn information criterion (HC), Final prediction error (FPE) and the Schwarz or Bayesian Information Criterion (BIC).

On conducting the lag selection order criteria, if it is observed that asterisks are attached to a particular lag order of the selected criterion, then that lag order becomes the optimal lag to be specified in the VAR specification in equation 16.

### **Variance Decomposition**

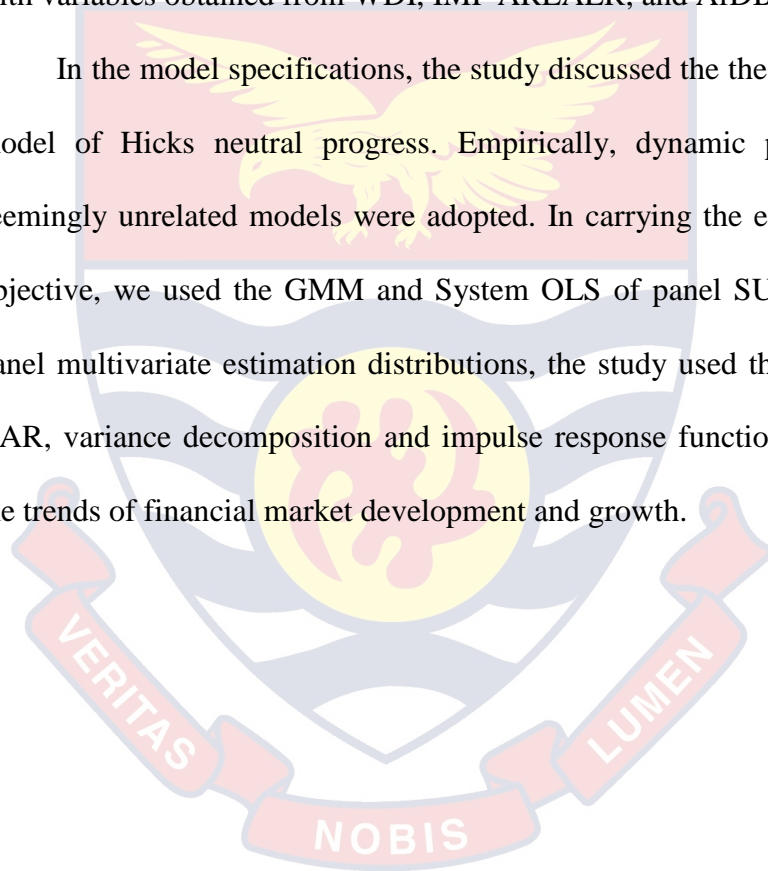
In an attempt to uncover the interrelationships among the innovations and endogenous variables in the VAR specification of forecasting, the forecast error variance decomposition shows the fraction of the movements in a sequence resulting from its “own” shocks versus shocks to other variables. In a VAR model of series  $y_{it}$  and  $z_{it}$  with their innovations  $\varepsilon_{zit}$  and  $\varepsilon_{yit}$ , if  $\varepsilon_{zit}$  shocks explain none of the forecast error variance in  $y_{it}$  at all forecast horizon,  $y_{it}$  series becomes exogenously determined. In this effect, the forecast of  $y_{it}$  evolves independently of the shocks  $\varepsilon_{zit}$  and the series  $z_{it}$ .

However, the series  $y_{it}$  turns to be endogenous if  $\varepsilon_{zit}$  shocks explain all the forecast error variance in the  $y_{it}$ .

### Conclusion

The study on its inception established a quantitative analysis and a positivist approach from a philosophical perspective. Due to the limitation of missing values in some SSA countries, the study considered 34 SSA countries with variables obtained from WDI, IMF AREAER, and AfDB.

In the model specifications, the study discussed the theoretical modified model of Hicks neutral progress. Empirically, dynamic panel and panel seemingly unrelated models were adopted. In carrying the estimations of the objective, we used the GMM and System OLS of panel SUR. According to panel multivariate estimation distributions, the study used the panel standard VAR, variance decomposition and impulse response functions in forecasting the trends of financial market development and growth.



## CHAPTER FOUR

### ANALYSIS AND DISCUSSION OF RESULTS

#### Introduction

Probing to know and achieve the stated objectives in the initial chapter of the study, this chapter proceeds to examine the findings and discussions. The current section of this chapter presents the summary of statistics of the variables we have employed for the study. Followed by the descriptive statistics is the justification of the type of GMM estimation technique, behavior of macroeconomic variables on growth, behavior of macro-finance on growth, the behaviour of financial market index on growth, regression classifications (income groups, economic blocs and financial crises cycle), finance- growth relationships on the basis of moderating role of portfolio risks and financial liberalisation, the chapter finally uses panel sure model to establish the bidirectional of finance-growth.

#### Summary of Statistics

Summary statistics showed in table 1 encompasses 34 selected Sub Saharan African countries within the duration of 1996-2016 with its classifications in economic communities and income level countries. The summary statistics of much relevance to this study are the number of observation, average, standard deviation, minimum and maximum values

**Table 1: Summary of statistics (1996-2016)**

Economic Growth	Financial Market Development						Real Sector		Portfolio Risks		
	GDP (%)	STMT (%)	SYNLI (%)	LISTC	STMC (%)	PORTE (%)	PORTDL (%)	GE (%)	TRADE (%)	INFL (%)	IDP (%)
<b>SUB-SAHARAN AFRICA (N= 34)</b>											
Obs	709	206	224	234	204	273	282	671	691	643	706
Mean	4.7	13.8	8.1	7.2	40.1	10.5	7.8	14.9	73.6	15.9	24.9
Std. D	4.5	75	29.4	12.8	61.3	29.3	36.2	6.0	37	165	24.9
Max	26.8	1081	269	84.5	311.1	259	395	47.2	311	4145	77
Min	-30.1	0.0	0.1	0.1	0.1	0.0	0.0	0.9	18	-8.5	2.1
<b>ECOWAS (N=13)</b>											
Obs	268	58	85	59	58	138	136	264	269	247	269
Mean	4.5	6.7	15.9	1.6	16	8.1	2.5	12.6	67.2	6.1	20.3
Std.D	4.5	6.2	46.3	0.4	10.3	36.8	3.4	4.6	35.1	7.2	6.8
Max	26.4	30.6	269	2.5	37.8	259	17.3	25.8	311	47	37
Min	-30.1	1.0	0.1	0.9	0.5	0.0	0.0	0.9	20.7	-5.4	3.2
<b>EAC(N=4)</b>											
Obs	84	36	2	47	38	21	32	84	84	84	84
Mean	6.3	3.9	1.4	0.8	13.9	0.2	0.3	14.2	44.8	7.8	18.8
Std.D	2.7	3.2	2.4	0.7	12.0	0.2	0.43	2.8	8.7	4.7	3.6
Max	13.4	14.8	11.1	2.1	40	0.8	1.6	19.6	64.5	26	26.4
Min	0.2	0.0	0.1	0.1	0.6	0.0	0.0	7.5	28.8	-2.4	12.3
<b>SADC (N=12)</b>											
Obs	252	112	81	128	108	97	110	233	248	208	248
Mean	4.4	20.6	4.4	12.1	62.3	17.9	16.8	18.2	93.7	34.7	30.5
Std.D	4.8	102.2	6.1	15.6	77.3	19.7	56.9	7.0	37.7	289	16.2
Max	26.8	1081	45.4	84.5	311.1	94.1	395.2	47.2	225	4145	77.4
Min	-17.7	0.0	0.0	0.5	0.0	0.0	0.0	2.0	38.6	-2.4	10.9
<b>ECCAS (N=2)</b>											
Obs	42	-	18	-	-	4	4	2	42	42	42
Mean	3.3	-	1.1	-	-	0.2	1.0	12.6	69	2.1	40.3
Std.D	3.1	-	1.1	-	-	0.1	1.2	1.9	19.6	1.8	13.7
Max	7.1	-	3.9	-	-	0.3	2.8	16.5	101.7	5.3	61.7
Min	-8.9	-	0.7	-	-	0.1	0.3	9.6	40.4	-1.9	24.5
<b>HIGH INCOME (N=1)</b>											
Obs	21	-	-	4	-	5	5	21	21	21	21
Mean	3.8	-	-	37.4	-	79.8	13.5	33.3	168.3	5.6	19.0
Std.D	4.9	-	-	32.5	-	8.0	1.7	6.6	43.3	10	6.7
Max	12	-	-	84.5	-	94.1	16.4	47.2	225	37	30.3
Min	-5.9	-	-	11.1	-	75	12.0	26.9	80.6	-2.4	10.0
<b>UPPER MIDDLE INCOME (N=5)</b>											
Obs	375	40	72	53	38	146	155	354	359	317	370
Mean	5.0	4.2	17.7	2.1	27.6	7.4	1.7	13.7	62.7	6.6	18.5
Std.D	5.1	4.5	50.1	2.6	56.4	259.1	3.21	4.3	31.7	7.4	5.9
Max	26.8	23.3	269	6.4	311	0.0	17.3	28.3	311	44.8	36.3
Min	-30.1	0.0	0.2	0.1	0.6		0.0	2.0	28.2	-8.5	3.2
<b>LOW MIDDLE INCOME (N=10)</b>											
Obs	210	90	110	97	90	70	53	191	206	207	210
Mean	4.9	5.8	3.3	1.5	16.6	1.9	2.4	13.0	73.8	36.4	32.1
Std.D	3.5	5.5	4.3	0.4	10.1	2.7	2.0	5.2	33.9	289.2	16.6
Max	18.7	30.6	26.1	2.7	37.0	9.4	8.9	28.7	165.6	4145	77.4
Min	-4.4	0.2	0.1	0.5	0.5	0.0	0.1	0.9	17.9	-0.8	2.1

Table1: Summary of statistics (1996-2016)-continued

Economic Growth	Financial Market Development						Real Sector		Portfolio Risk		
	GDP (%)	STMT (%)	SYNLI (%)	LISTC (%)	STMC (%)	PORTE (%)	PORTDL (%)	GE (%)	TRADE (%)	INFL (%)	IDP (%)
<b>LOW INCOME (N=18)</b>											
Obs	105	76	42	80	76	52	69	105	105	98	105
Mean	3.7	28.3	4.2	15.9	74.2	24	25.1	18.5	91.8	5.2	34.1
Std.D	3.2	123.5	7.5	15.9	81.1	11.1	70.7	4.5	22.3	3.0	11.6
Max	12.3	1081	45.4	59.4	270	49.8	395	30.1	132.2	12.7	61.7
Min	-8.9	1.6	0.1	2.7	0.0	2.2	0.0	9.6	46.7	-1.9	18.6

Source: Arku-Korsah (2020)

### Sub Saharan Africa

A critical examination of the region's average annual growth rate of GDP over the 21 year period records 4.7 percent indicating a mild growth rate. With an unsatisfactory maximum annual growth rate of GDP over the period shows that the region 26.8%. Much more is the minimum GDP growth rate showing a negative value of -30.1 percent. The financial market development indicators reveal that except for stock market capitalisation which recorded an average of 40.1 percent of gross domestic product, all other financial variables recorded an average percentage of GDP below 15 percent with syndicated loan issuance volume being the least with 8.1 percent of GDP. In the context of trade (net export) shows a remarkable contribution in the region recording an average value of 73.6 percent of gross domestic product.

