NELSON MANDELA
UNIVERSITY

THE IMPACT OF FINANCIAL DEVELOPMENTS ON ECONOMIC GROWTH IN GHANA: EVIDENCE FROM THE MANUFACTURING INDUSTRIES

BY

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THESIS SUBMITTED IN FULFILMENT OF THE REQUIREMENT FOR THE DEGREE OF PHILOSOPHIAE DOCTOR COMMERCII (ECONOMICS), (Ph.D.)

IN THE

FACULTY OF BUSINESS AND ECONOMIC SCIENCES
DEPARTMENT OF ECONOMICS

OF THE

NELSON MANDELA UNIVERSITY

PROMOTER: PROFESSOR DR. PIERRE LE ROUX

APRIL 2019

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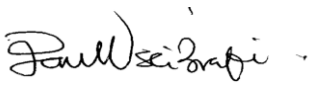
DECLARATION

In accordance with Rule G4.6.3, I hereby declare that the above mentioned thesis is my own work and has not been previously submitted for assessment to another university or for another qualification.

SIGNATURE: 

DATE: 14 December, 2018

ABSTRACT

This study provides an analysis of financial and growth dynamics with a view to assess the impact of financial development on economic growth in Ghana. The study also examines the extent to which financial developments in Ghana are affecting capital accumulation and industrial sector growth. The analysis was performed by examining the financial development indicators and economic growth data for Ghana over the period from 1965 to 2016. The study was motivated by the theoretical indications that improvements in financial intermediation within the economy can induce growth of the real sector and thus lead to economic growth. There have been notable structural and financial sector reforms in Ghana since the early and late 1980s. The indications in the financial sector portray improvement in the measures of financial development in the post-reform era as compared to the years before. The findings of the study complement existing research findings and information on finance-growth association as well as the influence that finance has on the sources of growth.

The study adopted real per capita gross domestic product (GDP) as a measure of economic growth. In addition, three real sector indicators serving as the sources of growth, included; capital accumulation, industrial value-added and manufacturing value-added. The analysis also adopts four financial indicators, expressed as percentage shares of GDP, namely; domestic credit to private sector, total domestic credit provided by financial sector, broad money supply and financial sector deposits—as measures of financial development.

The analysis of the impact of the financial development on capital accumulation, industrial output growth, manufacturing productivity and economic growth were estimated using the linear regression estimation techniques within the GMM estimation approach. The study, additionally, examined the short-run and long-run impacts of financial development on economic growth indicators by employing the Vector Autoregressive Regression (VAR) within the Autoregressive Distributed Lag (ARDL) approach. The study further assesses the direction of causality between financial development and economic growth indicators using the cointegration and Engle-Granger

causality testing approach within VAR models. The Bayesian Vector Auto Regression (BVAR) models were applied to examine the drivers of economic growth and to assess the sensitivity of economic growth to financial development and macro-economic shocks. This assessment was carried out to examine the maximising behaviour of financial development and also to find out if there exists threshold point beyond which finance adversely affects economic growth in Ghana. The results showed that credit to private sector shows a strong positive persistence in promoting economic growth in Ghana.

The results show that financial development dynamics in Ghana positively affect long-run economic growth and further indicate that the rate of impact was relatively higher in the post reform period of 1984 to 2016. The study further found a bi-directional causal association between financial development and economic growth. Regarding the sources of growth, the study found that financial development strongly contributes positively to capital accumulation in the long-term, however, the findings further suggested that, to some extent, the growing size of finance dampens capital formation and economic growth. This suggested the existence of inefficiencies in the expanding size of total credit offered by the financial system in Ghana. The study further found a long-run positive association between financial development and industrial productivity (except for manufacturing) growth in Ghana, with industry growth substantially determined by private credit. The results of the assessment on the sensitivity of economic growth to shocks in financial development indicators show that Ghana's economic growth is, to a larger extent, influenced by domestic credit provided to the private sector. Also, the results showed that economic growth has been highly responsive to macro-economic shocks such as government expenditure and industrial sector growth although industrial growth seems to show a strong negative persistence on Ghana's economy.

The results from the analysis of finance and economic growth shows that existence of different optimal growth maximising points domestic credit, broad money, financial sector deposits and the overall financial development ratios as depicted by the various inverted U-shaped relationship between the financial development indicators and economic growth. The optimal size or maximising positions or thresholds for private

credit and total credit were found to be at approximately 20.0 per cent and 28.0 per cent of GDP, respectively. On the other hand, the optimal size or minimum positions or thresholds for broad money supply and total financial sector deposits were found to be at approximately 19.0 per cent and 10.0 per cent of GDP, respectively. With regards to broad money supply-to-GDP and financial sector deposit-to-GDP ratios, the respective averages of 23.19 per cent and 13.77 per cent for the period 1965-2015 are higher than the minimum required thresholds of 19.00 per cent and 10.00 per cent, respectively. The findings show that financial developments have a strong positive association with economic growth but the results also give the indication that although financial development can enhance growth and inefficiencies in the financial system can equally dampen growth at some levels.

On the whole, the study found that financial reforms have positively contributed to economic growth in Ghana and the impacts of financial development on economic growth in Ghana have been higher in the post-reform era. The effect of financial reforms on capital accumulation was not significant although the study established that the impact of structural reforms was strong and adversely affected capital accumulation in Ghana. With regards to the industrial productivity growth, the study found a positive association between financial development and industry growth in Ghana. It was, however, observed that financial reforms have fails to significantly affect growth of industrial productivity and the impact of financial development on industry sector growth in Ghana are low but the sector experienced relatively higher growth in the pre-reform era.

DEDICATION

This thesis is dedicated to the entire Brafi family home and abroad, especially our children and all those yet to be born.

I also dedicate it to my mother, my wife and all my siblings for all their loving support and encouragement.

Finally, I dedicate to my maker for the gift of life.

ACKNOWLEDGEMENT

I wish to express my sincere gratitude to the Almighty who created the world in which we live. The wonders of creation and the singular opportunity to experience the wonder life on earth I can never show enough appreciation for.

Secondly, I am grateful for the support I received from the Nelson Mandela University and its Research Capacity and Development (RCD) department. The inspiration for this thesis has been greatly motivated by Professor Pierre Le Roux, my Supervisor. I am grateful Professor Le Roux, for the unflinching support, understanding and the height of academic professionalism he displayed during the cause of this study. I am grateful to the Department of Economics of the Nelson Mandela University for their excellent PhD programme and fertile academic climate that promotes originality. Special thanks also to Ms. Dedre and Ms. Smith for the exceptional assistance in the period that I have been at the School of Business and Social Science.

I would especially like to express my thanks to my employers, the Catholic University College of Ghana, Fiapre-Sunyani for their readily assistance towards my academic progress anytime the need arose. Notably, my warmest appreciation goes to Mr. Ernest Amoako-Adjei, an associate who helped me in my admission to the Nelson Mandela University. I also want to thank all my friends who offered me moral support throughout the period of my studies.

Finally, my utmost gratitude goes to the most unique family in the world headed by the one and only mother, Nana Adwoa Nyamekye Ampaabeng of Japekrom, for the unconditional love, the invaluable moral and financial support. Simply, I owe my academic and social progress to them.

PAUL OSEI BRAFI

DECEMBER 2018

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ABBREVIATIONS AND ACRONYMS

ARDL	Autoregressive Distributed Lag
BoG	Bank of Ghana
DFIs	Development Finance Institutions
ECA	Economic Commission of Africa
ECM	Error Correction Model
ERP	Economic Reform Programme
GFC	Gross Capital Formation
GFCF	Gross Fixed Capital Formation
FD	Financial Development
FINSAP	Financial Sector Adjustment Programme
GDP	Gross Domestic Product
IMF	International Monetary Fund
IDVA	Industry Value Added
ISSER	Institute of Statistical, Social and Economic Research
MVA	Manufacturing Value Added
NBFIs	Non-Bank Financial Institutions
NBFIs	Non-Bank Financial Institutions
OECD	Organisation of Economic Co-operation and Development
PCA	Principal Component Analysis
POP	Population
RD	Research and Development
SAP	Structural Adjustment Program
SMC	Stock Market Capitalisation
SOE	State-Owned Enterprise
SSA	Sub-Saharan Africa
TVT	Total Value Traded
TOR	Turnover Ratio
UNIDO	United Nations Industrial Organisation
UNCTAD	United Nations Conference on Trade and Development
WB	World Bank

CHAPTER ONE

INTRODUCTION

1.1 Introduction

The discussion on the nexus between financial development and economic growth have been pioneered by Schumpeter (1911, 1934) and further extended by Goldsmith (1969), McKinnon (1973), Shaw (1973), King and Levine (1993a) and other authors. It has been noted that the activities of financial intermediaries and other related indicators in the finance sector, and their level of development have been recognised as the potential determinants of economic growth, by enhancing the accumulation of physical capital and productivity. Accordingly, the more advanced financial systems within an economy mobilise savings and facilitate efficient allocation of resources (Greenwood, Sanchez & Wang, 2010; King & Levine, 1993b, 1993a), reduce agency costs and enhance innovation activities (Aghion, Howitt & Mayer-Foulkes, 2005), and contribute to high-return investments through risk-sharing (Bencivenga & Smith, 1991; Greenwood & Jovanovic, 1990; Saint-Paul, 1992). Ductor and Grechyna (2015) opine that these theoretical findings suggest that the causal effects of financial development should be considered jointly with the state of development in other sectors that govern economic growth.

A robust financial sector is important in supporting long-term economically viable projects towards successful completion. According to UNIDO (2013), a well-functioning financial market is important to boost industrial development through the provision of competitive lending for working capital, leasing of capital goods, consultancy services, and loans for fixed assets including investment projects. Thus, many countries in recognising the importance of the industrial sector, particularly, manufacturing in the economy have developed diverse schemes to support the growth of industries.

Financial development has been broadly defined as a state or process that marks improvement in quantity, quality, and efficiency of financial intermediary services in an economy (Abu-Bader & Abu-Qarn, 2008). According to Huang (2010), the quantity, quality, and efficiency of financial institutions and intermediary services within an economy are measured by examining the ratios of the indicators such as liquid liabilities; private credit provided; size of assets of commercial

and central banks; overhead costs and net interest margins; and stock market capitalisation, size, total value of stocks traded, stock turnover ratios to Gross Domestic Product (GDP).

Economic growth is an increase in the ability of an economy to produce goods and services from one period to the other. It is usually measured in terms of the real value and annual rate of growth of the Gross Domestic Product (GDP) of a country. The state and size of economic growth largely depends on a set of interrelated activities that occur in the real sectors of the economy within a time period. There have been many studies (Beck & Levine, 2004; Beck, Levine & Loayza, 2000; Becker & Sivadasan, 2006; King & Levine, 1993a, 1993b; Levine, 1997; Liu & Hsu, 2006) that have established a positive link between developments in the financial sector and economic growth. UNCTAD (2015) emphasise that a well-functioning financial system is critical to Africa's long-term growth. The financial sector can promote economic growth, stimulate investment and contribute to poverty reduction (Beck & Demirguc-Kunt, 2006; Fry, 1995).

Many developing countries have made attempts to structure their economies through reforms and strategic policies to make the financial sector a revolving instrument for growth (Aryeetey, Hettige, Nissanke & Steel, 1997; Nissanke & Aryeetey, 1998). Financial market failures sometimes provide a major justification for industrial policy through the creation of special financial instruments and special financing institutions like development banks to finance new products, firms entering new markets or new technologies (UNIDO, 2013, 2015). UNCTAD (2014) asserts that the development of the financial system is critical to boosting investment and growth in African Countries as the sector exhibits structural deficiencies that limit their ability to mobilise savings and channel it into productive investments. Reliable and accessible financial services promote innovation and technological progress and thus successful financing of long-term industrial projects can expand a country's productive capacity.

The literature on the financial development and economic growth nexus show how various indicators of financial advancement positively affect the real sectors and economy (Adu, Marbuah, & Mensah, 2013; Ductor & Grechyna, 2015; Fung, 2009; Gordon, 2009; Huang, 2010; McKinnon, 1973; McMillan & Rodrik, 2011; Shaw, 1973). These authors propose that well-

developed financial sector can provide the needed investment in the real sector, such as industry or manufacturing, and stimulate economic growth on one hand and economic growth on the other hand causes the industrial sector to grow optimally.

World Economic Forum (2013) suggests that the path to economic prosperity for a nation is tied to the robustness of its industrial sector, particularly, manufacturing, and the ability to accumulate productive knowledge and skills resulting in innovative products that can be competitively traded in global markets. The significance and benefits of the manufacturing sector to the economy was conceptualised by (Kaldor, 1960) who notes that as the industrial sector expands, it absorbs a growing amount of goods and services produced outside the industrial sector: these may be the products of agriculture or mining (food and industrial materials), or manufactures which it does not provide itself, or not in sufficient quantities, and which have to be imported. By extension, additional industrial growth generates demand for many kinds of services – banking, insurance and professional services of various kinds – and is thus partly responsible for a fast expansion of the "tertiary sector" of the economy (Kaldor, 1960; Libanio & Moro, 2013).

The literature on financial developments in Ghana indicate that there has been quite substantial improvements in the financial system as well as the economy (Aryeetey *et al.*, 1997; Aryeetey & Kanbur, 2008b; Bawumia, 2010; Buchs & Mathisen, 2008; IMF, 2011; Nissanke & Aryeetey, 1998). The questions as to whether the financial development has caused growth of the real sectors of the economy or vice versa justifies the need for empirical investigations on the interactive effects of financial development on economic growth in Ghana. Some studies have given the indication that, to some extent, too much finance can dampen economic growth and that there exists thresholds beyond which finance restricts growth (Arcand, Berkes & Panizza, 2012; Cecchetti & Kharroubi, 2012). The thesis examines the long-run relationship between financial development and industrial sector growth, investment and assesses the overall impact of finance on economic growth of Ghana.

This chapter presents the background to the study, the problem statement, study objectives and research questions. The chapter also highlights the hypotheses and further discusses the contribution of the study. The final section of the chapter outlines the organisation of the study.

1.2 Background to the Study

The debate as to the whether financial development causes economic growth or rather improvement in the financial system causes growth is still on-going with inconclusiveness on the direction of causality. Financial development has overarching effect on growth through economic channels in the real sector of the economy and specifically affects capital accumulation and industrial advancement. The study, thus, begins with a discussion on the theoretical basis of the financial development and growth association.

The seminal works of Schumpeter (1911, 1934) provided the foundation for examination of the relevance of financial developments in the growth agenda. Subsequently, early scholars such as Robinson (1952), Lewis (1955), Goldsmith (1969), McKinnon (1973), Shaw (1973), King and Levine (1993a, 1993b) and Levine (1997) shed more light and confirmed the existence of finance-growth relationship. The debate on the direction of causality in the finance-growth nexus remains inconclusive and three possible relationships have emerged. These include: finance-led growth or supply-leading (King & Levine, 1993a, 1993b; Levine, 1997), growth-driven finance or demand-following (Robinson, 1952; Kuznets, 1955; Stem, 1989) and two-way or bi-directional causal association (Lewis, 1955; Luintel & Khan, 1999). Yet there are still proponents of the finance-irrelevance hypothesis grounded on the position that financial development does not have a particular role in economic growth, or the impact can be ignored (Lucas, 1988; Stern, 1989).

Early studies which mainly concentrated on cross-country finance-growth associations indicated that country heterogeneity and the extent of financial development has an effect on the degree of growth in the relationship. The empirical studies that used cross-country data in examining the finance-growth nexus concluded that financial development enhances growth (Levine, 1997) although the heterogeneity of countries or regions were not considered abundantly. McKinnon (1973) and Shaw (1973) highlighted the importance of financial development by stressing on the need for financial liberalisation and argued against the use of extensive controls in the financial

sector. The significance of the relationship between financial development and economic growth depends on the level of financial development of that country or region (as cited by Bara, 2017). Implicitly, the indication that if countries or regions are to develop economically it is necessary to enhance the financial system in the economy.

Worsening and rapidly deteriorating economic and financial conditions that characterised many countries in the Sub-Saharan Africa (SSA) region between the 1960s and late 1980s necessitated major and far reaching economic reforms. During the late 1980s and early 1990s, the International Monetary Fund (IMF) and the World Bank (WB)—through Economic Reform Programme (ERP)—supported structural adjustment programs in most of the SSA countries to restructure their economies in order to achieve private sector led growth, through a market based system (Wold Bank, 1994). The financial sector was one of the sectors that recorded substantial level of reform as it was identified as impeding growth. The financial system of the SSA countries was described as shallow, inefficient with poor market structure and operated under a repressive and interventionist regime. Thus the absence of deep and efficient financial system and markets were seen as retarding the growth of the economies of SSA countries (Nissanke & Aryeetey, 1998; Quartey, 2005).

Repressive financial policies in the form of interest rate ceilings stifled growth of private investment, discouraged savings culture and inhibited financial deepening and hence restricted growth of the economy (Antwi-Asare & Addison, 2000; Epstein & Heintz, 2006; Senbet & Otchere, 2005). The negative repressive policies were evident in the trend performance of indicators of financial depth such as broad money supply (M2-to-GDP ratio). Deposit mobilisation and credit allocation to various economic agents in the SSA countries were abysmally low between 1960 and the mid-1980s. Central government controls and direct administrative manipulations in the financial sector in Ghana resulted in an underdeveloped and inefficient financial system (Bawumia, 2010). The financial system therefore failed in effectively intermediating funds to growth-enhancing real sectors of the economy such as agriculture and manufacturing. It was noted that the total volume of bank lending fell and the sectoral credit directives were not always effective in ensuring that the desired distribution of credit was realised. Credit to other priority sectors such as manufacturing—which had been identified as the

engine of growth—often fell short of the maximum permitted under the credit ceilings while that to non-priority sectors often exceeded their ceilings (World Bank, 1986).

Negative real interest rates also prevailed under the regime of direct controls given nominal interest and inflation rates (Adu *et al.*, 2013). Other indicators such as demand deposits, savings and time deposits and domestic credit recorded persistent declines as share of GDP between 1960 and the mid-1980s (Aryeetey & Kanbur, 2008b; Aryeetey, Nissanke, & Steel, 2000). Critics of the pre-reform financial sector had likened it to the financial repression categorisation of McKinnon (1973) and Shaw (1973). The overall impact on economic growth of the failed financial policies in the SSA region has been well documented (Aryeetey *et al.*, 2000; Bawumia, 2010). Real GDP growth rates within the SSA countries were relatively marginal between 1961 and 1980.

Reforms were therefore deemed necessary if the economies were to turn the seeming negative effects the financial sector put on growth of the economies of SSA. During the late 1980s and early 1990s, the IMF and WB launched a number of reforms under what was dubbed Structural Adjustment Programs (SAP) in most of the SSA countries. The objective of the reforms were, among others, to restructure the economies of the SSA countries in order to achieve private sector led growth, through a market based system. Examples of the reforms includes the Financial Sector Adjustment Program (FINSAP)—launched in Ghana and other SSA countries in 1988; and the Financial Sector Strategic Plan (FINSSP)—largely implemented from 2001 with almost similar objectives but the latter sought to consolidate gains made under FINSAP and further deepen the sector with improved financial service delivery (Aryeetey & Kanbur, 2008b; Bawumia, 2010).

Financial liberalisation was a significant component of the guided reforms under the FINSAP. Countries were to grant their central banks more autonomy in conducting monetary policy, liberalise interest rates, avoid or abolish the direct allocation of credit, implement monetary policy through indirect instruments, restructure and privatise banks and, more generally, develop and foster the environment for the proper functioning of financial markets (Mehran *et al.*, 1998). Additional reforms included liberalising access to foreign exchange; development of

Non-Bank Financial Institutions (NBFIs) to fill the gaps in the financial markets not served by the banks; development of stock markets; developing regulatory and legal framework; and the introduction of market based instruments of monetary control (Aryeetey *et al.*, 1997; Bawumia, 2010; Senbet & Otchere, 2005).

The financial sector of the countries of the SSA region has, over the last three decades (from the late 1980s to present), transitioned from what has been described as repressive and interventionist to a liberalised policy regime with some notable turnaround through comprehensive a series of reforms (Antwi-Asare & Addison, 2000; Nissanke & Aryeetey, 1998; Reinhart & Tokatlidis, 2003; Bawumia, 2010). A particularly interesting outgrowth of these financial sector reforms has been a surge of interest in the establishment of stock exchanges and their rapid proliferation in the recent years. The number of stock markets in Africa currently exceeds twenty - Botswana, Cote d'Ivoire, Ghana, Kenya, Malawi, Mauritius, Mozambique, Namibia, Nigeria, South Africa, Swaziland, Tanzania, Tunisia, Uganda, Zambia, and Zimbabwe.

These reforms aimed to raise the needed investment for growth of the real sectors of the economy such as the industrial and particularly, manufacturing and thus, over the last decades, many developing countries within the SSA region have adopted development strategies and prioritise reforms in order to modernise their financial systems. Gries, Kraft and Meierrieks (2009) observe that countries in SSA have been interested in fostering financial development by reducing governmental intervention in national financial sectors or by privatising banks. The primary aim of such reformative policies has been to promote growth through, *inter alia*, a higher mobilisation of savings or a rise in domestic foreign investments (Reinhart & Tokatlidis, 2003). It is, however, important to note that the effectiveness of such policies being undertaken in the SSA region requires a convenient causal relationship between financial developments and real sectors of their economies. Warwick (2013) opines that any type of intervention or government policy that attempts to improve the business environment or alter the structure of economic activity towards sectors, technologies or tasks that are expected to offer better prospects for economic growth or societal welfare than would occur in the absence of such intervention.

It is argued that financial reform measures, individually and in combination, are expected to affect saving and investment in the respective countries through their effect on asset returns and their characteristics, and through their effect on enhancing the availability and allocation of credit (Reinhart & Tokatlidis, 2003). Prime channels that highlight the anticipated effects of financial liberalisation include competitive interest rate, the availability of funds and provision of credit. It is widely assumed that liberalisation and the openness of the financial sector has led to competitive real interest rates, boosted deposit mobilisation, enhanced the efficiency of loan allocation, stimulated competition and improved general services in the financial sector in SSA (Quartey & Afful-Mensah, 2014). The financial sector in the SSA region now has a more supportive legal framework and this according to Gorlach and Roux (2013); Yartey and Komla (2007) are important, instils confidence in investors and makes long-term investments attractive which in turn increases economic growth. The various policy reforms over the past decade have contributed to an environment more conducive to financial sector development (KPMG Sector Report, 2014a).

Financial development increases economic growth through a number of channels within the economy. Beck and Levine (2004) and Levine (1997, 2004) maintain that finance mobilises and pools saving; produces information on possible investments so that resources can be channelled to their productive use; monitors the use of funds; facilitates the trading, diversification, and management of risk; and eases the exchange of goods and services. There have been many studies that have established a positive link between developments in the financial sector and economic growth. Following the works of McKinnon (1973) and Shaw (1973), many developing countries of SSA have, since the late 1980s, made various attempts to structure their economies through reforms and strategic policies to make the financial sector a revolving instrument for growth. A robust financial sector is important in supporting long-term economically viable projects towards successful completion.

Reliable and accessible financial services promote innovation and technological progress and thus successful financing of long-term industrial projects can expand a country's productive capacity. Archibugi, Cesaratto and Sirilli (1991); and World Economic Forum (2012) stress the importance of technological progress and innovation in enhancing the productive capacity of

manufacturing industries. Investments in Research and Development (RD) by firms thus form an important source of innovation in capital goods through the design activity sector. To be able to create jobs and add value to products, Sirilli and Evangelista (1998) emphasise the relevance of technological and financial resources necessary to face the costs and risks of RD and growth.

Financial development constitutes a potentially important mechanism for developing real sectors and long-run growth of the economy (Beck & Levine, 2004; Demetriades & Hussein, 1996; King & Levine, 1993a; Levine, 2003; Manning, 2003). Schumpeter (1911) argues that a well-functioning financial system will spur technological innovations through efficient allocation of resource from unproductive to productive sectors. Capital formation or expenditure is significant in promoting RD and an important measure of innovative intensity. In manufacturing, the most important objectives of firms' innovation strategies consist of increasing production, market shares and profits and also reducing production costs. Sirilli and Evangelista (1998) note that introducing innovations implies that firms have to face obstacles which are often of an economic nature and often cost and risk are too high.

Efficient financial systems may mitigate the risks associated with individual projects, firms, industries and countries. The financial system's ability to provide risk diversification services can affect long-run economic growth by altering resource allocation and savings rates (Acemoglu & Zilibotti, 1997). Well integrated financial system provides opportunity for companies to access more developed financial markets of advanced countries. If industries are able to take advantage of the development in the financial sector, then they would have reliable sources of financing their capital expansion and promote value addition and creation of jobs. Analysing firm-level evidence from 10 Eastern European countries, Larrain and Stumpner (2013) found that that reforms to reduce financial repression raised manufacturing productivity by 17.0 per cent through improvements in the within-industry allocation of resources across firms.

Amidst the structural reforms in the economies of most countries within the SSA, the region still faces relatively lower growth and records high level of unemployment. A number of countries have, over the past four decades, adopted various strategies including financial reforms as means

of improving economic growth within the respective economies. As such, a joint analysis of the long-run relationship and the dynamic behaviour of financial development indicators, real sector performance and macro-economic variables can provide some guidance as to the whether the various reforms have impacted economic growth as expected. Against this background, this study assesses the impact of financial development on economic growth in Ghana with a view to determine the specific effect on capital accumulation, the industrial sector and particularly manufacturing sub-sector performance—which are considered as sources of growth. Improved financial sector services should enhance growth of the real sectors of the economy to ensure and increase social welfare as suggested by literature.

1.2.1 Indicators of Financial Developments

Different indicators have been used to assess and measure financial development in several studies on the finance-growth nexus. There is no single aggregate or measure for financial development in literature and widely used indicators include Liquid Liabilities (LL), Private Credit (PC), Commercial-Central Bank Ratio (CCBR), Overhead Cost (OC), Net Interest Margin (NIM), Stock Market Capitalisation (SMC), Total Value-Traded (TVT) and Turnover Ratio (TOR). These indicators are often measured as a share of GDP. Other studies (Adu *et al.*, 2013; Khamis & Iossifov, 2009) have adopted the use of Principal Component Analysis (PCA) to produce new aggregate indices for financial development, based on selected indicators of financial development.

Asset concentration and quality, capital adequacy, savings mobilisation (deposits) and sectoral credit allocation, interest liberalisation and financial deepening indicators have shown marked improvements in countries of the SSA region following the financial sector reforms. According to Aryeetey and Kanbur (2008), the development of the financial sector should imply efficient and effective financial resource mobilisation and allocation to prioritised real sector development.

1.2.2 Financial Developments in Sub-Saharan Africa

Liquid Liabilities to GDP, Bank Deposits to GDP and Private Credit to GDP are standard indicators of financial development (financial deepening). Though Beck and Cull (2013) observe that Africa's financial systems are shallow in terms of international comparison, there have been marked improvements. All two standard indicators of financial development for the SSA region

have substantially improved over the period of 2000 to 2013. The median value for Liquid Liabilities to GDP increased from 20.0 per cent to 32.65 per cent, while that for Deposits to GDP increased from 12 to 24.56 per cent (World Bank, 2015). Financial deepening of the SSA economies has recorded notable improvements over the past decade following the financial sector reforms in the SSA region. Broad money supply to GDP ratio (M2+/GDP) rose from 35.73 per cent in 1987 to 48.17 per cent 2009.

Domestic credit is defined as the credit issued to the private sector by banks and other financial intermediaries divided by GDP. It measures general financial intermediary activities provided to the private sector (Huang, 2010). From 2003 to 2013, the total domestic credit to GDP in the SSA region increased from 11.58 per cent to 18.55 per cent. Between 1997 and 2007, the median ratio of private sector credit to non-oil GDP in SSA increased from 11.5 per cent to 18.6 per cent, as credit grew faster than non-oil GDP (Khamis & Iossifov, 2009). The Commercial-Central Bank Ratio (CCBR) is the ratio of commercial bank assets to the sum of commercial bank and central bank assets. According to Huang (2010), the ratio proxies the advantage of financial intermediaries in channelling savings to investment, monitoring firms, influencing corporate governance and undertaking risk management relative to the central bank.

Net Interest Margin (NIM) and Overhead Costs are measures for efficiency of the banking sector. Banks in sub-Saharan Africa have been branded as, on average, less efficient, but more profitable and operate in less competitive environments. Beck and Cull (2013) state that the NIMs in the median SSA country at 5.90 per cent in 2011, while they stood at 4.70 per cent outside Africa. Similarly, the interest rate spread between lending and deposit rate was 10.30 per cent in Africa and 8.20 per cent outside. Overhead costs (OC) in the median African financial system stood at 5.50 per cent of total assets, while they were 3.4 per cent outside Africa for the same period in 2011.

Stock Market Capitalisation (MCAP), Total Value Traded (TVT) and Turnover Ratio (TOR) are indices for stock market development. MCAP is the size index—is the ratio of the value of listed domestic shares to GDP. TVT is an indicator to measure market activity—is the ratio of the value of domestic shares traded on domestic exchanges to GDP, and can be used to gauge market liquidity on an economy-wide basis. TOR is the ratio of the value of domestic share transactions

on domestic exchanges to the total value of listed domestic shares. A high value of the TOR will indicate a more liquid (and potentially more efficient) equity market. The stock market capitalisation to GDP for the Sub-Sahara Africa region as at the end of 2014 was 91.70 per cent (World Development Indicators, 2015). The most active and liquid stock markets in the region are in South Africa, Nigeria, Kenya, Mauritius and Zimbabwe. They account for a sizeable percentage of portfolio equity investment in SSA with The Johannesburg Stock Exchange (JSE) dominating the region, representing 38.00 per cent of all listed companies and 83.00 per cent of total market capitalisation in SSA in 2012 (World Bank, 2013b). Between 2007 and 2013, the total investment financed by equity or stock sales increased from 0.25 per cent to 4.70 per cent.

Table 1.1: Selected Growth Indicators for SSA, Period Averages, 1965-2016.

Period	Real GDP Growth Rate (%)	Per Capita GDP Growth Rate (%)	Per Capita GDP (Current USD)	Gross Capital Formation	Industry Value-Added (% of GDP)	Manufac-turing (% of GDP)
1965-68	2.32	-0.21	1192.41	-	-	-
1969-72	7.22	4.45	1345.89	-	-	-
1973-76	4.36	1.55	1462.22	-	-	-
1977-80	2.54	-0.32	1457.02	-	-	-
1981-84	0.20	-2.61	1363.41	22.86	32.81	14.90
1985-88	1.57	-1.25	1265.52	15.28	32.89	14.03
1989-92	2.58	-0.15	1139.04	16.78	33.17	12.16
1993-96	2.98	0.29	1169.63	16.65	33.10	11.66
1997-00	2.98	0.29	1169.63	16.65	33.10	11.66
2001-04	5.87	3.09	1230.43	15.94	30.98	11.76
2005-08	6.28	3.44	1442.79	17.35	31.67	10.49
2009-12	4.10	1.29	1562.40	20.02	27.83	10.11
2013-16	3.44	0.67	1646.59	21.26	25.51	10.63

Source: World Bank, 2018.

SSA has experienced vast improvements in economic growth and six of the 10 fastest growing economies over the past decade are in the region (Miller, Holmes & Feulner, 2012). Annual GDP growth rate for developing countries of SSA which was 0.07 per cent in 1987 increased and peaked at 11.7 per cent in 2004. Khamis and Iossifov (2009) assert that acceleration of growth in SSA has occurred alongside an even more rapid development of the financial systems in the region. The GDP growth rate for the SSA region stood at 4.8 per cent in 2013 and has witnessed declines since then to 1.24 per cent in 2016.

1.2.3 The Macro-economic Environment of the SSA Region

There have been relatively significant improvements in the macro-economic environment of the SSA region. Growth and improved macro-economic stability lead to substantial private capital inflows. Masetti and Mihr (2013) assert that strong growth prospects, improved macro-economic management, increased political stability, as well as robust global commodity demand have led to sizeable capital inflows into SSA.

Table 1.2: Selected Indicators for SSA.

Indicator	Year				
	2011	**2012**	**2013**	**2014**	**2015**
Bank Capital to Asset ratio (%)	10.82	10.84	11.106	11.56	11.89
Bank Credit to Private sector	49.30	46.54	45.18	45.64	45.47
Interest Rate Spread (	7.26	7.07	7.20	6.83	7.31
Bank nonperforming loans to total gross loans (%)	5.10	6.06	6.08	6.55	9.61
Foreign direct investment, net inflows (% of GDP)	2.44	2.38	2.41	2.87	2.51
Bank liquid reserves to bank assets ratio (%)	17.73	18.65	18.59	18.60	16.98
Gross fixed capital formation (% of GDP)	20.23	20.53	21.25	20.52	21.16
Trade (% of GDP)	64.43	61.04	59.68	54.71	59.78

Source: World Bank, 2018.

There have been increasing private capital inflows to Sub-Saharan Africa over the last ten years. Private capital inflows, that is, foreign direct investment and portfolio investment, to SSA increased sharply and nearly quadrupled from USD 13.2 billion in 2003 to USD 48.3 billion in 2012 (IMF, World Bank, 2013). FDI is the main conduit for private investment, with 2012 FDI inflows accounting for two-thirds of total private capital inflows. There have been much development of the domestic financial markets in the SSA region and this has led to significant increase in the size of FDI inflow the countries in the region attracts. Net FDI inflow to GDP in quite low for most years before 2000 increased to a peak of 4.56 per cent in 2001 and dropped to 2.51 per cent in 2015. The SSA region recorded low net FDI outflows to GDP since 2013 and stood at 0.82 per cent in 2015. In comparative terms, the formal financial sector in Africa performed, relatively, more poorly during the period 2009–2012, as monetary resources

mobilised by the sector was 42.1 per cent on average, compared with 76.5 per cent in other developing countries and the world average of 72.3 per cent (UNCTAD, 2015).

Openness to trade is to trade a key indicator for the industrial and manufacturing sector growth. The share of trade to GDP which peaked at 74.56 per cent in 2008 has showed declines, registering 59.8 per cent in 2015. The size of the openness of the economy is determined by the sum of exports and imports to GDP. Interest rate spread (lending rate –deposit rate) for the SSA region which rose to a peak of 14.72 per cent in 2001, has seen persistent declines to 7.31 per cent in 2015.

The relatively strong growth performance prospects in the SSA region, improvements in the business environment, on-going economic reforms as well as robust commodity demand have drawn global investor attention to the economies of the region. Combined with easy conditions in the global financial markets – record low interest rates in developed markets and ample liquidity— provide great prospects for increasing private capital inflows to SSA.

1.2.4 Use of Financial Services and Markets in the SSA Region

The industrial sector, particularly the manufacturing sub-sector, is highly dependent on finance due to the capital intensive nature associated with its activities. The manufacturing companies access financial services from the banks and other financial institutions, and additionally from financial markets to support their operations and acquisition of capital or expansion. Banks, other financial institutions and the stock market offer reliable financing for the manufacturing companies and thus provide opportunities for them to embark on expansion and grow the economy. Ndikumana (2014) asserts that due to the pervasive information asymmetries, poorly developed or inexistent equity markets and other non- bank credit instruments, firms in SSA countries rely on bank credit as the primary source of external financing capital accumulation. Consequently, credit contraction or expansion is likely to cause relatively higher contraction or boom in private sector activity in SSA countries than in more advanced economies.