### Economic Communities

In the classification by economic communities, the study revealed that member states of ECOWAS with 268 observations in annual growth rate of GDP recorded 4.5 percent of average growth rate of GDP which fell below the region's benchmark by 0.2 percent over the period. The financial market variable in this regional bloc contributing the highest average percentage of GDP has been stock market capitalisation with 16 percent, falling below the



region's benchmark of 40.1 percent. Comparing the least contributing financial market variable in this bloc divulges that the stock market turnover ratio recorded 6.7 percent against the benchmark of 13.8 percent by the region. Though below the region's benchmark, trade of this economic bloc contributed 67.2 percent of GDP. Closely to the sub-Saharan's maximum annual growth rate of 26.8 percent for the duration, the ECOWAS member states attained 26.4 percent.

Statistics from the Eastern African bloc reveals that over the same period, contribution from this bloc in terms of the annual percentage growth rate of GDP shows 6.3 percent for 84 reported observations of GDP growth rate. The maximum value of GDP growth rate in this bloc indicates 13.4 percent reflecting half of the region's value. With 13.9 percent of GDP, the stock market capitalisation of this community parallels the argument of being the financial indicator with the highest reporting value as in the ECOWAS bloc and the region and reporting an insignificant percentage of 0.8 for gross portfolio equity. Trade in this category reported an average of 48.8 percent of GDP.

Contextually, Southern African Development Community statistics report that with 252 observed values of annual percentage growth rate of GDP, the average of this variable lagged behind the region with 4.4 percent annual GDP growth rate. Reporting a percentage value of 62.3 of GDP, the stock market capitalisation takes the lead in all the financial variables in this economic bloc. Strikingly, except for syndicated loan issuance volume which fell below the region's reported value by an average of 3.7 percent, all other financial variables in SADC report to lead the region's financial variables

Considering further, the Economic Community of Central African States reports 42 observed annual GDP growth. The average value reported for the annual growth rate of GDP is 3.3 percent for the period of analysis lagging behind the region's value by 1.4 percent. The unreported values of stock market capitalisation, stock market turnover ratio and number of companies per million people depict the immature and rudimentary structure of ECCAS stock markets. The values reported for syndicated loan issuance volume and gross portfolio equity contribute an insignificant proportion of its GDP; an average of 1.1 percent and 0.2 percent of GDP respectively.

Regards to groupings by economic communities, there were 31 SSA countries under discussion because 3 countries, Ethiopia, Mauritania and Sudan do not belong to any of the economic communities under discussion.

#### **Income Level of Countries**

From the perspective of income level countries, Seychelles which is regarded as the only high income country over the period presents 21 observed values of annual percentage growth rate of GDP. The absence of any reported value from the stock market capitalisation, syndicated loan issuance volume and stock market turnover ratio may possibly present a reflection of the rudimentary structure of this country's stock market. A counter intuitive from the number of companies per million people with average value of 37.4 and average value of gross portfolio equity of 79.8 percent of GDP reveal that its stock market may be developed but shares and stocks are traded over the counter (OTC) than they are on stock exchange. A remarkable contribution from the trade sector reports an average of 168.3 percent of the country's GDP over the period.

A considerable attention to the upper middle income countries shows that stock market capitalisation continues to be the financial variable with the highest average percentage value of GDP.

For low middle income category, results from the summary statistics shows that an average of with a corresponding 210 observable variable in this respect is reported over the period of analysis. Contribution in terms of GDP is much realised in the real sector (trade) than is seen in the financial markets; the highest reported financial market variable, stock market capitalisation contributing an average of 16.6 percent of GDP lags behind the 73.8 percent contribution from trade

An observable 105 annual percentage of GDP rate or the low income group reports an average value of 3.7 percent. Though contributions in terms of percentage of GDP is much realised from the trade sector (91.8 percent), the financial market also contributes a significant average percentage with stock market capitalisation indicating 74.2 percent of GDP.

**Table 2: Justification for Difference GMM**

Estimators	Coefficients (L.gdp)
Pooled OLS	0.1692
Fixed Effects	-0.1439
One- step Diff. GMM	-0.2060
Two- step Diff. GMM	1.2071

**Source:** Arku-Korsah (2020)

According to Bond et al., (2001) rule of thumb which specifies that in the model,  $Y_{it} = \Phi Y_{it-1} + \gamma X_{it} + \delta_i + \varepsilon_{it}$ , the  $\Phi$  is considered to be biased upward for the pooled estimate and downward biased towards fixed effect estimate. After the difference estimate if the coefficient  $\Phi$  is below the fixed

effect, it will be of much relevance in using System GMM. However, if the coefficient  $\Phi$  falls above the downward biased estimate, little relevance of System GMM will be required. From a regression of financial market development variables and lagged dependent variable, result in table 2.0 posits that the coefficient of the two-step difference GMM (1.2071) falls above the coefficient (-0.1439) of downward biased estimator. Such gives a justification that difference GMM will be relevant over the use of system GMM.

**Table 3: Macroeconomic and Financial institutions on SSA economic growth**

GDP <sub>t-1</sub>	-0.09 (0.24)
GDS	1.49*** (0.50)
TRADE	0.59 (0.42)
FDI	-0.81 (0.70)
GE	1.12 (1.42)
HUM	0.52 (1.29)
MS	0.03 (0.04)
PRVCR	0.05 (0.04)
No. of Obs	340
F Statistic	1.15
Groups/ Instrument	32/23
AR(2)	0.351
Hansen-Sargan Statistic	0.18/0.039

**Source:** Arku-Korsah (2020)

Result from table 3 shows that in the absence of the development of financial market, except for gross domestic savings which for a 1% increase in value will drive the growth of the region by 1.49% on average ceteris paribus, all other macroeconomic variables remain insignificant in their contributions.

**Table 4: Effect of Macroeconomic and Financial market on SSA economic growth**

GDP <sub>t-1</sub>	-0.76 *** (0.03)
GDS	0.73*** (0.12)
TRADE	0.33** (0.14)
FDI	-0.03 (0.16)
GE	1.74*** (0.51)
HUM	-0.46* (0.24)
MS	0.60** (0.04)
STMC	0.10 (0.08)
SYNLI	-0.35*** (0.03)
STMT	0.40*** (0.05)
PORTE	0.57 (0.42)
PORTDL	-1.59*** (0.28)
LISTC	12.81*** (1.51)
No. of Obs	20
F Statistic	2178.17
Groups/ Instrument	20/20
AR(2)	0.906
Hansen-Sargan Statistic	0.10/0.03

**Source:** Arku-Korsah (2020)

For the period of analysis, result in table 4.0 reports that the one period lag of growth negatively drives the current growth level of the region by -0.76% for 1% increase in the one period growth lag on an average ceteris paribus. Strikingly, in the development of financial market, the previous insignificant macroeconomic variables in table 3 now become significant in their contribution to the regional growth level; Gross domestic savings positively affect the regional growth level by 0.73% in the short run for every 1% increase in its value on an average ceteris paribus. In the trade sector, it is reported that for 1% increase in the regional trade will correspondingly affect the region growth by 0.33% in the short run on an average ceteris paribus. Government expenditure shows an elastic relationship with the regional growth level- a 1% increase in the level of government expenditure will be associated with 1.74% in the short run period in the economic outlook of the region on an average ceteris paribus. Strikingly, for 1 percent increase in the

human capital formation will cause the level of growth of the region to plummet by 0.46% in the short run on an average ceteris paribus. In analysing the short run, 1% increase in the value of the regional broad money will drive the growth level by 0.60% on an average ceteris paribus.

The financial market reports that for 1% increase in the value of syndicated loan issuance volume and gross portfolio debt liability will affect the SSA growth by -0.35% and -1.59% respectively on an average ceteris paribus. Howbeit, for a 1% increase in the stock market turnover ratio and for each existence of a listed company per million people will increase the growth of SSA by 0.40% and 12.81% respectively in the short run on an average ceteris paribus. Due to a number of missing data in the financial market variables, their inclusion under table 4 and 5 reduced the number of observation to 20.

**Table 5: Effect of financial market development index on economic growth in SSA**

GDP <sub>t-1</sub>	-0.84*** (0.12)
GDS	0.26 (0.23)
TRADE	-0.20 (0.21)
FDI	0.71** (0.29)
IDP	1.13** (0.43)
GE	0.81 (0.65)
HUM	0.22 (0.22)
MS	0.12 (0.22)
FMDI	53.17** (19.77)
No. of Obs	20
F Statistic	53.41
AR (2)	0.09
Groups/ Instrument	20/8
Hansen Statistic	1.00

**Source:** Arku-Korsah (2020)

Using principal component analysis, the study created the financial market index for the financial market development variables through the rotate and predict algorithm to examine the effect it has on economic growth.

Table 5 shows that over the period of analysis, the one year lagged period of economic growth reduces its current period by 0.84% on an average ceteris paribus. In the operation of financial market development index, 1 percent increase in foreign direct investment is accompanied with 0.71% in the short run period on an average ceteris paribus. In view of the fullness of financial market development reports that by increasing the aggregate financial development indicators by a one percentage increase will affect the region's growth by 56.17% in the short run on average ceteris paribus.

**Table 6: Moderating role of portfolio risks on finance-growth relationship**

VARIABLES	IDP	INFL
GDP <sub>t-1</sub>	-0.39** (0.16)	-0.42*** (0.15)
GDS	-0.09 (0.12)	-0.19 (0.13)
TRADE	0.08 (0.09)	0.23*** (0.08)
GE	0.11(0.42)	-0.05 (0.41)
MS	-0.07 (0.12)	-0.23* (0.13)
IDP	0.31(0.33)	-
INFL	-	0.14 (0.42)
STMC	0.55* (0.29)	0.04 (0.06)
SYNLI	-0.14 (0.72)	0.33 (0.52)
PORTE	-2.10 (1.92)	-0.22 (0.51)
PORTDL	-0.66 (1.46)	0.58 (0.63)
LISTC	-2.49 (2.11)	0.00 (0.80)
SYNLID	0.01(0.03)	-
STMTID	-0.02 (0.03)	-
STMCID	-0.02* (0.01)	-
LISTID	0.09 (0.07)	-
PORTEID	0.07 (0.07)	-
SYNIF	-	-0.03 (0.06)
STMTIF	-	0.02 (0.20)
STMCIF	-	0.00 (0.01)
STMCIF	-	0.00 (0.01)
LISTIF	-	0.02 (0.11)
PORTEIF	-	-0.03 (0.07)
PORTDLIF	-	-0.07 (0.07)
No. of Obs	56	56
F Statistics	64.42	47.21
Groups/ Instrument	9/43	9/43
Sargan Statistic	0.35	0.23

**Source:** Arku-Korsah (2020)

### **Moderating role of financial portfolio risks**

### **Moderating role of Industrial Production**

Table 6.0 reports that in the presence of industrial production the one period lag of the regional growth will affect the current growth level by -0.39% for 1% increase in its value on an average ceteris paribus. Further, result from the same table reports the insignificant contribution of an independent industrial production in its role on economic growth. However, it is observed that the specification of partial effect  $\frac{dgdp}{dstmc} = 0.55 - 0.02idp$  shows that, for mean value 24.9% of industrial production, the impact from the percentage change of the value of listed stocks on exchanges will increase the growth rate of the region by 0.052% ( $0.55\% - 0.02 \times 24.9\%$ ) on an average ceteris paribus. Result further maintains that, at 27.5% ( $0.55\% / 0.02\%$ ) increase in the industrial production, a percentage change in the value of listed stocks will have no impact on the regional growth level.

### **Moderating role of Inflation**

Not so far reached from our expectation, the presence of inflation has no significant role in the financial-growth of SSA; inflation induces allocation of financial funds to be invested in the commodity market and the real investment such as real estate. The channelling of funds by the surplus units to these sectors renders the financial market insensitive and irresponsible to any changes-thus, not having any effect on the growth level of the region. Table 7.0 reports that in the presence of inflation the one period lag of the regional growth will affect the current growth level by -0.23% for 1% increase in its value on an average ceteris paribus.



**Table 7: Moderating role of financial liberalisation on finance-growth relationship in SSA**

	FDI	AEL	AML
GDP <sub>t-1</sub>	-0.59*** (0.14)	-0.62*** (0.16)	-0.64*** (0.14)
IDP	0.73*** (0.17)	0.40 (0.27)	0.63*** (0.22)
STMC	0.08*** (0.03)	0.16** (0.08)	0.26** (0.12)
SYNLI	0.32 (0.32)	1.35** (0.63)	1.62*** (0.78)
STMT	-0.13 (0.11)	-0.43** (0.23)	-0.68** (0.30)
PORTE	-0.66** (0.28)	-0.54 (0.53)	-0.79 (0.67)
PORTDL	0.61 (0.40)	0.65 (0.65)	0.95 (0.61)
LISTC	0.69 (0.50)	-1.41(2.01)	-4.58* (2.35)
FDI	1.62** (0.66)	-	-
SYNFDI	-0.01 (0.06)	-	-
STMTFDI	0.06 (0.04)	-	-
STMCFDI	-0.02** (0.01)	-	-
LISTFDI	-0.2 (0.13)	-	-
PORTEFDI	0.17* (0.10)	-	-
PORTDLFDI	-0.29** (0.14)	-	-
AEL	-	-1.34 (20.63)	-
SYNAEL	-	-1.67** (0.82)	-
STMTAEL	-	0.83** (0.42)	-
STMCAEL	-	-0.48* (0.27)	-
LISTAEL	-	7.77 (7.31)	-
PORTEAEL	-	0.49 (1.64)	-
PORTDLAEL	-	-1.49 (1.11)	-
AML	-	-	-89.50** (16.50)
SYNAAML	-	-	-2.02*** (0.77)
STMTAML	-	-	1.44* (0.76)
STMCAAML	-	-	-0.80* (0.44)
LISTAML	-	-	21.37** (9.05)
PORTEAML	-	-	0.89 (2.26)
PORTDLAML	-	-	-1.56 (1.26)
No. of Obs	56	50	50
F Statistics	65.55	37.12	52.80
Groups/	9/43	9/37	9/37
Instrument			
Sargan Statistic	0.09	0.39	0.32

Source: Arku-Korsah (2020)

### Moderating role of financial market liberalisation

#### Foreign Direct Investment

The partial specification of stock market capitalisation,  $\frac{dgdp}{dstmc} = 0.08 - 0.02fdi$  shows that, at a mean value of 4.67% of foreign direct investment, the impact from the percentage change of the value of listed stocks on

exchanges will impair the growth rate of the region by 0.013% on an average ceteris paribus.

Notably from the gross portfolio equity asset result, shows that with a partial specification of  $\frac{dgdp}{dporte} = -0.66 + 0.17fdi$ , shows that, at a mean value of 4.67% of foreign direct investment, the impact from a percentage change in the value of portfolio equity induces SSA growth to increase by 0.13% on an average ceteris paribus. The argument from this impact of portfolio equity on growth could be held in the efficiency of the extension of foreign direct investment from portfolio asset (equity).

#### **Average Money Market liberalisation**

From the perspective of average money market liberalisation, the partial effect of stock market capitalisation,  $\frac{dgdp}{dstmc} = -89.5 - 0.8Aml$  shows that, at a mean value of 0.39 of liberalised money market, the impact from the percentage change of the value of listed stocks on exchanges will plummet growth rate of the region by 89.8% on average ceteris paribus. The drastic decline in the growth rate of the region from liberalising money market reflects the contagion influence of the sensitivity of stock market capitalisation on economic growth. Such decline will necessitate that average money market liberalisation be reduced not less than 111.9 percent  $(-89.8/0.8)$  to realise a positive growth.

The partial effect from the gross portfolio,  $\frac{dgdp}{dporte} = -89.50 - 2.02Aml$  posits that, at a mean value of 0.39 of liberalised money market, the derived impact from the percentage change of gross portfolio equity asset will cause a decline in the growth rate of the region by 90.3% on average ceteris

paribus. Relative from the partial effect of stock market turnover ratio  $\frac{dgdp}{dstmt} = -89.50 + 1.44Aml$  asserts that, at a mean value of 0.39 of liberalised money market, the sensitivity from a percentage change in the stock market turnover ratio causes economic growth to be impaired by 88.9% on an average ceteris paribus. Furthermore, the partial effect of number of listed companies per million people,  $\frac{dgdp}{dlistc} = -89.5 + 21.37Aml$  establishes that, at the mean value of liberalised money market, the impact of a percentage change in the number of listed companies per million people will correspondingly cause the level of economic growth rate to decline by 81.2% on an average ceteris paribus. At 4.2% increase in the level of money market liberalisation will induce number of listed companies per million people to have no impact on the economic growth of the region.

#### **Average Equity Liberalisation**

The partial effect of syndicated loan issuance volume  $\frac{dgdp}{dsynli} = -1.67Ael$  shows that, at an average value of 0.36 of the liberalized equity market, the impact of a one percentage change in the syndicated loan issuance volume will be accompanied by a reduction in economic growth by 0.6% on an average ceteris paribus. The partial effect,  $\frac{dgdp}{dstmt} = 0.83Ael$  shows an impact of 0.3% in the level of economic growth which is expected for a one percent change in the level of the stock market turnover at an average value of the liberalised equity market on an average ceteris paribus. In the discussion of stock market capitalisation, the partial effect,  $\frac{dgdp}{dstmc} = -0.48Ael$  assert that at the average value of 0.36 of the liberalized equity market, the impact of a

percentage change of stock market capitalisation on the growth level is impaired 0.2% on an average ceteris paribus.