Manufacturing companies in SSA region use the services of banks, other financial institutions and the stock market to finance the finance investment and parts of their operations. The World Bank (2015) indicated that 21.2 per cent of firms in Ghana used banks to finance investments in

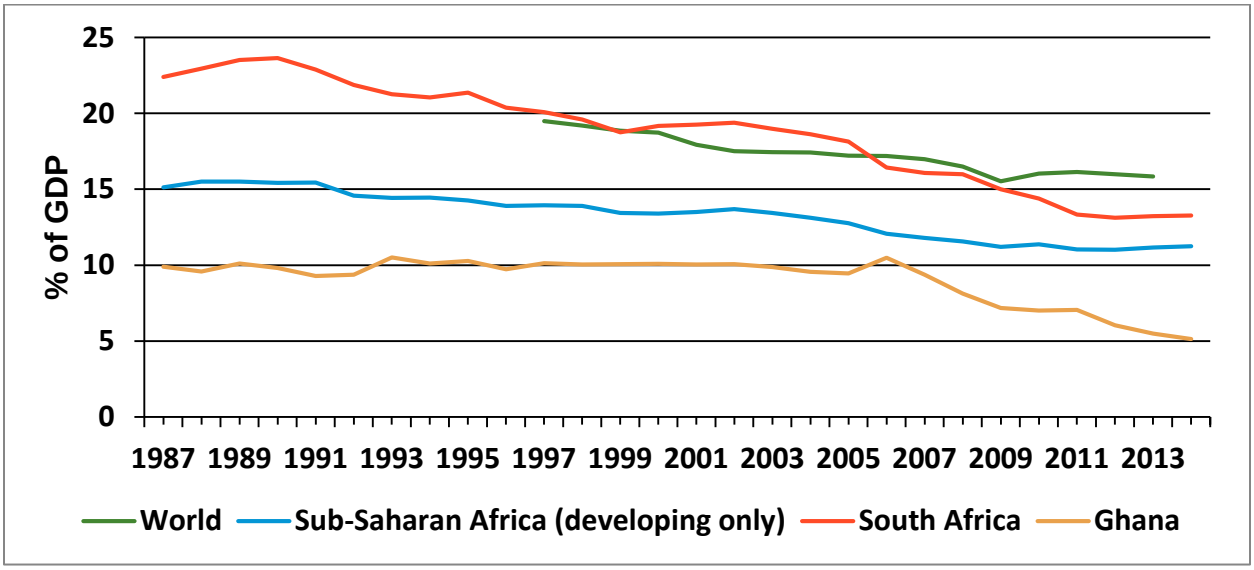
the year 2013 while additionally, 25 per cent used same source to finance working capital. 2007 estimates indicate that 34.8 per cent of firms in South Africa used banks to finance investments in the year while additionally, 21.1 per cent used same source to finance working capital. Though the World Bank indicate that there is comparatively increasing use of financial services by firms, it stresses that companies report access to finance as the biggest obstacle to their operations. Firms' use of financing services in Ghana is still lower than elsewhere in the world and further, there exists comparatively lesser access to financial services (UNCTAD, 2015; World Bank, 2015).

1.3 Manufacturing Value-Added and Capital Formation in SSA

Developing countries of SSA are expected to record higher rates of growth in the various sectors of the economy. The overall contribution of the SSA region to industrial value added growth is relatively lower as compared to emerging markets. Most SSA countries have exhibited robust MVA growth in recent times, with Ethiopia (8.6 per cent), Equatorial Guinea (8.4 per cent), Tanzania (8.2 per cent), Uganda (8.2 per cent) and Nigeria (7.9 per cent) showing the highest rates. Only a few countries, including Zimbabwe, The Gambia and the Central African Republic, saw a decline in their manufacturing out-put over 2007–2012. South Africa, the region's largest producer, recorded a rather modest performance with 0.3 per cent overall growth for the same period. Amid rising domestic costs and low demand in its main export markets, UNIDO (2013) asserts that South Africa has yet to find a way to harness the potential benefits of manufacturing, which accounts for only 13.0 per cent of jobs and 15.0 per cent of GDP, and concludes that the figures are much lower than in other emerging countries.

Manufacturing value added to GDP of developing countries of SSA is below the global growth levels and have relatively recorded declines since the 1980s. Globally, the manufacturing industry value added for the period 2006 to 2013 was between 17.19 per cent and 15.83 per cent to GDP. For the same period, developing countries of SSA recorded 12.06 per cent and 11.24 per cent with South Africa recording values between 16.43 per cent and 13.28 per cent. Ghana recorded a manufacturing value added to GDP of 0.48 per cent and 5.14 per cent from 2006 to 2013 respectively.

Figure 1.1: Manufacturing Value-added (% of GDP)



Source: World Bank, 2015

Comparing the global values to the countries of SSA, it is noticeable that the economies of recorded lower manufacturing value added. Share of MVA to GDP of SSA region has been declining from 15.51 per cent in 1988 to 11.24 per cent in 2014. After rising from a record low annual MVA growth of minus 10.63 per cent to a highest of 5.91 per cent in 2010, South Africa has recorded steady decline to 0.04 per cent in 2014. Sustaining MVA growth in SSA region is critical in the efforts to minimise poverty and promote economic growth amidst increasing rates of unemployment.

Annual growth rates of Gross Capital Formation (GCF) and Gross Fixed Capital Formation (GFCF) for the SSA region increased from minus 9.09 per cent and minus 6.04 per cent in 1987 and 2014 to 6.92 per cent and 6.60 per cent respectively. The SSA region recorded a peak GCF annual growth rate of 24.56 per cent in 2000 while GFCF recorded a highest annual growth of 15.91 per cent in 2006.

As indicated in literature, the critical role of the financial sector, as highlighted by Levine (1997, 2004), in mobilising and pooling saving; producing information on possible investments so that resources can be channelled to their productive use; monitoring the use of funds; facilitating

trade, diversification and management of risk; and easing the exchange of goods and services. Finance is important for growth of the real sector and its impact can be significant to the overall growth of the economy through the use of effective policies.

The study is of the view that the full potential of improvements or developments in the financial sector have not been utilised in order to lead to optimal growth of the real sectors of the economy. The industrial and particularly, Manufacturing contribution and growth in SSA are still low in comparison to the other emerging markets, particularly in Asia. It is indicative of a fact that the manufacturing industry of the SSA region has not been able to significantly use the financial developments to expand the physical capital and labour as countries in the region are still rank high in unemployment. An integral part of growth is the lower unemployment and improvement in the standard of living.

After almost a decade of the implementation of reforms, Collier, Hoeffler and Pattillo (1999), and Nissanke and Aryeetey (1998) argued that the financial reforms appeared to have affected the economies in Sub-Sahara Africa very little. Reinhart and Tokatlidis (2003) explained that whether the blame is to fall on their initial design itself, or on the difficulties and partial nature of their implementation, liberalisation policies have seemed insufficient in mobilising savings, deepening intermediation through the financial sector, or raising investment.

Ghana's industrial sector accounts for 22.0 per cent of GDP and consists of mining and quarrying, manufacturing including aluminium smelting and food processing, electricity and water and construction (Zakari & Boly, 2013). Ghana's manufacturing sector was weak and as a result, accounted for only 9.0 per cent of GDP in 2004, equivalent to less than US$ 1 billion. Manufacturing growth averaged 4.3 per cent between 2000 and 2004, lagging behind growth in agriculture and services, which averaged 4.8 per cent and 4.9 per cent, respectively, during the same period. The manufacturing sector's share of GDP was 8.9 per cent in 2005 and 8.8 per cent in 2006. Ghana's MVA as a share of GDP for 2016 was 5.7 per cent (World Bank, 2016).

The failure of developing countries to translate economic growth into jobs, economic development, poverty reduction and enhanced living standards has also contributed to new

thinking on the relevance of policies and strategies, including financial reforms and industrial policies, to the proactive promotion of multiple development objectives (ECA, 2013; ILO, 2011; IMF, 2013; OECD, 2013; UNIDO, 2013; World Bank, 2013b). Examining the long-run relationship between financial development and economic growth and analysing the impact of financial development on investment and industrial sector of Ghana's economy is relevant.

1.4 Financial Developments and Economic Growth in Sub-Saharan Africa

Liberalisation of the financial sector has been one of the notable trends characterising the SSA region, with decreasing capital controls and an as such increasing participation of developing countries in international financial markets over the last four decades. More broadly, domestic financial development, measured in terms of liquid liabilities or stock market capitalisation, has relatively risen dramatically over the same period. It is important to examine the impact of the financial development on the real sector of the SSA countries. The goal of reforming the financial sector and improving the general political economy was to ensure the development of the economy by providing the grounds for financing long-term investments and projects. Abiad and Mody (2005) provide an analytical framework for examining the political economy of financial reforms and highlights its relevance for financial development.

Notwithstanding the fact that financial liberalisation has been criticized as increasing the likelihood of financial crises and financial fragility, it is widely regarded as promoting the flow of financial resources, thereby reducing capital costs, stimulating investment and fostering financial development and economic growth (Ang & McKibbin, 2007; Detragiache & Demirgüç-Kunt, 1998; McKinnon, 1973; Shaw, 1973; Summers, 2000). As a consequence, governments of the SSA region in recent decades have remained committed to reducing direct intervention in the financial system by easing or removing controls over, credit allocation, interest rates and financial transactions domestically and internationally, opening up the banking system for foreign entry, and privatising commercial banks or non-bank financial intermediaries.

Table 1.3: Period Averages of share of GDP (%) for Selected Financial Development Indicators, 1965-2016, Ghana.

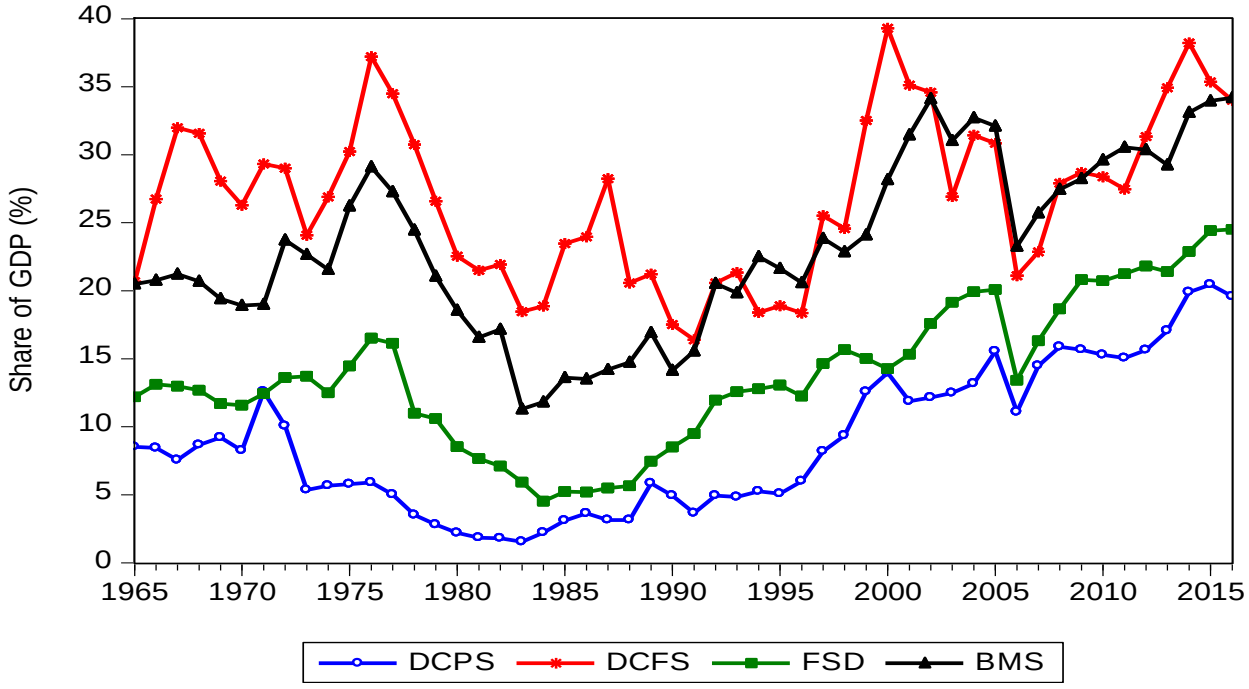
Period	Private Credit (DCPS)	Total Credit (DCFS)	Gross Savings (GDS)	Deposits (FSD)	Broad Money (BMS)
1965-68	8.29	27.74	8.62	12.74	20.79
1969-72	10.02	28.17	11.55	12.33	20.25
1973-76	5.67	29.60	11.46	14.29	24.89
1977-80	3.38	28.59	6.40	11.55	22.83
1981-84	1.85	20.18	3.80	6.3	14.21
1985-88	3.25	24.06	5.44	5.39	14.02
1989-92	4.84	18.92	4.91	9.35	16.78
1993-96	5.29	19.24	10.82	12.66	21.14
1997-00	11.02	30.47	5.87	14.89	24.73
2001-04	12.42	32.01	7.19	17.99	32.33
2005-08	14.25	25.67	3.90	17.11	27.13
2009-12	15.41	28.97	12.64	21.14	29.69
2013-16	19.25	35.62	15.24	23.29	32.62

Source: World Bank, 2018.

Among others, a key motivation for developing the financial sector has been to make the financial system efficient to be able to support the real sector and enhance growth of the economies.

Although financial systems in the SSA region remain comparatively lower, there has been relative increase in the financial deepening in Ghana when compared with the situation since the implementation of reforms. The data in Table 1.5**,** indicate that there total financial sector credit in the Ghanaian economy has increased and averaged at about 35.62 per cent of GDP between 2013 and 2016. Similarly, there has been significant improvement in credit to the private sector in Ghana, given that the share of private credit to GDP which averaged 8.29 per cent in 1965 and 1968 increased to 19.25 per cent for the 2013-16 period. These indicate that access to financial services and the state of financial intermediation is quite better, and provides basis for improvement in the engagement between private enterprises and the financial sector.

Figure 1.2: Trends in Share of Financial Indicators (%) 1965-2016, Ghana



Source: World Bank, 2018.

1.5 Productivity in the Industrial Sector in African Developing Economies

The share of African manufacturing in GDP rose from a low of 6.3 per cent in 1970 to a peak of 15.3 per cent in 1990. Since then, there has been a significant decline in the contribution of manufacturing to GDP. In particular, the share of manufacturing in GDP fell from 15.3 per cent in 1990 to 12.8 per cent in 2000 and 10.5 per cent in 2008. The decline in the contribution of manufacturing to GDP since 1990 has been observed in all sub-regions of the continent. In Eastern Africa, the share of manufacturing in GDP fell from 13.4 per cent in 1990 to 9.7 per cent in 2008. In West Africa it fell from 13.1 to 5 per cent over the same period. Furthermore, in Southern Africa, it fell from 22.9 to 18.2 per cent and in Northern Africa it fell from 13.4 to 10.7 per cent for the same period. Available evidence suggests that there is a significant variance across African countries in terms of both the level and the growth of MVA per capita. In 1990, six out of the 52 African countries for which data are available had an MVA per capita of at least $200, and in 2010, the number of countries with an MVA per capita of at least $200 was nine. In terms of manufacturing growth, 23 African countries had negative MVA per capita growth over

the 1990–2010 period, and five countries had an MVA per capita growth of above 4.0 per cent (UNCTAD & UNIDO, 2011).

These facts suggest that African countries have not taken full advantage of the opportunities offered by manufacturing for growth and development (UNCTAD & UNIDO, 2011). With the introduction of financial reforms and the subsequent improvements in financial indicators for the SSA region, it is relevant to examine the long-run relationship and the impact that financial developments have had on the industrial sector. In fact, most sub-Saharan African countries have been experiencing premature de-industrialisation: manufacturing value added as a percentage of GDP declined from 15 per cent in 1990 to 10 per cent in 2008 (ILO, 2011; UNCTAD & UNIDO, 2011).

1.6 Industrial Sector and Manufacturing sub-sector as the Engines of Growth

The industrial sector has been identified as a significant growth sector in the Ghana's economy over the past three decades because of its potential to contribute meaningfully to the economic development agenda of government. Asante and Addo (1997b) and Asante (2013) are of the view that for the sector to reach its full potential and impact the economy as desired there is the need to address the central issues of resource availability and enabling policy environment.

The manufacturing sector's capacity to expand significantly has been limited due to a number of problems including: the imported input requirement of full capacity production often exceeding the amount of foreign exchange available; instances of full capacity production exceeding the demands of the domestic market in some sectors; and periods where processing capacity often exceeds the availability of local raw materials. Addressing these problems indirectly offer opportunities for expansion of the Ghanaian economy.

1.7 Objectives and the Growth Challenge of the Industrial Sector in SSA

The United Nations (UNCTAD & UNIDO, 2011) policy recommendations for Africa suggests that efforts to promote industrial development should focus on (a) the promotion of scientific and technological innovation; (b) the creation of linkages in the domestic economy; (c) the promotion of entrepreneurship; (d) the improvement of government capabilities; (e) the adoption of appropriate monetary and fiscal policies; (f) avoiding exchange rate over-valuation; (g)

enhancing resource mobilisation; (h) strengthening regional integration; and (i) the maintenance of political stability.

Countries of the SSA have over the last decade set up targets and embarked on some industrial initiatives with the focus of promoting manufacturing sector developments. The UNECA (2015) report highlights industrial policy initiatives by some regional bodies in Africa with the aim of promoting industrial development within the SSA. Some of the policy initiatives and objectives of some regional bodies include the following:

- The Southern Africa Development Community (SADC) Industrial Development Policy Framework (2013–2018) provides a blueprint for the industrial development of its 15 member states. The goal is to "promote development of an integrated industrial base within SADC through the exploitation of regional synergies in value-added production and enhancement of export competitiveness", including via "collaboration in the development of regional value chains with targeted interventions".

- The East African Community (EAC) has introduced two policy documents on industrialisation: the Industrial Strategy (2012–2032) and the Industrialisation Policy (2012–2032). The documents seek to promote "structural change of the manufacturing sector through value addition and product diversification based on comparative and competitive advantages of the region".

- Similarly, the Economic Community of West African States (ECOWAS) launched the West African Common Industrial Policy (WACIP) in 2010 with a vision is to "maintain a solid industrial structure which is globally competitive, environment-friendly and capable of significantly improving the living standard of the people by 2030". The general objectives are to accelerate industrialisation of the region through the transformation of local raw materials, develop and diversify industrial productive capacity, and strengthen regional integration and export of manufactured goods.

A striking feature of these policy initiatives highlight the need to make the industrial sector more robust and significant so as to promote and sustain economic growth within the SSA.

The period for Ghana's independence was identified as a key moment for industrialisation since it was seen as an important factor in modernisation and development (Asante & Addo, 1997). Thus the objectives of industrialisation in the immediate post-independence era, among others, were "to exploit natural domestic resources, form a base for the developing other economic sectors, satisfy basic needs of the population, create jobs, assimilate and promote technological progress and modernise society" (Asante & Addo, 1997). Ghana's industrial policy is designed to promote increased competitiveness and enhanced industrial production, with increased employment and prosperity for all Ghanaians (Republic of Ghana, 2010). The key development objectives of the Ghana Industrial Policy (2010) are to: (i) expand productive employment in the manufacturing sector; (ii) expand technological capacity in the manufacturing sector; (iii) promote agro-based industrial development; and (iv) promote spatial distribution of industries in order to achieve reduction in poverty and income inequalities.

The achievement of the stated objectives depends on the ability economies to the harness the potential financial development economies through enhanced investment in industry Financing is a major challenge that confronts the manufacturing sector in Ghana. It has been identified to be significantly affecting the ability of firms to invest and upgrade technology to support vital operations and achieve competitiveness. Thus minimising financing challenges in the manufacturing drive has featured prominently in government policy documents with the aim of encouraging financial institutions to support the re-tooling of local industries, lowering the relatively high cost of borrowing which limits access to credit and raises the cost of doing business and restricts the scope for growth of manufacturing firms.

1.8 Problem Statement

The high levels of underdevelopment and unemployment in developing countries in the SSA region has raised many questions for policymakers of the effectiveness of reforms and strategies that were aimed to promote economic growth. For example, how can developing countries of SSA developments in the financial sector to ensure high and sustainable growth of the real sectors of their economies? What can policymakers do to cause improved growth of the

industrial or manufacturing sector through improved financial system? These concerns point to the need for strategies to ensure optimal growth of the real sector such as industrial or manufacturing with defined objectives.

Since the late 1980s, countries in the SSA region have implemented reforms including liberalising interest and exchange rates, eliminating credit controls, restructuring and privatising of commercial banks, adopting indirect instruments of monetary policy, developing financial markets (Mehran *et al.*, 1998). These reforms, among others, have to a larger extent, led to significant development of the financial sector of the economies of SSA countries (Masetti & Mihr, 2013). This development implies that banks system and the general financial environment puts the Region in a relatively better position to finance or provide the necessary investment support to important sectors such as the manufacturing.

The industrial sector, particularly, manufacturing has been identified as having the potential to transform the economies of developing countries by serving as a main driver of growth. Kaldor (1960) pioneered and advanced the studies of the sector by hypothesising about the stylised facts and empirical regularities regarding the benefits of the manufacturing sector for the entire economy. Kaldor (1966) emphasises the importance of the manufacturing sector by suggesting three channels through which manufacturing transforms the structure of the economy as: (i) increasing returns at the firm level – that is, producing proportionately more output relative to inputs; (ii) dynamic increasing returns at the sector or cluster level – productivity improvements due to economies of proximity of related supplier and competitor firms and institutions; and (iii) economy-wide linkages and multipliers, as manufacturing draws in inputs from primary sectors, manufacturing itself and services as well as generating forward linkages to the rest of the economy.

For most governments of developing countries in SSA, the key for growing their economies, which have primarily be agro-based, and the creating high-value jobs for its citizens, is to attract investment to the manufacturing sector and expand its capacity through technological innovation. Almost all advanced countries have gone through the industrialisation to bring significant growth to their economies. KPMG Sector Report (2014) thus concludes that economic benefit or value-added to the nation—and the specific geographic region—can be significant due to the strong

multiplier effect of advanced manufacturing through the economy. Most economies of the SSA region have thus since the late 1980s embarked on reforms and adopted various strategies to boost the growth of the manufacturing sector.

Countries in the sub-Saharan Africa region have recorded growth in the manufacturing sector in recent times as compared to previously when the economies were dominated by the agricultural sector. Ghana, Ethiopia and Malawi are three countries that have experienced growth-enhancing structural change with the share of employment in the agricultural sector declining while the share of employment in the manufacturing sector has seen some increases (Cantore, Clara & Camelia, 2014; McMillan & Rodrik, 2011). It is however the case that labour productivity in manufacturing remains notably low in both Ghana and Ethiopia, just as in most of the other countries within the SSA region.

Industrial production, particularly, manufacturing value-added to GDP of developing countries of SSA is still relatively low as compared to other recent emerging markets in Asia. The region records lower trends in net manufactured exports and industry technology use. SSA has significantly high population, the region has the lowest record of formal manufacturing sector or service related employment (UNIDO, 2013).

A notable feature about the objective to add value to manufacturing output, create jobs for the growing population and thus grow the economies of the SSA countries is the need to optimise the growth of the sector through an efficient and supportive financial system. Due to the heavy reliance of the industrial sector on finance and investment, there is the need to identify the key financial indicators that cause optimal growth of the economy and notably, its sources of growth.

To ensure optimal and sustainable growth, the manufacturing industry requires a robust macro-economic environment and functional financial sector that is liquid, efficient, responsive and competitive. Consequently, for developing countries to fully apply this objective, there is need for identification of key factors and determinants that can cause optimal growth of manufacturing is desirable.

Over the past three decades, the financial sector of SSA and Ghana, in particular, has been considered as more liberalised and open as compared to the 1960s and 1970s (Quartey & Afful-Mensah, 2014). Removal of restrictions on capital inflows and outflows in a country has been deemed as promoting participation by foreign investors. This according to Roux and Moyo (2015) would offset low savings and therefore increase the amount of investment, employment and economic growth. The financial repressionists, led by McKinnon (1973) and Shaw (1973) often referred to as the 'McKinnon-Shaw' hypothesis—indicate that financial liberalisation in the form of an appropriate rate of return on real cash balances is a vehicle for promoting economic growth. When the financial sector of an economy is liberalised and robust in terms of mobilisation of savings; accessible credit facilities; well-functional stock market; competitive interest rates; and sound financial sector policy regime; it may thus propel significant growth in major sectors such as manufacturing or industrial.

There have been several studies that have established positive causal relationship between financial development indicators and economic growth through the use of various econometric models. The use of VAR models and cointegration approach has been widely used in recent times in testing economic associations. Most of the studies have used cross-sectional panel regression to establish the Granger-causality between indicators of financial development and economic growth. This thesis uses the Principal Component Analysis (PCA) to generate new indices for financial development from four financial sector growth indicators. The study uses the cointegration approach within the Autoregressive Distributed Lags (ARDL) tests the short and long-run relationship between financial development and the components of economic growth.

Over the past three decades, Ghana's economy has transitioned from a low-income economy into a middle-income country, registering relatively consistent higher economic growth rates. Capital accumulation or investments and industrial sector growth have been identified as important sources of growth. Frontiers of the finance-growth nexus highlight capital accumulation and industrial productivity as important channels through which improved financial intermediation enhance medium to long-term economic growth. In order to come out with growth optimisation strategy there is the need to identify behaviour of the factors that maximise growth and other

measures of interest. According to Bohn (1990), risk minimisation is accomplished by choosing instruments which ensure a low return variability and provide a hedge against an unexpected economic slowdown. The thesis aims to use the principal component analysis, cointegration approach and VAR models to analyse the long-run dynamic behaviour and impact of the indicators of financial development and macro-economic variables on capital accumulation, industrial output and economic growth in Ghana.

It has been noted that the competition to attract manufacturing investment and foreign direct investment between nations and between individual geographic regions within nations is increasing (World Economic Forum, 2012, 2013). GDP growth rate in most SSA countries have been relatively high yet it has not translated into high income jobs and outputs. It is the case that most of the countries of SSA including Ghana and South Africa still experience relatively high unemployment and poverty amongst its population. The relative financial development and macro-economic stability in the SSA region stress the need for a comprehensive analysis of how these developments can influence optimal growth of the manufacturing industry.

The seeming inability of developing countries to translate economic growth into jobs, economic development, poverty reduction and enhanced living standards in the face of major reforms and structural adjustments makes it imperative to examine the long-run impacts of notable growth-augmenting indicators. It may be critical to shaping policies and strategies for translating growth in terms jobs and improving standard of living. Zakari and Boly (2013) assert that Ghana's manufacturing sector has not responded well to the various economic and trade policy reforms introduced over the past decades. Manufacturing firms have faced much challenges in the form of increased competition in the domestic and export markets and high production and distribution costs arising from high interest rates, aged and obsolete equipment, inefficient infrastructural services and low productivity (Zakari & Boly, 2013).

This thesis, is therefore, motivated by the necessity to comprehensively examine the long-run relationship and dynamics of the impact of indicators of financial development on economic growth and the sources of growth (capital accumulation and industrial productivity) in Ghana. Accordingly, this thesis aims to provide insight into the following questions:

- What are the key financial sector developments in Ghana before and after the introduction of reforms?
- What is industrial sector growth dynamics and their implication for economic growth in Ghana in the light of the implementation of key structural reforms and sector-specific policies;
- What is the long-run relationship between financial development and capital accumulation in Ghana and the impact of key financial development indicators in the association?
- What is the long-run relationship between financial development and industrial growth in Ghana and the impact of key financial development indicators in the association?
- What is the long-run relationship between financial development and manufacturing output growth in Ghana and the impact of key financial development indicators in the association?
- What is the long-run relationship between financial development and economic growth in Ghana and the impact of key financial development indicators in the association?
- What has been the reaction of capital formation (investment), industrial productivity and economic growth to financial development and macro-economic shocks?
- What are the stable positions, maximising behaviour and optimal thresholds of financial development indicators beyond which finance affects economic growth?
- What has been the extent of impact of financial developments on growth components in Ghana in the pre-reform and post-reform periods?
- Has the industrial sector and particularly, manufacturing sub-sector been the engine of growth of Ghana's economy?

An insight into these questions is of critical importance given the fact that, historically, there have been specific structural and financial sector reforms to bring about change in the real sectors of the economy in order to promote growth in Ghana and other economies of the SSA region. Answers to the above questions would assist in determining the long-run effect of the policy reforms and financial development on real sectors that have been identified as major sources of economic growth.

1.9 Objectives of the Study

The main objective of this study is to examine the impact of key determinants of financial development on economic growth and its components in Ghana. Specifically, the thesis aims to:

i. Analyse the key financial sector developments in Ghana before and after the introduction of structural and financial reforms and assess the effect the reforms on the financial sector;
ii. Examine industrial sector growth dynamics and their implication for economic growth in Ghana in the light of the implementation of key structural reforms and sector-specific policies;
iii. Analyse the long-run relationship between financial development and capital accumulation in Ghana and the impact of key financial development indicators in the association;
iv. Analyse the long-run relationship between financial development and industrial productivity growth in Ghana and the impact of key financial development indicators in the association;
v. Analyse the long-run relationship between financial development and manufacturing output growth in Ghana and the impact of key financial development indicators in the association;
vi. Analyse the long-run relationship between financial development and economic growth in Ghana and the impact of key financial development indicators in the association;
vii. Examine the reaction of capital formation (investment), industrial productivity and economic growth to financial development and macro-economic shocks;
viii. Determine the stable positions, maximising behaviour and optimal thresholds of financial development indicators beyond which finance affects economic growth;
ix. Analyse the extent of impact of financial developments on growth components in Ghana in the pre-reform and post-reform periods; and
x. Find out whether the industrial sector and particularly, manufacturing sub-sector been the engine of growth of Ghana's economy.

1.10 Research Hypotheses

The study tests the hypotheses below based on the propositions that financial development enhances growth of the real sectors of the economy, depending on the degree of responsiveness

of the real sectors to improvements in the financial sector and the general macro-economic environment. The impact of financial development indicators and macro-economic policy is reflected by the reaction of the economic growth to changes in the real sector as well as the overall economy.

Based on the research findings and postulations of Beck and Levine (2004); Beck *et al.* (2000); Becker and Sivadasan (2006); King and Levine (1993a); Levine (2004); and Schumpeter (1911), it is hypothesised that a long-run significant relationship exist between financial development and economic growth. It is further hypothesised, based on the research findings of Arcand *et al.* (2012); Lin, Sun and Jiang (2009) and Santomero and Seater (2000) that an optimal point of financial development exists beyond which significant variations in financial intermediation indicators would negatively affect economic growth. Such an optimal point or thresholds provide valuable information for monitoring developments in the financial sector so as to ensure sustained growth. Accordingly, the following five hypotheses are tested in this study:

The following null hypotheses will be tested as part of the study.

(i) H_0: There is no long-run relationship between financial development and capital accumulation in Ghana.

H_1: There is a long-run relationship between financial development and capital accumulation growth in Ghana.

(ii) H_0: There is no long-run relationship between financial development and industrial growth in Ghana.

H_1: There is a long-run relationship between financial development and industrial growth in Ghana.

(iii) H_0: There is no long-run relationship between financial development and economic growth in Ghana.

H_1: There is a long-run relationship between financial development and economic growth in Ghana.

(iv) H_0: Financial development does not positively impact on capital accumulation in Ghana.

H_1: Financial development positively impact on capital accumulation in Ghana.

(v) H_0: Financial development does not positively impact on the Industrial Sector Growth in Ghana.

H_1: Financial development positively impact on the Industrial Sector Growth in Ghana.

(vi) H_0: Financial Development does not positively impact on the Economic Growth in Ghana.

H_1: Financial Development positively impact on the Economic Growth in Ghana.

(vii) H_0: The Industrial Sector is not the engine of growth in Ghana.

H_1: The Industrial Sector is the engine of growth in Ghana.

1.11 Contribution of the Study

Technological innovation, industrial advancement and manufacturing sector activities are important to the growth of the economies of SSA countries. It has been noted by Zakari and Boly (2013) that 'to become competitive in the global and domestic market, manufacturers must be able to offer high quality products, processes and services, and be empowered to effectively engage in competitive trade and take advantage of opportunities to expand and retain market share'. UNIDO (2013, 2015) implore on governments of SSA countries to employ modern technology and strategies in optimise growth of industry and particularly manufacturing sector since it is considered as the main engine of growth.

There is extensive research work that has proved the existence of positive relationship between the financial development and economic growth. The empirical literature suggests that there is a long-run positive relationship between financial development and economic growth through their effects on real sectors of the economy. Literature further suggests a range of optimal financial intermediation levels, thus, further complicating the growth management problem. Nevertheless, there is currently no agreement in literature on long-run relationship between financial development and real sector growth. Similarly, there is currently no agreement in literature on optimal financial sector management. The issue is still a subject of earnest academic debate. It is argued that better financial systems mobilise savings and facilitate efficient allocation of resources (Greenwood *et al.*, 2010; Greenwood, Sanchez & Wang, 2013; King & Levine, 1993a), reduce agency costs and enhance innovation activities (Philippe Aghion et al., 2005), and contribute to high-return investments through risk-sharing (Bencivenga & Smith, 1991;

Greenwood & Jovanovic, 1990; Saint-Paul, 1992). Others are of the view that financial development may lead to high systemic risk (Allen & Carletti, 2006; Deaton, 1991; Gai, Kapadia, Millard & Perez, 2008; Gennaioli, Shleifer & Vishny, 2012; Wagner, 2007), sub-optimal low savings (Jappelli & Pagano, 1994), sub-optimal high allocation of labour to the financial sector (Bolton, Santos & Scheinkman, 2016; Philippon, 2010), overheated economic capacity (Zeira, 1999), or the exertion of inefficiently high cost on the economy (Santomero & Seater, 2000).

These studies highlight the importance of this relationship to savings, investment and growth of key sectors of the economy including manufacturing. There is however limited studies in Ghana (Eshun, Adu, & Buabeng, 2014; Sakyi, Kofi Boachie, & Immurana, 2016) that focus on the impact of financial development on the real sector components such as manufacturing and capital accumulation. This study examines how key indicators of financial development and other variables such as the size and efficiency of financial intermediation, bank credit, stock market capitalisation, interest rate, fixed capital formation, foreign direct investment, per capita GDP and export—import ratio can interact to optimise growth of the manufacturing sector of SSA countries.

While past research (Beck et al., 2000; King & Levine, 1993b, 1993a, Levine, 1997, 2005; Naceur, Blotevogel, Fischer & Shi, 2017) have primarily looked at cross-country link between indicators of financial development and the overall growth of the economy, relatively little attention has been given to sector or industry-specific studies. There is the need to examine how the financial development indicators and other economic indicators affect the real sectors of the economy, such as manufacturing sector. It is imperative to improve the empirics of financial development and growth in real sectors so as to provide policy makers and researchers more empirical evidence on how to apply financial sector developments to can cause change in the real sectors of the economy.

Governments in developing countries in the sub-Saharan Africa regions have over the past few decades undertaken structural changes and reforms in their respective countries with the objective of growing their national economies through industrial advancement. The measures

central to most structural adjustment programmes adopted by countries in the sub-Saharan Africa were: reduction/removal of direct State intervention in the productive and distributive sectors of the economy, restricting the State's responsibility of an institutional and policy framework conducive to the mobilisation of private enterprise and initiative (Sawyerr, 1990).

The literature still does not provide unambiguous answers on how to best enhance growth by promoting the manufacturing sector. The manufacturing sector can have a positive impact on the general economy through different channels:

(1) Compared with other sectors, manufacturing provides greater opportunities to accumulate capital, exploit static and dynamic economies of scale, acquire new technologies and foster embodied and disembodied technological change (Lavopa & Szirmai, 2012; Weiss, 2005);
(2) Manufacturing activities increase knowledge and productivity through "training on the job" mechanisms (Araújo, Bogliacino, Negri, & Vivarelli, 2009); and
(3) Structural change towards medium-/high-tech manufacturing sectors helps diffuse knowledge and the promotion of technological change (UNIDO, 2013).

Cantore *et al.*, (2014) argue that although the mechanisms and channels are somehow different, they share light on a common characteristic: thus to be operational, they require drivers that specifically promote a leading role for the manufacturing sector. These may refer to drivers that facilitate the penetration of industries or factors that strengthen the manufacturing sector's capacity to improve the technological intensity of economic activities.

According to Cantore *et al.*, (2014), it is unlikely that industries that are unable to propagate innovation and to absorb/propagate value added and labour can significantly contribute to economic growth. Africa and South America are world regions where industrialisation did not promote a sustained growth process, whereas in China and South East Asia, manufacturing growth was key in boosting development (McMillan & Rodrik, 2011; UNIDO, 2013).

Research is necessary to understand which drivers of industrialisation are more effective in maximising GDP growth. Beck and Levine (2004) reviewed the theory and empirical findings of

other researchers and concluded that the bulk of existing research suggests that countries with better functioning banks and markets grow faster since better functioning financial systems ease the external financing constraints that impede firm and industrial expansions, suggesting that this is one mechanism through which financial development matters for growth.