PANEL SUR MODEL ESTIMATION

**Table 8: Threshold and Bidirectional effect**

	GDP	STMC	STMT	LISTC
GDP	-	-0.06*** (0.02)	0.43***(0.09)	-0.14 (0.82)
STMC	0.06*** (0.01)	-	0.45***(0.22)	0.75***(0.02)
STMT	0.03*** (0.01)	0.03*** (0.00)	-	-0.73***(0.00)
PORTE	-0.24*** (0.01)	0.07*** (0.00)	0.13***(0.02)	-0.10***(0.02)
PORTDL	0.02*** (0.01)	-0.04*** (0.00)	-0.02 (0.02)	-0.10***(0.02)
SYNLI	0.10*** (0.01)	-0.03** (0.01)	-0.02 (0.03)	-0.02 (0.22)
LISTC	-0.38*** (0.02)	1.20*** (0.01)	1.06***(0.13)	-
PRVCR	-0.05*** (0.00)	-0.003** (0.00)	0.04***(0.01)	0.01 (0.01)
MS	-0.09*** (0.00)	0.03*** (0.00)	0.03(0.02)	-0.03** (0.01)
GE	-0.19*** (0.02)	0.08*** (0.02)	0.14*(0.08)	-0.21***(0.06)
FDI	-0.11*** (0.01)	0.00 (0.01)	0.07 (0.05)	0.16***(0.04)
TRADE	0.11*** (0.00)	-0.01*** (0.00)	-0.04***(0.01)	0.04***(0.01)
STMCSQ	-0.0003***(0.00)	-	-	-
STMTSQ	-0.00003***(0.00)	-	-	-
PORTESQ	0.001***(0.00)	-	-	-
PORTDSQ	-0.00006***(0.00)	-	-	-
SYNLISQ	-0.0004***(0.00)	-	-	-
LISTCSQ	0.004***(0.00)	-	-	-
Number of Obs				632
Number of Equation				4
Number of Group Variable				8

Source: Arku-Korsah (2020)

PANEL SUR MODEL ESTIMATION

**Table 9: Threshold and Bidirectional effect**

	GDP	PORTE	PORTDL	SYNLI
GDP	-	-0.46*** (0.02)	0.12*** (0.04)	0.05 (0.06)
STMC	-0.01 (0.01)	0.14*** (0.00)	-0.06*** (0.01)	0.14*** (0.02)
STMT	0.02** (0.01)	0.01*** (0.00)	-0.01*** (0.00)	0.00 (0.01)
PORTE	-0.29*** (0.01)	-	0.09*** (0.01)	-0.44*** (0.02)
PORTDL	-0.13*** (0.01)	-0.03*** (0.00)	-	-1.41*** (0.00)
SYNLI	0.05*** (0.01)	-0.38*** (0.01)	-0.45*** (0.01)	-
LISTC	-0.29*** (0.02)	0.61*** (0.01)	1.05*** (0.03)	2.21*** (0.04)
PRVCR	-0.03*** (0.00)	0.12*** (0.00)	0.06*** (0.00)	0.21*** (0.00)
MS	-0.05*** (0.00)	-0.04*** (0.00)	-0.15*** (0.01)	-0.22*** (0.01)
GE	0.03** (0.01)	0.12*** (0.02)	-0.04 (0.04)	0.07 (0.05)
FDI	-0.03*** (0.01)	0.53*** (0.01)	-0.06*** (0.02)	0.43*** (0.03)
TRADE	0.10*** (0.00)	-0.01** (0.00)	0.10*** (0.01)	0.03*** (0.01)
STMCsq	0.00 (0.00)	-	-	-
STMTsq	0.00** (0.00)	-	-	-
PORTESq	0.00*** (0.00)	-	-	-
PORTDSq	0.00*** (0.00)	-	-	-
SYNLISq	0.00*** (0.00)	-	-	-
LISTCSq	0.003*** (0.00)	-	-	-
Number of Obs				632
Number of Equation				4
Number of Group variable				8

**Source:** Arku-Korsah (2020)

**Finance- growth nexus: The bidirectional and threshold effect**

From nonlinear model estimation, results from table 8 establish that there is a direct positive but a diminishing effect ( $gdp = 0.06stmc - 0.0003stmcsq$ ) of stock market capitalisation on economic growth in the region. The marginal effect,  $\frac{dgdp}{dstmc} = 0.06 - 0.0006stmc$  thereof, maintains that at an average value of 40.1% of market capitalized stock, the impact of a percentage change of stock market capitalisation is associated with 0.04% on economic growth on average ceteris paribus. At 100% (0.0006/0.06) maximum threshold of stock market capitalisation, a further increase in this variable will cause economic growth to plummet. An examination of the result

shows that there exist a significant bidirectional effect of growth and stock market capitalisation; whilst from 1% increase in stock market capitalisation causes growth level to respond positively with 0.06% in the short run, stock market capitalisation responds negatively by 0.06% for every 1% increase of growth on an average ceteris paribus. An unexpected but a justifiable cause of the negative response of stock market capitalisation following an increase in growth is the presence of a positive inflation; if an increased productivity which causes growth to increase is underlined by a positive inflation, the growth increase will reduce the demand for stocks – accumulated funds from increased growth is invested in real and commodity sectors to exploit returns at the expense of financial sector causing the value of listed stocks on exchange to decline.

Parallel to the aforementioned argument on the positive but diminishing effect of stock-growth relationship is one observed in the stock market turnover ratio and growth relationship ( $gdp = 0.03stmt - 0.0003stmts^2$ ). From the analysis of marginal effect,  $\frac{dgdp}{dstmt} = 0.03 - 0.0006stmt$  indicates that at an average value of 13.8% of the stock market turnover ratio, the impact of a percentage change of stock market capitalisation is associated with 0.02% on the regional growth level on an average ceteris paribus. The threshold posits that at 50% ( $0.03/0.0006$ ) maximum stock market capitalisation, a further increase in this variable will cause economic growth to plummet. Analysis from a two-way relationship reveals that whilst stock market turnover ratio affect the regional growth level by 0.03%, a greater contribution of 0.43% from economic growth affects the stock market turnover ratio on an average ceteris paribus.

In the analysis of gross portfolio equity asset reports a negative but an increasing ( $gdp = -0.24porte + 0.001portesq$ ) effect overtime. The marginal effect  $\frac{dgdp}{dporte} = -0.24 + 0.002porte$  reveals that at an average value of 10.5% in the value of portfolio equity asset, the impact of a percentage change from the level of gross portfolio equity asset will correspondingly impair the regional growth level by 0.2% on an average ceteris paribus. With a striking value of 120% reports to be the barest minimal threshold for which any further percentage increase in the portfolio equity will positively drive the regional growth level. From an argument of a bidirectional relationship, a 1% increase in gross portfolio equity asset impairs the growth level by 0.29% on average ceteris paribus while a parallel negative effect of 0.46% is said to affect the portfolio equity asset from a 1% increase in the growth level of the region on an average ceteris paribus. From a justifiable argument, enrolling increase portfolio equity is guided by expected growth in investment on ceteris paribus. Such argument establishes that a negative response of growth from portfolio increase is apparently caused by failure of insider laws and corporate governance which reduce the worth of financial portfolio. Decline in the financial portfolio consequentially reduces the economic growth level through a reduction in the productivity level of financial sector. Parallel to the negative response of capitalised stock from increase in growth level is seen in the negative response of portfolio equity asset- the phenomenon of a contributing positive inflation to growth.

In view of gross portfolio debt liability, a positive but diminishing effect ( $gdp = 0.02portdl - 0.00006portdsq$ ) is said to be reported over the period. The marginal effect  $\frac{dgdp}{dportdl} = 0.02 - 0.00012portdl$  reveals at an

average value of 7.8% in the value of portfolio debt liability, the impact of a percentage change from the level of gross portfolio debt liability will correspondingly increase the regional growth level by approximately 0.02% on an average *ceteris paribus*. The threshold maintains that at 166% (0.02/0.00012) maximum threshold stock market capitalisation, a further increase in this variable will cause economic growth to plummet. Analysis from a two-way relationship reveals that gross portfolio debt liability reduces the regional growth level by 0.13%. However, a contribution of 0.12% from economic growth affects gross portfolio debt liability on average *ceteris paribus*. Financial distress, default debt payment and interest rate risk are justifiable cause of decline in the worthiness of portfolio which induces growth level to decline.

The syndicated loan issuance market shows a positive but diminishing effect ( $gdp = 0.10synli - 0.0004synlisq$ ). The marginal effect  $\frac{dgdp}{dsynli} = 0.10 - 0.0008synli$  reveals that at an average value of 8.1% in the value of syndicated loan issuance volume, the impact of a percentage change from this variable will correspondingly spur the regional growth level by 0.09% on an average *ceteris paribus*. At a maximum threshold of 125% of syndicated loan issuance volume, any further increase will cause the regional growth level to decline. Results establish a two way causal relationship between syndicated loan issuance volume and growth level; comparatively, a greater percentage of 0.10% reports to affect growth from 1% increase in syndicated loan than 0.05% which is said to affect syndicated loan issuance volume following a 1% increase in the level of the regional growth on an average *ceteris paribus*.



In the analysis of the number of listed companies per million people reports a negative but an increasing ( $gdp = -0.38listc + 0.004listcsq$ ) effect overtime. The marginal effect  $\frac{dgdp}{dlistc} = -0.38 + 0.008listc$  reveals that at an average value of 7.2% of listed company per million people, the impact of a percentage change from this variable will correspondingly impair the regional growth level by 0.3% on an average ceteris paribus. With the minimal threshold of 47.5 listed companies per million people, any further increase will positively affect the growth level. Result indicates the existence of a two way relationship; for every listed company per million people will cause a decline in the regional growth by 0.38% while a parallel negative effect of 0.14% is said to affect the number of listed companies per million people from a 1% increase in the growth level of the region on an average ceteris paribus. Though with an increase in listed companies on an exchange, if there is a loosening of insider laws where efficient market hypothesis is infiltrated will cause a decline in the prices of listed stocks to induce a long run negative influence on economic growth- the justification of a negative response on economic growth following an increase in the number of listed companies.

From an observable value of -0.05% in table 8 indicates the effect on the growth level for 1% increase in credit to private sector on average ceteris paribus. Though theoretically, extension of credit to private sector by deposit banks is said to positively affect growth. However from contextual argument, failure of prudential regulation and supervision which cause high default rate in credit extension induce deterioration of assets of banks' balances sheet. A decline in the worthiness of banking sector will consequentially reduce the economic growth level. Relationship of this financial institutional variable and

the financial market asserts that for a 1% increase in the credit to private sector will negatively drive stock market capitalisation by -0.003% on average ceteris paribus. Howbeit, with the same percentage increase from the private sector will positively drive the stock market turnover ratio and number of listed companies per million by 0.04% and 0.01% respectively on an average ceteris paribus.