This thesis examines the extent to which financial development indicators and relevant policies can contribute to the growth of the real sector of Ghana's economy. This thesis provides an assessment of the developments in the financial sector and their impact on the growth of industrial sector in developing countries in the sub-Saharan Africa region, particularly, Ghana. It is motivated by the need to identify key factors of financial development that can cause optimal growth of the real sector (industrial) in developing countries. This is also in line with the objective of providing the necessary financial environment that is relevant for optimal growth of the manufacturing sector.

This thesis uses the PCA on the indicators of financial development to create new indices from domestic credit to private sector, total credit provided by the financial sector, broad money supply and financial sector deposits. Using the growth components (capital accumulation, industrial productivity growth and economic growth) as the dependent variables and the new indices of financial development as independent, the cointegration approach are applied to test the long-run relationship. The aim is to use the principal component analysis, cointegration approach and VAR models to analyse the long-run dynamic behaviour and impact of the indicators of financial development and macro-economic variables on industrial and economic growth of Ghana. It is intended that the study would come findings on how financial development have affected capital accumulation and industrial productivity growth in Ghana.

The thesis contributes to academic knowledge by using key financial development indicators and macro-economic growth variables by further examining the finance-growth association to find out if there exist thresholds in financial development. The findings of the study will be relevant to policymakers in developing strategies for the optimal growth of the industrial sector.

1.12 Organisation of the Study

This thesis is organised into twelve chapters.

Chapter One – Chapter One provides an introduction to the study. The chapter consists of the background to the study, problem statement, research questions, objectives, hypotheses and the significance of the study.

Chapter Two – provides an overview of financial sector developments in Ghana and the SSA region. The analysis in Chapter Two facilitates an understanding of the various policies, strategies and reforms in the financial system of Ghana and their effects on the financial development.

Chapter Three – Chapter Three provides a historical analysis and overview of the industrial sector productivity and its contribution in the Ghanaian economy. The purpose of the analysis in this chapter is to share light on the specific policies and strategies that have aimed at developing the industrial sector in Ghana. The analysis also involves an overview of the relative composition of the industrial sector and their respective contribution in the economy of Ghana.

Chapter Four – Chapter Four presents a review the theoretical foundations and empirical literature on financial development, real sector advancement and economic growth. The literature review also includes a discussion on the interconnectedness of the financial development and the components of growth. Furthermore, the Chapter specifies the theoretical reflections on stable long-run associations and growth maximising behaviour.

Chapter Five – Chapter Five outlines the central theme of this thesis and provides the research methodology of the study. Specifically, chapter presents the research methodology by reviewing the literature on the models and methodologies employed and applied in analysing the financial development and growth association. The review also includes criticisms and supporting arguments on the methodologies used in previous studies and also indicates the methodologies adopted in this study. The chapter further discusses the model specifications used in examining the finance-growth associations, particularly, the long-run relationship between financial

development, capital accumulation, industrial sector advancement and economic growth. The empirical models used in assessing the impact of financial development on economic growth are also discussed in this chapter. This chapter also presents the dynamic models for assessing impacts and VAR models for impulse response analysis of financial development indicators and the components of growth (capital accumulation, industrial advancement and economic growth). The methodology also comprised a literature on models in assessing the stable and maximising behaviour between financial development indicators and growth components.

Chapter Six – Chapter Six presents the empirical results and analysis of the impact of financial development on capital accumulation for the period under review using the dynamic model and Granger causality tests. The model for in assessing the impacts includes a dummy variable to capture the effect of financial reforms and structural reforms.

Chapter Seven – Chapter Seven presents the empirical results and analysis of the impact of financial development on industrial sector growth for the period under review using the dynamic model and Granger causality tests. The model for in assessing the impacts includes a dummy variable to capture the effect of financial reforms and structural reforms.

Chapter Eight – Chapter Eight presents the empirical results and analysis of the impact of financial development on manufacturing productivity for the period under review using the dynamic model and Granger causality tests. The model for in assessing the impacts also includes a dummy variable to capture the effect of financial reforms and structural reforms.

Chapter Nine – Chapter Nine presents the empirical results and analysis of the impact of financial development on economic growth for the period under review using the dynamic model and Granger causality tests. The model in assessing the impacts includes a dummy variable to capture the effect of financial reforms and structural reforms.

Chapter Ten – Chapter Ten assesses the response of the measures of growth (capital accumulation, industrial advancement and economic growth) to shocks in financial development and macro-economic variables. This analysis uses the VAR and the Bayesian Vector Auto

Regression (BVAR) models to generate impulse responses and variance decomposition to assess the response of the growth variables to financial development shocks.

Chapter Eleven – Chapter Eleven presents the empirical results on the stabilising positions, growth maximising behaviour and the economic reaction functions for Ghana. The chapter presents information on the stabilising positions of financial development indicators and the economic growth measurement variables using bivariate functions. The chapter further presents an analysis of the non-monotonic relationships between financial development and economic growth to determine the maximising behaviour and optimal levels of financial development using quadratic and polynomial model estimations. The analysis also provides the probability measures of whether there is a point beyond which financial development hinder growth. Additionally, the discussions in the chapter include final results and analysis of the impact of financial development on growth. The chapter concludes by testing the engine of growth hypothesis of whether the industrial sector has been the driving factor in Ghana's economic growth using the principle of the Kaldor Law.

Chapter Twelve – Chapter Twelve concludes the study and additionally analyses the policy implications and proffers a set of recommendations based on the findings. The chapter also makes suggestions for future research.

1.13 Chapter Summary

This introductory chapter has sets out the background and the objectives of the study together with a brief description of financial development and industrial sector growth concerns in SSA region and Ghana. The study examines the impact of financial development on economic growth as well as the sources of growth. It further discussed the motivation, problem statement, research questions, hypotheses and significance of the study together with a brief explanation of the organisation of the thesis.

The background threw light on the foundational theories of the relationship between financial development and economic growth. The introductory review point to the fact that debate on the causality link between finance and growth remain inconclusive since the foundational

propositions of Schumpeter (1911) and subsequently, Goldsmith (1969); McKinnon (1973) and Shaw (1973). The introduction also indicated brief description of the financial developments as well as developments in the industrial sector of that have occurred in the SSA region and Ghana in particular.

The chapter discussed the need to investigate the association between developments in the financial sector and economic growth in Ghana considering the fact that the country has embarked on significant structural and financial reforms in the economy. Ghana's financial sector is considered as developed since the implementation of policies including financial liberalisation. Further, Ghana has also transitioned form a low income economy to a middle income status within the period under investigation and there is the need to examine how financial sector has affected the country's economic growth.

Beyond the introductory chapter, there is the need to undertake a detailed review of the financial sector, the state of financial development and economic developments in Ghana. The next chapter analyses the financial systems of the SSA region and Ghana, in particular, and Chapter Two discusses financial sector developments in Ghana during the period under study. The chapter also analyses the state of the financial system of Ghana and the challenges that necessitated financial sector reforms in Ghana as well as the current state of financial development.

CHAPTER TWO

OVERVIEW OF FINANCIAL DEVELOPMENTS IN GHANA

2.1 Introduction

This chapter provides an analysis of financial sector developments in Ghana from the 1960s up to 2018. Ghana, like many of the countries in the SSA region that embarked on financial sector reforms and structural adjustment to boost economic growth presents a very relevant case study among middle income countries (MICs) to analyse economic policy impacts given the fact that the country has transitioned from a low income country (LIC) to a MIC. Ghana, during the period under review in this thesis is deemed to have achieved successes considering the fact the Country migrated from a LIC into a MIC during the over five decades under review. The analysis provides a benchmark for assessing stimulated and tested economic-sector structural response to financial sector reforms and polices policies. The need to understand the historical developments in the financial system provide basis for analysing the impact of the financial developments on economic growth and its relevant components of capital accumulation, industrial, and particularly, manufacturing productivity. The analysis involves the decomposing of alterations in key financial developments determinants, their magnitudes and their implications on major economic sectors such as capital accumulation and industrial output.

Assessment of a country's historical financial performance as a proxy for future financial performance assists in the formulation of result-oriented sector-specific policies. As highlighted by Reinhart and Tokatlidis (2003), the track record of a country's financial performance facilitates the assessment of what constitutes an optimal policy. It is thus important to study a country's record because of the fact that it serves as a guide to policy development. Meeting governments' obligations in managing the macro economy in the past is relevant to simulating its ability to sustain moderate to high levels of growth in the medium to long-term. An analysis of historical growth trends of major sectors of the economy assist in identifying whether fiscal authorities should change the structure of the existing financial structure in a more efficient manner. This may entail changing either the approach or structure by changing the financial sector management policies substantially. Discussions in the chapter draws from the overview of financial development in Ghana as presented from the perspective of earlier studies (Bawumia,

2010; Gockel, Kwakye & Baffour, 1997; Quartey & Afful-Mensah, 2013) and public official documents on the financial sector.

This chapter starts by observing first the examining the background and objective of financial reforms in Ghana and then the historical pattern of financial development dynamics. Finally, the chapter examines the impact of financial reforms on financial development in Ghana.

2.2 Financial Developments in Ghana (1960—1983)

Ghana's financial system, like most other countries of the SSA region, has to a larger extent developed around the banking sector. The development is consisted with the observation by Buchs and Mathisen (2008) that financial systems tend to evolve around a banking sector seeking to achieve economies of scale in order to offset the costs of collecting and processing information designed to reduce uncertainty, thereby facilitating a more efficient allocation of financial resources. To facilitate efficient allocation of financial resources, however, a competitive banking system is required to ensure that banks are effective forces for financial intermediation, channelling savings into investment fostering higher economic growth. Towards the mid-1980s, Ghana's financial system was considered as inefficient and thus a source of declining economic growth rates. Experts criticised that poor sector policies had caused Ghana's financial system to shallow and repressive, undermining growth and thus consistent with the financial repression description by McKinnon (1973) and Shaw (1973).

Financial reforms in Ghana was considered as necessary as the pre-reform financial policies of government control over financial markets and the weak economic situation during the late 1980s was thought to have severely crippled the financial system, leading to both financial swallowing and bank distress. Before 1988, there was an active and persistent government involvement in monetary and credit policies which situation was influenced, to some extent, by the belief that perceived externalities and other market imperfections inherited from the colonial banking arrangements militated against desirable patterns of investment and economic growth. As a result of this perception, public ownership dominated the banking system (Bawumia, 2010). Though the major banks had majority of shares owned by foreign banks, their policies and operations were controlled by the Bank of Ghana as they were incorporated in Ghana under the

Banking Act of 1970. Accordingly, the banking system, prior to the reforms could be described as indigenised, largely owned and significantly influenced by the State (Gockel *et al.*, 1997).

The structure of the banking system in Ghana showed that it was relatively diverse and somehow adequate in terms of the physical existence of banks. In addition to the central bank, there were three primary commercial banks, seven secondary or specialised banks, three merchant banks and 123 unit banks that were classified as rural banks. The number as well as the diverse nature of the banks was viewed as a potential strength in promoting the development of financial services and economic development (Gockel *et al.*, 1997). According to the World Bank (1986), in 1981, Ghana's density of bank branches did not only ranked third in West Africa after Cote d'Ivoire and Togo but was far above that of Benin, Burkina Faso, Senegal and Niger; and above average of all countries of the West African Monetary Union.

Although the institutional framework of banks in Ghana appeared adequate in terms of visibility and diversification, an examination of some key macro financial data suggested that the impact of the banking system on the economy was less than might have been expected (Gockel *et al.*, 1997).

Table 2.1: Financial Development Indicators for Ghana.

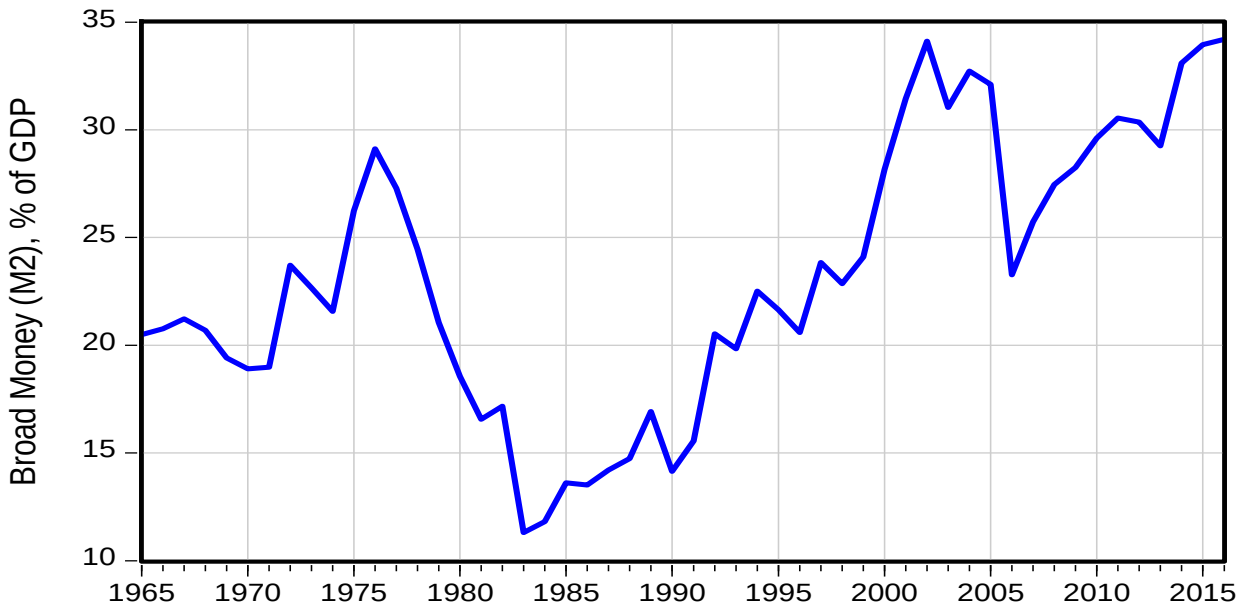
Year	M2/GDP	DCPS/GDP	DCFS/GDP	FSD/GDP	Savings
1965	20.50	8.52	20.66	12.19	8.25
1970	18.91	8.25	26.29	11.59	12.79
1975	26.23	5.78	30.24	14.47	13.65
1980	18.55	2.19	22.55	8.52	4.93
1985	13.62	3.11	23.46	5.24	6.63
1990	14.14	4.93	17.51	8.50	5.47
1995	21.64	5.07	18.89	13.06	11.59
2000	28.17	13.97	39.30	14.27	5.55
2005	32.11	15.54	30.84	20.07	3.73
2010	29.62	15.29	28.70	20.73	9.57
2015	34.20	20.44	35.35	24.51	13.08
Period Averages					
1965—1984	20.60	5.85	26.86	11.45	8.37
1985—2016	24.81	10.72	26.87	15.23	8.26
1965—2016	23.19	8.84	26.87	13.78	8.30

Source: World Bank (WDI Dataset, 2018), FRED Economic Data (2018).

Table 2.1 shows some selected key financial indicators for Ghana between 1965 and 1915. The period before 1985 represents the Pre-FINSAP reforms era.

As evident from Figure 2.1, period after 1976 witnessed noticeable declines in the ratio of broad money to GDP (M2/GDP) towards 1984. The M2/GDP ratio was generally low and had been declining in most years since 1977, reaching a lowest level of about 11.0 per cent in 1983. The substantial decline in the broad money to GDP ratio in the Pre-FINSAP era suggested a weakening or failing financial system had been repressed. In the same manner, ratio of quasi money to national income (QM/GDP) had also been low and exhibited a declining trend, falling to about 1.9 per cent in 1984. The declining trend in the money supply ratio reflected the "repressive policies" that characterised the late 1970s and early 1980s and this tended to discourage the holding of financial assets with banks (Aryeetey *et al.*, 1997; Gockel *et al.*, 1997; Nissanke & Aryeetey, 1998). Thus, in spite of the quite competitive number and diversity of banking facilities, savings and time deposits were low during the period.

Figure 2.1: Share of Broad Money (M2) to GDP

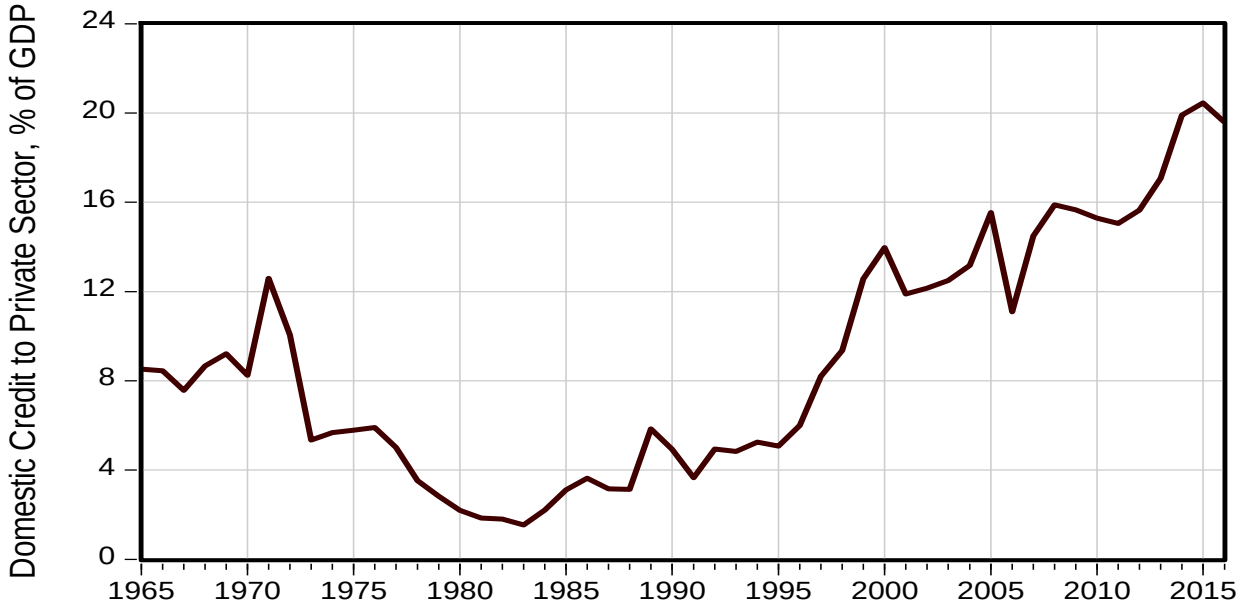


Source: World Development Indicators, 2018.

Notably, while the M2/GDP ratio was declining, the currency/money ratios not only remained high but increased over the years, averaging about 62.0 per cent for currency/M1 and 42.0 per

cent for currency/M2 between 1980 and 1985: the years in which the M2/GDP declined most. According to Gockel *et al.* (1997), the high currency-money ratios appear to signify the influence of several factors which could include disintermediation probably informal sector financial activities and increasing trend of self-financing of investment projects. Developed countries' experience has shown that disintermediation tends to affect only different classes of financial assets but not the total available supply of loanable funds for investment and under such circumstances total financial savings for investment tend not to be disrupted (Harrington, 1987).

Figure 2 2: Trend of Domestic Credit to Private Sector (% of GDP)



Source: World Development Indicators, 2018.

While disintermediation in developed countries would not be expected to change the total of financial assets but cause only a re-organisation of asset portfolios, the process in Ghana implied that an absolute reduction in loanable funds. Gockel *et al.* (1997) argue that Ghana's pre-reform financial system was not diversified sufficiently enough to allow for such trade-offs; reduction in the flow of banks' resources implied a reduction in total financial resources; and the banking system had not been successful in promoting the monetisation process of the economy at a pace

consistent with economic growth. Domestic credit offered by banks steadily declined from 1970 towards 1985 as indicated in Figure 2.2.

The conclusion of Gockel *et al.* (1997) was reinforced by the banking sector's currency holdings, which were equally as high as the non-bank public's currency holdings. Combining the liquidity of the public and that of the banks, base money as percentage of M2 averaged about 57.0 and ranged between 45.0 and 69.0 per cent between 1977 and 1988. This implied that the banks in Ghana played a minimal role in the monetary process and the BoG, controlling an abnormally high money base, had a major monetary responsibility. Different reasons were put forward to explain the weak financial development. The following sub-sections discusses causes of the weak financial sector performance in Ghana before the country embarked on financial sector reforms.

2.2.1 Causes of Weak Financial Development in Ghana before Financial Reforms

The government of Ghana intended to structure the banking system and as well use specific governmental policy regime such that policymakers could use bank operations as a conduit to promote accelerated economic development. This policy framework focused on the Keynesian models that the interactive mechanism between finance and economic development proceed from interest rates to increased investment to high rate of output and income growth, and subsequently to high interest rates. This policy approach was deem appropriate as the pattern of credit allocation inherited from pre-independence banking culture was considered undesirable for rapid economic development and it became imperative for government to intervene in the financial markets (Gockel, 1995). Consequently, four general considerations tended to influence financial policies in Ghana before the financial reforms included:

i) The desire to increase the level of investment;

ii) The desire to improve the allocation of investment among the various sectors of the economy;

iii) The desire to keep financial costs down in order to avoid what was believed to be the inflationary effects of liberalised market rates of interest; and

iv) The desire to maintain low and stable interest rates to countervail the perceived baneful effects of exorbitant rates in the informal financial markets.

As a strategy to achieve these objectives, the BoG planned to use, as instruments, low interest rates, credit ceilings and sectoral credit controls as well as reserve requirements. The low interest rates and the credit ceilings were designed to reinforce each other to ensure that the bank credit flowed to the designated priority sectors of the economy, namely, agriculture, manufacturing and exports. Gockel (1995) is of the view that such the motive for such policies was mainly to supposedly ensure larger volumes of agricultural and manufacturing output to stem any inflationary pressures that might ensue.

2.2.1.1 Low Interest Rates

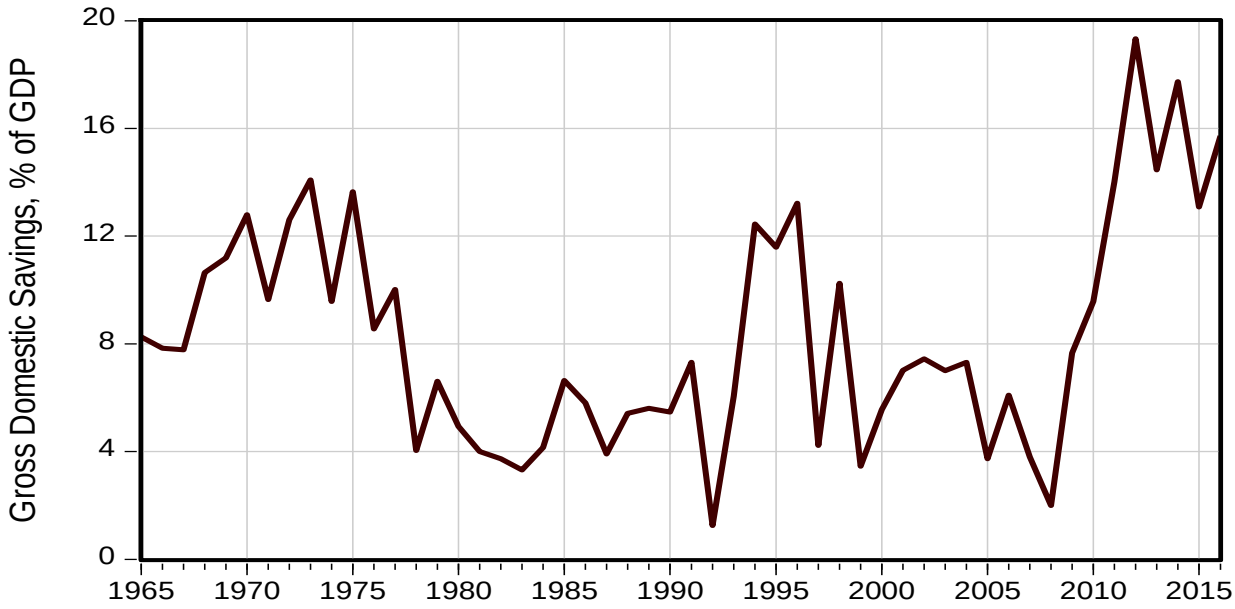
Under the low interest rate policy, the practice was for the BoG to set minimum rates for deposits and to place ceilings on lending rates to serve as incentives to attain higher levels of investment. These rates were effective for extended period over time, at least one year, without adequate consideration of the changes in the real sectors of the economy. Again, the structure of the lending rates did not sufficiently discriminate between credits with different degrees of risk and maturity. The lending rates for the agricultural and manufacturing sectors tended to be lower in order to ensure that there were no adequate incentives to the banks to make loans as those sectors were considered by the banks to be more risky. The rates on such priority lending tended not to be different from the rate on Government Bonds, which were perceived to be risk free. The lending to the manufacturing industries, particularly to the small-scale enterprises, carried high risks and high intermediation costs and as a result the banks rather preferred the soft options (Gockel *et al.,* 1997).

It can thus be deduced that the policy of low interest rates in Ghana appeared to have led to more distortions than the market imperfections it was designed to overcome. The low rates were fixed for extended period of time without recognition of the high rates of inflation, and real interest rates tended to become negative. The interest rates were determined by a fiat rather than by market forces and rose less rapidly that the rate of inflation which increased from 10.0 per cent in 1972 to 123 per cent in 1983.

The general consequence of high rates of inflation and the negative real interest rates reinforced the disincentive effects of dealings in financial assets by both banks and other wealth owning units (Gockel *et al.,* 1997). Inflation exacerbated financial shallowing as prospective increases in

prises altered the relative attractions of present values of future claims and of consumption, particularly, as the returns on financial assets did not rise to compensate for the loss of value engendered by rising prices. Thus monetary profits could be realised by the accumulation of real physical commodities and total wealth portfolios were altered adversely to financial investment in favour of sterile commodity hoarding. The banks became reluctant to mobilise savings and savers equally refused to save for fear of loss of value in financial resources. This according to Gockel *et al.* (1997) led to a reduction in financial saving as reflected in the declining M2/GNP ratio.

Figure 2.3: Trends of Gross Domestic Savings (% of GDP)



Source: World Development Indicators, 2018.

Concurrently, the real price of credit declined with inflation. The purchasing power of borrowed funds was high relative to future purchases, the real price of credit was reduced, and abnormally high demand for credit was generated; negative interest rates encouraged the demand for loanable funds not only for investment purposes but for the purchase of real assets whose prices appreciated with inflation. This created a situation where the borrower's debt burden was reduced and substantially transferred to the banks and the banks had to invoke other considerations such as increasing collateral requirements in addition to BoG's credit policy in the granting of loans. Thus credit allocation became inefficient, and average rate of return on

investment was reduced below maximum attainable level and this discouraged banks from active intermediation, especially in the collection of interest bearing deposits.

Against this backdrop, Ghana's low interest rate policy tended to confirm the views of Shaw (1973) and Mckinnon (1988a) that monetary policy that adds the risk of money holding is bound to stimulate demand for physical wealth and for consumption as well as causing capital flight. Accordingly, the set-up and development of viable financial system for saving mobilisation becomes difficult.

2.2.1.2 Credit Ceilings and Sector-based Credit Controls

One of the key financial policies employed by the BoG in the pre-reform era was credit ceilings and sectoral credit allocations. This policy was mainly effective from the early 1960s and ended in the late 1980s. The credit ceilings were derived from the Central bank's macro-economic ceilings on the banking system's net domestic assets set according to monetary and inflationary projections. The ceilings were bank-specific and each bank's ceiling was categorised into credit to the rest of the economy and credit to the government and cocoa financing. The credit was measured in gross terms without allowance for debt provisions. The allocation among banks overall increment for credit expansion was based on historical market shares rather than on the basis of each bank's efficiency and capacity to generate new deposits and lending opportunities.

As part of the credit ceilings for banks, the BoG also prescribed sectoral credit ceilings for all productive sectors of the economy. The sectoral credit ceiling was in the form of permissible percentage increase in the outstanding credit of each bank to a given sector. This implied that when all sectoral credit ceilings were summed-up and the total was required to be equal to the specific bank's credit ceiling.

One of the key objectives for implementing the credit ceilings and sectoral credit controls was to curtail inflation and as well use official government policy to direct credit to specific sectors and promote a specific pattern of investment and growth. The designated priority sectors were the export, agriculture and manufacturing. Gockel *et al.,* (1997) argues that although credit ceilings and sectoral credit controls were relatively easy to administer, such a policy added additional distortions in financial intermediation, especially in the mobilisation of savings. Together with

low interest rates, they produced a disincentive effect on the banking system, discouraging banks in the collection of savings once the banks attained their credit ceilings. This effect tended to reduce the total amount of funds available for credit to the real sectors of the economy though the credit ceiling regime was intended to promote such sectors. Thus credit ceilings are incompatible with the need for increased intermediation as they tend to encourage both intermediation outside the banking system and capital flight.

It is evident from the Ghana's pre-financial reform era that credit ceilings and selective controls, like low interest rate policies, caused banks to hold excess cash as lending under prescribed conditions was not exactly profitable. Severe misallocation of resources ensued, competition among banks was inhibited and the development of interbank market became retarded. Intermediation was discouraged and this was reflected in the low M2/GNP ratios by 1986.

2.2.1.3 Reserve Requirement

As part of the monetary management policy in Ghana, the BoG imposed reserve ratios for cash and secondary liquid assets. The cash reserve requirement was a two-tier system: one for demand deposits and another for savings and time deposits. These were to be held as either cash in bills or balances in the BoG and such deposits did not earn interest. Reserves in respect of secondary liquid assets were held as government stocks and treasury bills.

Unlike the reserve requirements in the industrialised countries which are typically low, often less than 10.0 per cent, Ghana's reserve requirements averaged over 50.0 per cent by 1983 and about 32.0 per cent from 1987-89. The effects on the banking system of such high reserve requirement can be categorised into two. Firstly, a substantial amount of the available funds is directed away from potential borrowers and according to Aryeetey and Gockel (1991) and Gockel (1995) these potential borrowers had to look elsewhere for their financial needs, and the indications were that there was a growing informal financial sector. Secondly, when banks are forced by high reserve requirements to hold large amounts of low or zero-yielding assets, major distortions to interest rates arise and this could possibly lead to increases in the margin between deposit and lending rates. Banks therefor resorted to high service charges to borrowers and major debtors such as those in the manufacturing sector were affected most.

Conclusively, the BoG's monetary policy instruments reinforced one another in accentuating the distortions in financial intermediation, making investment in financial assets less attractive. Financial intermediation became shallower with a risk aversion demand for physical wealth, with increased informal financial activities and with capital flight. Gockel *et al.* (1997) contents that, either directly or in other ways, monetary policies that tend to be repressive and inhibit the development of financial sector, which in turn retards the process of economic development in certain instances, can completely retard growth and this appears to characterise Ghana's economic growth in the late 1980s. Thus, such policy instruments could potentially affect growth and innovation in major real sectors such as manufacturing that depends on substantial financing.

2.2.1.4 Unorthodox Monetary Policies and Unfavourable Legislation

In addition the BoG's general monetary policies on financial development, the central bank carried out two major unorthodox monetary policy measures in attempts to mop up excess liquidity in the economy as a whole and halt inflation once and for all. These measures included: the demonetisation of existing currency on March 27, 1979; and demonetisation of fifty-cedi notes in circulation in 1982. The 1979 demonetisation exercise entailed that all currency holdings outside the banking system were subjected to tax rates of 30.0 per cent on cash holdings not exceeding five thousand and 50.0 per cent of amounts exceeding 5 000 (1979 Cedis). By demonetisation, it was envisaged that total money supply would be reduced significantly (to 40 from 50.0 per cent), and especially currency outside the banking system. With the exception 1979, the monetary growth rate resumed its rising trend as reflected in M1 growth rates from 1978-1982.

These developments are thought to have had substantial impact on the banking system. The measure, according to Gockel (1995), resulted in a situation where the public lost confidence in the banking system as it was deemed that holding financial assets, especially money, was not only attractive but dangerous and life threatening. Consequently, financial savings represented by M2/GDP ratios fell after 1982. The loss of confidence in the banking system, especially for purposes of financial savings, was further aggravated by a series of laws and policy directives between 1979 and 1982 including the freezing of all bank deposit accounts and investigating amounts exceeding 50,000 for tax liability, corruption or fraud; the recall of bank loans for the financing of trading inventories; introduction of compulsory payment by cheque for all business

transactions in excess of one thousand cedis; and a decree empowering the revolutionary government to call for any person's bank statement without the knowledge and approval of the person or entity. Gockel, (1995) emphasises that the effect of these policy directives moved beyond the banking system to impact the entire financial development of Ghana. The loss of confidence in the banking system was further worsened by high cost of transaction measured in terms of time taken to make withdrawals and to make deposits. These reasons among others according to (Gockel *et al.*, 1997) account for the declining trends in some financial ratios such as the Quasi-money (QM/GDP) ratio which fell rapidly in the early 1980s, reaching its lowest level of 1.9 per cent.

Gockel *et al.* (1997) opine that whilst the repressive policies including interest rate controls and credit ceilings appeared to be largely ineffective in their intended objectives, they were quite successful in creating and exacerbating banks' passivity in intermediation. They conclude that the desire to change the allocation of credit among the respective sectors of the economy to increase investment in the productive sectors through low and often negative lending rates tended to push average rates downwards below market equilibrium levels.

The banking sector thus became characterised with, among other problems, low capital base; weak management and accounting information system; inadequate legal and regulatory framework including ineffective supervision by the BoG; restricted banking products and undeveloped operational skills; overexposure to few customers and high risk concentration; and huge non-performing assets and ineffectual recovery efforts (Gockel *et al.*, 1997). With the exception of banks those banks which retained foreign equity participation, all banks became insolvent as a result of bad debts and investments in commercially unsuccessful ventures thereby rendering them incapable of proving the needed financial support for industrial sector. Table 2.2 shows non-performing assets transferred to NPART by banks in 1990.

Table 2.2: Non-Performing Assets transferred to NPART by Banks (Millions of Cedis)

Banks*	**GCB**	**SSB**	**NSCB**	**ADB**	**NIB**	**BHC**	**BB**	**SCB**	**MBG**	**Total**
NPAs	14,321	12,585	725	1,293	6,632	12,853	689	462	881	50,433
% of NPAs	28.4	25.0	1.4	2.6	13.1	25.5	1.4	0.9	1.7	100%

Source: Gockel *et al.*, (1997).

*The banks included GCB: Ghana Commercial Bank; SSB: Social Security Bank; NSCB: National Savings and Credit Bank; ADB: Agricultural Development Bank; NIB: National Investment Bank; BHC: Bank for Housing and Construction; BB: Barclays Bank; SCB: Standard Chartered Bank; and MBG: Merchant Bank Ghana.

The performance of the foreign banks was much better as compared to the mainly state-owned banks mainly due to a government directive for all business to move their accounts to state-owned banks. The poor performance of the state-owned banks motivation for the reduction of state involvement in the banking system in Ghana (Bawumia, 2010). The concern here was that the banks, which to a larger extent were to provide the base for financial long-term projects and propel development of the real sectors of the economy was failing in its objective. The declining growth of the major sectors of the economy and as well as the overall economy in the early 19980 necessitated the need for major economic and financial sector reforms in Ghana.

2.3 Objectives of Financial Reforms in Ghana

Ghana embarked on major economic overhaul in 1983 with an overarching objective of turning around a declining economy and substantially boost economic growth through enhanced real sector and private sector participation. A key part of the reforms involved the implementation of significant financial sector reform programmes that included financial liberalisation and institutional reforms in the late 1980s. A notable objective of the reforms was to increase the share of savings channelled through a formal financial system, enhancing financial intermediation and rebuilding confidence in the banking system (Gockel *et al.,* 1997). The policy reforms were aimed at resulting in financial deepening (M2/GDP) of 25.0 per cent and gross domestic saving ratio of 20.0 per cent by the year 2000. The growth targets were deemed necessary by the economy as government's Mid-Term Co-ordinated Programme of Economic and Social Development expected that the real GDP growth rate to average 8.0 per cent to enable Ghana to achieve a balanced economy and a middle-income status of living by the year 2020.

2.4 Financial Sector Reforms in Ghana (1984-2017)

Financial sector reforms in Ghana were part of the comprehensive macro-economic adjustment programme with the support of the IMF and the World Bank. Against the background that

Ghana's financial system was characterised as having financial shallowing and repressive measures, a programme dubbed Financial Sector Adjustment Programme (FINSAP) was implemented between 1988-90 to *inter alia:* restructure banks that were distressed; improve savings mobilisation and enhance efficiency in credit allocation; reform banking laws; restructure the regulatory framework, and improve bank supervision; develop money and capital and security markets; and establish a non-performing asset recovery trust. These measures became known as FINSAP 1. Additional measures, which became known as FINSAP 2, were implemented from 1990-91 with the following objectives: to address new challenges as well as problems arising from the implementation of policies under FINSAP 1; divest state-owned banks in accordance with financial liberalisation and deregulation; reform the institutional structure of the central bank; and promote and strengthen the non-bank financial institutions (Bawumia, 2010; Gockel *et al.*, 1997).

Since the implementation of FINSAP began in the late 1980s, the financial sector has witnessed several reforms to date. In all the reforms, the objective and strategy of government has been to move the Ghanaian financial sector from an era of financial repression towards one of financial liberalisation (Bawumia, 2010). These measures and strategies include the removal of interest rate ceilings, abolishing of directed credit and credit controls, restructuring of financially distressed banks,, improving the regulatory and supervisory framework, privatisation of banks, development of money and capital markets and the move towards indirect and market determined instruments of monetary policy. A comprehensive of analysis of these financial reform measures, their implications and perceived impacts are discussed below.

2.4.1 Liberalisation of Interest Rates

Interest rate liberalisation policies have been implemented gradually over the years since the late 1980s. First, the maximum and minimum deposit interest rates were abolished in September 1987 and all sectoral credit allocations were also phased out. Interest rate controls were gradually relaxed and full liberalisation was achieved in February 1988. A foreign exchange auction was introduced in 1986 and the establishment of forex bureaus was permitted in 1988. In November 1990, the BoG liberalised all bank charges and fees. With the liberalisation, the nominal interest rates have generally followed the trend of inflation rates. However, it appears the central bank's policy rate has been a very effective instrument for bringing down the inflation rate and thus

indirectly influencing the general trend of lending and savings rates. Real savings rates have been consistently negative while real lending rates have been consistently positive.

Table 2.3: Interest Rate Structure (%), Ghana.

Year	Nominal saving Rate	Nominal Lending Rate	Prime/Policy Rate	Inflation Rate	Real Savings Rate	Real Lending Rate
1997	27.7	44.2	45	20.8	6.9	23.4
1998	16.5	38.5	37	15.7	0.8	22.8
1999	10.5	36.5	27	13.8	-3.3	22.7
2000	18	47	27	40.5	-22.5	6.5
2001	14.5	43.8	27	21.3	-6.8	22.5
2002	11.1	36.4	24.5	15.2	-4.1	21.2
2003	9.8	32.8	21.5	31.3	-21.55	1.5
2004	9.5	28.8	18.5	16.4	-6.9	12.4
2005	6.4	26	15.5	14.8	-8.42	11.2
2006	4.8	24.3	12.5	10.5	-5.8	13.8
2007	4.8	24.2	13.5	12.8	-8.1	11.4
2008	5.2	27.3	17	18.1	-12.92	9.2
2009	10	32.8	18	16	-6	16.8
2010	5.9	27.6	13.5	8.6	-2.72	19
2011	4.1	25.9	12.5	8.6	-4.6	17.3
2012	5.3	25.7	15	8.8	-3.6	

Source: Bank of Ghana, Various reports, (Adapted from Quartey & Afful-Mensah, 2013)

Quartey and Afful-Mensah (2013) argue that while the non-interference may seem good, its repercussions in terms of discouraging savings has implication on the availability of loanable funds needed to enhance investment activities.

2.4.2 Restructuring of Financially Distressed Banks

In meeting the objective of restructuring distressed banks, measures such as: reconstitution and strengthening of board of directors; closure of unprofitable branches; reduction of operations cost through retrenchment of staff; cleaning of balance sheets by offloading non-performing loans granted to state-owned enterprises, non-performing loans granted to the private sector, and loans guaranteed by the government of Ghana; upgrading of managerial capacity; intensified staff training of affected banks; and proving enough capital and adequate liquidity to enable the

distressed banks to operate in a self-sustaining manner after restructuring (see Bawumia, 2010; Gockel *et al.*, 1997). In recent times, the structure of Ghanaian banks is described as efficient and more robust as compared to the pre-FINSAP era (Bawumia, 2010; KPMG Sector Report, 2014a).

2.4.3 Strengthening Regulatory and Supervisory Framework of the Central Bank

An important reform measure under FINSAP is the Banking Law of 1989 and the Non-Banking Financial Institutions (NBFI) Law of 1993. The previous Banking Act of 1970 was considered as not providing clear guidelines on minimum capital requirements, risk exposure, prudent limits for banks, and provisioning for loan losses, *inter alia* (Bawumia, 2010). Accordingly, the new Banking Law of 1989 was to deal with the aforementioned deficiencies. The new Act laid out basic regulatory framework for the banking system including: minimum capital requirement, capital adequacy ratios, prudential lending ratios, exposure limits, and uniform accounting and auditing standards (Bawumia, 2010). Specifically, the Banking Law of 1989 sets out *inter alia* the following: the minimum paid-up capital for development banks was set at one billion cedis; banks are required to maintain a minimum capital base or adequacy ratio of 6.0 per cent of risk-weighted assets; and banks cannot lend more than 25.0 per cent of their net worth by way of secured loans and not more than 10.0 per cent by way of unsecured credit.

Since the inception of the Banking Act of 1989 there have been additional revisions and amendments that have aimed at strengthening the supervisory powers of the central bank of Ghana. These Laws provide the legal and regulatory framework for the banking industry activities in Ghana. The liberalisation of financial sector and the subsequent enactment of relevant legal and regulatory framework for the banking sector have streamline banking activities and provided confidence for investment in the industry. In the case of bank development, the period of reforms since 1990 towards the end of 2016 has seen the establishment of new banks, to give the current banking structure as indicated in Table 2.4 It is important to emphasise that until the 1990s, no private banks were licensed and that today there is more private involvement in the banking industry in Ghana. The implication is that the existence, diversity and growth of banks augments the traditional activities of banks and thus means that financial services to industry and major real sectors of the economy can be extended significantly.

2.4.4 Non-Bank Financial Institutions

The liberalisation of the financial sector led to the emergence of non-bank financial institutions to add some depth and diversity to the financial system. In order to streamline the regulatory framework Non-Bank Financial Institutions Law (NBFIs) Law of 1993 was enacted to provide legislative basis to govern the operations of non-banks including discount houses, finance companies, acceptance houses, building societies, leasing and hire-purchase companies, venture capital funding companies, mortgage financing companies, savings and loans associations, and credit unions. The NBFI law of 1993 introduced the following features: minimum capital requirement for the establishment of an NBFI was set at GH¢ 100 million; and minimum capital adequacy ratio was set at 10.0 per cent of risk assets and with exposure limits set at 15.0 per cent of networth for secured advances and 10.0 per cent of unsecured advances.

Since the inception of the NBFIs Law of 1993 there have been subsequent revisions and amendments, as at and when necessary, primarily aimed at strengthening the supervisory powers of the central bank of Ghana over the operations of non-bank institutions. These Laws provide the legal and regulatory framework for the non-bank financial activities Ghana. The Banking Act of 1989 and the NBFI Law of 1993 have resulted in the increases in banks and the emergence of new financial institutions which have added diversity and depth to the financial system. There have been increases in the number of new bank registered in Ghana since the year 2000 and various types of NBFIs have been established by private entrepreneurs. The NBFIs have been branded as targeting the categories of savers and investors largely not accommodated by the banking system with such services as equity finance, long-term credit for industry and small-scale savings. By the end of the year 2016, the non-banking financial sector constituted a total of 61 establishments as indicated in Table 2.4. The implication is that with the existence, diversity and growth of NBFIs augment the traditional activities of banks and thus means that financial services to industry and major real sectors of the economy can be extended beyond the range typically provided by the banks.

2.4.5 Recovery of Non-Performing Banks Bank Assets

Another major part of the process to restructure banks involved removing non-performing loans (NPLs) from the balance sheets of banks. This objective was achieved either through swapping such loans for government-guaranteed interest-bearing bonds issued by BoG or offsetting such

NPLs against liabilities to the government (Bawumia, 2010). In return, the GoG issued the distressed banks with interest-bearing FINSAP bonds redeemable in annual instalments.

Evidence show that NPAs of foreign owned banks or banks with foreign equity participation (Barclays, SCB and MBG) were lowest while the NPAs of the state-owned banks (GCB, SSB, BHC, and NIB) were highest and accounted for 91.6 per cent of the NPAs transferred to NPART. The experience with the performance of the state-owned banks provided the rationale for the reduction of state direct involvement in the banking system under the FINSAP and subsequently influenced the promotion of diversified ownership structure of banks towards private sector participation and equity holdings.

2.4.6 Rural Banks Reforms

Rural Bank reforms were deemed necessary to ensure the development of the rural banking system. Rural banks are unit banks incorporated as limited liability companies and they are predominantly owned by the communities within which they operate. Rural banks are subjected to the same regulatory oversight as the deposit money banks and operate under the dictates of the Banking Act.

Prior to the implementation of the FINSAP, rural banks were required to allocate 45.0 per cent of their loan portfolio for agriculture and 30.0 per cent for cottage industry. The lending requirement was discontinued at the beginning of the 1990s as part for the financial sector reforms. The number of rural banks recorded an increment from 20 in 1980 to 129 in 2008 and stood at 139 at the end of 2016.

2.4.7 Ghana Stock Exchange

Recommendation was made for the establishment of the Ghana Stock Exchange (GSE) to provide a boost for companies to have alternative means of accessing financial services. The GSE was incorporated in 1989 and has been described as landmark event in the financial sector development of Ghana (Bawumia, 2010). The presence of a stock exchange was seen as increasing the possibilities for raising financial savings contributing to capital formation. The GSE was further observed as a way to accelerate government's privatisation programme through participation by local investors.

A Securities Industry Law (SIL) was passed in 1993 to provide for the establishment of a Securities Regulatory Commission (SRC) to provide supervision over the industry. The main functions of the SRC include maintaining surveillance over securities market to ensure orderly, fair and equitable dealings in securities; and to license and authorise stock exchanges, unit trust and mutual funds and securities dealers and investment advices. In the years 1993 and 1994, the GSE was adjudged as the sixth-best and the best performer among emerging stock markets and had a capital appreciation of 116.0 per cent and 124.0 per cent respectively. After a slump in performance in 1995 following high inflation and interest rates, the GSE recovered in 1998 with the GSE index increasing by 70.0 per cent to become the best performing stock market in Africa (IMF, 2000).

2.5 Impact of Financial Sector Reforms on Financial Development in Ghana (1984-2017)

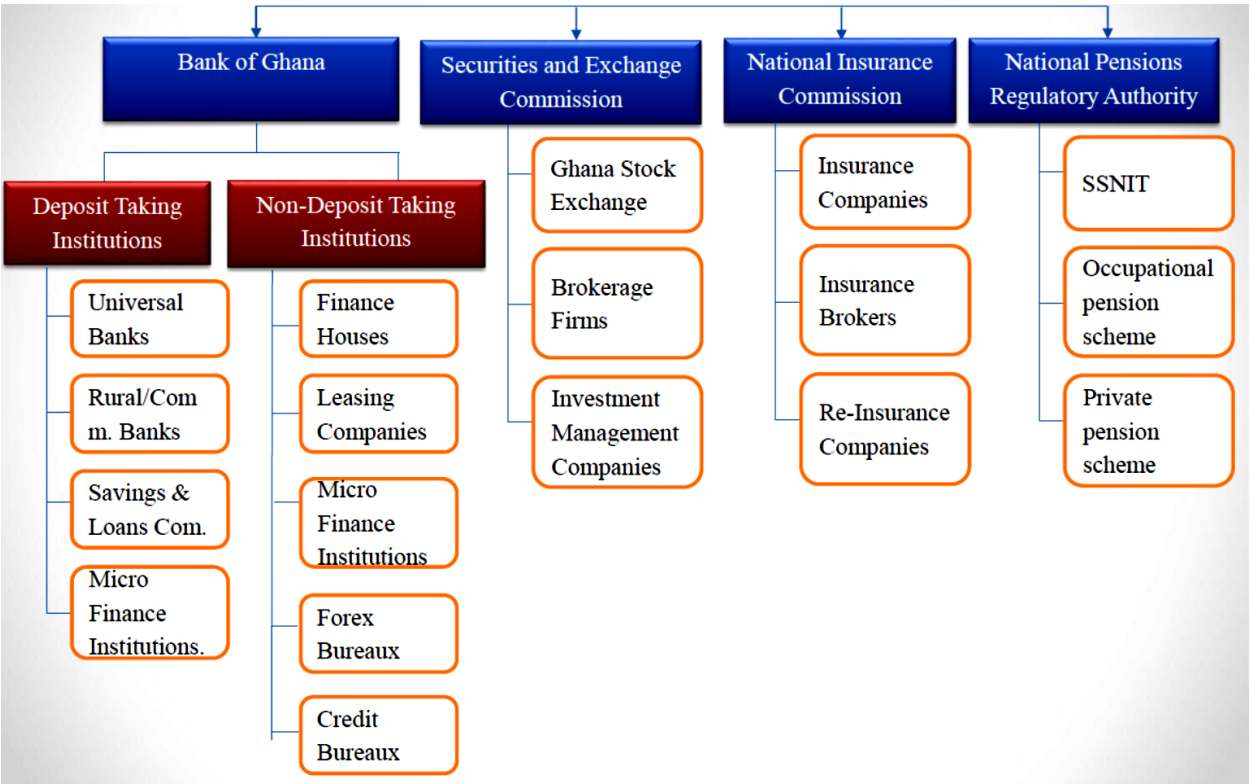
The Financial sector in Ghana has witnessed remarkable improvements in recent times as compared with pre-1988 period. The IMF and the World Bank instigated the implementation of the Financial Sector Adjustment Programme (FINSAP) between 1988 and 2000. Subsequently, the Financial Sector Strategic Plan (FINSSIP) which is to a larger extent a local initiative was implemented from 2001 to 2008. It has been widely opined that these sets of reforms have positively impacted on the banking and financial system in many areas (Bawumia, 2010). Since the reforms, there have been significant increase in the number of banks and non-banks; enhanced total assets of the banking system; improved asset concentration, capital adequacy; increased savings, deposit mobilisation, financial deepening and competition in the financial sector. The structure of the financial services industry has broadened as indicated in Figure 2.4 and also showing the nature of activity and the respective regulatory body that supervise each.

2.5.1 New Banks

The liberalisation of the financial sector as part of the FINSAP led to an increase in the number of banks and non-banking financial institutions. Notably, the financial sector has witnessed increased private sector participation. As at 1988, the Ghanaian banking system consisted of 10 banks with a total of 405 branches.

As at December, 2016, the total number of banks was 33 comprising commercial, merchant and development banks and operated in 1 342 branches across the country (Bank of Ghana, 2017). Out of the 33 banks, domestic owners control 16 while the remaining 17 are foreign-controlled.

Figure 2.4: Structure of the Financial Services Industry in Ghana.



Source: Bank of Ghana, 2016.

Ghana's financial system is dominated by the banking sector with the sector accounting for larger shares of financial system assets.

Table 2.4: Number of Financial Institutions in Ghana.

Type of Institution	Number of Financial Institutions for Selected Years				
	2012	2013	2014	2015	2016
Banks	27	27	27	27	33

NBFIs	50	52	57	57	61
RCBs	135	136	140	139	139
MFIs	-	-	135	337	555
Total	**212**	**214**	**359**	**560**	**788**

Source: Bank of Ghana (2016, 2017).

The banking system asset to GDP which in 1988 was 21.0 per cent had increased to 60.7 per cent in 2008, and accounted for 84.7 per cent in the year 2016.

Table 2.5: Assets and respective shares of financial System in Ghana (GH₵, Millions).

Type of Institution	Assets, (Asset Share, %)				
	2012	**2013**	**2014**	**2015**	**2016**
Banks	22,936.56 (88.2)	27,996.11 (86.6)	39,128.47 (86.0)	55,087.22 (85.9)	64,556.76 (84.7)
NBFIs	1,914.19 (7.4)	2,768.55 (8.6)	4,236.20 (9.2)	5,803.23 (9.0)	7,722.92 (10.1)
RCBs	1,149.20 (4.4)	1,559.38 (4.8)	1,832.89 (4.0)	2,160.59 (3.4)	2,672.53 (3.5)
MFIs	-	-	342.47 (0.8)	1,113.87 (1.7)	1,316.19 (1.7)
Total	**25,998.96 (100)**	**32,324.04 (100)**	**45,520.24 (100)**	**64,164.91 (100)**	**76,268.39 (100)**

Source: Bank of Ghana (2016).

Before the reforms in 1988, the banking system concentration was high, with the four largest banks accounting for 81.0 per cent of the assets of the banking system. This rate reduced significantly to 55.0 per cent of assets by 1998 and further to 51.9 per cent by 2008.

2.5.2 Asset and Liabilities of the Banking System

Assets and liabilities of commercial banks have seen remarkable changes following the financial sector reforms in Ghana. Trends in the assets and liabilities of commercial banks showed

increases in the total assets of banking system and they, respectively, recorded 0.31 per cent in 1993 and 0.44 per cent of GDP in 2000. Since 2001, total assets of the banking system have seen steady increase to 0.66 per cent of GDP by 2008, reflecting a more vibrant financial system. Total commercial bank assets increased by 32.8 per cent year-on-year (y-o-y) to reach GH¢36.2 billion by end of 2013. One year later, commercial bank assets had increased by 42.2 per cent y-o-y to GH¢51.4 billion, partly driven by a 41.6 per cent y-o-y increase in gross advances, of which the larger portion went to private sector (KPMG Sector Report, 2014a).

Table 2.6: Assets and Liability Structure of the banking Sector.

Component of Asset (% of Total)	**Year**				
	2012	**2013**	**2014**	**2015**	**2016**
Cash and Due from Banks	24.1	21.7	26.8	26.4	27.2
Investments	27.4	30.1	23.5	22.6	27.0
Net Advances	42.9	42.6	43.2	42.7	38.1
Other Assets	3.0	3.0	3.6	4.8	3.9
Fixed Assets	2.5	2.5	2.8	3.4	3.6
Components of Liabilities and Shareholders' Fund (% of Total)					
Total Deposits	71.9	64.5	63.0	65.1	63.6
Total Borrowings	8.3	13.4	16.0	15.0	16.8
Other Liabilities	4.7	7.0	6.4	5.4	6.3
Shareholder's Funds	14.8	14.7	14.3	13.5	13.2

Source: Bank of Ghana, 2016.

The period between 1993 and 2000 shows a growing shift in the composition of bank assets as lending to the private sector increased at the expense of lending to government. The ratio of loans to assets increased from 0.16 per cent in 1993 to 0.40 by 2000 while at the same time the ratio of holdings of treasury and Bank of Ghana bill to total assets declined from 0.40 in 1995 to 0.24 in 2000. The concurrent trend strengthened after 2001 with loans to asset ratio increasing from 0.38 per cent in 2001 to 0.52 per cent by 2008 while the bills to total asset ratio declined

from substantially to from 0.32 per cent in 2002 to 0.14 per cent by 2008 (Bawumia, 2010; Quartey & Afful-Mensah, 2013).

Meanwhile, on the liabilities side, total deposits reached GH¢32.4 billion by December 2014, 39.0 per cent y-o-y higher. Nonetheless, the increase in borrowing continued to outpace deposit growth, with the former 69.2 per cent y-o-y higher. This meant the share of deposits in total liabilities declined from 71.9 per cent in December 2012 to 63.6 per cent in December, 2016. The relatively recent developments imply that banks have become increasingly indebted over the past six years towards 2018, through loans rather than deposits.

Table 2.7: Gross Loans and Real Credit Growth.

Item	Year, December.				
	2012	**2013**	**2014**	**2015**	**2016**
Gross Loans and Advances, (GH¢,M)	13,021.88	17,027.23	24,103.74	30,102.39	35,409.0
Real Growth (y-o-y), %	27.9	11.62	21.01	6.13	1.89
Private Sector Credit Growth (GH¢,M)	11,477.37	14,894.33	21,121.96	26,258.63	30,222.08
Real Growth (y-o-y), %	23.2	10.78	21.23	5.65	-0.31
Household Loans (GH¢,M)	2,084.65	2,862.56	4,143.29	4,477.86	4,754.57
Real Growth (y-o-y), %	29.3	17.2	23.7	(8.2)	(8.0)

Source: Bank of Ghana, 2016.

By providing demand deposits and choosing an appropriate mixture of liquid and illiquid investments, banks provide complete insurance to savers against liquidity risk while simultaneously facilitating long-run investments in high return projects (Levine, 2004). Demand deposits as a proportion of total deposits increased from 48.0 per cent in 1993 to 66.0 per cent by the year 2000 and declined marginally to 58.0 per cent in 2008. Over the same period, savings deposits declined from 40.0 per cent of total deposits in 1993 to 21.0 per cent by 2001 and further to 15.0 per cent by 2008. Time deposits however increased over the reform periods from

12.0 per cent of total deposits in 1993 to 16.0 per cent of total deposits by 2000 and further to 26.0 per cent of total deposits by 2008 (refer to Table A1).

According to Bawumia (2010), the dominant influence of the state in banking system at the onset of FINSAP is evident from the public sector's share of total assets (79.0 per cent), total credit (71.0 per cent) and total deposits (73.0 per cent). Since the reforms, there has been decreasing public sector influence and as increasing attention has been shifted to the private sector with sizeable amount of credit being extended to the private enterprises. The lowering public sector influence is demonstrated by the decline in public sector's share of the total assets of the banking system from 37.0 per cent by 1998 its share of total credit and total deposits declined to 54.0 per cent and 32.0 per cent respectively by 1998. By 2008, the public sector's share of total bank assets had further declined to 24.9 per cent and its share of bank advances also declined to 30.7 per cent in 2008 and stood at 14.6 as at December 2016.

2.5.3 Asset Quality

Following the FINSAP reforms and the restructuring of the balance sheets of what was classified as problem banks, there was an improvement in the quality of the assets of the banking industry. The ratio of non-performing loans to total loans decreased from 41.0 per cent in 1991 to 7.7 per cent in 2008 but has seen increases in since 2014. Towards the end of 2000, the proportion of non-performing loans stood at 12.1 per cent indicating a decline from the 1988 rate of 41.0 per cent. The trend analysis in Figure 2.5 shows that though non-performing loans declined substantially to 6.4 per cent in 2007, the ratio has been increasing progressively since 2014. Relatively recent records, however, indicate a deteriorating asset quality largely due to rising non-performing loans (Bank of Ghana, 2017, 2018; IMF, 2011). The BoG indicated that the stock of NPLs increased from GH¢ 4.4 billion in December 2015 to GH¢ 6.2 billion in December 2016.

Figure 2.5: Banks' Non-Performing Loans to Gross Loans Ratio, Ghana.

Source: Researcher's own computations based on Bank of Ghana data (2018).

The non-performing loans ratio (NPL ratio) for the banking industry has witnessed increases from 11.27 per cent in December 2014 to 17.3 per cent in December 2016 and stood at 23.5 per cent in April, 2018. The trend in the ratio of non-performing loans is displayed in Figure 2.8.

Table 2.8: Distribution of Loans and NPLs by Economic Sector (%), Ghana.

Sector	December 2014		December 2015		December 2016	
	Total Credit Share	NPLs Share	Total Credit Share	NPLs Share	Total Credit Share	NPLs Share
a. Public Sector	**12.4**	**2.3**	**12.7**	**3.9**	**14.9**	**3.2**
i. Government	3.6	1.6	2.4	1.6	1.6	1.4
ii. Public Institutions	1.5	0.2	1.9	0.1	5.6	0.1
iii. Public Enterprises	7.3	0.5	8.3	2.1	7.6	1.7
b. Private Sector	**87.6**	**97.7**	**87.3**	**96.1**	**85.1**	**96.8**
i. Private Enterprises	68.5	88.2	71.1	88.7	70.1	92.0
ii. Households	17.2	8.7	14.8	6.8	13.4	4.4
iii. Others	1.9	0.9	1.4	0.6	1.6	0.3

Source: Bank of Ghana (2017)

The private sector accounted for the bulk of NPLs in the banking industry, with recent rate standing at 90.7 per cent as at April 2018. The composition of banks' credit portfolio by economic institutions showed that the largest proportion of banks' loans went to private sector, with a share of 85.1 per cent by the end of December 2016.

2.5.4 Capital Adequacy

The capital adequacy of the banking system also witnessed substantial improvement after the financial sector reforms in Ghana. The average capital adequacy ratio (CAR) for the banking system increased from 10.7 per cent in 1996 to 14.7 by 2001, a rate that was above the minimum of 6.0 per cent required by law. The CAR increased further to 15.7 per cent in 2007 but however declined to 13.8 per cent at the end of 2008. Ghana's banking sector is considered as solvent and capital adequacy ratio has remained well above the regulatory requirement of 10.0 per cent. The bank capital adequacy ratio (CAR) has witnessed consistent increases and stood at 17.9 per cent in December, 2014 but declined marginally to 17.8 per cent in December 2016.

2.5.5 Savings Mobilisation

The data show that the banking sector witnessed a growth in deposits over the immediate post-reform period, with deposits of private sector with banking system increasing from GH¢ 14.0 million in 1990 to GH¢ 427.8 million by 2000. The FINSSIP reform period of 200-2008 also showed major increase in deposits as the economy expanded. Total private sector deposits in the banking system increased from GH¢ 427.8 million in year 2000 to GH¢ 5, 713.6 million by 2008. The increased in total deposits was reflected in all its categories, namely; demand, savings, foreign currency and deposits. Demand deposit of the private sector increased from GH¢ 8.0 million in 1990 to GH¢ 70.1 million by 2000. Private sector demand deposit increased further from GH¢ 70.1 million in 2000 to GH¢ 1, 686 million by 2008. In similar trend, savings deposits of the private sector increased from GH¢ 109.5 million in 2000 to GH¢ 964.1 million by 2008 while time deposits increased from GH¢ 53.8 million to GH¢ 1,246.1 million by 2008. On the whole, the trend in gross savings demonstrates volatilities with higher rates observed since 2010.

2.5.6 Interest Rates

According to Bawumia (2010) an explanation for the increase in the deposit mobilisation observed under the FINSAP and FINSSIP may be due to interest rate developments in the pre and post-reform periods. The pre-FINSAP period saw negative interest rates prevailing under the regime of direct controls and disincentive to savings and deposit mobilisation. The FINSAP reform, by liberalising interest rates, resulted in an increase in nominal interest rates though real interest rates continued to be negative, with bank savings rates averaging minus 10.0 per cent between 1984 and 2000; and minus 8.8 per cent between 2001 and 2008 (Bawumia, 2010). Real bank lending rates on the other hand turned positive in 1989, increasing from 5.0 per cent in 1989 to 22.0 per cent in 2000. The real bank lending rates declined to 9.1 per cent by 2008 in line with the general declining trend between 2001 and 2008. The post-reform period altogether result in positive real interest rates on bank products. Real interest rates on savings deposit accounts, for instance, increased from minus 46.0 per cent between 1975 and 1986 to an average of minus 6.0 per cent between 1987 and 2000. Real interest rate spreads on the average negative between 1983 and 2008. The FINSAP period between 1984 and 2000 shows real interest rate at an average of minus 20.0 per cent while it recorded a marginally positive average at minus 9.0 per cent between 2001 and 2008. Economic theory predicts that there will be higher deposit mobilisation and higher bank lending if real interest rates paid are higher (McKinnon, 1973; Shaw, 1973).

2.5.7 Financial Deepening

Major monetary indicators mostly used in determining the level of financial deepening in an economy point to the fact that there has been significant deepening of the financial system of Ghana in the post-reform period. Common indicators used to measure financial expansion include the ratio of money supply to GDP (M2/GDP or M2+/GDP), the currency-money supply ratio (Cu/M2+) and credit to the private sector as a share of GDP. Broad money supply saw consistent increases from 13.62 per cent in 1985, averaging 20.0 per cent of GDP between 1991 and 2000; 29.6 per cent of GDP between 2001 and 2010 to 34.2 per cent at the end of 2016. Additionally, the period recorded strong deposit mobilisation by DMBs, rising significantly from 11.1 per cent of GDP between 1990 and 1995 to 36.1 per cent of GDP at the end of 2008. The overall deposit mobilisation which was 5.24 per cent of GDP in 1985 rose to 24.51 per cent of GDP in 2015. The robust and consistent deposit mobilisation has supported increased growth of

bank credit to private sector. Thus the data indicates that broadly used measures of financial deepening, namely; M2/GDP, Bank Credit/GDP, Financial Sector Deposit/GDP have witnessed some notable positive changes since the liberalisation of the financial sector.

2.5.8 Credit to Private Sector

On the whole, there have been consistent improvements in terms of total deposit money bank (DMB) credit to the private sector. A comparison of private sector credit to GDP shows significant relative improvements. DMB credit to private sector to GDP increased from 3.1 per cent in 1988, averaging at 7.4 per cent between 1991 and 2000 to 19.6 per cent at the end of 2016. The consistent increases in private sector credit suggests that there have been relatively better investment climate and increased opportunities for the expansion of the Ghanaian economy. However, it must be noted that increasing ratios of NPLs in the private sector credit portfolios have resulted in relative, year-on-year declines in the extent of credit provided to the private sector, especially since 2014. This notwithstanding, the expansion in private credit should thus have important implication for advancement of the Ghanaian economy in both the short- and long-run development of the various components of economic growth (Ductor & Grechyna, 2015; Loayza & Ranciere, 2005).

2.5.9 Sectoral Credit Allocations

The private sector receives relatively higher amount of credit from the financial sector, although the IMF (2011) observed that while private sector credit increased, a significant segment of the economy continues to have limited access to finance. The structure of credit allocations show that a substantial proportion of credits offered by the banking institutions are channelled to the private enterprises. For instance, the composition of banks' credit portfolio by economic institutions presented in Table 2.8 showed that the largest proportion of banks' loans went to private sector, with a share of 85.1 per cent by end-December 2016. Out of this, the share of household loans in total gross loans declined from 14.8 per cent in December 2015 to 13.4 per cent in December 2016, while that for private enterprises declined from 71.1 per cent to 70.1 per cent. Although the structure of the credit allocation by deposit money banks has not changed substantially, available data show that sectors such as manufacturing, domestic trade and services have enjoyed greater proportions of DMB credit in Ghana.

Table 2.9: Selected Credit Allocation by DMBs (%), Ghana.

Year	Agriculture	Manufacturing	Mining	Construction	Total Industrial	Others
1997	12	22.8	5.1	10.1	39.9	50
1998	12.2	24.6	5	11.2	41.8	47
1999	11.8	24.9	5.8	8.9	42.5	48.6
2000	9.6	28.1	5.5	6.8	43.2	50
2001	9.6	19.3	4	6.8	32.9	60.3
2002	9.4	21.1	3.8	7.8	34.3	57.9
2003	9.4	20.7	2.3	4.7	32.4	62.9
2004	7.7	21.5	2.2	6	31.4	62.6
2005	6.7	19.1	3.7	5.7	29.5	64.8
2006	5.4	18.5	3.8	7.9	27.7	64.4
2007	4.9	15.5	4.1	7.6	24.5	67.9
2008	4.3	11.9	2.9	6.8	19.1	74.1
2009	4.74	11.63	2.75	7.84	19.12	73.04
2010	6.13	13.26	2.71	7.53	22.1	70.37
2011	5.74	8.95	4.26	8.04	18.95	73.01
2012	5.11	10.47	1.29	4.31	16.87	78.82

Source: Bank of Ghana, Various Reports; ISSER, 2013.

The manufacturing sector received the highest share of DMB credit between 1997 and 2004, averaging at 20.0 per cent of total credit. However, major industrial sub-sectors, namely; manufacturing, mining and construction which received a substantial proportion of 40.4 per cent of DMB credit recorded significant declines, averaging from 27.3 per cent between 2001 and 2010 to 16.1 per cent in 2012 as can be observed in Table 2.9. The commerce and finance sector accounted for the largest share of outstanding credit balances, accounting for 24.7 per cent as at December 2016. The three largest sectors in terms of outstanding credit balances, namely commerce and finance, services, and electricity, gas and water accounted for 58.8 per cent of total banking sector credit in December 2016 compared with 62.3 per cent in December 2015. The rising NPLs ratio has resulted in reduction in the loans and advances offered by the banking sector to enterprises especially large enterprises (Bank of Ghana, 2018). The share of credit to the mining and quarrying, manufacturing and agriculture have recorded declines in recent times.

2.6 Implication of the Development of Financial Sector for Growth of the Real Sectors

With the comparatively improved financial sector in Ghana, the expectation is that the real sectors of the economy would grow as a result the financial development as suggested by the

literature (Beck *et al.*, 2000; Levine, 1997; Levine, Loayza, & Beck, 2000). The expansion in private credit to enterprises should be able to support growth of the real sectors of the Ghanaian economy in both the short- and long-run to ensure economic growth (Ductor & Grechyna, 2015; Loayza & Ranciere, 2005). According to the Bank of Ghana (2016), studies undertaken in 2012 showed that the overall level of savings and investments in Ghana has remained comparatively low despite increasing financial sector stability and deeper financial intermediation.

The IMF (2011) observed that although, in the aggregate, the banking system was liquid, profitable and highly capitalized, the NPLs ratio were high and a significant segment of the banking industry was fragile. This development gives an indication of the existence of inefficiencies in the financial system and this can adversely affect growth of the real sector by supressing industry expansion and potentially limit financing opportunities for new and existing investment projects.

2.7 Chapter Summary

This chapter has examined the monetary and financial policies that existed in Ghana before and after the implementation of major reforms of the financial sector. The reform aimed at liberalising the financial system of Ghana which had been described shallow and repressed, and thus was impeding the growth of the economy.

The objective of the reform policies was aimed at improving financial deepening to enable the financial sector play a significant role in providing the requisite financing support necessary for the growth of real sectors of the economy. The various policy initiatives have contributed growth in the banking and non-banking financial sub-sectors of the economy in terms their numbers, innovation and service delivery. In 1997, Ghana's financial sector was made up of 17 banks and 33 NBFIs; however, by the end of 2012, there were 29 banks and 53 NBFIs. Additionally, there have been substantial improvements in assets, capital adequacy, savings mobilisation, interest rate regime amongst others. These developments have contributed to financial deepening, which is evident in the over 300 per cent increase in the M2+/GDP ratio since the implementation of the reforms.

In general, the FINSAP and FINSSIP reforms have been classified as very important financial sector reforms that has substantially transformed Ghana's financial sector. The available data indicate that broadly used measures of financial deepening, namely; M2/GDP, Bank Credit/GDP, Bank Deposit/GDP and size of credit offered by the financial sector have witnessed some notable positive changes since the liberalisation of the financial sector, although there are indications of the existence of inefficiencies in the financial system.

As observed by Ductor and Grechyna (2015) and Loayza and Ranciere (2005), the expansion in private credit should have important implication for advancement of the Ghanaian economy in both the short- and long-run development of the various components of economic growth. Beck *et al.* (2000) and Levine (1997) have indicated that developments in the financial sector affect growth of the real sectors of the economy. The preceding chapter looks at developments in real sector of the economy as well as growth of the economy as a whole.

CHAPTER THREE

ANALYSIS OF THE INDUSTRIAL SECTOR AND ECONOMIC GROWTH IN GHANA

3.1 Introduction

This chapter provides a comprehensive analysis of the developments in the economy of Ghana with emphasis on industrial sector growth from the 1960s up to 2016. During the early part of this period, the government considered industrialisation as the most relevant and effective factor in modernising and developing Ghana. Accordingly, government rolled out extensive programme which emphasised import substitution and aimed to transform the industrial structure and reduce dependence on foreign importation of goods from foreign economies. According to Killick (2010), the government prioritised import substitution because it was believed that it would eliminate the distortions of the earlier system, provide an escape from the dependence on primary exports and break the vicious circle of poverty. A key part of the strategy of government was to use financial sector reforms and structural adjustment programmes to boost investment in industrial activities and thereby create jobs, assimilate and promote technological progress. The analysis provides a benchmark for assessing stimulated and tested economic-sector structural response policies. The need for understanding the historical structure and changes to the economic growth and its relevant components of industrial, and particularly, manufacturing productivity is fundamental in developing a sustained advancement of the job creation and economic value addition. The analysis involves the decomposing of alterations in key financial developments determinants, their magnitudes and their implications on major economic sectors such as manufacturing.