Broad money supply principally impairs the annual growth and the number of listed companies per million people by 0.09% and 0.03% for every 1% increase in its liquidation on average ceteris paribus. Howbeit, with the same percentage increase of money supply will require both stock market capitalisation and stock market turnover ratio to increase by the same percentage of 0.03 on an average ceteris paribus.

Notably from Table 8, the impact of a 1% increase in the level of government expenditure reduces the growth level and the number of listed companies per million people by 0.19% and 0.21% respectively on an average ceteris paribus. Of the same percentage increase from government expenditure will potentially affect the stock market capitalisation and stock market turnover ratio by 0.08% and 0.14% respectively on average ceteris paribus.

For 1% increase in FDI will cause a decline in the regional growth rate by a percentage of 0.11%. However, such 1% increase from foreign direct investment will cause stock market turnover ratio and number of listed companies per million people by 0.07% and 0.16% respectively on average ceteris paribus. Analysis from the trade sector reveals that 1% increase in trade reduces the stock market capitalisation and stock market turnover ratio by -0.01% and -0.04% respectively on an average ceteris paribus

**Table 10: Vector Auto Regression estimates**

	GDP	LISTC	PORTDL	PORTE	STMC	STMT	SYNLI
GDP (-1)	0.237 [0.819]	0.026 [1.181]	-0.179 [-1.033]	0.267 [1.102]	2.529 [1.681]	-0.164 [-0.240]	0.254 [1.239]
GDP (-2)	-0.164 [-0.737]	-0.008 [-0.490]	0.047 [0.353]	0.280 [1.497]	2.552 [2.195]	0.511 [0.969]	0.069 [0.438]
LISTC (-1)	-4.525 [-2.251]	1.755 [11.676]	-0.497 [-0.413]	1.728 [1.027]	11.609 [1.110]	-1.921 [-0.405]	-5.759 [-4.035]
LISTC (-2)	3.269 [2.091]	-0.718 [-6.142]	-0.151 [-0.161]	-1.534 [-1.173]	-5.080 [-0.624]	0.193 [0.052]	4.235 [3.815]
PORTDL(-1)	-0.610 [-1.529]	-0.042 [-1.401]	0.369 [1.548]	-0.341 [-1.021]	-5.664 [-2.728]	-3.464 [-3.678]	-0.728 [-2.571]
PORTDL(-2)	-0.695 [-1.594]	0.013 [0.407]	0.067 [0.257]	0.834 [2.284]	7.584 [3.341]	1.666 [1.617]	-0.102 [-0.332]
PORTE (-1)	0.309 [1.479]	0.052 [3.334]	0.203 [1.623]	1.120 [6.395]	5.564 [5.109]	0.801 [1.621]	0.386 [2.600]
PORTE (-2)	0.218 [0.923]	0.013 [-1.839]	0.137 [0.966]	-0.312 [-1.581]	-5.314 [-4.324]	0.534 [0.958]	0.011 [0.067]
STMC (-1)	0.028 [0.982]	-0.001 [-0.494]	-0.058 [-3.306]	-0.130 [-5.283]	0.476 [3.107]	-0.106 [-1.521]	0.004 [0.213]
STMC (-2)	-0.034 [-1.115]	-0.001 [-0.431]	0.061 [3.390]	0.162 [6.412]	0.437 [2.782]	0.122 [1.713]	0.041 [1.934]
STMT (-1)	-0.093 [-0.986]	-0.002 [-0.247]	-0.010 [-0.179]	0.137 [1.739]	0.767 [1.568]	0.863 [3.890]	-0.128 [-1.922]
STMT (-2)	0.056 [0.582]	-0.006 [-0.838]	-0.066 [-1.166]	-0.192 [-2.400]	-1.707 [-3.437]	-0.488 [-2.166]	-0.173 [-2.549]
SYNLI (-1)	0.226 [0.748]	-0.018 [-0.796]	0.007 [0.038]	-0.203 [-0.803]	-1.189 [-0.755]	-0.453 [-0.634]	0.031 [0.144]
SYNLI (-2)	-0.037 [-0.115]	-0.022 [-0.944]	-0.280 [-1.469]	-0.243 [-0.911]	-4.048 [-2.444]	-0.966 [-1.285]	0.743 [3.289]
C	9.794 [3.205]	0.070 [0.308]	4.516 [2.470]	-3.416 [-1.336]	-25.576 [-1.609]	11.103 [1.539]	5.099 [2.350]
R-squared	0.73	0.999	0.969	0.993	0.993	0.907	0.820
Adj. R-squared	0.52	0.997	0.946	0.987	0.988	0.834	0.680
F-statistic	3.43	855.8	41.13	172.39	186.34	12.55	5.87
Akaike AIC	4.71	-0.472	3.69	4.39	8.01	6.43	4.03
No. of Obs	33	33	33	33	33	33	33

Source: Arku-Korsah (2020)

### Analysis of vector auto regression

Results from the vector auto regression report that, though unaffected by the first period realization, the past two period realisation of the real annual percentage growth rate is associated with 2.6% increase in the stock market capitalisation on an average ceteris paribus.

Observably from the VAR table 10, while the past one period of the number of listed companies per million people negatively affect the real annual percentage growth rate of GDP by -4.5% on average ceteris paribus, the second period past realization of this concerned financial variable positively affect the real annual percentage growth rate of GDP by 3.3% on average ceteris paribus. Notably, it is observed the number of listed companies per million people is a strong influencer of itself; while the first period of its past realisation increasingly affect itself by 1.8 on an average ceteris paribus, the second period past realisation is associated with a decline in itself by -0.7 on an average ceteris paribus.

Parallel to the argument in the listed company and real GDP, result maintains that while the first period past realisation of the listed companies per million people is associated with a decline in the syndicated loan issuance volume by -5.8% on average ceteris paribus, the second period of its past realisation is correspondingly associated with 4.2% increase in the syndicated loan issuance volume on an average ceteris paribus.

Though unaffected by the second past period realization of the gross portfolio debt liability, results reveal that the stock market turnover ratio and the syndicated loan issuance volume are both negatively affected by the first period past realization of the gross portfolio debt liability by -3.5% and -0.7% respectively on an average ceteris paribus. Further, analysis maintains that while the first period past realization of the gross portfolio debt liability is associated with -5.7% reduction in the stock market capitalisation, on an average ceteris paribus, its second past period realization is associated with 7.6% increase in the stock market capitalisation on an average ceteris paribus.

With sensitivity from the second past period of gross portfolio debt liability, the gross portfolio equity asset is affected by 0.8% increase on average ceteris paribus.

Analysis from the gross portfolio equity assets shows that with no sensitivity from its second past period, however, the number of listed companies per million people, gross portfolio equity asset and syndicated loan issuance volume are all positively affected by the first period past realization of the gross equity asset by 0.1, 1.1% and 0.4% increase on average ceteris paribus. With sensitivity from both past first and second periods of gross portfolio equity, the stock market capitalisation is affected by 5.6% and -5.3% respectively on average ceteris paribus.

With a symmetric value of -0.1% and 0.1% respectively from the first and second past period realisation of the stock market capitalisation, the gross portfolio debt liability is affected on an average ceteris paribus. Notably, the first and second past period realisation of stock market capitalisation is associated with -0.1% and 0.2% respectively on average ceteris paribus. Analysis further argues that there is a significant sensitivity of the stock market capitalisation past periods on itself; with 0.5% and 0.4% increase from the first and second past period realization respectively.

Result shows that though there is no influence in the first past period of the stock market turnover ratio, it is observed that the second past period realisation of the stock market turnover ratio is associated with -0.2%, -0.5% and -0.2% decline respectively in the gross portfolio equity asset, stock market capitalisation and syndicated loan issuance volume on average ceteris paribus. Further, stock market turnover ratio strongly influences itself by 0.9% and -

0.5% from both the first and second period past realisation respectively on an average ceteris paribus.

In the analysis of syndicated loan market, result from the vector auto regression reports that only the second past period of this variable is associated with -4.0% decline and 0.7% increase on stock market capitalisation and syndicated market respectively on average ceteris paribus.

## **Forecasting**

### **Variance Decomposition Interpretation**

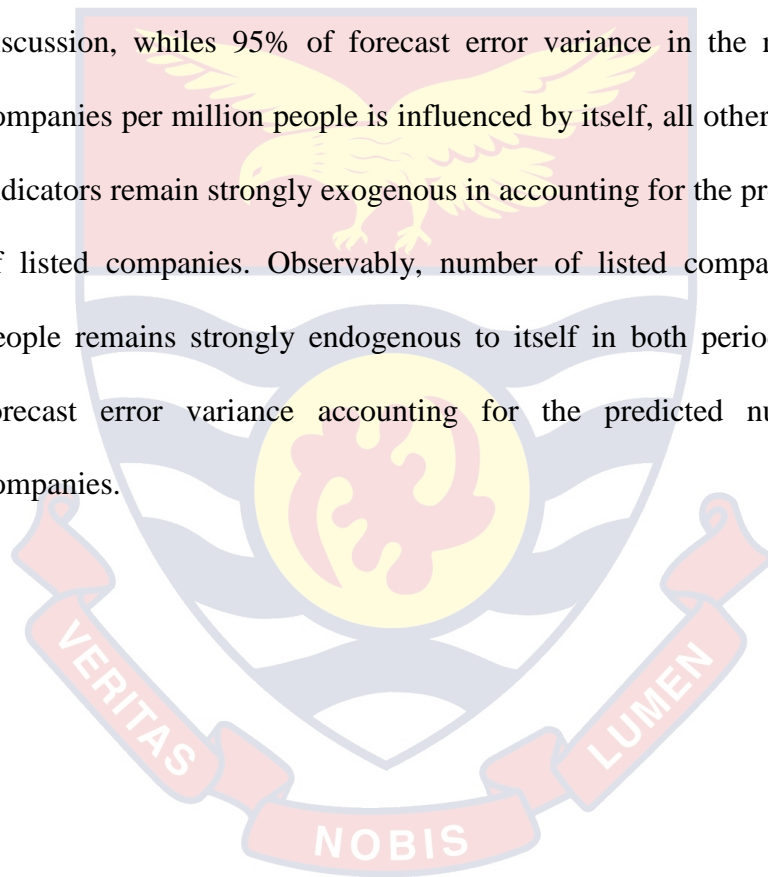
In determining the proportion and the sources of volatility of shocks of financial market development and economic growth, we conducted variance decomposition. We used the choleski decomposition method in analyzing the sources of variation in the volatility of shocks to our vector auto regressive variables. According to Enders, (2009) one weakness of the Choleski decomposition method maintains that its innovation do not have any economic interpretation. Its use however does not suggest posing any problem in forecasting.