Against the backdrop that the financial sector was a relevant part of the strategy to promote industrial growth makes it imperative to assess the impact that it in facilitating Ghana's industrial sector development. It is thus important to study a country's record because of the fact that it serves as a guide to policy development. Meeting governments' obligations in managing the macro economy in the past is relevant to simulating its ability to sustain moderate to high levels of growth in the medium to long-term.

An analysis of historical growth trends of major sectors of the economy assist in identifying whether economic authorities should change the structure of the existing industrial dynamics in a

more efficient manner. This may entail changing either the approach by changing the financial sector management policy in its entirety. The analysis of historical economic dynamics also provides a benchmark against which alternative strategies can be tested and evaluated. This chapter starts by observing first the examining of the background and objective of industrial sector strategies, policies of Ghana and then the historical pattern of industrial sector dynamics. Finally, the chapter analyses the contribution of the industrial sector to economic growth in Ghana. The analysis in the chapter draws from the overview of economic growth in Ghana as discussed by earlier authors (Ackah, Adjasi & Turkson, 2014; Alagidede, Baah-Boateng & Nketiah-Amponsah, 2013; Asante & Addo, 1997; Asante, 2013) and public official documents on the productive sectors of the economy.

3.2 Evolution of Ghana's Industrial Sector and Developments since the 1960s

Ghana's independence coincided with a period when industrialisation was viewed as a key factor in modernisation and development. The post-independence industrial development strategy aimed to change the industrial sector from mainly import substitution industrialisation to one that is driven by the private sector (Ackah *et al.*, 2014). The stated objectives of industrialisation were explicitly to exploit natural domestic resources, form a base for developing other economic sectors, satisfy the basic needs of the population, create jobs, assimilate and promote technological progress and modernise society (Asante & Addo, 1997b; Baah-Nuakoh, 1997).

Initial industrial strategy policy of Ghana from the 1960s period was characterised by (i) emphasis on import substitution through high levels of effective protection, (ii) reliance on administrative controls rather than market mechanisms to determine incentives and resource allocation, and (iii) reliance on large scale, public sector investment as the lending edge in industrial development. At the centre of the import substitution strategy was the development of large-scale, capital-intensive manufacturing industries owned and managed by the government. Manufacturing has been an important growth sector in Ghana in the past, and has the potential to contribute efficiently to future economic development if the central problems of resource availability and policy environment can be overcome (World Bank, 1985).

The emphasis on import substitution was partly a motivated by a post-independence drive to reduce the economic dependence on imported goods and promote growth through the

manufacturing locally what was previously imported, and partly a consequence of balance of payment difficulties due to rapidly rising import and stagnant export earnings (Asante & Addo, 1997b; Steel, 1972). A policy environment of high protection evolved through tariffs and quantitative restrictions. By the late 1960s, effective protection exceeded 100 per cent for nearly half of manufacturing industries (World Bank, 1985). The development thus created strong incentives for companies to shift from the importation of consumables to the production of locally manufactured goods using foreign inputs.

The policies adopted stimulated rapid growth of industries with the manufacturing output as the leading component within the industrial sector. The industrial sector output and manufacturing productivity, respectively, averaged 21.76 per cent 12.89 per cent per annum from 1965 to 1970. By 1968, manufacturing as a share of GDP had risen to 14.02 per cent. The increasing share of manufacturing in GDP peaked at 15.54 per cent in 1975 with government-owned industrial enterprises and joint public-private partnership industrial firms accounting for 49.0 per cent of manufacturing value-added while private firms formed the remaining 51.0 per cent.

Table 3.1: Selected Growth Indicators for Ghana

Year	GDP ($ Millions)	GDP Growth Rate (%)	Industrial (% of GDP)	Manufacturing (% of GDP)	Capital Formation
1965	2053.46	1.37	21.36	11.19	8.25
1970	2215.03	9.72	21.12	13.23	12.79
1975	2810.11	-12.42	23.40	15.54	13.65
1980	4445.23	0.47	12.31	8.09	4.93
1985	4504.34	5.09	17.99	12.44	6.63
1990	5889.17	3.32	16.85	9.81	5.47
1995	6465.14	4.11	26.74	10.27	11.59
2000	4983.02	3.70	28.39	10.07	5.55
2005	10731.64	5.90	27.46	9.46	3.73
2010	25977.85	7.90	19.80	7.02	9.57
2015	37543.36	3.91	27.60	5.33	13.08
2016	42689.78	3.58	28.16	5.63	22.84
Period Averages					
1965—1984	2964.05	0.76	17.50	10.93	9.51
1985—2016	16102.39	5.38	23.99	9.02	21.07
1965—2016	11049.18	3.60	21.49	9.75	16.62

Source: World Bank (WDI Dataset, 2018).

Total industrial output as a percentage of GDP for the period before 1984 peaked at 23.41 per cent in 1975 but the subsequent years witnessed consistent declines until it reached its lowest at 6.47 per cent in 1982. Similarly, its largest component, manufacturing output as a percentage of GDP, also declined spontaneously from its all-time peak of 15.54 per cent of GDP in 1975 to 3.73 per cent in 1982. The share of mining and quarrying declined from 2.4 per cent in 1970 to 1.2 per cent in 1982 while that of electricity and water did not change by much for the period 1970 and 1982. Construction increased from 4.0 per cent of GDP to 5.2 per cent in 1977 but this declined to 3.0 per cent in 1982.

Over the period from 1973 to 1982, industrial output declined on average by 3.3 per cent. With the exception of electricity and water which recorded an average annual growth rate of 8.8 per cent, the other sub-sectors recorded negative growth rates. The decline in the growth rates was more acute between 1981 and 1982 period with total industrial output declining by 23.0 per cent and manufacturing declining by 36.3 per cent. Due to the high dependence on imports of raw materials, spare parts and equipment, manufacturing industries suffered heavily from the decline in import capacity (World Bank, 1985).

Table 3.2: Growth Rates of GDP, Industry and its Sub-sectors' (%)

Year	Total Industry	Manufac-turing	Mining and Quarry	Electricity and Water	Constructi on
1971—1975	1.84	2.34	-4.10	19.88	4.88
1975—1980	-5.60	-4.58	-7.12	6.08	-9.76
1981—1985	-1.60	-1.90	-2.16	6.52	3.20
1986—1990	7.18	6.52	7.82	14.38	6.62
1991—1993	2.76	1.20	5.24	5.64	5.12
1996—2000	4.50	4.58	4.08	3.70*	5.04
2001—2005	5.02	4.54	3.38	5.72	6.50
2006	7.3	4.20	13.30	24.20	8.20
2007	6.1	-1.20	6.90	1.20	23.40
2008	15.1	3.70	2.40	0.80	39.00
2009	4.5	-1.30	6.80	7.70	9.30
2010	6.9	7.60	18.80	5.30	2.50
2011	41.1	13.00	206.50	2.90	20.0
2012	7	4.30	5.0	0.00	11.8

Source: ISSER (1997, 2013) and GSS (2012).

Construction however, grew by 35.0 per cent between 1981 and 1982. Since 2006, there has been increasing growth of the mining sector with the prospects and exploration of mining for oil affecting the contribution of the sub-sector to industry growth. Between 1975 and 1982, total formal industrial employment decreased from 158 000 to 68 000. With the exception of the mining and quarrying sub-sector, all sub-sectors suffered significant declines but the hardest hit was manufacturing sub-sector whose employment by 70.6 per cent from 77 000 to 22 600 over the same period (Asante & Addo, 1997). Labour productivity (average value added per worker deflated by manufactures wholesale price index) in the manufacturing sub-sector declined by about 43.0 per cent between 1977 and 1981 (World Bank, 1985). The downward trend in labour productivity was largely due to constraints on laying off redundant labour in spite of low rates of capacity utilisation and the low wages relative to the urban cost of living provided little incentive to work. The impact of the falling productivity on production costs was largely offset by the declining real cost of workers (relative to wholesale prices) about 11.0 per cent per annum between 1977 and 1981. The compressed wage structure offered little reward to greater skills and productivity, especially in the public sector.

Ghana's industrial capacity for this period was largely underutilised because the economy as a whole did not generate sufficient foreign exchange to supply the sector's substantial imported input requirements let alone to maintain and replace its ageing capital stock. The high cost of manufacturing prevented the sector from meeting its own foreign exchange needs through export earnings. Excess capacity has been a feature of the manufacturing sector since 1960s, exacerbated by high investment activity from 1966 to 1971 and again in the period between 1974 and 1977. Average capacity utilisation between 1970 and 1977 ranged 43.0—52.0 per cent. It worsened in the late 1970s (33.0 per cent in 1979) and early 1980s (25.0 per cent and 21.0 per cent in 1981 and 1982 respectively).

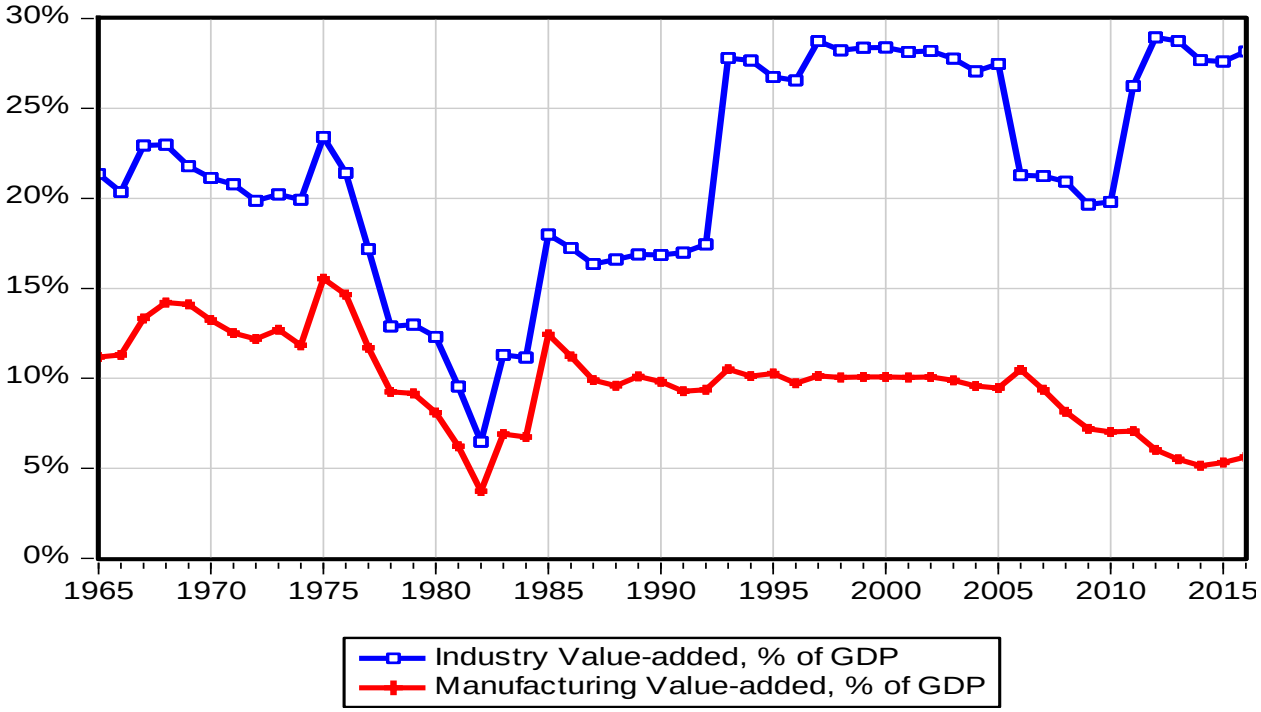
From 1973 to 1982, the structure of industry did not change significantly. The share of manufacturing in industrial GDP increased from 63.5 per cent in 1973 to about 71.6 per cent in 1982 and declined sharply to 59.1 per cent in 1982. The average for the period was about 66.0 per cent. That of mining and quarrying declined from 11.3 per cent to 9.7 per cent, over the

period with an average of 9.2 per cent. The share of Electricity and water increased from 3.7 per cent to 7.1 per cent averaging 4.3 for the period, and that of construction increased from 21.5 per cent to 24.1 per cent with an average of 20.6 per cent.

Even though the industrial sector has a great deal of potential for development, the sector, especially, the manufacturing sub-sector, was constrained by a number of factors. The constraints can be grouped as follows: exogenous factors, domestic policies, raw material shortages, physical bottlenecks, manpower and political constraints.

One notable reason for using administrative controls to guide resource allocation was the belief that the results of market-determined prices and resource allocation would not satisfy the objectives for national development. Though this was the reason for the emphasis on strategic public industrial development on the basis of strategic considerations, direct controls were not effective and thus successful in achieving the intended objectives for a number of reasons.

Figure 3.1: Share of Industrial and Manufacturing Value-added to GDP



Source: (World Development Indicators, 2018).

On a whole, government policies did not favour the development of an indigenous small and medium scale industrial sector. Policies were consistently biased against agriculture, the sector which provided the raw materials to feed and promote the local small scale processing within the economy. The increasing price distortions of the 1970s made commerce and illegal activities more attractive to small entrepreneurs than investment in industrial activities.

3.3 Industrial Sector Polices and Developments in Ghana (1983—2016)

Ghana has sought to introduce and implement a number different policies with the sole aim of promoting growth of the industrial sector, particularly, the manufacturing sub-sector. The different policies attempts have resulted from identifiable challenges that have emerged in the industrialisation drive of the country. The implementation of the different policies have often been in direct response to bottlenecks that were deemed as causing declining contribution of the industrial sector, particularly, the manufacturing productivity. The sub-sections below discuss some of the notable industrial sector policies have been implemented by government and an analysis of key developments in the industrial sector since the economic breakdown in 1982.

3.3.1 Industrial Sector Developments under Economic Recovery Programme (ERP)

Ghana's economy experienced lower and declining levels in industrial output especially in the early 1980s. This led to the introduction of the Economic Recovery Programme (ERP) in 1983. The programme, principally, sought to arrest and reverse over a decade of precipitous decline in all sectors of the economy, and to rehabilitate ruined productive and social infrastructure (Asante & Addo, 1997). The ERP therefore meant, among other things, the restructuring of almost all sectors of the Ghanaian economy. To address the problems and constraints inherited from the past efforts at industrialisation, the major objectives for the industrial sector under the ERP were to:

i. increase production of manufactured goods through greater use of existing capacity;
ii. remove production bottlenecks in efficient industries through selective rehabilitation;
iii. encourage the development of local resources to feed industries and promote the development of agro-based and other resource-based industries;
iv. strengthen existing institutions providing assistance to the industrial sector, as well as strengthening new ones; and

v. develop economically viable linkages among local industries and between key economic sectors (e.g. agriculture, construction, transport, health, education etc.).

These objectives were based on an industrial strategy that emphasises (i) development of more internationally competitive industrial sector based on increased exports and efficient import substitution; (ii) the introduction of measures that will attract entrepreneurs and investors, particularly, the private sector into all major subsectors with special emphasis on the development of appropriate technologies in the small and medium-scale manufacturing sector. Thus the objectives and strategies were to be matched against the specific economic policy measures initiated under the structural adjustment programme (Clapham, 1996). The salient features of the reforms included the following: the introduction of a market-determined exchange rate; removal of price and distribution controls; liberalisation of interest rates; promotion of a new investment code and the establishment of the Ghana Investment Promotion Centre; abolishing import licensing system and rationalising import tariffs under trade reforms; rationalising the tax system; initiation of state-owned enterprises reform programme; overhauling the financial sector, etc.

The industrial sector responded positively to the measures under ERP with growth recorded in output and capacity utilisation. After six years of continuous decline, real industrial and manufacturing GDP experienced positive growth rates since 1984 though at a decreasing rate since 1988. According to Asante and Addo (1997), the initial spurt in the growth rates after the implementation of the ERP was not sustained and came from a low base.

Between 1984 and 1995, industrial output grew at an annual average of 7.0 per cent and manufacturing grew at 6.6 per cent. Between 1984 and 1993, the average annual growth rate of mining and quarrying was 8.0 per cent, electricity and water grew at an annual rate of 16.4 per cent and construction grew at an annual average of 6.4 per cent. The average annual growth rate for the industrial sector between 1988 and 1995 was 4.4 per cent with 1994 recording a growth rate of 1.3 per cent and 1995 at 3.3 per cent. Over the same period, manufacturing averaged 2.6 per cent with 1994 recording a growth rate of 1.5 per cent and 1995 at 1.8 per cent. Asante and Addo (1997) attribute the decline in the growth rate between 1988 and 1995 to be the pace of

trade liberalisation. Lall (1995) observed that the low level of capacities in Ghana towards the late 1980s implied that rapid liberalisation, unaccompanied by supply-side measures to develop skills, capacities and technical support could lead to significant and costly de-industrialisation. Notably, the greater part of new investments into industry around the time went into non-manufacturing sub-sectors such as mining and electricity while the manufacturing sub-sector seemed to have reached its limits of capacity utilisation (Asante & Addo, 1997).

Asante and Addo (1997) assert that the improve performance between 1984 and 1987 was due to the access to imported raw materials and inputs, and the re-alignment of relative prices. Improvement in real producer prices boosted the expansion of activity in mining and manufacturing sectors. As a share of real GDP, industrial output averaged 13.9 per cent between 1984 and 1995, stabilising around 14.0 per cent between 1987 and 1995. This average was lower than that of the decade prior to the ERP. Manufacturing output averaged 8.7 per cent of GDP between 1984 and 1995, increasing from 7.2 per cent in 1984 to 8.1 per cent in 1995. Mining and quarrying showed much stability averaging 1.3 per cent of GDP between 1984 and 1993 while construction averaged 2.7 per cent with electricity and water at 1.2 per cent.

As a share of real industrial output, the annual average for manufacturing over the period 1984 to 1995, was 6.5 per cent, which was lower than the average for the period prior to the ERP. Declining averages were also recorded in the mining and quarrying and construction, while electricity and water, on the other hand, increased their average share from 4.3 per cent during the decade prior to the ERP to 8.4 per cent between 1984 and 1993. This implies that to some extent, the ERP changed the structure of the industrial sector in favour of electricity and water.

Capacity utilisation in manufacturing increased from a low of 18.0 per cent in 1984 to 46 per cent in 1993. The liberalisation of the foreign exchange market eased the flow of imported raw materials as well as essential spare parts and replacement of obsolete machinery and plants in certain instances (Asante & Addo, 1997). The sub-sectors which depended on local resources such as tobacco, beverages, wood and food processing showed remarkable increase in capacity utilisation. The most consistent positive correlation between local resource intensity and capacity utilisation and output growth is found in the wood products sub-sector and according to Hettige,

Steel and Wayem (1991), the domestic component of inputs in this activity is about 90.0 per cent in Ghana. This is confirmed by the increase in capacity utilisation in the wood sub-sector from 20.0 per cent in 1983 to 65.0 per cent in 1993.

Total formal sector employment in industrial sector decreased from 104 000 in 1984 to 47 200 in 1991 due to, among other factors, the divestiture programme, the running down of assets and the closure of a number of enterprises due to their inability to adjust. That of manufacturing sector also decreased over the same period from 46 300 to 20 600.

The removal of production bottlenecks through selective rehabilitation was identified as one of the measures aimed at consolidating gains of the industrial sector. Flow of funds to the sector had been from both the private sector in the form of foreign commercial loans, and government in the form on concessional loans also from foreign sources (Asante & Addo, 1997). The capital for major industrial (manufacturing) rehabilitation between 1988 and 1992 was estimated to be in the region of $200 million. This went mostly into sub-sectors like chemicals, food, tobacco and beverages, metallurgical, building materials, textiles, forest-based industries.

The virtual absence finance in the system, to a larger extent, affected the ability of firms or companies to embark on rehabilitation and innovative programmes, and this underscored the importance of harmonising the linkages between the industrial sector and other sectors of the economy. These linkages were identified as low and recommendations were that an improvement in the general provision of a vibrant financial sector to support the industrial sector.

If the economy and for that matter the industrial sector were to develop, there was the need for collaborative work among major public and private institutions with specified mandates and objectives to promote industrial development. Major institutions involved in industrial development by mandate and objectives include: Ministry of Trade and Industry, National Board for Small-Scale Industries, Ghana Regional Appropriate Technology Industrial Service, Ghana Standards Board, Ghana Investment Promotion Centre, Council for Scientific and Industrial Research, National Development Planning Commission, Ghana Export Promotion Council, State Enterprises Commission, Divestiture Secretariat, Ministry of Business Development. Some of

these institutions were set up during the ERP period, while others that existed were strengthened to be more effective.

Though many of the old constraints and bottlenecks were considerably removed, major problems that confronted the manufacturing industries during the part of the year 1996 were:

i. Inadequate finance for working capital, rehabilitation, innovation and modernisation;
ii. The tight monetary policy pursued had increased the cost of credit; and
iii. A number of enterprises had developed behind high protective barriers and many were finding it difficult to cope with the liberalised and more competitive market environment.

Additionally, there was low utilisation of installed capacity as a result of the following factors, namely; obsolete plant and machinery; inadequate raw material inputs and high cost of locally produced raw materials; increased competition from imports associated with trade liberalisation; and low levels of aggregate demand associated with economic restraint measures (Asante & Addo, 1997b).

The challenges mentioned above that confronted the industrial sector, particularly, manufacturing, were identified as stifling growth of the economy. Thus, there was the need for the development of sector specific policies that would move the industrial sector from the downward trend towards a more robust sector.

3.3.2 Industrial Sector Policies and Objectives: (Since 1997)

These challenges that confronted the industrial sector necessitated the initiation and implementation of policies that were deemed as important for the sustainable growth of industrial sector. In the light of this, the following policy documents have, since 1996, been developed to promote industrial growth: Ghana Vision 2020—The First Step (1996-2000); Ghana Poverty Reduction Strategy (GPRS I, 2003-2005); Growth and Poverty Reduction Strategy (GPRS II, 2006-2009); and Ghana Shared Growth and development Agenda (GSGDA, 2010-2013). These policy documents were implemented with specific industrial programmes that included:

- Integrated Industrial Policy for Increased Competiveness (MOTI, 2002)

- New Industrial Reform and Accelerated Growth Programme (MOTI, 2003)
- National Trade Policy (MOTI, 2005)
- Private Sector Development Strategy Phase I: (2005-2009)
- Private Sector Development Strategy Phase II: (2010-2015)
- Industrial Policy (2011-2016)

The following sections examine the main policy objectives and analyse their effects on industrial performance in Ghana since 1996.

At the beginning of 1997 saw the implementation of the Ghana Vision 2020 policy. The long-term objectives, within the Vision-2020 policy framework, for the industrial sector were to: increase industry's share of GDP to 37.0 per cent with an annual rate of growth of over 12.0 per cent; make Ghanaian manufactured products internationally competitive; establish effective linkages between manufacturing, agriculture, education services and other relevant sectors; expand the range of manufactured goods to meet domestic demand and diversify exports; secure increased domestic and foreign private investment in industry; maximise the use of local raw materials in industry; and ensure that all industrial operations are environmentally friendly.

The medium-term objectives aimed at improving the general industrial performance and overcome the problems of heavy dependence on imported inputs and underutilisation of production capacity. Against this backdrop, emphasis was placed on: (i) restructuring the industrial sector and rehabilitating major industries; in addition, diversification, and modernisation of viable enterprises and enhance their competiveness; (ii) promoting the establishment of new industrial capacity and environmentally sound industrial operations in areas such as food and agro-industries, wood processing, building and construction, metallurgical industries, textiles and garments, engineering (including electrical and electronics, packaging and chemical firms; and (iii) promoting the local indigenous private sector involving both local and foreign enterprises to a greater degree in the development of the economy (Government of Ghana, 1995).

3.3.3 Industrial Developments (1997-2001)

The industrial and manufacturing growth rates declined from 6.4 per cent and 7.3 per cent respectively in 1997 to 3.8 per cent and 3.8 per cent in 2000. Within the same period, both the industry and manufacturing shares of GDP stagnated around 25.3 per cent and 9.2 per cent respectively. The decline in the manufacturing sector was partly attributable to the energy crises of 1998, as indicated by the -10.0 per cent growth rate in electricity and water. Asante (2013) explains that manufacturing companies, which mostly relied on hydroelectric power for their energy supplies, had to readjust manufacturing procedures and techniques to sustain production; and in some instances had to lay off workers as the firms cut down production. The 7.3 per cent growth rate of manufacturing in 1997 was the highest between 1997 and 2009. This was mainly due to local and foreign investment that followed the incentives provided by the Ghana Investment Promotion Act of 1994 (Asante, 2013).

Mining and quarrying growth rates fell from 5.6 per cent in 1997 to 1.5 per cent in 2000. Electricity and water growth, after declining to -10 per cent in 1998, increased to 7.8 in 1999 but declined again in 2000 to 4.5 per cent. Construction growth increased from 4.4 per cent to 5.1 per cent in 2000. These declining rates, according to Asante (2013) suggests that the Vision-2020 (medium-term) policies were ineffective in improving industrial performance.

Table 3.3: Industry and Sub-sectors' share of GDP (%)

Year	Total Industry	Manufac-turing	Mining and Quarry	Electricity and Water	Constructi on
1970—1974	18.72	11.68	2.28	0.46	4.30
1975—1979	19.44	12.94	1.70	0.66	4.12
1980—1984	13.10	8.58	1.18	0.80	2.54
1985—1989	13.76	9.02	1.18	1.08	2.52
1990—1993	11.56	7.04	1.10	1.12	2.28
1996—2000	25.22	9.14	5.58	2.64	7.74
2001—2005	24.92	9.06	5.22	2.58	8.10
2006	20.8	10.2	5.4	2.1	5.7
2007	20.7	9.1	5.9	1.6	7.2
2008	20.4	7.9	5.6	1.3	8.7
2009	19.0	6.9	2.1	1.2	8.7
2010	19.1	6.8	2.3	1.2	9

2011	25.9	6.7	8.3	1.4	8.8
2012	27.6	6.7	8.80	1.2	10.90

Source: GSS (2012) and ISSER (1997, 2013).

The growth rates of the industrial sector and all its sub-sectors declined in 2001 from the previous year, with mining and quarrying showing a negative growth rate of -1.6 per cent. The 3.7 per cent growth rate of manufacturing in 2001 was the lowest between 1997 and 2006. In the same year of 2001, the shares of total industry, manufacturing and mining and quarrying in GDP declined from the previous year while electricity and water stagnated while construction increased marginally.

Though the rate of inflation of 21.3 per cent in 2001 was relatively lower as compared to the previous year's rate of 40.5 per cent, lending rates did not fall. The cost of credit remained high with average lending rates for the manufacturing sub-sector falling marginally from 47.0 per cent at the end of 2000 to 46.0 per cent in November 2001 (ISSER, 2002). This made it difficult for most manufacturing firms to access credit from Deposit Money Banks (DMBs) and the implication was that small and medium enterprises could not also access credit from the financial market (Asante, 2013). Additionally, the Business Assistance Fund offered to the manufacturing sector by government was not sufficient for the rehabilitation, modernisation and expansion of firms needed for improvements in technologies and machinery or equipment. These possibly contributed to the abysmal performance of the manufacturing sub-sector in 2001.

3.3.4 Industrial Sector Policy Objectives—GPRS I (2002-2005) and GPRS II (2006-2009).

The broad objectives outlined in GPRS I for the industrial sector aimed, among other things, to accelerate industrial growth, increase the share of industry in GDP, and increase manufacturing sector growth rate and its corresponding share in GDP. The medium-term objectives were to improve general industrial performance and overcome the problem of heavy dependence on imported inputs and underutilisation of production capacity. The also launched the Enterprise Competiveness Strategy (ECS) in 2002 to compliment GPRS I. The ECS aimed at removing the bottlenecks and constraints that impeded private industrial development.

The difference between GPRS I and GPRS II is that the later attached greater importance to accelerated growth. The central goal of GPRS II was to accelerate the growth of the economy so that Ghana could achieve middle-income status. GPRS II focused on four thematic areas, namely: continued macro-economic stability; accelerated private-led growth; vigorous human resource development; and good governance and civic responsibility.

Within this thematic areas framework, the broad industrial sector was supposed to grow at the rate of 6 per cent per annum over four years, with the manufacturing sector leading the growth at an average rate of 7.1 per cent. Construction and mining and quarrying sub-sectors expected to grow at annual rates of 6.6 per cent and 4.4 per cent respectively.

Earlier in 2001, the government had launched the Presidential Special Initiatives (PSIs) on cassava, garments and textiles and salt to boost industrial output and exports through agro-processing and also to exploit opportunities arising from preferential access to the US and EU markets. The PSI was to introduce to entrepreneurs to investment opportunities and wealth creation in the rural areas by increasing output of cassava, salt, oil palm and cocoa production and processing same by value addition through manufacturing.

3.3.5 Industrial Development—GPRS I and GPRS II

The industrial and manufacturing growth rates for this period saw improvements. Industrial growth rate increased on average to 4.9 per cent from the previous three-year average of 3.9 per cent. Manufacturing growth increased from 4.1 per cent to 4.7 per cent over the same period while mining and quarrying from 1.0 per cent to 4.1 per cent and construction from 5.1 per cent to 5.9 per cent. Electricity and water, however declined from 5.5 per cent to 4.0 per cent (check the average figures). The shares in GDP for the period did not change much. Industry share declined marginally from 25.2 per cent to 24.9 per cent and manufacturing from 9.2 per cent to 9.1 per cent. Mining and quarrying from 5.4 per cent to 5.2 per cent, electricity and water stagnated at 2.6 per cent, and construction increased from 7.8 per cent to 8.1 per cent.

Performance of the industrial sector and all its sub-sectors showed improvements in 2005, albeit marginally. Industrial growth increased from 4.6 per cent to 5.0 per cent, mining and quarrying from 3.0 per cent to 6.3 per cent, electricity and water 3.7 per cent to 12.4 per cent and

construction from 6.6 per cent to 10.0 per cent. Various reasons have been attributed to the relatively faster growth rates, including the fall in lending rates of the DMBs, an increase in credit to the manufacturing sub-sector, and improvement in the macro-economic environment.

Though industry's growth rate averaged at 8.3 per cent, the manufacturing sub-sector recorded considerably lower rates. Mining and quarrying grew at an annual average of 7.4 per cent and construction grew at 20.0 per cent. Manufacturing growth averaged at 1.4 per cent over the period, with negative growth rates in 2007 and 2009. Asante (2013) attributes the negative growth rates of manufacturing to the negative growth rate of 17.2 per cent in electricity in 2007, followed by a rebound to 19.4 per cent growth in 2008, and then a plunge to 7.5 per cent in 2009. The industrial sector grew by 6.1 per cent in 2007, down from 7.3 in 2006 due to the energy crisis. The manufacturing sub-sector grew by negative 1.2 per cent in 2007 after a growth rate of 4.2 per cent in 2006.

The industrial sector recorded a relatively high growth rate of 15.1 per cent in 2008. This notable growth was largely influenced by the phenomenal growth in electricity (from negative 17.2 per cent in 2009 to 19.4 per cent in 2008), as well as high growth rates in construction (from 23.4 per cent in 2007 to 39 per cent in 2008). The development in the energy sector and the ensuing stability in power supply moved the negative rate of 1.2 per cent recorded in manufacturing in 2007 to 3.7 per cent growth in 2008.

In 2009, industry's growth rate fell to 4.5 per cent from 15.1 per cent in 2008. Manufacturing grew by negative 1.3 per cent in 2009 partly due to high crude oil prices which might have increased production cost, especially the cost of imported raw materials. The improvements in the growth rates recorded in the mining and quarrying sub-sector mitigated the impact of manufacturing sub-sector contraction on the overall growth of industry. The decline in industry's share in GDP from 20.4 per cent in 2008 to 18.9 per cent in 2009 marked a further decline in the significance of the sector. The shares of manufacturing, mining and quarrying, water and sewerage showed declines while the shares of electricity and construction stagnated.

It is worth noting that the share of manufacturing in GDP declined continuously from 10.2 per cent in 2006 to 6.7 per cent in 2011. Similarly, the share of manufacturing in total industrial GDP declined continuously over the same period from 49 per cent to 24.1 per cent. The shares of both indicators in 2011 were the smallest over the entire period of 1997-2011. The share of manufacturing in total GDP declined by over 34.0 per cent in 2011 and Asante (2013) suggests that this might be symptomatic of "Dutch disease".

The industrial sector in 2010 grew at a rate of 6.9 per cent, an improvement over its 2009 rate of 4.5 per cent. The growth has been widely attributed to developments in electricity sub-sector (which grew at 12.3 per cent, up from 7.5 per cent in 2009), the mining and quarrying sub-sector (which grew at 18.8 per cent in 2010 compared with 6.8 per cent in 2009) and the manufacturing sub-sectors (which grew at 7.6 per cent in 2010, from negative 1.3 per cent in 2009). The growth in these sub-sectors helped to counter balance the lower growth rates of water and sewages (5.3 per cent) and construction (2.5 per cent). The growth rates recorded in the industrial sector give an indication of a recovery from the poor performance in 2009 in spite of the challenges of production costs, and fluctuations in world market prices for commodities and crude oil.

The growth of the industrial sector has generally outpaced that of the economy since 2005. The manufacturing sub-sector has performed below the average of the industrial sector thus the share of the industrial sector in GDP rose from 20.8 per cent to 25.9 per cent between 2006 and 2011, but the share of the manufacturing sector in GDP fell from 10.2 per cent to 6.7 per cent during the same period. The share of medium and high-tech industry as a percentage of manufacturing value added which stagnated at an average of 0.045 per cent between 1990 and 2002 has been declining since 2003 and currently stood at 0.008 per cent in 2015.

Developments in the manufacturing sub-sector have been identified as critical for the growth of the industrial sector and the economy as a whole although the manufacturing growth has recorded steady declines and relevance in terms of its contribution to GDP growth. This gives the indication the financial development has either not substantially impacted on manufacturing growth or the sub-sector has been adversely affected by financial or structural reforms.

3.4 Post-Financial Sector Reform and Impact on Industrial Development (1988-2016)

The post-reform era has had effect on the development of Ghana's industrial sector through the improvements in the financial deepening and capacity. The post-reform period indicates increases in domestic credit, flow of investment, capital formation and increase capacity utilisation. There have been increases in the percentage of firms that use banks to finance investment. The number percentage of firms which use banks to finance investment activities in Ghana in 2007 was 16.0 per cent and has increased to 21.2 per cent in 2013 (World Bank, 2015).

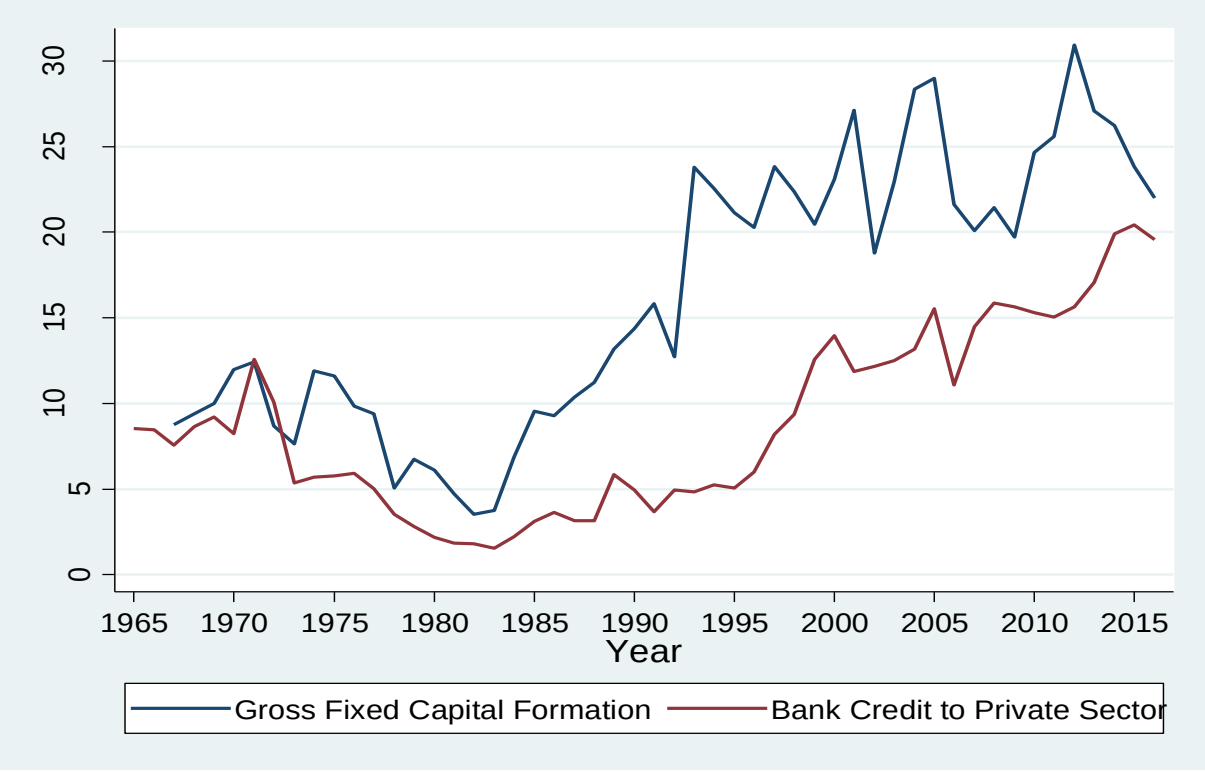
The highest contribution of the industrial sector to GDP occurred in the post-reform period which recorded an average of 24.3 per cent and a peak GDP share of 28.94 per cent in 2012. On the contrary, the manufacturing shares to GDP and the industrial sector indicates steady declines. The manufacturing sub-sector's contribution to GDP peaked in the pre-reform period at 15.54 per cent in 1975 and averaged at 10.93 between 1965 and 1984. Although, the manufacturing sub-sector recorded a relatively lowest share of GDP in 1982, the post-reform era has witnessed comparatively greater percentages of lower rates and indicates consistently declining contributions to GDP. The average contribution of manufacturing sub-sector to GDP was 9.02 per cent and had witnessed consistent declines since 2006 although the financial sector has reported steady increases in size and depth.

There have been relatively significant improvements in the flow of foreign direct investment (FDI) to Ghana with the liberalisation of the financial sector coupled with the introduction of tight regulatory and supervisory framework. The share of FDI to GDP which averaged 0.39 per cent between 1975 and 1984 increased to an average of 8.03 per cent between 2007 and 2016 (WDI Dataset, 2018). This development has positive implications for industrial growth in Ghana. This is buttressed by the fact that, within the SSA sub-region, export revenues have soared from US$100 billion in 2000 to $420 billion in 2011 (World Bank, 2013a), while foreign direct investment (FDI) tripled from $15 billion in 2002 to $46 billion in 2012.

Figure 3.2 shows the annual growth of fixed asset investment and total credit offered by banking sector. Gross fixed capital formation which average 6.8 per cent between 1975 and 1984 increased to 24.2 per cent between 2007 and 2016. This represents an improvement considering

the fact that capital formation which measured at 4.93 per cent of GDP in 1980 and rose to 22.84 per cent in 2016. Capital formation is an important element for industrial and economic growth. The figure shows that the banks and the financial sector exhibit an inclination towards fluctuations between expansion and contraction. The growth behaviour and the trend of the banking sector credit to the private sector show that financial sector has been supportive of productive investment over the long term. The post-reform, 1988-2016, indicate relative increases in bank credit and investment ratios to GDP.

Figure 3.2: Annual Percentage share of Capital Formation and Bank Credit to Private Sector, 1965-2016.



Source: World Bank (WDI Dataset, 2018).

It is noted that in the period after the financial sector reforms, the industrial sector has recorded higher contributions to GDP growth in Ghana. However, the manufacturing component of the

industrial growth has recorded lower and declining share in GDP ratios amidst expanding financial sector. The gives the indication of non-sustained manufacturing throughout the decades that have followed the financial reform era. This period represents when Ghana's financial sector is thought to have developed with several policy reforms aimed at improving the sector to make the sector more responsive to business environment.

This notwithstanding, the industrial sector, given the contribution it makes to GDP, continues to support the growth of the Ghanaian economy. Industrial sector products are also important foreign exchange earners. In terms of its contribution to GDP, industry has overtaken agriculture since 2011 as the second largest sector. In 2012, industry contributed 27.6 per cent to GDP, making it the second largest after the service sector (49.3 per cent) and exceeding agriculture (23.1 per cent).

3.5 Overview of Economic Development in Ghana (1960-2016)

This objective of this section is to provide an overview of Ghana's economic development, particularly, since the 1960s with some emphasis on evolution of major polices, strategies and their outcomes. Also the section discusses the targets achieved under the Ghana Vision-2020 policy launched in the year 1995 to direct the long-term economic growth of Ghana.

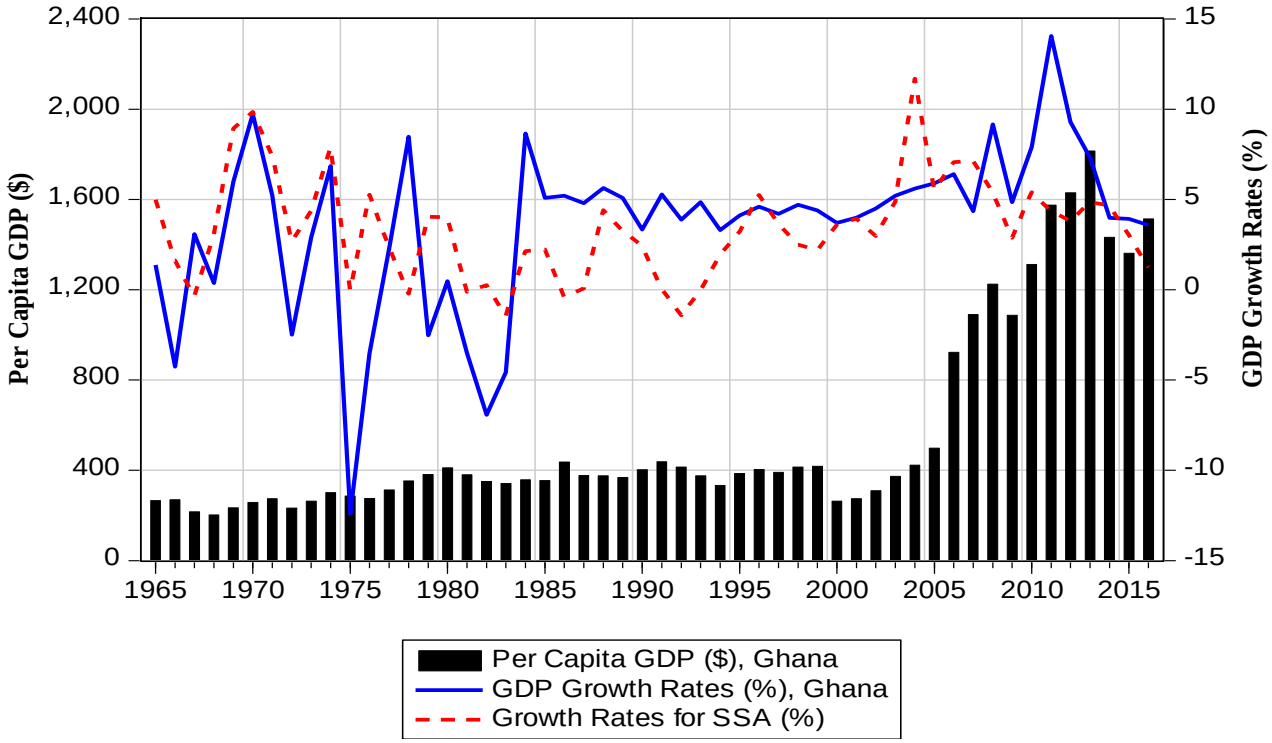
Specifically, the section gives: an overview of the period of 1960 to 1983 which is generally viewed as the period before the World Bank and IMF launched economic recovery programmes in Ghana; highlights economic development during the period 1983 to 1986—a period which covers the implementation of the Economic Recovery Programme (ERP); discusses the period 1986 to 1991 which witnessed a profound structural adjustment and also some real growth in the economy; highlights perspectives on the economic development from 1992 to 2000; and finally a discussion of achievements over the last two decades based on the Ghana Vision-2020 document and other major notable policy targets directed at economic growth.

3.5.1 Macro-economic Developments in Ghana

The Ghanaian economy has gone through various phases and has been characterised by unpredictability, exhibiting volatile trends since the 1960s to date. A key indicator of a country's macro-economic performance is real GDP growth. Ghana's growth record was quite erratic prior

to the mid-1980s when the country embarked on economic reforms. From a reasonably high GDP growth of 6.2 per cent in 1961, the economy of Ghana began to record a steady decline in GDP growth reaching negative 3.0 per cent in 1967 before recovering strongly to record 6.4 per cent the following year as shown in Figure 3.3. Growth of Ghana's economy remained stable for a short while and stumbled again in 1972 with a growth rate of negative 2.45 per cent. The economy growth between 1965 and 1985 indicated high levels of volatility but began to show stability from 1985.

Figure 3.3: Real GDP Growth Rates and Per Capita GDP, 1965-2016.



Source: World Bank (WDI Dataset, 2018).

As shown in Figure 3.3, the negative growth the country experienced occurred in 1967, 1972, 1975-1976, 1979, and 1981-1983. Political instability and external shocks have been attributed to the turbulence and negative growth rates in the Ghanaian economy (Alagidede *et al*., 2013). Though the economy performed quite well in 1972 and 1973, it began to deteriorate steadily throughout the rest of the 1970s, largely as a result of poor domestic policies, economic mismanagement and adverse external terms of trade shocks, particularly, oil prices. The economic deterioration in the 1970s was characterised, in varying intensity, by persistently high

inflation, large budget deficit, declining production and exports, flourishing illegal economic activities, rising unemployment and political instability (Dordunoo & Nyanteng, 1997). As indicated in Dordunoo and Nyanteng (1997), major developments in the economy during the period 1970 to 1983 can be summarised *inter alia* as follows: Per capita income fell by about 30 per cent; real export earnings declined approximately 52.0 per cent while exports fell from 21.0 per cent to 4.0 per cent of GDP; domestic savings rate as a proportion to GDP declined precipitously from 13.0 per cent to about 3.0 per cent; the rate of investment decreased from 14.0 per cent to 2.0 per cent of GDP; government revenue covered only 35.0 per cent of total expenditures, and the budget deficit increased from 0.4 per cent to 13.2 per cent of GDP; and government borrowing from the central bank and printing of money to finance increasing budget deficit caused rapid monetary growth with a typical annual growth rate being 40-50 per cent and high annual rates of inflation.

The worsening economic growth in Ghana resulting from extensive state control, particularly, developments in the early 1980s, led the implementation of economic reforms under the auspices of the World Bank and the International Monetary Fund (IMF). The economic reforms mainly centred on the implementation of a relatively radical, aggressive and more market-oriented programme dubbed the Economic Recovery Programme (ERP). The ERP was implemented between the period of 1983-86 with major policy objective aimed at stabilising the economy and turning it around towards the path of recovery. The specific objectives of the ERP included (i) halting the long period of decline in production of goods and services by realigning relative prices in favour of production and away from trading and rent seeking activities, (ii) lowering the high rate of inflation, (iii) reducing high budget deficits, (iv) improving government finances, rehabilitation of social and economic infrastructure and (vi) realigning the local currency with major currencies in the world.

The economy responded strongly to the policy reforms under the ERP. The recovery of the economy showed in the real GDP which rose from negative to over 8.0 per cent in 1984 and maintained growth rates above 5.0 per cent in 1985 and 1986. The stabilisation of prices was achieved to a large extent and inflation was brought to 10.0 per cent. Industrial production during the period improved markedly. In the area of fiscal policy, the ERP put emphasis on a package of

measures, including a simplification and rationalisation of major taxes, improved tax administration, a prompter adjustment of petroleum and other administered prices to limit the subsidy burden of higher import prices and a restructuring of expenditure to favour development.

Even though the ERP led to substantial improvement in turning the downward economic trend around, it brought to bare some vital structural problems of the economy towards the . Exports remained far low below historical levels. At the beginning of 1986, the economy witnessed substantial weakness in the financial system and this hindered the mobilisation of savings and resurgence of private investment (Dordunoo & Nyanteng, 1997). Production of goods of goods and services were well below the potential, particularly, in agriculture and manufacturing which were identified as the backbone to the economy in terms of employment and revenue generation. In view of these among other problems, and government in August 1986 augmented the reform effort by implementing the Structural Adjustment Programme (SAP). The main objective of the SAP, among others, was to correct a number of structural imbalances to ensure a sustained stable economic growth by attaining a 5.0 per cent average annual rate of GPD growth in order to improve real per capita income by 2.5 per cent per annum after adjustments have been made for population growth (Alagidede *et al.*, 2013; Dordunoo & Nyanteng, 1997).

The response of the economy to the paradigm shift of economic management from state control to a liberalised one was strongly positive with a strong growth rate of 8.6 per cent in 1984. This positive growth performance has continued since 1984 and picking up strongly since 2001.

Fiscal performance in the 1986-1989 period was on target, but fell short in 1990 as a result of shortfall in revenue coupled with some unexpected expenditures. Tax revenue fell to 11.2 per cent of GDP, due to slowdown in economic activity, lower tax rates, and a drop in receipt from cocoa taxes. Government of Ghana budget deficit increased substantially. The central government budget deficit including project expenditures financed by external assistance was 4.4 per cent of GDP, significantly higher than the previous year. As in 1989, foreign financing covered the deficit and the government was able to retire debt to the banking sector (Dordunoo & Nyanteng, 1997). This development caused severe challenges and overstretched the financial system in the late 1980s.

The need to improve resource mobilisation led to reforms of the tax system as well as the strengthening of the banking system. Government implemented the FINSAP, to strengthen, regulate and provide a legislative framework to serve as basis for supervising the banking sector and non-bank financial institutions. The primary objectives of the FINSAP were to: (i) enhance the soundness of the banks by improving the regulatory framework and strengthen bank supervision; (ii) restructure financially distressed banks; and (iii) improve resource mobilisation and increase the efficiency of credit allocation by the banking system.

Beyond the FINSAP, government reformed State-Owned Enterprises (SOEs) in the share ownership structure and divestiture in order to improve the management of public sector funds. Subsequently, as part of the divestiture process, by end of January, 1991, 23 enterprises had been liquidated and another 15 sold to the private sector including joint ventures, leases, management contracts and sale of shares.

3.5.2 Economic Development of 1992-2000: The Period of Stunted Growth

Through the above-mentioned policy actions, GoG was able to reduce the budget deficit which averaged more than 6.0 per cent to a surplus averaging about 2.4 per cent of GDP for the period of 1986-1991. This development was attributable to the implementation of the policies and programmes under the ERP and the SAP. With the implementation of the structural adjustment programmes and policies, the economy was expected to take off during the 1992-2000 period, growing between 8-10 per cent. Instead, the GDP growth rate during the period averaged only 4.5 per cent (verify), lower than the average of 4.8 per cent for the period of 1986-91. This occurrence of this unexpected lower growth rates suggest that the structural adjustment programme was successfully implemented (Dordunoo & Nyanteng, 1997). The 1992-2000 period began with an inflation rate of 10 per cent but ended with a much higher rate of 40.5 per cent after reaching a record high of 70.8 per cent in 1995. Money supply, however, declined almost consistently from about 57.0 per cent in 1992 to 31 per cent in 1996 but this was still higher than the target set in the financial programme.

Interest payments proved a burden for GoG's public sector accounts as it increased during this period. For instance, interest on domestic debt as a proportion of recurrent expenditure which

was 19.1 per cent in 1995 rose to over 24.0 per cent in 1996. Thus the domestic debt continued to be the major source of debt servicing burden on public sector accounts as a result of heavy domestic borrowing by the GoG and the accompanying high rates of interest on the debt instrument has a significant crowding-out effect on the private sector (Dordunoo & Nyanteng, 1997).

Private investments levels were rather lower for the period of 1992-2000 compared with public investment levels during the 1980s as public investments had been deemed as the "engine of growth". After the introduction of the ERP, public investment grew from about 6.0 per cent of GDP in 1986 to 8.2 per cent of GDP in 1995, 8.0 per cent in 1996. Beginning from 1990 onwards, private investment recovered gradually during 1992 to 2000 and stabilised at some 10.0 per cent of GDP for the period.

3.5.3 The Ghana Vision-2020, Implications for Growth and the Challenges

Over the years, the focus of economic programmes, policies, strategies and challenges that have ensued beyond the various implementations, the long-term of managers of the Ghanaian economy was to grow the economy from a low income to that of a middle-income country by the year 2020 (Government of Ghana, 1995). The realisation of this vision was expected to raise the average per capita income from $430 around the time to about $4000 by year 2020. To real GDP was targeted to grow at rates ranging from 5.5 per cent in 1997 to 7.4 per cent in 2000 with an annual average of 6.5 per cent. To achieve the target of real GDP growth rates, the three major sectors of the economy namely: agriculture, industrial and services were programmed to grow at specific rates.

The agricultural and, particularly, the industrial sectors were expected to play major roles in the growth rates and welfare (income) targets that had been set for the long-term development of the economy.

At the time of the initiation of the Ghana Vision-2020 policy and programme guidelines, the industrial and for that matter manufacturing sector were beset with numerous problems and constraints. Among the major problems and constraints that facing the potential growth of the productive sectors included high rate of inflation resulting in high interest rate and thus making it

unattractive to borrow for long-term investment; obsolete machinery dominating the manufacturing sector; low utilisation of installed capacity of machinery and high cost of production, inability to reap the benefits of economies of scale; difficulty of locally manufactured goods gaining access into international markets for a number of reasons including poor packaging, unknown brand names and place of origin, that is , third world or developing country tag.

The main strategies of the medium-term development plan for Ghana since early stage of the implementation of the Vision-2020 and other policies have focused on achievement of sound macro-economic environment and strong productive base and international competiveness. The macro-economic strategies have been, *inter alia*, to accelerate and sustain high growth through fiscal and monetary policy measures to achieve stability in consumer and producer prices as well as wage, interest and exchange rates; promote private investment as engine of growth with support of a vibrant public administration; and increase domestic savings that will support investment; and thereby reduce the deficits on the current account of the balance of payments and the public sector account.

Ghana's economy has generally experienced faster growth relative to sub-Saharan Africa (SSA), particularly, since 2007. On average, the Ghanaian economy grew annually by 5.8 per cent compared to 3.7 per cent in SSA in 13 of the years between 1991 and 2013. The strong growth performance of the country pushed it to the rank of a lower middle-income country after recording a per capita GDP of USD 1,099 in 2007. Per capita GDP, which stood at about USD 439 in 1991, increased to USD 502 in 2005 and, after rebasing of the National Accounts, surged to USD 930 in 2006, rising to reach USD 1,858 in 2013 (Figure 3.3).

3.5.4 Contribution of the various Sectors of the Economy of Ghana

The agricultural sector has been has played a dominant role in Ghana's economy growth, particularly, in the 1960s. However, the composition and pattern of Ghana's economic growth has varied significantly by sector and this is characterised largely by the shifts in the sectoral distribution of national output from agriculture in favour of the two other sectors, namely; industrial and services. Growth has been relatively stronger in services and industry, and the outcome of this development is the shift in sectoral dominance from agriculture to services. As

shown by the estimates in Table 3.3, the annual average growth rate of agriculture of about 3.3 per cent between 1984 and 2012 compared with 7.8 per cent for industry and 6.7 per cent for services. Consequently, the share of services improved from an average of 37.9 per cent between 1984 and 1988 to 42.5 per cent for the 1989 and 1992 period, based on 1975 constant prices. After a rebase of the national accounts in 1993, the sector's share which dropped to 31.2 per cent between 1993 and 1996 improved marginally to 32.9 per cent in the 2001 and 2005 period. A rebase of the national accounts in 2006 further pushed the contribution of the sector to GDP to an average of 50.0 per cent. The strong show of services in terms of growth and sectoral contribution has emanated largely from improved growth performance of trade, hospitality, telecommunication and financial subsectors, aided by liberalisation of activities that have seen increased private sector participation in the sub-sector (Alagidede *et al.*, 2013).

Table 3.4: Sectoral Growth Rates and Composition of GDP, 1984-2012, (%).

Sector	**1984-1988**	**1989-1992**	**1993-1996**	**1997-2000**	**2001-2005**	**2006-2010**	**2011**	**2012**
Agriculture	49.0 (1.9)	43.5 (1.6)	40.9 (3.1)	40.2 (3.9)	9.7 (5.1)	28.2 (4.5)	25.3 (0.8)	22.7 (1.3)
Industry	13.0 (12.7)	14.0 (4.4)	27.9 (4.6)	27.7 (4.2)	27.4 (5.0)	21.7 (8.4)	25.6 (41.6)	27.3 (7.0)
Manufacturing	8.5 (12.7)	8.7 (2.6)	10.2 (2.1)	10.1 (4.5)	10.0 (4.5)	8.8 (2.6)	6.9 (17.0)	6.9 (5.9)
Service	37.9 (7.8)	42.5 (7.1)	31.2 (5.2)	32.1 (5.7)	32.9 (5.3)	50.1 (7.6)	49.1 (9.4)	50.0 (10.2)

Note: 1984-1992 figures are based on 1975 constant prices; 1993-2005 based on 1993 prices; and 2006-2012 based on 2006 constant prices.
Source: Computed from National Accounts (Adapted from Alagidede *et al.*, 2013).

The contribution of the industrial sector to national output also increased strongly from 13.0 per cent in 1984-1988 to 27.4 per cent. This substantial increment came about as a result of improved growth performance of mining and the construction sub-sectors (Alagidede *et al.*, 2013). The commencement of oil production in commercial quantities in 2011, pushed industrial growth rate to a high of 41.6 per cent and thus bringing the share of the sector from 21.7 per cent in 2006-10 to 27.3 per cent in 2012, as evident in Table 3.4. Manufacturing recorded some appreciable growth performance in the early period of the reform in the second half of the 1980s which contributed to improved share of the subsector in GDP in the late 1980s and early 1990s. The removal of foreign exchange restrictions as part of the economic reform contributed to

improved capacity of manufacturing firms through the availability of foreign exchange for the importation of raw materials, spare parts and equipment for the operation of existing plants and machinery. The sector has, however, witnessed weak growth which has reflected in the declining share of the sub-sector from 10.2 per cent in 1993-96 to 6.9 per cent in 2012 (Table 3.4). Over the past two decades, the sub-sector has been battling with the problem of rapid depreciation of the domestic currency, high cost of credit, lack of adequate and reliable energy supply, cheap imports and weak infrastructural base. These factors, in addition to the structural rigidities within the economy have contributed to the less than satisfactory competitiveness of domestic manufacturing enterprises in the liberalised trade environment (Alagidede *et al.*, 2013).

On the other hand, the agriculture which was considered the backbone of the Ghanaian economy has consistently lost its dominance in the economy with a decline in its contribution to national output from 49.0 per cent in 1984-88 to 22.7 per cent in 2012. The shift from agricultural dominance to services in real GDP may be perceived as structural transformation of the economy. It has been argued that the structural transformation of economic arrangement represents an increasing ability of the economy and society to respond efficiently and effectively to changing and growing pressures for enhanced welfare among people (Alagidede *et al.*, 2013; Aryeetey & Baah-Boateng, 2015). The dominance of informal activities in the services sector and the dwindling importance of manufacturing in economic arrangements make it difficult for the structural shift to be characterised as structural transformation of the Ghanaian economy (Alagidede *et al.*, 2013).

Table 3.5: Growth Rate and Sectoral distribution of Real GDP (%)

Sector	**Annual Average Growth Rate**				**Sectoral Shares of GDP**					
	1993-1999	2000-2006	2007-2013	1993-2013	1993	2000	2005	2011	2012	2013
Agriculture	3.8	4.6	3.4	3.9	41.4	39.4	40.9	25.3	23.0	22.0
Industry	4.4	5.5	12.9	7.6	27.8	28.4	27.5	25.6	28.6	28.6
Mining and oil	5.5	4.5	37.7	15.9	6.1	5.6	5.0	8.4	8.8	7.9
Manufacturing	3.6	4.4	4.8	4.2	10.5	10.1	9.5	6.9	6.9	6.3
Construction	7.3	6.6	15.8	9.9	8.3	9.7	10.0	8.9	10.5	12.6
Service	5.5	5.5	8.6	6.5	30.8	32.2	31.6	49.1	48.4	49.4

Trade	7.2	6.2	7.4	6.9	6.5	7.5	7.8	5.9	5.6	5.4
Finance	7.0	5.9	14.3	9.1	4.6	4.8	4.8	4.4	5.0	5.2

Source: Computed from National Accounts, GSS.

Aryeetey and Baah-Boateng (2015) observe that Economic growth, particularly since the rebasing of the National Accounts in 2006, has largely been driven by stronger growth in mining and construction in the industrial sector, and financial intermediation in the services sector. These sectors are noted to create a limited number of direct jobs (Baah-Boateng, 2013). Between 1993 and 2013, mining and oil recorded the highest growth rate of 15.9 per cent, followed by 9.9 per cent in construction and 9.1 per cent in financial intermediation as can be observed in Table 3.5.

On the contrary, growth has been slower in agriculture and manufacturing, which is estimated to have high labour absorption capacity in Ghana (Baah-Boateng, 2013). Undeniably, the agricultural sector recorded the lowest average growth rate—3.9 per cent annually over a period of two decades from 1993—followed by manufacturing with an annual average growth rate of 4.2 per cent over the same period as indicated in Table 3.4. The slower growth in manufacturing and agriculture has culminated in a dwindling share of these sectors in GDP, while mining and oil, construction, and finance recorded some gains in their contribution to GDP (Alagidede *et al.*, 2013; Aryeetey & Baah-Boateng, 2015). Agriculture lost its dominance in national output, dropping from 41.4 per cent in 1993 to only 22.0 per cent in 2013, while manufacturing also saw its share in GDP drop from 10.5 per cent to a low of 6.3 per cent over the same period, relegating it from its leading position in the industrial sector to the third largest contributor to industrial output.

3.5.5 Employment in Ghana

A key measure of economic growth, from human development perspective, is the rate of employment and unemployment in the economy. Aryeetey and Baah-Boateng (2015) share in the view that the relevance of economic growth is measured by its effect on the quality of life of the citizenry through the creation of sufficient good quality jobs. This section gives brief details of the Ghanaian labour market from the perspective of employment and unemployment since 1984. It provides a snapshot of the current and the changing trend with regard to the level and quality

of employment and the changing pattern of unemployment in Ghana over three decades. Employment growth in Ghana has generally been slower than economic growth, raising concerns about the quality of Ghana's growth. The overall employment levels in Ghana are marginally higher than the SSA average, with a higher employment-to-population ratio in Ghana than in SSA (Table 3.6). The ratio is a measure of the ability of an economy to create employment.

Table 3.6: Selected Sectoral Employment Statistics (% shares of GDP)

Indicator/Economic Sector	1984	1992	1999	2000	2006	2010	2013
Employment-to-pop. ratio, SSA	-	64.3	64.1	64.1	64.9	65.2	65.5
Employment-to-pop. ratio, Ghana	80.2	72.9	73.9	66.9	67.7	67.4	75.4
Total Employment, Ghana (millions)	5.42	5.77	7.22	7.43	9.14	10.24	12.03
Agriculture	61.1	62.2	55.0	53.1	54.9	41.6	44.7
Industry	13.7	10.0	14.0	15.5	14.2	15.4	14.6
Manufacturing (Part of industry)	10.9	8.2	11.7	10.7	11.4	10.7	9.1
Services	25.2	27.8	31.0	31.5	30.9	43.0	40.9

Source: Computed from Ghana Living Standards Survey (GLSS) 3, 4, 5, and 6; Population Census 1984, 2000, and 2010.

Developed economies tend to have lower ratios than developing economies, and an excessively high ratio is an indication of an abundance of low productive and low-quality employment. Employment levels in Ghana rose from 5.77 million in 1992 to 12.03 million in 2013, representing a 3.7 per cent average annual employment growth compared to 3.0 per cent in SSA (ILO, 2014).

Agriculture still remains the major source of employment in Ghana, even though its share has been in steady decline. The sector accounts for 44.7 per cent of total employment compared with 61.1 per cent in 1984 (Table 3.6). In contrast, employment in the services sector has seen remarkable improvement, from 25 per cent to 40.9 per cent over a period of three decades between 1984 and 2003, with industry experiencing a marginal increase of about 1.00 percentage point over the period.

In sum, the performance of Ghana's economy in terms of growth has been quite strong and robust. It is worth noting, however, that growth has been driven largely by the extractive sub-

sector, which is known to have limited job creation impact, while manufacturing and agriculture, with relatively better employment-generation effect, continue to register slower and declining growth.

3.6 Chapter Summary

Chapter Three provides an analysis of industrial development and economic growth in Ghana for the period 1960 to 2016. Ghana has implemented a quite a number policies and strategies since the early 1960s. The post-independence industrial development strategy aimed to change the industrial sector from mainly import substitution industrialisation (ISI) to one that is driven by the private sector. The objective the implementation of strategic industrial development policies was to develop the industrial sector, particularly the manufacturing sub-sector, to become the main engine of Ghana's economic growth. The success of the ISI strategy in Ghana during the 1960s was evident in the significant growth of the domestic manufacturing sector, the expansion of already existing industries and the shift of production towards SOEs.

The post-independence industrial development policies led to increase in industrial output in the early 1960s but sharply declined in the 1970s. Therefore, the increase in industrial output over the 1960s did not stimulate economic growth or improve per capita incomes, as had been envisaged. Rather, over this period, real GDP growth declined steadily from 4.8 per cent in 1961 to 1.1 per cent in 1966.

During the mid-1970s to 1983, the industrial sector and the Ghanaian economy as a whole suffered a severe deterioration in economic and financial performance. The period 1975-83 was characterised by a decline in exports earnings (estimated to be about two-thirds of imports), significant reduction in capital flows and official aid as well as the loss of creditworthiness (World Bank, 1985). In addition, a number of inappropriate macro-economic policies were pursued which had a negative impact on the industrial sector and the economy. While the contribution of the agriculture and services sectors to real GDP increased from 47.7 per cent and 31.0 per cent in 1975 to 55.6 per cent and 35.8 per cent in 1984, respectively, the share of the industrial sector over the same period declined almost by half (from 21 per cent to 11.1 per cent). The industrial sector recorded an unimpressive annual growth rate of 1.8 per cent over the period, mainly as a result of the decline in manufacturing subsector contribution.

The economic recovery programme (ERP) was introduced as part of the structural adjustment programme (SAP) in early 1983 to arrest and reverse the decline in all sectors of the Ghanaian economy as well as to rehabilitate the ruined productive and social infrastructure. The SAP and ERP sought to correct the structural macro-economic imbalances of the previous decade by restructuring almost all sectors of the economy, including industry. The implementation of the reforms and policies under the ERP and SAP, initially caused the industrial sector in general, and the manufacturing sector in particular, to respond robustly and positively in contributing to economic growth.

The industrial sector in recent times show strong contribution to economic growth, however, the significance of its previously dominant sub-sector, manufacturing, has declined. Other sub-sectors such as mining and oil, and construction have witnessed increasing importance in their contribution towards GDP growth.

Comparing the performance of Ghana's economy to others in the SSA region, growth of the economy has been quite strong and robust. The indication, however, is that growth seems to be driven largely by the extractive sub-sector, which is known to have limited job creation impact, while manufacturing and agriculture, with relatively better employment-generation effect, continue to record slower and declining growth. This notwithstanding, Ghana's economy has registered relatively stronger growth in the post-reform era and this suggests that developments in the financial system may have played and equally important role in the economic growth since the financial sector has seen quite substantial reforms.

Chapter Four presents a review of the secondary literature that pertains to the core issues under investigation in this study. The review specifically discusses the theoretical and empirical literature on the financial development-growth relationship and as well as the link between financial development and real sector growth.

CHAPTER FOUR

LITERATURE REVIEW ON FINANCIAL DEVELOPMENT AND GROWTH

4.1 Introduction

The main objective of this study is to find out the impact of financial developments on economic growth of Ghana. As outlined, conceptually in Chapter One, the study further examines how financial developments in Ghana have affected capital accumulation, industrial sector advancement and manufacturing productivity which are components of economic growth. The concepts behind the interconnectedness and the relevance of these sources of growth have been introduced and this chapter further comprise a review of the relevant literature and empirical basis on the associations between financial development and economic growth.

The chapter undertakes a detailed review of the theoretical and empirical literature, and methods that have been developed, adopted and used in previous researches on the finance-growth relationship. Specifically, the literature and methodological review consists of the fundamental concepts, theoretical models on the concepts and an analysis of empirical literature for the concepts. As part of the empirical review, the analysis also highlights brief commentary on the models and methods used in the previous researches reviewed in this study.

This chapter further reflects on perspectives on the relationship between financial development and economic growth to determine the stable and optimal thresholds of financial developments, industrial output positions that maximise economic growth. The chapter further looks at how financial developments affect capital accumulation and industrial output growth in the economy. The study has adopted capital accumulation, industrial output growth and manufacturing productivity improvements as the sources of growth and thus components of economic growth. The chapter firstly discusses the concept of financial development and growth, thereafter a review of theories of optimal growth. The chapter concludes with a discussion in the literature on optimal industrial growth.

The chapter is organised under two broad sections, namely; theoretical and empirical perspectives. The sections are presented in the following order: Section 4.2 focuses on the theoretical literature and examines the finance-growth relationship followed by the financial developments and their relationships with the sources of growth. This section also involves a discussion of the theory of how finance affects the sources of growth and particular attention on the association between financial development and real sector growth. Section 4.3 presents the empirical literature on the concepts and relevant issues discussed in the theoretical literature review. This Chapter ends with a summary and conclusions highlighting vital observations and identifying knowledge gaps that stand out from the literature.

4.2 The Theoretical Literature Review

This section presents a review of the literature on the theoretical foundations of the finance-growth nexus. The sub-sections are presented in the following order: financial development and economic growth; financial developments and economic growth; financial developments and the sources of growth; financial development from a theoretical viewpoint. The focus of this section is analyse the theoretical framework and reviews the various literatures on the relationship between financial development and economic growth.

4.2.1 The Foundations of the Concept of Financial Development

Schumpeter's view is that that the financial system can promote economic growth. Schumpeter (1911) argued that the services provided by financial intermediaries mobilising savings, evaluating projects, managing risk, monitoring managers, and facilitating transactions are essential for technological innovation and economic development (Levine, 1994). Since this pioneering postulation by Schumpeter many studies have critically examined the role of financial development in economic growth and its capacity to substantially improve standard of living within an economy. According to King and Levine (1993a), various measures of the level of financial development are strongly associated with real per capita GDP growth, the rate of physical capital accumulation, and improvements in the efficiency with which economies employ physical capital. To this extent, improvements in the financial system and well-functioning financial intermediary service provides the basis for socio-economic development of countries (Beck *et al.*, 2000; Levine, 1997, 2004). Thus countries with higher levels and efficient

financial system thus grow faster and experience rapid rates of socio-economic growth (Cihak, Demirgüç-Kunt, Feyen, & Levine, 2012; Levine, 1997).

Efficient financial systems enhance growth through improved financial intermediation instruments, markets and institutional capacities. Thus the costs of acquiring information, enforcing contracts, and making transactions create incentives for the emergence of particular types of financial contracts, markets and intermediaries are mitigated in an efficient financial system. Different types and combinations of information, enforcement, and transaction costs in conjunction with different legal, regulatory, and tax systems have motivated distinct financial contracts, markets, and intermediaries across countries and throughout history (Levine, 1997). The cost involved in acquiring and processing information about potential investment coupled with costs and uncertainties associated with writing, interpreting, and enforcing contracts in addition to costs associated with transacting goods, services, and financial instruments make it impossible to find perfect market in any economy in the world.

The aforementioned market imperfections inhibit the flow of society‘s savings to those with the best ideas and projects, curtailing economic development and retarding improvements in living standards (Easterly & Levine, 1997; Levine, 2004). These market imperfections have brought the emergence of financial contracts, financial markets and financial intermediaries. In attempt to lessen these imperfections, profit-minded entrepreneurs create financial products and institutions to improve the effects of these market imperfections. Governments often provide an array of services; ranging from legal and accounting systems to government owned banks with the stated goals of reducing these imperfections and enhancing resource allocation. Whiles some economies are successful in developing financial systems that reduces the cost of these imperfections, other economies are considerably less successful in reducing these costs.