The table 11 reports the forecast error variance in predicting the short run (period 1 and 2) and long run (period 3 to period 5) values of growth and the financial market development indicators.

Analysing annual percentage growth of GDP, it is reported that in the short run, particularly in year one, 100% of forecast error variance in annual percentage growth of GDP is explained by the variable itself. This indicates that all other variables exhibit strong exogenous impact on real GDP-having no influence in predicting the real GDP in year one. Following analysis into the future, 64% of real GDP is explained by itself. In the early part of the long

run (period 3), gross portfolio debt liability exhibits a weak exogenous impact of 21% of its forecast error variance on the annual percentage growth of real GDP.

From number of listed companies per million people, result shows that in year one of the short run period, annual growth in real GDP exhibits strong exogenous impact; 5.4% of forecast error variance in real GDP accounts for the number of listed companies per million people. In the same period of discussion, while 95% of forecast error variance in the number of listed companies per million people is influenced by itself, all other financial market indicators remain strongly exogenous in accounting for the predicted existence of listed companies. Observably, number of listed companies per million people remains strongly endogenous to itself in both periods, with 84% of forecast error variance accounting for the predicted number of listed companies.



**Table 11: Variance Decomposition**

Period	GDP	LISTC	PORTDL	PORTE	STMC	STMT	SYNLI
Variance decomposition on GDP							
1 year ahead	100.0	0.0	0.0	0.0	0.0	0.0	0.0
2 years ahead	78.1	0.4	8.8	9.9	0.3	1.8	0.7
3 years ahead	63.5	1.7	21.0	11.9	0.2	1.2	0.5
4 years ahead	65.0	3.4	17.8	9.8	0.9	1.6	1.4
5 years ahead	64.0	5.5	15.0	8.9	3.0	1.3	1.3
Variance decomposition on LISTC							
1 year ahead	5.4	94.6	0.0	0.0	0.0	0.0	0.0
2 years ahead	1.2	89.7	4.3	4.4	0.1	0.1	0.3
3 years ahead	0.7	83.4	8.0	5.0	1.4	0.4	1.2
4 years ahead	0.4	83.4	7.4	3.7	2.4	0.6	2.1
5 years ahead	1.0	83.7	6.5	2.5	3.1	0.5	2.7
Variance decomposition on PORTDL							
1 year ahead	7.4	7.7	84.9	0.0	0.0	0.0	0.0
2 years ahead	20.9	9.0	62.6	0.0	7.4	0.1	0.0
3 years ahead	32.1	9.3	46.0	0.3	6.0	4.3	1.9
4 years ahead	34.7	7.2	48.5	0.5	4.4	3.1	1.7
5 years ahead	37.8	8.1	42.3	0.4	5.2	3.6	2.6
Variance decomposition on PORTE							
1 year ahead	7.4	2.4	3.8	86.5	0.0	0.0	0.0
2 years ahead	10.7	1.6	8.2	60.4	12.4	6.0	0.8
3 years ahead	10.5	1.5	10.0	56.1	13.2	5.9	2.9
4 years ahead	8.2	2.7	7.8	64.0	10.4	4.6	2.2
5 years ahead	6.9	2.4	14.2	56.5	8.8	6.3	4.8
Variance decomposition on STMC							
1 year ahead	14.2	7.7	2.4	32.1	43.5	0.0	0.0
2 years ahead	28.3	8.1	17.8	30.3	13.3	2.0	0.3
3 years ahead	36.7	8.3	17.7	22.9	8.5	1.4	4.4
4 years ahead	35.5	12.6	14.2	21.9	7.7	3.0	5.1
5 years ahead	29.3	17.5	14.8	21.6	6.2	2.4	8.1
Variance decomposition on STMT							
1 year ahead	5.7	2.2	0.5	3.0	4.7	83.9	0.0
2 years ahead	6.4	1.0	27.6	1.4	2.0	61.2	0.4
3 years ahead	10.2	0.8	31.6	1.2	2.2	50.7	3.2
4 years ahead	14.6	2.1	27.9	2.3	2.3	48.2	2.7
5 years ahead	13.8	1.9	30.6	2.0	2.5	43.8	5.4
Variance decomposition on SYNLI							
1 year ahead	30.5	5.1	5.7	8.8	1.4	2.5	46.1
2 years ahead	33.0	5.0	21.0	14.7	0.7	7.0	18.6
3 years ahead	38.1	3.2	11.3	17.3	1.6	11.1	17.4
4 years ahead	42.6	6.6	7.4	19.0	2.0	10.3	12.2
5 years ahead	45.6	8.4	4.8	17.7	2.5	9.9	11.1

**Source:** Arku-Korsah (2020)

In the long run, the forecast error variance from all other variables account for less than 8% in explaining the occurrence of listed companies. It is revealed that though in the early part of the short run period, annual growth in real GDP shows a strong exogenous impact of 7.4% in accounting for the variation in the predictability of the gross portfolio debt liability value, it



gradually increases to exhibit a least exogenous impact of 37.8% its forecast error variance on the future value of gross portfolio debt liability. 84.9% of the forecast error variance in the gross portfolio debt liability is influenced by itself in the early part of the short run. As the period extends into the future, this variable loses its strong endogenous impact on itself; accounting for 42.3% of the forecasted error variance in the predictability of its value in year 5. All other financial market variables remain insignificant in explaining the variation of future forecasted value of gross portfolio debt liability.

Considerable attention to the fourth panel of the vector auto regression depicts that in the short run periods, all variables except for gross portfolio equity asset exhibit strong exogeneity with barely 13% of their variation of predictability of the gross portfolio equity asset. In the short run periods, gross portfolio shows a strong exogenous impact on the variable itself, yet fluctuating from 86.5% to 60.4% of forecast error variance in year one and two respectively. From the early part through to the late period of the long run, the argument of exogeneity persists for all variables with less than 15% of their forecast error variance except the main variable. In the long run, the forecast error variance of the main variable, gross portfolio equity fluctuates from 56.1% to 56.5% yet remaining a strong endogenous impact on itself.

In the short run period of year one and two, except for real GDP and gross portfolio equity asset which show some level of weak exogenous impact on stock market capitalisation (accounting for barely 30% of forecast error variance), all other financial variables exhibit a strong exogenous impact on the main variable. The main variable, stock market capitalisation exhibits a weakly endogenous impact in the short run (43.5% and 13.3% of forecast error

variance in year one and two respectively). In the long run period, except for annual real GDP and gross portfolio equity asset, which show relatively weak exogenous impact (accounting for not less than 21% of their forecasted error variance on stock market capitalisation), all other variables remain insignificant in their predictability of the variation of the future value of stock market capitalisation. Stock market capitalisation remain weakly endogenous on itself in the long run periods accounting for 8.5% to 6.2% of variation in predicting its own future values from year 3 through to year 5.

Except for gross portfolio debt liability and the main variable, stock market turnover ratio, all other variables under discussion remain strongly exogenous in explaining the variations of the forecasted value of stock market turnover in both periods. Gross portfolio debt liability shows a weak exogenous impact on the main variable accounting for not less than 27% of forecasted error variance on gross portfolio debt liability in year 2 to year 5. Stock market turnover ratio showing a strong endogenous impact from year 1 to year 3 accounting for not less than 50% of forecasted error variance on itself, year 4 to year 5 however, indicate a weak endogenous impact of 48.2% and 43.8% respectively on the variable itself.

In the variance decomposition of syndicated loan issuance volume, it is observed that in the first year of the short run period, annual real GDP exhibits weak exogeneity on syndicated loan issuance volume; it significantly influence the variation of the predictability of syndicated loan issuance volume by accounting for 30.5% of forecast error variance. In this same period of analysis, syndicated loan issuance volume exhibits a weak endogenous impact on itself by accounting for 46.1% on itself. While there is strong exogeneity in

all other variables in the short and long run periods, annual real GDP increasingly predicts the future value of syndicated loan issuance volume by accounting for 45.6% of forecasted error variance in the syndicated loan market. With a dwindling endogeneity, syndicated loan issuance volume accounts for 11.12% of forecast error variance in the future predictive measure of itself.

### **The Impulse Response Functions (IRF)**

To unravel the response of economic growth and the adjustment path following the influence of a shock to financial market development, we conducted an IRF analysis. This was done by using the Choleski degree of freedom adjusted method as the impulse definition.

Result presented from the impulse response graphs below indicate that for a one standard deviation shock to:

The number of listed companies per million people, the response on growth gradually declines from period 1 to period 5 in the negative region. Shocks to number of listed companies per million people will have negative impact on growth both in the short run and the long run period.