Financial development occurs when financial instruments, markets, and intermediaries ameliorate – though do not necessarily eliminate – the effects of imperfect information, limited enforcement, and transactions costs (Cihak *et al.*, 2012). Defining financial development in terms of the degree to which the financial system eases market imperfections, however, is too narrow and does not provide much information on the actual functions provided by the financial system.

As a result Demirguc-Kunt and Levine (2008) and Levine (2004b) have developed a broader definition of financial development and state that financial development occurs when financial instruments, markets, and intermediaries ameliorate – though do not necessarily eliminate – the effects of information, enforcement, and transactions costs and therefore do a correspondingly better job at providing the five financial functions. Thus, financial development involves improvements in the (1) production of *ex ante* information about possible investments, (2) monitoring of investments and implementation of corporate governance, (3) trading, diversification, and management of risk, (4) mobilisation and pooling of savings, and (5) exchange of goods and services. Each of these financial functions may influence savings and investment decisions and hence economic growth. Since many market frictions exist and laws, regulations, and policies differ markedly across economies and over time, improvements along any single dimension may have different implications for resource allocation and welfare depending on the other frictions at play in the economy.

In recent times, the emphases have been placed on the need for financial development to more efficient and not just concentrate on the size and expansion. To this extent, there is the need to place much attention to ensuring efficient financial system with the economy and balance quantity with quality. Accordingly, the World Economic Forum (2012) broadly defines financial development as the factors, policies, and institution that lead to effective financial intermediation and markets, as well as deep and broad access to capital and financial services. The World Bank (2013a) draws the importance of the state in finance into perspective and highlights that because of the central role that financial sectors play in market economies, governments and major central banks intervene to avoid the collapse of the economic system.

4.2.2 The Determinants of Financial Development

Various financial sector indicators have been used as measures of the financial development in the literature. Thus in principle there is no single indicator for financial development (Huang, 2010) and accordingly various researches have adopted different measures and approaches for determining financial development. Primary determinants are usually determined by an economy's financial sector performance indices as observed from both financial and non-financial institutions that are involved in financial intermediary activities. Secondly, other

potential factors have been identified as influencing the extent of financial development in an economy.

4.2.2.1 Conventional Measures of Financial Development

The conventional indicators that have been used as proxies for measuring financial development have been highlighted by (Huang, 2010) who observes that there is no single measure for determining financial development. The study adopts the following indicators from (Huang, 2010) as measures of financial development. Accordingly, the conventional measures of financial development, as adopted and based on widely used indicators, are Liquid Liabilities (LL), Private Credit (PC), Commercial-Central Bank Ratio (CCBR), Overhead Cost (OC), Net Interest Margin (NIM), Stock Market Capitalisation (SMC), Total Value-Traded (TVT) and Turnover Ratio (TOR).

Liquid Liabilities to GDP, Private Credit to GDP and Financial Sector Deposits, Private Credit to GDP are standard indicators of financial development (financial deepening). The first measure, Liquid Liabilities (LLY), is one of the major indicators used to measure the size, relative to the economy, of financial intermediaries, including three types of financial institutions: the central bank, deposit money banks and other financial institutions (Huang, 2010). It is calculated as the liquid liabilities of banks and non-bank financial intermediaries (currency plus demand and interest-bearing liabilities) over GDP. Private Credit to GDP is another standard indicator of financial development. The second indicator, Private Credit (PRIVO), is defined as the credit issued to the private sector by banks and other financial intermediaries divided by GDP, excluding credit issued to government, government agencies and public enterprises, as well as the credit issued by the monetary authority and development banks. It measures general financial intermediary activities provided to the private sector (Huang, 2010). The third, Commercial-Central Bank Ratio (BTOT) is the ratio of commercial bank assets to the sum of commercial bank and central bank assets. According to Huang (2010), the ratio proxies the advantage of financial intermediaries in channelling savings to investment, monitoring firms, influencing corporate governance and undertaking risk management relative to the central bank.

The Net Interest Margin (NIM) and Overhead Costs (OVC) are measures for efficiency of the banking sector. OVC is the ratio of overhead costs to total bank assets. The NIM equals the

difference between bank interest income and interest expenses, divided by total assets. A lower value of overhead costs and net interest margin is frequently interpreted as indicating greater competition and efficiency (Huang, 2010).

Stock Market Capitalisation (MCAP), Total Value Traded (TVT) and Turnover Ratio (TOR) are indices for stock market development. MCAP is the size index—is the ratio of the value of listed domestic shares to GDP. TVT is an indicator to measure market activity—is the ratio of the value of domestic shares traded on domestic exchanges to GDP, and can be used to gauge market liquidity on an economy-wide basis. TOR is the ratio of the value of domestic share transactions on domestic exchanges to the total value of listed domestic shares. A high value of the TOR will indicate a more liquid (and potentially more efficient) equity market (Huang, 2010).

In view of the fact that there is no single aggregate or measure for financial development in literature; some studies adopt the Principal Component Analysis (PCA), based on widely used indicators of financial development, to produce new aggregate indices for financial development.

4.2.2.2 The Political and the General Macro-economic Environment

Literature suggests the consideration of other potential determinants of financial development as such factors provide basis for the existence of differences in the extent of financial development across countries. (Huang, 2010) identified institutional factors, policy regimes (macro-economic factors), geographical and other variables (economic growth, income level, technology and population, among others). Further, Voghouei, Azali and Jamali (2011) identified five categories of determinants of financial development as legal tradition, institutions, government intervention, openness policy and political economic factors. The consensus on these other potential determinants is that the state of the political economy in different regions brings about differences in extent of financial development and influence on performance.

The political economy takes into account the impact of political factors and approach in shaping the overall macro-economic climate. It models the impact of a range of political factors on the industrial sector as political stability, macro-economic stability and policy, credibility and reputation. Since the general financial environment is influenced by activities of the regulatory

and supervisory bodies such as Central Banks are considered to be of importance to the growth of the industrial sector due to the sector's capital intensive nature.

The general political and macro-economic environment to a larger extent influences the capacity and degree of impact of the various indicators of financial development through their effects on private capital inflows, long-term private investments and savings mobilisation. Growing and improved macro-economic stability generates confidence in the economy leads to substantial private capital inflows, savings mobilisation and steady long-term private investments. Interest rate, trade openness, inflation, exchange rate, FDI and CPI are good indicators of the general macro-economic environment. Strong growth prospects, improved macro-economic management, increased political stability, as well as robust global commodity demand have led to sizeable capital inflows into SSA.

Huang (2010) opines that the geography applies mainly at the demand side of financial development, although it may affect its supply side by influencing the quality of institutions within the economy. To this extent, openness to international trade (trade openness) and capital flows (financial openness) have a bi-directional effects on a country's financial and product markets (Bara, 2017). On one perspective, a well-developed financial sector can stimulate exports and imports by providing low cost financing, and assist in overcoming liquidity constraints (Voghouei *et al.*, 2011). From the other, with efficient technology, an open trading regime and high volume of trade increases the pay-off to financing entrepreneurs and fosters the formation of active capital markets (Ginebri, Petriol, & Sabani, 2001).

Policy regimes influence the macro-economic environment in terms of level of trade openness, capital flows, output volatilities, inflation and other macro-economic variables. Bara (2017) puts forward that the ultimate goal of all economies is to have high economic growth that ensures sustainable development. The argument as to how financial development is linked to economic growth, however, to a larger extent is debatable. The general observations are that countries with relatively solid financial development have high economic growth than countries with low or poor financial intermediation. The fact that countries are deemed financially developed does not imply that growth is driven by financial development and this makes the finance-growth association ambiguous therefore further empirical proofs are necessary. Naceur *et al.* (2017)

observe that the influence of the different dimensions of financial development on the sources of growth varies across income levels and regions. The following sections provide a discussion on the theoretical basis of economic growth and the finance-growth nexus.

4.2.3 Foundational Models of Long-run Economic Growth

One of the earliest models that served as the foundational basis for studying the concept of economic growth is the Harrod-Domar model. The Harrod-Domar model predicts a strong positive relationship between economic savings and growth (Quartey, 2005). Solow (1956) observes that, regarding the Harrod-Domar model, the critical question of balance boils down to a comparison between the natural rate of growth which depends, in the absence of technological change, on the increase of the labour force, and the warranted rate of growth which also depends on the saving and investing habits of households and firms. Accordingly, economic growth, as measured by the rate of productivity, $Y(t)$, is a function of capital accumulation, $K(t)$ and labour, $L(t)$. Capital accumulation and for that matter investment emanates from a percentage of income saved after consumption and this gives the rate of savings, $sY(t)$. Thus the stock of capital, $K(t)$, takes the form of an accumulation of the composite commodity and net investment is then just the rate of increase of the capital stock, $\frac{dk}{dt}$ or $\dot{K}$, thus the basic identity at every instant of time is given by:

$$\dot{K} = sY \tag{4.1}$$

Output is thus produced with the help of two factors of production, capital and labour input, given technological possibilities; output is represented by a production function:

$$Y = F(K, L) \tag{4.2}$$

Output is to be understood as net output after making good the depreciation of capital. Under the assumption that production shows constant returns to scale (CRS), the production function is homogeneous of first degree. This amounts to assuming that there is no scarce non-augmentable resource like land. Solow (1956) notes that the CRS seems to be the natural assumption to make in a theory of growth. The assumption of the scarce-land would lead to decreasing returns to scale in capital and labour and inserting equations (4.1 and 4.2), the model becomes

$$\dot{K} = sF(K, L) \tag{4.3}$$

As can be deduced from Harrod model, the exogenous population growth the labour force increases at a constant relative rate *n*. In the absence of technological change *n* is the Harrod's natural rate of growth. Thus:

$$L(\dot{t}) = L_o e^{nt} \tag{4.4}$$

In Equation (4.3) L stands for total employment; in (4.4) L stands for the available supply of labour and it is assumed that full employment is perpetually maintained. Inserting Equation (4.4) into (4.3), the time path of capital accumulation is formulated as:

$$\dot{K} = sF(K, L_o e^{nt}) \tag{4.5}$$

According to Solow (1956), Equation (4.5) is a basic equation which determines the time path of capital accumulation that must be followed if all available labour is to be employed. Once the time path of capital stock and that of the labour force are determined, we can compute from the production function the corresponding time path of real output. At any point of time the pre-existing stock of capital (the result of previous accumulation) is inelastically supplied. Solow (1956) indicates that since the real return to factors will adjust to bring about full employment of labour and capital, the production function, Equation (4.2), can be used to find the current rate of output. Following from that the propensity to save tells how much of net output will be saved and invested. Hence the net accumulation of capital during the current period can be determined. Solow (1956) states that a remarkable characteristic of the Harrod-Domar model is that it consistently studies long-run problems with the usual short-run tools.

Solow (1956) further observed that perfectly arbitrary changes over time in the production function can be contemplated in principle, but are hardly likely to lead to systematic conclusions. Solow (1956) indicates that an especially easy kind of technological change is that which simply multiplies the production function by an increasing scale factor, $A(t)$, and becomes

$$Y = A(t)F(K, L). \tag{4.6}$$

This notwithstanding, in relatively more recent times, the development of new growth models have evolved in reaction to what have been viewed as the 'incompleteness' of the Harrod-Domar-Hicks tradition (Sena & Fontenele, 2015). The new endogenous growth theory is an instance of this sort of challenge that has improved upon Solow's tradition, introducing endogenously into the theory the formation of knowledge, either as part of labour or as a broad notion of capital.

There are two main branches in the new endogenous growth theory. The first model emphasises that technological advances endogenously generate externality effects. As a result, the production function presents increasing returns to scale due to the presence of spill-over effects coming from knowledge generation and/or education. The works of Romer (1986) and Lucas (1988) provide good basis regarding the first branch models of the 'new' growth theory. The 'new' production model is thus formulated, from the perspective of the Cobb-Douglas production function, as:

$$Y_t = F(K_t\,, L_t, k_t) = K_t^{\alpha}.\,L_t^{\beta}.\,k_t^{n} \tag{4.7}$$

Where $Y_t = \sum_i^N Y_{ti}\,, K_t = \sum_i^N K_{ti}$ and $L_t = \sum_i^N L_{ti}$ and N is the number of firms in the economy. We divide through Equation (4.7) by L_t to its intensive representation and use constant returns to scale (CRS) on the two inputs ($\mathbf{K_t}, \mathbf{L_t}$) to yield:

$$\mathrm{y_t} = \mathrm{K_t^{\alpha} k_t^{n}}. \tag{4.8}$$

Introducing consumption into the analysis in the model, consumption is modelled with households maximising an intertemporal constant elasticity of substitution (CES) utility function as:

$$\mathbf{U}_t(c_t) = \left[c_t^{1-\varphi}\right]/[1-\varphi], \tag{4.9}$$

Where c_t is per capita consumption and $0 < \varphi < 1$ represents the intertemporal substitution in consumption. Given the utility function, $\mathbf{U_t(c_t)}$, the dynamic optimisation problem can be formulated as:

$$\text{Maximise } \mathbf{U}_t(c_t) = \int_0^{\infty}\{\left[c_t^{1-\varphi}\right]/[1-\varphi]\}\, e^{-rt}dt. \qquad (4.10)$$

$$\text{Subject to } \dot{k_t} = K_t^{\alpha}.k_t^{n} - c_t,$$

Where r is the discount rate and $k_t = K_t/L_t$ (capital-labour ratio). The dynamic maximisation problem can be considered by applying the Hamiltonian as:

$$\mathbf{H}^{C} = \left[c_t^{1-\varphi}\right]/[1-\varphi] + \mu_t(K_t^{\alpha}.k_t^{n} - \mathbf{c}_t) \qquad (4.11)$$

And setting the maximum principle conditions as

$$\frac{d\mathbf{H}^{C}}{d\mathbf{c}_t} = 0$$

$$\dot{\mu_t} = \mu_t.\, r - \frac{d\mathbf{H}^{C}}{d\mathbf{K}_t} \qquad (4.12)$$

$$\dot{k_t} = K_t^{\alpha}.k_t^{n} - c_t,$$

The objective is to maximize the present value of the CES utility, which is a function of the control (policy) variable c_t, subject to the capital accumulation equation. Combining the results of the first two conditions, after taking logarithms and the derivative with respect to time, and using the fact that for equilibrium in the capital market total capital must be equal to the sum of individual capital stocks ($k_t = L_t.K_t$) the long-run per capita consumption growth rate is:

$$\dot{\mathbf{c}}_t/\mathbf{c}_t = \left[\boldsymbol{\alpha K_t^{-(1-n-\alpha)} L_t^{n}} - \mathbf{r}\right]/\varphi \qquad (4.13)$$

The positive or otherwise of the long-run per capita growth rate of consumption depends on the difference between the marginal productivity of capital and the discount rate, since the intertemporal parameter is less than one but positive. Using the third condition, $\dot{k_t} = K_t^{\alpha}.k_t^{n} - c_t$ in Equation (4.12), it is observed that the long-run per capita capital growth rate is the same as that of consumption (for $\alpha = 1$). Additionally, using equation (4.8), it can further be observed that the long-run per capita income growth equals the long-run per capita capital growth rate. Therefore, this model can be used to predict the continued long-run growth for a given country

depending on how productive its technology is as well as the extent of influence of the discount rate.

Assuming that k_t includes both physical and human capital, as indicated by Lucas (1988), or rather includes the stock of knowledge as advanced by Romer (1986), externalities will be present due to the non-rival character of skills and/or knowledge. Policy implications coming from this model are related to the potential for externalities spill-overs coming from the stock of knowledge and/or labour force skills. Against that backdrop, economies which have abundance in those factors, can grow faster than the ones constrained by shortage of them.

The second branch of the new endogenous growth theory models economic growth using the AK-technology. Under the AK-technology constant returns due to the accumulation of all types of capital – physical, human and knowledge – are present. This model has been advanced by Rebelo (1991) who formulates the production side of the economy and represents it by the following Cobb-Douglas production function as:

$$Y_t = A_0 . K_t,$$

with the intensive form as

$$y_t = A_0 . k_t. \tag{4.14}$$

Where, A_0 is the constant average or marginal productivity of capital and K_t is aggregate capital. Under the Rebelo (1991) formulation, the dynamic maximisation problem in equation is subject to $\dot{\mathbf{k}}_\mathbf{t} = \mathbf{A_0 k_t} - \mathbf{c_t}$ and the assumption of equality between savings and investment ($\mathbf{S_t} = \mathbf{I_t}$) is used, no depreciation on capital is assumed ($\delta = 0$) and $\mathbf{r}$ is the discount rate as stated before. The current Hamiltonian is stated as $\mathbf{H}^C = \left[c_t^{1-\varphi}\right]/[1-\varphi] + \mu_t(A_0 . k_t - \mathbf{c}_t)$. The long-run per capita capital growth is the same as the long-run optimal per capita consumption, $[\dot{\mathbf{k}}_t/\mathbf{k}_t = \dot{\mathbf{c}}_t/\mathbf{c}]$ and it is a positive constant so long as $\mathbf{r}$ is less than $\mathbf{A_0}$. The derivation of the optimal long-run per capita output can be done in a similar manner. Using Equation (4.14), after applying logarithms and taking the time derivatives yields: $\dot{\mathbf{y}}_t/\mathbf{y}_t = \dot{\mathbf{k}}_t/\mathbf{k_t}$. Thus, making use of earlier results, the optimal steady-state growth rates of the relevant variables relate one to each other as:

$$\dot{\mathbf{y}}_t/\mathbf{y}_t = \dot{\mathbf{k}}_t/\mathbf{k_t} = \dot{\mathbf{c}}_t/\mathbf{c} = \lambda_0 = [\mathbf{A_0} - \boldsymbol{r}]/\varphi \tag{4.15}$$

All the long-run growth rates are determined in this model in a similar way as they were in the Romer-Lucas model. Thus, it is possible to endogenously determine the optimal long-run savings rate as a fraction of the aggregate per capital output in the as follows:

$$\dot{\mathbf{y}}_t/\mathbf{y}_t = [\dot{\mathbf{k}}_t/\mathbf{k}_t][k_t/\boldsymbol{y_t}] = \lambda_0 = [1/\mathbf{A_0}], \text{ since } \dot{\mathbf{k}}_t = I_t = S_t \text{ and } y_t = A_0.k_t \quad (4.16)$$

The λ_0 can be substituted to determine a final expression for the savings rate as:

$$S_t/\mathbf{y}_t = [\mathbf{A_0} - r]/[\varphi\mathbf{A_0}] = [1/\varphi] - r/[\varphi\mathbf{A_0}] \quad (4.17)$$

Solving for λ_0 (the optimal long-run growth rate of per capita output) in Equation (4.16), the long-run growth rate of the economy can be expressed as:

$$\lambda_0 = \mathbf{A_0}[S_t/\mathbf{y}_t] \text{ or } \lambda_0 = \mathbf{A_0}[I_t/\mathbf{y}_t] \text{ Since, } I_t = S_t. \quad (4.18)$$

Therefore, on the basis of the Rebelo Model (1991), the long run growth rate of a country dependent on its savings rate (investment rate), which is also influenced by φ and **r**, and on how productive its capital, $\mathbf{A_0}$ is. Therefore, differently from Romer-Lucas' Model, policies that have impact on savings and investments are crucial for long-run growth. In all, the Harrod-Domar, Rebelo and Romer-Lucas' models emphasise the importance of improved savings and investment within the economy. Thus financial development has implications for savings mobilisation which can potentially augment capital accumulation and technological progress.

Beyond these 'new' models discussed, there are at least two extensions that are important in examining growth models, from the perspective of economic policy. These models extend the Rebelo Model to include governance-enhancing growth component (Barro, 1990) and trade-augmenting growth (Grossman & Helpman, 1990, 1991). Barro (1990) modifies Rebelo's (1991) analysis to incorporate a public sector. Specifically, Barro's (1990) economic growth formulation includes the quantity and quality of public services provided by the government to each private producer in the economy. Grossman & Helpman (1991), on the other hand, develop a model envisioning both technology and foreign trade engagement in an endogenous manner. The extensions discussed briefly or mentioned (per Barro, 1990; Grossman & Helpman, 1990, 1991) emphasise the need to pay attention to the role of government and trade in impacting on

the growth process. As noted, the two extensions point to certain conditions under which government action and trade engagement can improve the growth possibilities of an economy.

From the framework of literature on economic growth theory, two important concepts have for long influenced much of the existing discussion on economic growth. These include neoclassical growth theory and endogenous growth theories.

4.2.4 The Determinants of Economic Growth

Conceptually, Denison (1962) states that economic growth is the increase of real GDP or GDP per capita or an increase of national product that is measured in constant prices. The neoclassical Solow-Swan (1956) economic growth theory, also known as the exogenous growth model, advocates for the accumulation of physical capital as an important driver of economic growth in the short run, while technological advancement is the key determinant of economic growth in the long run.

Economic growth is affected by direct factors like human resources (increasing the active population, investing in human capital), natural resources (land, underground resources), rate and efficiency of capital employed or technological advancements. Economic growth is also influenced by indirect factors such as institutions (financial institutions, private administrations etc.), the size of the aggregate demand, saving and investment rates, the efficiency of the financial system, budgetary and fiscal policies, migration of labour and capital and the efficiency of the government. Solow (1956), Romer (1986) and Lucas (1988) emphasise the importance of state factors such as the accumulation of physical capital and human capital development in economic growth.

In terms of endogenous growth theorists, the major contribution is based on the inclusion of productivity factors such as experience and useful application of technological knowledge (research and development), and the extent of foreign trade engagement as important drivers of economic growth (Aghion & Howitt, 1992; Grossman & Helpman, 1991; Lucas, 1988; Romer, 1986, 1990). The implication of the endogenous growth theories these aforementioned factors enhance the productive capacities of the real sector or the sources of growth.

Knight, Loayza and Villanueva (1993) show that physical capital, human capital, public investment, openness to trade and population growth are important determinants of economic growth. Boldeanu and Constantinescu (2015) thus observe that there are four major determinants of economic growth, namely: human resources, natural resources, capital formation and technology, but the importance that researchers had given each determinant is always different. Barro and Sala-i-Martin (1992), for instance, modelled the significance of government spending on economic growth and found that high and imprudent government spending has a negative impact on economic growth.

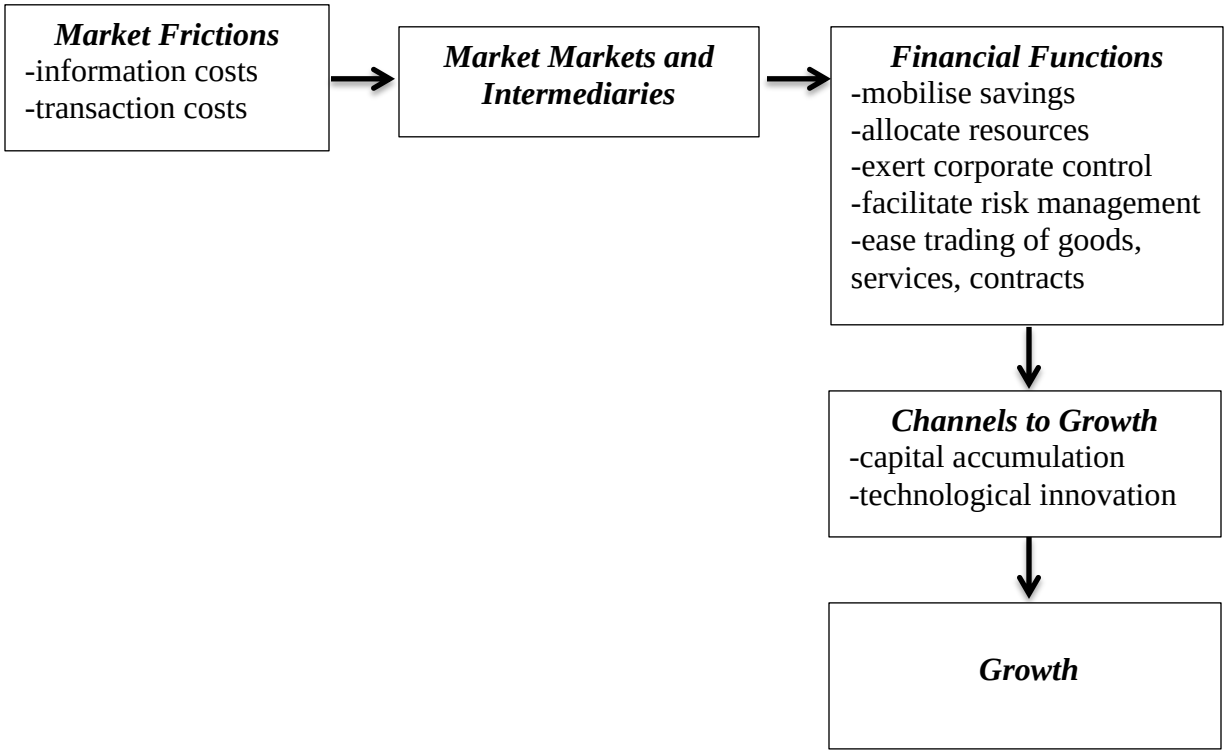
4.2.5 Theoretical Literature on Financial Development and Economic Growth

The literature on the link between finance and growth largely attributes the foundation of the association to the seminal work of Schumpeter (1911). The proposition of Schumpeter, largely, emphasises that a well-developed financial system has the potential to catalyse technological innovation and economic growth through the provision of financial services and resources to those entrepreneurs who have the highest probability of successfully producing innovative products and processes. The postulations emphasise that financial markets channel funds to the most efficient investors that foster entrepreneurial ingenuity for economic growth (Kagochi, Nasser, & Kebede, 2013). Relatively early works that supported the Schumpeter's proposition include, Gurley and Shaw (1955), Goldsmith (1969) and Hicks (1969) who advanced that the development of a financial system is essential in stimulating economic growth. The overriding premise of the finance and growth association that stands out is that financial development improves resource allocation and also provides strong basis for better monitoring, ensures fewer information asymmetries and these promote productivity thereby leading to long-run economic growth (Kim, Lin, & Suen, 2012; Shen & Lee, 2006). In this regard, the development of the financial systems lower income countries could improve opportunities for growth of their economies.

Different strand of the theory that positively links finance and growth emerged in the early 1990s. King and Levine (1993a, 1993b) showed that there exists an important link between financial development and long-run growth as suggested by Schumpeter. The financial system affects capital accumulation either by altering the savings rate or by reallocating savings among

different capital producing technologies (Levine, 1997). Additionally, the functions performed by the financial system affect steady-state growth by altering the rate of technological innovation. Thus, These models postulated that financial development reduces informational frictions and improves resource allocation efficiency (Ang, 2008). Literature on these endogeneous growth revealed that the increase in growth rates can be sustained and the rate of technological progress is endogenously determined (Eschenbach, 2004). Whilst the Mckinnon-Shaw models highlight the role of financial development in the process of economic growth, the endogenous models show reciprocal interactions between financial development and growth (Ang, 2008).

Figure 4.1: A Theoretical Approach to Finance and Growth



Source: Levine, (1997b)

Financial sector development is important not only for fostering the economic growth process, but also for dampening the volatility of the growth process (Beck, 2012; Beck, Chen, Lin & Song, 2012). Financial systems can alleviate the liquidity constraints on firms and facilitate long-

term investment, which ultimately reduces the volatility of investment and growth (Aghion, Angeletos, Banerjee & Manova, 2010). Industries that are naturally heavy users of external finance benefit disproportionately more from financial development than industries that are not naturally heavy users of external finance (Rajan & Zingales, 1998). Braun and Larrain (2005) and Raddatz (2006) indicate that financial development lowers output volatility of industries, especially in sectors that are financially vulnerable. Carlin and Mayer (2003) also show that the difference in financial structure has an impact on the real economy by affecting growth and investments of different industries.

4.2.5.1 The Functions of Financial Systems in the Economy

When economies have considerably developed and well-functioning financial systems, the economy grows and benefit through economic growth through two diverse but complementary mechanisms as emphasised by growth theory (Ang, 2008). Financial intermediation facilitates economic growth through the process of total factor productivity and capital accumulation. Gurley and Shaw (1955) provided the basis for examining capital accumulation as a key channel in economic development. This channel is based on the efficiency of the financial intermediary to locate "idle funds", pool it together and allocate it to the most economically viable projects. A continual and efficient allocation of capital towards viable investment ventures may lead to higher growth. The other channel focuses on the means to minimise the informational asymmetries involved in the financial sector. Financial improvement is one way to ensure efficient allocation of resources and monitoring of projects. Some authors have put forward an elaborative analysis of the functions of the financial system and categorised them under five basic functions (Ang, 2008; Demirguc-Kunt & Levine, 2008; Levine, 1997). According to the authors, the functions of the financial system are grouped into the following sections: savings mobilisation, risk management, resources allocation, facilitating transaction and exercising corporate control (Ang, 2008; Beck & Demirgüç-Kunt, 2008; Demirguc-Kunt & Levine 2008; Levine, 1997, 2004). The study adopts a discussion of the functions of financial system as expounded by Demirguc-Kunt and Levine (2008) and Levine (1997, 2004).

Saving Mobilisation

Savings mobilisation from individual depositors is difficult and expensive. According to Levine (1997), there are two costs associated in the mobilisation of savings. Firstly, addressing

informational asymmetries associated with making savers feel comfortable in relinquishing control of their savings. Secondly, overcoming the transaction costs associated with collecting savings from different individuals.

To minimise the costs associated with multiple bilateral contracts, pooling of savings may also occur through intermediaries, where several investors entrust their wealth to intermediaries that invest in different number of firms (Sirri & Tufano, 1995). In order for this interaction, "mobilisers" have to convince savers of the soundness of the investments (Boyd & Smith, 1992). Toward this end, intermediaries worry about establishing stellar reputations, so that savers feel comfortable about entrusting their savings to the intermediary (Lamoreaux, 1995).

Financial systems that are more effective at mobilising the savings of individuals can profoundly affect economic development by increasing savings, exploiting economies of scale and overcoming investment indivisibilities (Levine, 2004). Mavrotas and Santillana (1999) argue that financial liberalisation increases competition between providers of financial intermediation, thereby eliminating the constraint on borrowing. Besides the direct effect of better savings mobilisation on capital accumulation, better savings mobilisation can improve resource allocation and boost technological innovation (Levine, 2004). Without access to multiple investors, many production processes would be constrained to economically inefficient scales (Sirri & Tufano, 1995). Furthermore, many endeavours require an enormous injection of capital that is beyond the means or inclination of any single investor. In addition, mobilisation frequently involves the creation of small denomination instruments. These instruments provide opportunities for households to hold diversified portfolios (Sirri & Tufano, 1995). Acemoglu and Zilibotti (1997) show that with large, indivisible projects, financial arrangements that mobilise savings from many diverse individuals and invest in a diversified portfolio of risky projects facilitate a reallocation of investment toward higher return activities with positive ramifications on economic growth. Thus, Mavrotas and Santillana (1999) support the view that higher savings raise the growth of GDP by increasing capital accumulation.

Risk Management

With information and transactions costs, financial contracts, markets and intermediaries may arise to ease the trading, hedging, and pooling of risk with implications for resource allocation

and growth. Demirguc-Kunt and Levine (2008) have identified three types of risk, namely; cross-sectional risk diversification, inter-temporal risk sharing, and liquidity risk. Accordingly they argue that well-functioning financial systems may mitigate the risks associated with individual projects, firms, industries, regions, countries, etc. Banks, mutual funds, and securities markets all provide vehicles for trading, pooling, and diversifying risk. Thus developed financial systems may have the ability to provide risk diversification services and this can affect long-run economic growth by altering resource allocation and savings rates. The basic intuition is straightforward. While savers generally do not like risk, high-return projects tend to be riskier than low-return projects. Thus, financial markets that make it easier for people to diversify risk tend to induce a portfolio shift toward projects with higher expected returns (Greenwood & Jovanovic, 1990; Gurley & Shaw, 1955; Patrick, 1966; Saint-Paul, 1992).

Another type of risk is liquidity risk. Liquidity reflects the cost and speed with which agents can convert financial instruments into purchasing power at agreed prices. Liquidity risk arises due to the uncertainties associated with converting assets into a medium of exchange. Informational asymmetries and transaction costs may inhibit liquidity and intensify liquidity risk. These frictions create incentives for the emergence of financial markets and institutions that augment liquidity (Demirguc-Kunt & Levine, 2008). The standard link between liquidity and economic development arises because some high-return projects require a long-run commitment of capital, but savers do not like to relinquish control of their savings for long-periods. Thus, if the financial system does not augment the liquidity of long-term investments, less investment is likely to occur in the high return projects. (Hicks, 1969) assert that the principal cause of the industrial revolution in England was the development in the capital market that alleviated liquidity risk at the time. Hicks (1969) argues that the products manufactured during the first decades of the Industrial Revolution had been invented much earlier. Rather, the critical innovation that ignited growth in 18th century England was capital market liquidity (Hicks, 1969). With liquid capital markets, savers can hold liquid assets— like equity, bonds, or demand deposits—that they can quickly and easily sell if they seek access to their savings. Simultaneously, capital markets transform these liquid financial instruments into long-term capital investments. Thus, the industrial revolutions require financial revolution so that large commitments of capital could be made for long periods (Bencivenga, Smith, & Starr, 1995).

Bencivenga and Smith (1991) show that, by eliminating liquidity risk, banks can increase investment in the high-return, illiquid asset and therefore accelerate growth. Bencivenga and Smith (1991) explain that, financial intermediaries enhance liquidity, reduce liquidity risk and influence economic growth. Banks can offer liquid deposits to savers and undertake a mixture of liquid, low-return investments to satisfy demands on deposits and illiquid, high-return investments. By providing demand deposits and choosing an appropriate mixture of liquid and illiquid investments, banks provide complete insurance to savers against liquidity risk while simultaneously facilitating long-run investments in high return projects. Banks replicate the equilibrium allocation of capital that exists with observable shocks.

Producing Information and Efficient Allocation of Capital

The timely acquisition and dissemination of accurate information within the highly divertible business cycle minimises inefficiencies and costs for enterprises. Financial intermediaries assist and promote business growth by providing valuable information for enterprises at relatively lower costs. Levine (1997) stresses that if there is a fixed cost to be incurred in order to obtain information about production technology, each investor will have to bear the full cost to attain it. But on the other hand, a group of investors can pool resources together to obtain it at a comparably lower cost.

By improving information on firms, managers, and economic conditions, financial intermediaries can accelerate economic growth. Assuming that many entrepreneurs solicit capital and that capital is scarce, financial intermediaries that produce better information on firms will thereby fund more promising firms and induce a more efficient allocation of capital (Greenwood & Jovanovic, 1990). Besides identifying the best production technologies, financial intermediaries may also boost the rate of technological innovation by identifying those entrepreneurs with the best chances of successfully initiating new goods and production processes (Acemoglu, Aghion & Zilibotti, 2003; Blackburn & Hung, 1998; King & Levine, 1993b; Morales, 2003).

Stock markets may also stimulate the production of information about firms. As markets become larger and more liquid, agents may have greater incentives to expend resources in researching firms because it is easier to profit from this information by trading in big and liquid markets

(Grossman & Stiglitz, 1980) and more liquid (Holmstrom & Tirole, 1993; Kyle, 1984). Intuitively, with larger and more liquid markets, it is easier for an agent who has acquired information to disguise this private information and make money by trading in the market. Thus, larger more liquid markets will boost incentives to produce this valuable information with positive implications for capital allocation (Merton, 1987). It is to be noted that, acquiring the information depends on the level of market efficiency of the stock market. Frimpong (2008) concludes that the GSE is in the weak inefficient form and suggests that investors on the GSE have to incur costs in order to acquire information to aid in resource allocation. In corporate finance, the strong-form of efficiency of a stock market absorbs all information (past, present and insider-information) and reflects same in the stock prices.

Monitoring Firms and Exerting Corporate Governance

The concept of corporate governance is important to the understanding of economic growth in general and the role of financial factors in particular. The degree to which the capital providers (both debt and equity investors) to a firm can effectively monitor and influence how firms use that capital has implications on both savings and allocation decisions. The high expectation and vigilance of stakeholders tend to induce managers to maximise firm value and this improves the efficiency with which firms allocate resources and put confidence to savers to be ready to finance production and innovation. The mitigation processes usually hinge on financial arrangements such as debt contracts put in place by creditors of long-term funds (Williamson & Wright, 1994). Additionally, equity-holders can also exert their control ironically through disposing off their interests or stakes in an organisation by voting with their feet (Watson & Head, 2010). The ability of the shareholder to dispose of his interest depends on the liquidity of the capital market. Further still, stock markets may promote corporate control (Jensen & Meckling, 1976). Using performance-related incentive schemes, owners can link managerial compensations to stock prices (Watson & Head, 2010).