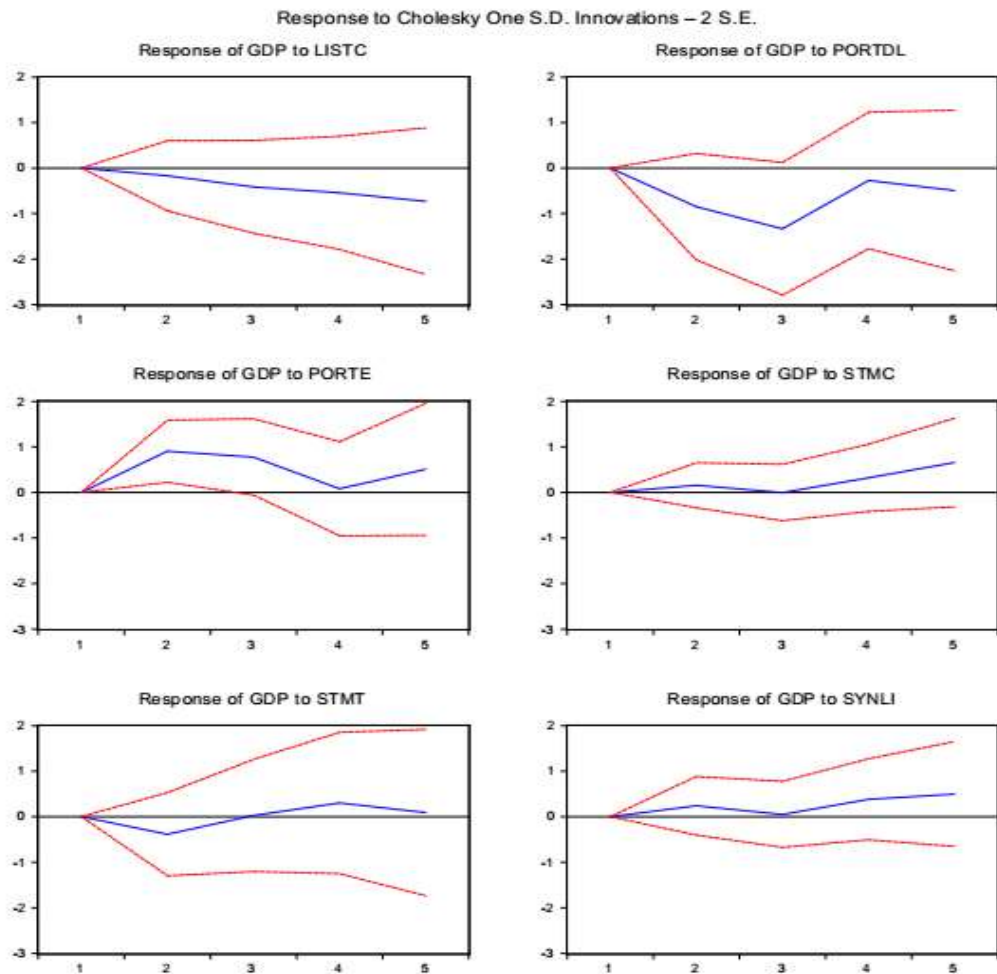


Figure 2: Impulse response of financial market development on growth

Source: Arku-Korsah (2020)

Gross portfolio debt liability, response on growth gradually declines from period 1 to period 2. Following period 2 is a continuous but a steadily decline in the negative region until period 3 where growth now takes a sharp increase until period 4. Beyond the 4<sup>th</sup> period growth relatively stable to the 5<sup>th</sup> period. Observation from this innovation maintains that the impact on growth remains negative throughout the forecasted periods.

Following innovation from the gross portfolio equity asset, response on growth sharply rises from the 1<sup>st</sup> period and hits a positive peak in the 2<sup>nd</sup> period. After period 2, growth takes a positive stable response but sharply

declines from period 3 and hits a steady state in period 4. beyond the 4<sup>th</sup> period, growth positively rises into the long run.

Stock market capitalisation, the response on growth will have no significant noticeable increase and a fall in period 1 and 2. From the half period after period 2, growth begins to hit its steady state throughout to period 3. After the 3<sup>rd</sup> period, growth rises above its steady state into the long run period. The observable forecast reveals a positive impact from the shock of market capitalisation on growth.

Stock market turnover ratio, the response on growth initially declines and hits a negative peak in period 2. With a steady rise from period 2, growth attains a steady state in period 3 and continues to rise until period 4 where it falls to hit second steady state in the long run. Observably, a shock to stock market turnover reveals an asymmetric effect in the short and long run.

Syndicated loan issuance volume, the response on growth will have no significant noticeable increase and a fall in period 1 and 2. From the half period after period 2, growth begins to hit its steady state throughout to period 3. After the 3<sup>rd</sup> period, growth rises above its steady state into the long run period. The observable forecast reveals a positive impact from the syndicated loan issuance volume on growth.

### **Conclusion**

At the inception of this section, the study presented the summary statistics of financial market development, real sector and portfolio risks at the regional level, economic communities' level and income category level. The study proceeded to examine the effect of financial institution and macroeconomic indicators on economic growth. Following this, the study integrated the

financial market development variables to ascertain the behavior of macroeconomic and financial institutions on economic growth. It was observed that the existence of financial market development augmented the insignificant macroeconomic and financial institution on economic growth thus, establishing the relevance of financial market development and its index.

The study further conducted an estimation to analyse the effect of financial market development on economic growth by economic communities to ascertain which economic bloc contributes to growth in their financial market contributions. In the same panel, the study examined financial market contribution to growth by income level countries and particularly, financial crisis phases to establish the various contributions made by financial market development before, during and after the financial crisis of 2007 to 2009.

Particularly to the objectives, the study conducted estimations on the moderating role of portfolio risks and financial market liberalisation and the threshold analysis of the financial market development indicators to know their levels of operations on economic growth.

Other estimations carried by the study included the VAR, variance decomposition and the IRF to determine the adjustment path to shock of financial market development on growth. Upon these analyses, the study revealed the main findings, conclusions and recommendations in the next chapter.

## CHAPTER FIVE

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### Introduction

This section presents the summary, conclusions and recommendations. Whereas the summary presents a preamble of the objectives, methodology and findings, the outcomes regarding the findings of the study is recognized in the conclusion. Recommendations in this section also show specific policy actions to be undertaken by policy advisors and specific institutions.

#### Summary

The objective of this study was to analyse financial market development and economic growth in sub-Saharan Africa using a balanced panel data from 34 SSA countries spanning from 1996 to 2016. Specifically, the study examined the moderating role of financial portfolio risks on the finance-growth relationship, examined the interactive role of financial market on the finance-growth nexus and evaluated the bidirectional and threshold of financial market on economic growth.

The main variables of interest employed in the study included real annual GDP per capita, stock market capitalisation, gross portfolio equity asset, stock market turnover ratio, gross portfolio debt liability, syndicated loan issuance volume and number of listed companies. For the moderating variables of the financial market liberalisation, the study employed foreign direct investment, average equity liberalisation and average money market liberalisation. Also, for portfolio risk variables the study employed industrial production and inflation. Variables used for the study were obtained from WDI, IMF AREAER and AfDB.

In examining the objectives of the study, the Generalised Method of Moment was employed to achieve objectives one and two. The panel seemingly unrelated regression estimation was used to achieve objective three.

Prior to the objectives, we performed analysis at three levels: sub regional, income classification and financial cycle; our findings showed that contributions of financial market development vary in these levels.

Results from objective one showed that the proportion of the market value of stocks on the exchanges of SSA countries that evolve from value added of various sectors spur economic growth. Further, empirical evidence from objective two showed that in the liberalisation of money market, economic growth becomes sensitive to downside following the impact of financial market development. Finally, results from objective three revealed that relative to the annual real GDP per capita, optimal thresholds that indicate the level of operations of financial market exist for all financial market development indicators and the study examined the strength of the interdependencies between economic growth and financial market development.

### **Conclusions**

The empirical study of financial market development and economic growth in sub-Saharan Africa was exhausted based on the three objectives of the study. From the key findings obtained from the robustness of the results, the overall conclusion establishes that financial market development significantly contributes to the growth of SSA countries. Specifically, the study concludes on the following;



The proportion of the market value of stocks on the exchanges of SSA countries that evolve from value added of industrial production spur economic growth.

Further, the study concludes that in the liberalisation of the money market, economic growth may be sensitive to decline and comparatively, the liberalisation of the money market may cause financial market to exert undesirable impact on the economic growth than a liberalised equity market.

Like other statistical techniques including stress testing and Value-at-Risk method, the real GDP per capita establishes a threshold of financial market instrument operations that optimally contribute to economic growth. The strength of interdependency between financial market development and economic growth exists to determine the extent of effect of their relationship.

### **Recommendations**

With much cognisance of the findings and the conclusion from the study, the recommendations below are proposed.

### **Policy recommendations and implications**

The following policy recommendations are made on the basis of the findings and conclusions:

The study recommends policy makers and regulators of financial market to allocate the value added from industrial production in acquiring stocks on the stock exchanges- the mechanism of this allocation contributes both to the of the financial market development and the economic growth.

The study recommends financial market intermediaries of SSA countries that in a liberalised money market, a review of prudential regulation on the

market component (i.e. introducing and expanding financial engineering) be taken into consideration to avoid the risk of default in the financial market.

Lastly, the study recommends statisticians and economists to consider the use of real GDP per capita as a technique in determining the level of operations of the financial market instruments that optimizes economic growth.



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## APPENDICES

### A: LIST OF THE 34 SELECTED SUB-SAHARAN AFRICA COUNTRIES

Angola	8. Ethiopia	15. Madagascar	22. Niger	29. Sudan
Benin	9. Gabon	16. Malawi	23. Nigeria	30. Tanzania
Botswana	10. Gambia	17. Mali	24. Rwanda	31. Togo
Burkina Faso	11. Ghana	18. Mauritania	25. Senegal	32. Uganda
Cameroon	12. Guinea	19. Mauritius	26. Seychelles	33. Zambia
Congo, Rep.	13. Kenya	20. Mozambique	27. Sierra Leone	34. Zimbabwe
Cote d'Ivoire	14. Liberia	21. Namibia	28. South Africa	

### B: RESULTS OF UNIT ROOT TEST

Variables	Fisher-ADF (Choi, 2001)	
	Levels	Differences
<b>GDP</b>	0.000 (1)***	
<b>INFLATION</b>	0.000 (1)***	
<b>GROSS DOMESTIC SAVINGS</b>	0.453 (1)	0.000 (1)***
<b>INDUSTRIAL PRODUCTION</b>	0.012 (1) **	
<b>TRADE</b>	0.484 (1)	0.000 (1)***
<b>GOVERNMENT EXPENDITURE</b>	0.011 (1) **	
<b>HUMAN CAPITAL</b>	1.000 (1)	0.000 (1)***
<b>STOCK MARKET CAPITALISATION</b>	0.125 (1)	0.000 (1)***
<b>GROSS PORTFOLIO EQUITY ASSET</b>	0.604 (1)	0.000 (1)***

<b>GROSS PORTFOLIO DEBT LIABILITY</b>	1.000 (1)	0.000 (1)***
<b>SYNDICATED LOAN ISSUANCE VOLUME</b>	0.493 (1)	0.000 (1)***
<b>STOCK MARKET TURNOVER RATIO</b>	0.003 (1) **	
<b>NUMBER OF LISTED COMPANIES PER MILLION PEOPLE</b>	0.852 (1)	0.000 (1)***
<b>CREDIT TO PRIVATE SECTOR</b>	1.000 (1)	0.000 (1)***
<b>BROAD MONEY</b>	1.000 (1)	0.000 (1)***
<b>AVERAGE EQUITY LIBERALISATION</b>	0.008 (1) ***	
<b>AVERAGE MONEY MARKET LIBERALISATION</b>	0.734 (1)	0.000 (1)***
<b>FOREIGN DIRECT INVESTMENT</b>	0.000 (1)***	

### C: MEASUREMENT OF VARIABLES

<b>VARIABLES</b>	<b>MEASUREMENT / UNITS</b>
<b>GDP</b>	Annual percentage growth rate of GDP at market prices
<b>INFLATION</b>	Consumer price index
<b>GROSS DOMESTIC SAVINGS</b>	GDP less final consumption expenditure as percentage of GDP
<b>INDUSTRIAL PRODUCTION</b>	Total value added in mining, manufacturing (also reported as a separate subgroup), construction, electricity, water, and gas
<b>TRADE</b>	Sum of exports and imports of goods and services as share of GDP

<b>GOVERNMENT EXPENDITURE</b>	Sum of all government current expenditures for purchases of goods and services as percentage of GDP
<b>HUMAN CAPITAL</b>	Ratio of total enrollment, regardless of age, to the population of the age group that officially correspond to tertiary level
<b>STOCK MARKET CAPITALISATION</b>	Total value of all listed shares in a stock market as a percentage of GDP : $\{(0.5) * [F_t / P_{et} + F_{t-1} / P_{et-1}]\} / [GDP_t / P_{at}]$ where F is stock market capitalisation, P <sub>e</sub> is end-of period CPI, and P <sub>a</sub> is average annual CPI. End-of period CPI
<b>GROSS PORTFOLIO EQUITY ASSET</b>	Sum of traded shares, stocks and foreign securities receipts as percentage of GDP
<b>GROSS PORTFOLIO DEBT LIABILITY</b>	Total value of bonds, debentures, notes, and money market or negotiable debt instruments as percentage of GDP
<b>SYNDICATED LOAN ISSUANCE VOLUME</b>	Total volume of newly issued syndicated loans by private entities divided by GDP in current USD
<b>STOCK MARKET TURNOVER RATIO</b>	Total value of shares traded during the period divided by the average market capitalisation for the period: $T_t / P_{at} / \{(0.5) * [M_t / P_{et} + M_{t-1} / P_{et-1}]\}$ where T is total value traded, M is stock market capitalisation, P <sub>e</sub> is end-of period CPI.
<b>NUMBER OF LISTED COMPANIES PER MILLION PEOPLE</b>	Number of publicly listed companies per 1,000,000 people

<b>CREDIT TO PRIVATE SECTOR</b>	Deflation method : $\{(0.5)*[F_t/P_{et} + F_{t-1}/P_{et-1}]\}/[GDP_t/P_{at}]$ where F is credit to the private sector, P_e is end-of period CPI, and P_a is average annual CPI
<b>BROAD MONEY</b>	Deflation method : $\{(0.5)*[F_t/P_{et} + F_{t-1}/P_{et-1}]\}/[GDP_t/P_{at}]$ where F is liquid liabilities, P_e is end-of period CPI, and P_a is average annual CPI
<b>AVERAGE EQUITY LIBERALISATION</b>	Average equity index
<b>AVERAGE MONEY MARKET LIBERALISATION</b>	Average money market index
<b>FOREIGN DIRECT INVESTMENT</b>	Sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as percentage of GDP
<b>FINANCIAL MARKET DEVELOPMENT INDEX</b>	Index of financial market development indicators using PCA
<b>SYNLID</b>	Syndicated loan issuance volume multiplied by industrial production
<b>STMTID</b>	Stock market turnover ratio multiplied by industrial production
<b>STMCID</b>	Stock market capitalisation multiplied by industrial production
<b>PORTEID</b>	Gross portfolio equity asset multiplied by industrial production
<b>PORTDLID</b>	Gross portfolio debt liabilities multiplied by industrial production
<b>LISTID</b>	Number of listed companies per million multiplied by industrial production
<b>SYNIF</b>	Syndicated loan issuance volume multiplied by inflation
<b>STMTIF</b>	Stock market turnover ratio multiplied by

	inflation
<b>STMCIF</b>	Stock market capitalisation multiplied by inflation
<b>LISTIF</b>	Number of listed companies per million multiplied by inflation
<b>PORTEIF</b>	Gross portfolio equity asset multiplied by inflation
<b>PORTDLIF</b>	Gross portfolio debt liabilities multiplied by inflation
<b>SYNFDI</b>	Syndicated loan issuance volume multiplied by foreign direct investment
<b>STMTFDI</b>	Stock market turnover ratio multiplied by foreign direct investment
<b>STMCFDI</b>	Stock market capitalisation multiplied by foreign direct investment
<b>LISTFDI</b>	Number of listed companies per million multiplied by foreign direct investment
<b>PORTEFDI</b>	Gross portfolio equity asset multiplied by foreign direct investment
<b>PORTDLFDI</b>	Gross portfolio debt multiplied by foreign direct investment
<b>SYNAEL</b>	Syndicated loan issuance volume multiplied by average equity liberalisation
<b>STMCAEL</b>	Stock market capitalisation multiplied by average equity liberalisation
<b>STMTAEL</b>	Stock market turnover ratio multiplied by average equity liberalisation
<b>LISTAEL</b>	Number of listed companies per million multiplied by average equity liberalisation

<b>PORTEAEL</b>	Gross portfolio equity asset multiplied by average equity liberalisation
<b>PORTDLAEL</b>	Gross portfolio equity asset multiplied by average equity liberalisation
<b>SYNAML</b>	Syndicated loan issuance volume multiplied by average money market liberalisation
<b>STMTAML</b>	Stock market turnover ratio multiplied by average money market liberalisation
<b>STMCAML</b>	Stock market capitalisation multiplied by average money market liberalisation
<b>LISTAML</b>	Number of listed companies per million people multiplied by average money market liberalisation
<b>PORTEAML</b>	Gross portfolio equity asset multiplied by average money market liberalisation
<b>PORTDLAML</b>	Gross portfolio debt liabilities multiplied by average money market liberalisation
<b>STMCSQ</b>	Stock market capitalisation multiplied by stock market capitalisation
<b>STMTSQ</b>	Stock market turnover ratio multiplied by stock market turnover ratio
<b>PORTESQ</b>	Gross portfolio equity asset multiplied by gross portfolio equity asset
<b>PORTDSQ</b>	Gross portfolio debt liabilities multiplied by gross portfolio debt liabilities
<b>SYNLISQ</b>	Syndicated loan issuance volume multiplied by syndicated loan issuance volume
<b>LISTCSQ</b>	Number of listed companies per million people multiplied by number of listed companies per million people



**D: OPTIMAL LAG SELECTION CRITERIA**

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-684.238	NA	3.69e+09	41.8932	42.2107	42.000
1	-491.789	291.589	662077.2	33.19934	35.7389	34.0538
2	-367.219	135.895*	10470.84*	28.61932*	33.3809*	30.2215*

**E: SUMMARY OF DIRECTION AND THRESHOLD EFFECT**

Variable	Impact on growth (%)	Direction	Threshold (% of GDP)	Beyond Threshold
STMC	0.04	Bidirection	100	Growth falls
STMT	0.02	Bidirection	50	Growth falls
LISTC	-0.3	Unidirection	47.5	Growth increases
PORTE	-0.2	Bidirection	120	Growth increases
PORTDL	0.02	Bidirection	166	Growth falls
SYNLI	0.09	Unidirection	125	Growth falls

**F: CORRELATION OF VARIABLES**

	STMC	STMT	SYNLI	LISTC	PORTE	PORTDL	INFL	IDP	FDI	AEL	AML
STMC	1.000										
STMT	0.032	1.000									
SYNLI	0.013	-0.800	1.000								
LISTC	0.216	-0.024	0.441	1.000							
PORTE	0.652	0.155	0.078	0.455	1.000						
PORTDL	0.121	-0.025	0.246	0.559	0.558	1.000					
INFL	-0.218	-0.070	0.019	-0.272	0.013	-0.090	1.000				
IDP	0.112	0.043	-0.232	-0.053	-0.100	-0.040	0.154	1.000			
FDI	-0.263	0.088	0.366	-0.032	0.548	-0.009	-0.009	0.004	1.000		
AEL	-0.254	-0.008	0.288	0.117	0.280	0.042	-0.590	-0.134	0.188	1.000	
AML	-0.180	-0.080	0.317	0.300	0.320	0.166	-0.057	-0.164	0.168	0.032	1.000