In terms of intermediaries, a number of studies show that well-functioning financial intermediaries influence growth by boosting corporate governance. Bencivenga and Smith (1993) show that financial intermediaries that improve corporate governance by economising on monitoring costs experience reduced credit rationing and this boosts productivity, capital accumulation, and growth. Harrison, Sussman and Zeira (1999) amd Sussman (1993) postulated

that financial intermediaries facilitate the flow of resources from savers to investors in the presence of informational asymmetries with positive growth effects. Focusing on innovative activity, De la Fuente and Marin (1996) develop a model in which financial intermediaries arise to undertake the particularly costly process of monitoring innovative activities. This improves credit allocation among competing technology producers with positive ramifications on economic growth.

Easing Exchange of Goods and Services

Financial arrangements that lower transaction costs can promote specialisation, technological innovation and growth. The links between facilitating transactions, specialisation, innovation, and economic growth were core elements of Adam Smith‘s (1776) Wealth of Nations, and thus argued that specialisation, which results from division of labour, is the principal factor underlying productivity improvements. With greater specialisation, workers are more likely to invent better machines or production processes (Smith, 1776). Smith (1776) focused on the role of money in lowering transaction costs, permitting greater specialisation, and fostering technological innovation. Information costs, however, may also motivate the emergence of money. Since it is costly to evaluate the attributes of goods, barter exchange is very costly. Thus, an easily recognisable medium of exchange may arise to facilitate exchange (King & Plosser, 1986; Williamson & Wright, 1994). The drop in transaction and information costs is not necessarily a one-time fall when economies move to money, however. Transaction and information costs may continue to fall through financial innovation.

Greenwood and Smith (1996) have modelled the connections between exchange, specialisation, and innovation. More specialisation requires more transactions. Since each transaction is costly, financial arrangements that lower transaction costs will facilitate greater specialisation. In this way, markets that promote exchange encourage productivity gains. There may also be feedback from these productivity gains to financial market development. If there are fixed costs associated with establishing markets, then higher income per capita implies that these fixed costs are less burdensome as a share of per capita income. Thus, economic development can spur the development of financial markets.

The following sub-sections present a review of the causality and criticisms of the finance-growth relationship, as well as the literature on the impact of financial reforms.

4.2.5.2 The Causality Link between Financial Development and Economic Growth

Existing literature exhibits variant views and position on the direction of causality between financial development and economic growth. The session of the study takes a look at the literature on the various views on the direction of causality in the finance-growth relationship.

The literature on the direction of causality between financial development and economic growth has been varying and to solve this ambiguity within an empirical framework different causality techniques have been widely implemented and advanced by various authors. As noted by Kakilli-Acaravci, Ozturk and Acaravci (2009) and demonstrated by Topcu and Çoban (2017), the causality between financial development and economic growth can be summarised into four hypotheses.

The first causality link is dubbed 'financial development led economic growth' is premised on the foundational propositions by Schumpeter (1911) who theorised that financial development plays a major role and positively impacts on economic growth. King and Levine (1993a) provided empirical evidence to corroborate the conclusions that finance is good for growth. Much inferences have been drawn from the fundamental propositions and further emphases have placed in literature that the financial system affects the real economy either through increases in saving rates and investment or efficiency improvements in capital accumulation (Beck *et al.*, 2000; Goldsmith, 1969; King & Levine, 1993a, 1993b; McKinnon, 1973; Neusser & Kugler, 1998; Shaw, 1973). This approach of financial developments stimulating the components of growth is also referred to as supply-leading growth hypothesis with causality running financial development to economic growth. King and Levine (1993a) using data from 1960 to 1989 for over 80 countries show that cross-country evidence supported Schumpeter's argument that financial systems can promote economic growth and concluded that financial development leads to economic growth. The data used support early views that financial intermediation services stimulate economic growth where increases in capital accumulation rate leads to growth through effective use of capital. Nyasha and Odhiambo (2014) re-echo the position of the supply-leading hypothesis and indicate that financial systems transfer resources from non-growth sectors to

high-growth sectors and exerts a positive influence on capital by efficiently allocating new investments among alternative uses. Demirguc-Kunt and Levine (2008) conclude that countries with a better-developed financial system tend to grow faster and indicated that both financial intermediaries and markets matter for growth. The size of the banking system and the liquidity of stock markets are each positively linked with economic growth. Demirguc-Kunt and Levine (2008) suggest that well-functioning financial systems need stable macro-economic policies and strong legal and information systems. The authors further note that governments have a role to play as regulators by empowering the markets and promoting a contestable financial sector which is essential for improving depth, efficiency and access.

Secondly, in opposing the finance-leading growth hypothesis, other authors indicate that causality rather runs from economic growth to financial development and dub this proposition as demand-following growth. Robinson (1952) argues the demand-following view that expansion in the various components of the economy leads to advancement in the size and efficiency of the financial system. The view thus suggests that financial development occurs as a result of economic growth and, thus, attention should be attached to the development of the economy and specifically, economic sectors that generates large employment. The opposing argument is that the expansion of an economy increases demand for financial services which, in turn, generates the creation of financial intermediaries (Demetriades & Hussein, 1996; Greenwood & Smith, 1996; Gurley & Shaw, 1955; Harrison *et al.*, 1999; Jung, 1986; Kuznets, 1955; Robinson, 1952; among others). The demand-following hypothesis suggests that when the economy is expanding demand for financial services becomes higher and this results in expansion of the financial sector (Chow & Fung, 2013, Robinson, 1952). Accordingly, in the absence of economic progress, financial systems become less effective (Laeven, Levine, & Michalopoulos, 2015), offer ineffective, non-standard amidst declines in the quality of service (Beck, Demirgüç-Kunt, & Levine, 2010). Rachdi and Mbarek (2011) show that economic growth led to financial development while Boulila and Trabelsi (2004), using the GMM co-integration approach and Granger causality test, conclude that economic growth leads to financial growth.

Third, the feedback hypothesis brings the supply-leading and demand-following hypotheses together (Demetriades & Hussein, 1996; Gupta, 1984; Khalifa Al-Yousif, 2002; Shan, Morris, &

Sun, 2001). This interaction could exist even during the same period, which indicates that financial development contributes to economic growth, and this, in turn, induces further financial deepening. This theoretical proposition thus suggests that there exist a bi-directional causality association between financial development and economic growth in a way that financial markets develop in response to economic growth, and financial markets, in turn, generate feedback effects that propel real growth. Moreover, the direction of causality may alter with respect to the general development level of the economy (Patrick, 1966; Thornton, 1996). The bi-directional hypothesis has been advanced by the studies such as Wood (1993), Demetriades and Hussein (1996), Akinboade (1998), Luintel and Khan (1999), Apergis, Filippidis and Economidou (2007), Rousseau and Vuthipadadorn (2005) and Frimpong and Adam (2010). A significant number of researches conducted on Africa and other emerging economies have produced results which support the bi-directional hypothesis. Chuah and Thai (2004) found evidence of bi-directional causality in five countries and finance leading growth in at least one. These results indicate that countries should continue to promote financial development while pursuing the needed reforms to develop the real sector.

Finally, there is the fourth position dubbed the irrelevance hypothesis (Topcu & Çoban, 2017) which assert that financial development and economic growth are almost independent from each other. Accordingly, financial development does not have a particular role in economic growth, or the impact can be ignored as argued by Lucas (1988) and Stern (1989), respectively. This view is consistent with neo-classical theory, which assumes zero transaction costs and perfect information (Blum, Federmair, Fink & Haiss, 2002).

Yet others hold the view that the direction of causality between financial development and economic growth changes over the course of development (Patrick, 1966). Calderón and Liu (2003) assert that financial development induce capital formation in the early stages of economic development but gradually diminishes and eventually becomes responsive to economic growth. Nyasha and Odhiambo (2014) observe that the supply-leading pattern precedes the demand-following pattern in different stages of economic development.

Quite a significant number of studies (Chow & Fung, 2013; Levine, 2005; Odhiambo, 2008; Zhuang, Gunatillake, Niimi, Khan, Jiang, Hasan, Khor, Lagman, Martin & Huang, 2009) on finance-growth follow the postulations of Schumpeter that financial intermediaries are agents that drive investment and growth. The Levine (2005) stance is that financial systems ameliorate market frictions, and as a result influence savings rates, investment decisions, technological innovation and hence long-run economic growth rates. Odhiambo (2008) suggests that the conventional knowledge has been in favour of the supply-leading response, where development of the financial sector is expected to lead to development of the real sector.

The debate of the finance and growth has been extended to capture the existence of different levels of financial developments across countries. Cheng, Ho and Hou (2014) opine that the level of financial development of a country matters finance-growth relationship may depend essentially on the state of growth of that economy. The literature supports the premise that performance, long-run economic growth and welfare of countries are related to the degree of financial development since higher financial setups ensure the availability of financial services that allow the diversification of risks, thereby increasing the long-term growth (World Economic Forum, 2011). This assertion is consistent with the view of Acemoglu and Zilibotti (1997) that the finance-growth relation tends to be weaker in the early stage of development than the later stage.

4.2.5.3 The Optimistic and Sceptic Approaches to the Finance-Growth Association

Literature indicates extensive discussions of the various approaches and channels through which financial development contributes to economic growth within the economy. Ductor and Grechyna (2015) categorises the related theories under optimistic and sceptical approaches of the finance-growth relationship. The former approach, emphasise that better financial systems mobilise savings and facilitate efficient allocation of resources (Greenwood, Sanchez & Wang, 2010; King & Levine, 1993b), reduce agency costs and enhance innovation activities (Philippe Aghion et al., 2005). In further supporting the optimistic approach, other authors indicate that efficient financial markets contribute to growth by promoting the financing of high-return investments through risk-sharing (Bencivenga & Smith, 1991; Greenwood & Jovanovic, 1990; Saint-Paul, 1992). Consistent with the pioneering postulations of Schumpeter that financial

institutions play an important role, King and Levine (1993a) Rajan and Zingales (1998) emphasise that financial development has a stimulating impact on the economy.

According to the proponents of the sceptical approach, the inefficiencies in the financial system expansion could lead to high systemic risk (Allen & Carletti, 2006; Gai *et al.*, 2008; Gennaioli *et al.*, 2012; Wagner, 2007), sub-optimal low savings (Jappelli & Pagano, 1994), sub- optimal high allocation of labour to the financial sector (Bolton *et al.*, 2016; Philippon, 2010), overheated economic capacity (Zeira, 1999), or the exertion of inefficiently high cost on the economy (Santomero & Seater, 2000).

The theoretical findings suggest that the causal effects of financial development should be considered conjointly with the state of development in other sectors that govern economic growth (Ductor & Grechyna, 2015). The authors argue that, for instance, if financial deepening increases systemic risk because excess financing is allocated to risky investments, technological progress in the productive sector could extend the economy's production capacity and release the demand for funds from more efficient firms. This would stabilise the economy, reduce the probability of systemic crises, and thus increase the average economic growth rates. Otherwise, if high rent resulting from the financial sector's dis-proportionately fast development attracts too many skilled labour resources, then exogenous growth in other sectors' technologies could restore the optimal allocation of labour.

Ductor and Grechyna (2015) suggest that if financial innovations reduce savings (due to, for example, dampening interest rates), technological progress in the real sector has the opposite effect (increases the demand for funds with a consequent rise in interest rates). Savings, in turn, define the accumulation of capital in the economy, subsequent levels of output, and economic growth rates. Against this backdrop, balanced growth of financial sector technologies and real sector technologies might be necessary for financial development to have an unambiguously positive effect on economic growth.

The literature also indicated that there is a growing debate about the right kind and level of financial development that is optimal for economic growth. Innovations and technological

progress of the financial system can promote growth but there is the need to exercise caution as too much innovation can have adverse consequences for the overall economy (Beck *et al.*, 2012).

Arnaboldi and Rossiggnoli (2013) share the view that innovation is a double-edged sword with both bright and dark sides as put forward by (Beck, 2012; Beck *et al.*, 2012). Some highlights on the argument of the bright and dark side of financial innovation are discussed below:

- **The Bright Side of Financial Innovation**

Relevant and the right kind of innovation spurs banks and other financial intermediary institutions on to invest in new technologies that enables the financial system to fulfil its intermediation role and, consequently, deliver growth (Arnaboldi & Rossignoli, 2013). Financial innovation can thus contribute significantly to infrastructure investment; financial inclusion; mobilisation of funds; and the strengthening of the overall financial regulation that support economic growth (Morgan, 2010). Thus efficient and steady innovation, in the areas of product and service delivery, has a high potential to positively contribute significantly to GDP, investment and gross savings growth.

Financial innovation creates structures of financial markets that can promote economic growth by enabling agents to diversify their portfolios and meet their liquidity requirements (Ho, 2006). Finance influences the long-run growth by affecting the risk of investing in high-return projects (Laeven *et al.*, 2015). Additionally, financial innovations aid in mobilising surpluses from ultimate savers and channel it to the most productive investment avenues thereby raising capital accumulation, and hence economic growth (Mishra, 2008).

The literature has provided insights into the channels through which finance fosters economic growth. On the whole, the evidence has shown that finance has a more important impact on growth through fostering productivity growth and resource allocation than through pure capital accumulation (Beck *et al.*, 2010). Beck *et al.* (2012) stress that the availability of external finance is positively associated with entrepreneurship, and higher firm entry as well as with firm dynamism and innovation. Finance also allows existing firms to exploit growth and investment opportunities, and to achieve larger equilibrium size (Beck, 2012b). This position is further emphasised by Chou and Chin (2004) who indicate that financial innovations increase the variety

of products offered by financial intermediation and also foster the rate of technological progress. Thus financial innovation raises the efficiency of financial intermediation by increasing the variety of financial products and services resulting in capital accumulation, from improved matching of the needs of individual savers with that of firms, leading to economic growth.

More recent research, however, has pointed to important non-linearities in the relationship between finance and growth. There is evidence that the effect of financial development is strongest among middle-income countries, whereas other work finds a declining effect of finance and growth as countries grow richer (see Beck, 2012b). (Arcand *et al.*, 2012) find that the finance and growth relationship turns negative for high-income countries, identifying a value of 110 per cent private credit to GDP as approximate turning point, with the negative relationship between finance and growth turning significant at around 150 per cent private credit to GDP, levels reached by some high-income countries in the 2000s.

- **The Dark Side of Financial Innovation**

Beck *et al.* (2012) state that the same mechanism through which finance helps growth also makes finance susceptible to shocks and, ultimately, fragility. Specifically, the authors argue that the maturity and liquidity transformation from short-term savings and deposit facilities into long-term investments is at the core of the positive impact of a financial system on the real economy, but also renders the system susceptible to shocks, with the possibilities of bank and liquidity runs. The information asymmetries and ensuing agency problems between savers and entrepreneurs that banks help to alleviate also can turn into a source of fragility given agency conflicts between depositors or creditors and banks. The opacity of banks' financial statement and the large number of creditors (compared to a real sector company) undermine market discipline and encourage banks to take too much risk, ultimately resulting in fragility (see Carletti, 2008, for an overview).

To this extent, too much innovation in the financial system can have severe consequences for the wide economy in situations where the innovation is not properly applied (Beck *et al.*, 2012; Stiglitz, 2010). Financial innovation can introduce complexities to exploit uninformed investors (Henderson & Pearson, 2011). The failure of financial institutions can result in significant

negative externalities beyond the private costs of failure; it imposes external costs on other financial institutions through different contagion effects and the economy at large (Beck, 2012b). The external costs of bank failures have made banking one of the most regulated sectors and have led to the introduction of explicit or implicit safety nets across most countries of the modern world that – at a minimum - protect depositors, in many cases, especially during the recent crisis, also non-deposit creditors or even equity holders.

The preceding section of the reviewed literature considers the concept of optimal financial thresholds. As a result of the possibility of negative effects caused by too much finance, some authors have considered the existence of an optimal point in finance. The next section discusses the concept of optimal financial thresholds and stability.

4.2.6 The Concept of Optimal Financial Thresholds and Stability

Though Levine (1993a) and others highlight the positive impact that finance can have on economic growth, the occurrence of the financial crises of 2007 has reignited the debate that perhaps too much finance could hamper economic growth. This observation makes relevant the position of Aliber and Kindleberger (2017) and Kindleberger (1978) regarding the relationship between finance and macro-economic volatility as well as financial instability and financial manias. Some recent research shows that above there exists a threshold level and high credit-to-GDP growth, for instance, may slow down growth (Arcand *et al.*, 2012; Cecchetti & Kharroubi, 2012) or even that "banking development has an unfavourable, if not negative, effect on growth" (Shen & Lee, 2006). It is also worth noting that high credit-to-GDP growth precipitates crisis, as Jorda, Schularick, and Taylor (2011), Reinhart and Rogoff (2009b, 2009a), and Schularick and Taylor (2012) show, among others. Arnold, Borio, Ellis and Moshirian (2012) thus put forward that this development may be part of a changing relation between credit and growth over the financial cycle. Cecchetti and Kharroubi (2012) suggest that it is imperative to reassess the relationship of finance and real growth in modern economic systems since there is the indication that more finance could not always better. Bezemer, Grydaki and Zhang (2014) find that high ratio of bank credit to GDP has a negative effect on growth. They suggest that this negative relationship between finance and growth is due to a shift in the share of credit away from non-financial institutions. Ductor and Grechyna (2015) find evidence that suggest the existence of an optimal level of financial development given by the characteristics of an economy.

The possibility of financial systems to be stifled as a result of intended or unintended actions of major stakeholders could result in poor performance of the core functions of the financial system. According to Cihak *et al.* (2012) when financial systems perform these functions poorly, they tend to hinder economic growth, curtail economic opportunities, and destabilise economies. Cihak *et al.* (2012) further elaborates that if financial systems simply collect funds with one hand, and pass them along to cronies, the wealthy, and the politically-connected with the other hand, this slows economic growth and prohibits many potential entrepreneurs from succeeding in their economic endeavours. And, if financial institutions fail to exert sound corporate governance over the firms that they fund, this makes it easier for managers to pursue projects that benefit themselves rather than the firm and the overall economy. Additionally, inefficiencies resulting from expansion and allocation of financial resources by the financial system can have adverse effects growth the growth potential of the economy. This situation could be further aggravated and thrives under the poor financial regulatory and supervisory regimes.

Cihak *et al.* (2012) stresses the importance of examining the stability of financial systems and assert that financial stability is an important feature of the financial sector. There is a vast literature specifically on measuring systemic risk, stress tests, and other tools for financial stability. But financial stability is a part of the broader financial development process and can be used as a measure efficiency of the financial system indicators. To illustrate this, Cihak *et al.* (2012) uses an analogy where if banks‘ lending standards become very loose, and banks provide loans too easily, without proper risk management and loan monitoring. They suggest that on the surface, one could observe the rapid growth as a sign of deepening and increased access to finance. This developments and positions give the indication that there is a new approach in examining the finance-growth nexus should take into account the assessment of optimal and efficient financial development within economies.

The existence of macro-economic volatilities and the experience financial crises make the argument of financial thresholds worthwhile. These give the indication that expansion in financial depth could result in negative impacts on the economy. Arcand, Berkes and Panizza (2012) re-emphasise that most plausible of the reasons is that rapid credit growth could increase

macro-economic volatility or lead to financial and banking crises (Kaminsky & Reinhart, 1999) which, in turn, may have a negative effect on growth. This observation is re-echoed by the suggestion of Rousseau and Wachtel (2011) that banking crises are the culprits of the vanishing effect of too much finance. Arcand *et al.* (2012) thus conclude that such an explanation would also be consistent with the fact that the threshold for which they find that credit to the private sector starts having a negative marginal effect on growth is similar to the threshold for which Easterly, Islam and Stiglitz (2000) find that financial depth starts having a positive effect on macro-economic volatility.

This development points to the existence of non-linearities in the relationship between finance and growth. There are several, not exclusive, explanations for such non-linearities, as put forward by the recent literature and partly informed by the recent crisis. Beck, (2012b) discusses and puts forward five reasons that may explain the existence non-linearities and perhaps threshold points. First, the measures of financial depth and intermediation the literature has been using might be simply too crude to capture quality improvements at high levels of financial development. In addition, the financial sector has gradually extended its scope beyond the traditional activity of intermediation towards so-called "non-intermediation" financial activities (Demirgüç-Kunt & Huizinga, 2010). As a result, Beck, (2012b) suggests that the usual measures of intermediation services could become less and less congruent with the reality of modern financial systems. Second, it has been argued that the reason for the non-linearity of the finance-growth relationship might be that financial development helps catch up to the productivity frontier, but has limited or no growth effect for countries that are close or at the frontier (Philippe Aghion et al., 2005). Third, another reason for non-linearities might be the beneficiary of the credit as argued by Beck *et al.* (2012) who explore the differential growth effects of enterprise and household credit. Consistent with theory they find that the growth effect of financial deepening comes through enterprise rather than household credit. Most of the financial deepening in high-income countries, such as the United Kingdom, has come through additional household lending, which thus might explain the insignificant finance-growth relationship across high-income countries. Fourth, the financial system might actually grow too large relative to the real economy if it extracts excessively high informational rents and in this way attracts too much young talent towards the financial industry (Bolton *et al.*, 2016; Philippon, 2010). Finally, and

related, the financial system can grow too large and result in too aggressive risk-taking and overextending of the financial system.

4.2.7 Financial Reforms and Economic Growth

Against the background of the growing arguments that favourable financial systems are important for economic growth McKinnon (1973) and Shaw (1973) put up an argument in support of more liberalised financial systems and strongly recommended against what they described as repressed financial sector. They pointed out that financial repression is a major source of weakening and collapsing financial sectors, which in turn hampers economic growth. These conclusions prompted the recommendations, especially from the IMF and World Bank, for the introduction of financial reforms in economies whose financial systems were deemed as repressed and weak. Repressive financial policies in the form of interest rate ceilings stifled growth of private investment, discouraged savings culture and inhibited financial deepening and hence restricted growth of the economy (Antwi-Asare & Addison, 2000; Epstein & Heintz, 2006; Senbet & Otchere, 2005).

Many developing countries have made attempts to structure their economies through reforms and strategic policies to make the financial sector a revolving instrument for growth (Aryeetey *et al.*, 1997; Nissanke & Aryeetey, 1998). The overall impact on economic growth of the failed financial policies in the SSA region has been well documented (Aryeetey *et al.*, 2000; Bawumia, 2010). Real GDP growth rates within the SSA countries were relatively marginal between 1961 and 1980. Reforms were therefore deemed necessary if the economies were to turn the seeming negative effects the financial sector put on growth of the economies of SSA. During the late 1980s and early 1990s, the IMF and WB launched a number of reforms under what was dubbed Structural Adjustment Programs (SAP) in most of the SSA countries.

The objective of the reforms were, among others, to restructure the economies of the SSA countries in order to achieve private sector led growth, through a market based system. The reforms basically emphasised the implementation of policies that promote financial liberalisation. Financial liberalisation was a significant component of the guided reforms under the FINSAP. Countries were to grant their central banks more autonomy in conducting monetary policy, liberalise interest rates, avoid or abolish the direct allocation of credit,

implement monetary policy through indirect instruments, restructure and privatise banks and, more generally, develop and foster the environment for the proper functioning of financial markets (Mehran *et al.*, 1998). Additional reforms included liberalising access to foreign exchange; development of Non-Bank Financial Institutions (NBFIs) to fill the gaps in the financial markets not served by the banks; development of stock markets; developing regulatory and legal framework; and the introduction of market based instruments of monetary control (Aryeetey *et al.*, 1997; Bawumia, 2010; Senbet & Otchere, 2005).

In recent times, the debate on the impact of financial reforms or liberalisation on economic growth has not been conclusive. Tyavambiza and Nyangara (2015) assert that financial reforms have double-edged effects on economies and could either support financial development or spread financial crises. There are arguments as to whether financial reforms have led to improved growth or otherwise. To some extent, financial reform lead to growth by promoting financial innovation, efficiency and competition in the banking sector (Moyo, Nandwa, Oduor, & Simpasa, 2014). Liberations holds that it increases the amount of resources, reduces the cost of debt; create competition that promotes efficiency, leading to a rise in investment and growth. On the contrary, financial liberalisation may worsen asymmetric information in the financial sector and create competition that increases financial fragility of financial intermediaries such as banks (Moyo *et al.*, 2014). Bumann, Hermes and Lensink (2013) observe that financial system reform policies aim at supporting higher economic growth as noted by other authors (Aryeetey *et al.*, 2000; Nissanke & Aryeetey, 1998). Financial reforms should thus primarily enhance or propel the activities of the real sectors of the economy in order to promote economic. Owusu and Odhiambo (2015) conclude that increase in capital stock, not financial sector policy reforms, affects economic growth in Ghana.

4.2.8 Financial Innovation and Growth

The concept of financial innovation is premised on the ability of financial intermediation institutions to apply technological and efficient market knowledge in offering finance related services. Arnaboldi and Rossignoli (2013) define financial innovation, primarily, as product and organisational innovation, which allows cost or risk reduction for the single bank and/or an improvement in the financial system as a whole. According to the Bank of International

Settlement, financial innovations can be categorised into three, namely: risk-transferring innovations; liquidity-enhancing innovations; and equity generating innovations (Mishra, 2008).

Financial innovation thus forms part of financial development and subsequently has implications for economic growth. The nature and extent of financial innovation have been suggested to have varying effect on the economy and this makes the association worth exploring. The following sub-sections present theoretical arguments on the relationship between financial innovation and economic growth.

4.2.8.1 Theoretical literature on financial innovation and economic growth

Financial innovation involves the presence and application of mechanisms that enhance the processes of intermediation in terms of savings mobilisation, identification of entrepreneurs with viable projects and the transfer of long-term funds to investors. Innovation in financial intermediation processes is important for economic growth. Laeven *et al.* (2015) observe that financial innovation has been an integral component of economic activity for several years. Michalopoulos, Laeven and Levine (2009) deduced that economies without financial innovation face a possibility to stagnate, irrespective of the initial stage of financial development.

Sustainable growth thrives through steady, consistent and relevant innovation and institutions, laws, regulations and policies that impede financial innovation slow technological change and economic growth (Laeven *et al.*, 2015). Thus the extent of financial deepening, depth and access are enhanced by consistent innovation. To this end, Laeven *et al.* (2015) indicate that financial innovation has been a driving force behind financial deepening and economic development over the past centuries.

4.2.9 Investigating the Financial Development and Economic Growth Nexus

Different approaches and techniques have been employed in examining the financial development and economic growth association. Most of the studies have gone on to investigate the relationship between financial development and economic growth using different techniques (Beck & Levine, 2004; Ghirmay, 2004; Odhiambo, 2007). The empirical investigation can be categorised into various groups depending on the focus of the studies being undertaken. Some common categorisations of the methods of empirical investigation include cross countries, time

series analysis, panel studies, and country case studies. Theories that have evolved from finance-growth nexus are supply-led, demand-pulled, no relationship and bidirectional relationship. This section of the study reviews existing literatures along these categories.

4.2.10 Methods of Investigation in Finance-Growth Nexus Studies

The nexus between financial development and economic growth has been investigated empirically by means of time series analysis, panel studies, and cross countries and country case studies. Generally these studies emphasise some essential functions of financial intermediaries in promoting economic growth. One strand of the literature argues that cost is associated with firm and market condition. Financial intermediaries search investment prospects for individual savers who may not have the ability to collect and process information on possible investment opportunities. Thus by analysing alternative investment projects, financial intermediaries reduce information costs and improve resource allocation and allocate the funds to the projects with higher expected returns (Boyd & Prescott, 1986; Greenwood & Jovanovic, 1990; King & Levine, 1993b).

A number of studies used cross-country growth regression methods in which the average growth rate of per capita output over some period is regressed on some measure of financial development and a set of control variables (De Gregorio & Guidotti, 1995; King & Levine, 1993a; King & Levine, 1993b; Levine & Zervos, 1998; Ndikumana, 2000; Shan, Morris, & Sun, 2001; Xu, 2000). Other studies have also used the time series data of individual countries to investigate the causal relationship between the two variables (Christopoulos & Tsionas, 2004; Demetriades & Hussein, 1996; Luintel & Khan, 1999; Quartey & Prah, 2008). The problems with the pure cross-country studies are well documented in the literature. In particular, the method fails to explicitly address the potential biases induced by the endogeneity of the explanatory variables and the existence of cross-country heterogeneity. These problems may lead to inconsistent and misleading estimates (Caselli, Esquivel, & Lefort, 1996).

In providing solutions to these problems, recent empirical studies have employed dynamic panel data methods, such as the first differenced generalised methods of moments (GMM), as a way of controlling for the potential sources of biased coefficient estimates in cross-country regressions (Beck *et al.*, 2000; Benhabib & Spiegel, 2000). The results of these studies provide evidence of a

strong connection between the exogenous component of financial development and long-run economic growth. This is more or less consistent with the classical view on the relationship between growth and financial development.

4.2.10.1 Cross-Country Studies

The cross-country study started by Goldsmith (1969) which shows a graphically positive association between finance and growth, has subsequently been followed by several cross-country studies. These added more countries and more variables for financial development and economic growth that were observed over longer periods. Studies with disaggregated data across industry and firm levels were also conducted. All these studies, while finding a positive association between finance and growth, do not conclude on whether finance causes growth.

Even though the bulk of empirical work using cross country data agree that financial development enhances economic growth, Demetriades and Hussein (1996) and Manning (2003) argue that these studies may not properly consider the role of country heterogeneity. Cross section finance growth nexus studies treat countries with different experiences in both economic growth and financial development in addition to different institutional characteristics as homogenous entities. Demetriades and Hussein (1996) argue that the patterns and direction of causality between financial development and economic growth vary across countries. Similarly, Ram (1999) reports huge parametric heterogeneity when the data sample is split into three sub-groups according to the growth experience, showing a negligible or negative financial development- economic growth relationship. Andersen and Tarp (2003) also report that while a positive and significant relationship is found in the full sample cross section studies, the correlation is negative for the poorest countries. Additionally, Manning (2003) claim that when dummy variables controlling for some subset of countries either according to the continent they belong to or their extraordinary growth performances are included in the analysis, the effect of financial development on economic growth disappears. Empirical evidence indicates that different causal patterns between financial development and economic growth are observed for both individual and cross country studies and empirical results are sensitive to the type of the estimator used, the sample periods and country sub-groups covered.

One of the solutions to overcome the problems associated with the cross country studies is to investigate financial development and economic growth relationship in a regional analysis framework. Valverde, Humphrey and Fernandez (2003) point out that benefit of regional perspective come from two sources. First, it appears that the heterogeneity across regions within single country is lower and more easily controlled for than across countries. Secondly, the exogenous factors of financial development that affect economic growth, such as the degree of liberalisation and the nature of the legal and institutional framework, may be more efficiently controlled at the regional level than in cross country studies. Recently, the financial development and economic growth association has been investigated in a regional framework for China (Hao, 2006) and Spain (Valverde *et al.*, 2003). The scarcity of empirical work at regional framework can be attributed to the hypothesis that financial capital is perfectly mobile among regions and thus the financial development–economic growth issue cannot have a spatial dimension. Under this assumption financial intermediaries ensure a perfect allocation of capital between firms and across the space economy leading to a perfect integrated financial market across regions within a country. However, Klagge and Martin (2005) argue that financial capital is not perfectly mobile among regions or provinces and that financial activities have a spatial dimension.

4.2.10.2 Time Series Studies

The time series approach addresses the issue of non-applicability of the findings directly to specific countries by conducting the causality test for each country, thereby allowing individual countries to exhibit their own patterns of causality (Arestis & Demetriades, 1997; Rousseau & Wachtel, 1998). Though quiet a number of studies have adopted the time series approach in the finance-growth nexus, the findings on the direction of causality are mixed, depending upon the country and the proxies used to measure financial development and economic growth. Jung (1986) used more standard indicators of output and financial development and conducted causality tests using level vector auto regressions (VAR) for 56 developed and developing countries. The study found a uni-directional causality from financial development to growth for the developing countries and the reverse causality from growth to finance in developed countries. However, the inference in a level VAR framework is considered to be problematic when the variables are not tested for stationarity and co-integration (Sims, Stock, & Watson, 1990).

Arestis and Demetriades (1997) use time series analysis and Johansen co-integration analysis for the US and Germany. For Germany, they find an effect of banking development on growth. In the US, the study found insufficient evidence to claim a growth effect of financial development, and the data point to the direction that real GDP contributes to both banking system and stock market development.

4.2.10.3 Models used in Finance-Growth Analysis

The empirical literature show that most of the studies that have examined the finance-growth association in the SSA region either employ the time series framework (Ajakaiye, Fakiyesi & Oyinlola, 2009; Akinlo & Egbetunde, 2010; Ghirmay, 2004) or the panel data framework (Beck & Levine, 2004; Beck *et al.*, 2000). Time series is more appropriate for examining the general relationship between financial development and economic growth of one country. The panel data framework is more suitable for cross-country analysis. The study adopts the time series approach as the main focus of the study to determine the impact of financial development on economic growth in Ghana for the period 1965 to 2016.

4.3 Empirical Evidence

The empirical literature section comprises a discussion the findings of studies conducted on the major conceptual issues outlined under the theoretical review. The concluding part of the empirical review indicates a discussion of the knowledge gap identified by the researcher which the study seeks to fill.

4.3.1 Financial Development and Economic Growth

To a larger extent, the empirical evidence gives a strong indication that well-developed financial system is associated with higher economic growth rates, even though the causal relationship between finance and growth is still debatable (Lawrence & Longjam, 2003). Several studies have focused on the links between financial sector development and economic growth following pioneering works by Schumpeter (1911). Subsequent studies of Goldsmith (1969) and King & Levine (1993a) have further emphasised that there is great evidence that financial development is important for growth of economies especially through investment. The financial sector has an important role to play in creating strong incentives for investment in order to increase productivity, fostering trade and business linkages in order to facilitate technology transfer and

improved resources use, thus providing broad access to assets and markets. Beck and Levine (2004) reviewed the theory and empirical findings of other researchers and concluded that the bulk of existing research suggests that countries with better functioning banks and markets grow faster since better functioning financial systems ease the external financing constraints that impede firm and industrial expansions, suggesting that this is one mechanism through which financial development matters for growth.

A good number of researches have been carried out to study the effects of financial liberalisation on financial development over the past three decades, following the McKinnon-Shaw model (McKinnon, 1973; Shaw, 1973), which concludes that while financial repression reduces the quantity and quality of aggregate investment, financial liberalisation can foster economic growth by increasing investment and its productivity (Huang, 2010). Research on the positive correlation between external financial liberalisation, especially capital account openness, and financial development is discussed in the panel data studies of Bailliu (2000) and Chinn and Ito (2006), although potential destabilising effects may also exist. Gorlach and Roux (2013) recommend the abolition of international capital market controls and restricting capital mobility arguing such a move allows countries to experience the benefits of trade liberalisation and thus, increase economic growth.

Ductor and Grechyna (2015) point out that the empirical literature characterising the role of financial development in economic growth are similar to theoretical studies and follows two history-determined general approaches: namely; optimistic (more popular during the 1990s and 2000s) and sceptical (more popular after 2000). The first approach seeks to rationalise financial innovations and financial development as necessary components of economic prosperity and sustainable economic growth. This approach developed during the decade of the rapid expansion of financial services and the financial liberalisation of the global economy. Representatives of the first approach include King and Levine (1993a), Rajan and Zingales (1998), and (Beck *et al.*, 2000). Studies that have used industry or firm level data found positive impact of financial sector development on economic growth (Morgan, 2010). The depth or deepening of the financial sector has a positive and statistically significant effect on economic growth and Zhuang *et al.*, (2009) indicate that the growth is greater for developing countries than for developed countries.

The second approach describing the role of financial development in economic growth flourished after the financial crises in 1997–1998 and 2007–2008 (Ductor & Grechyna, 2015). This approach identifies possible dangers of financial liberalisation. In particular, the after-great-crises studies cast doubt on the conclusions of the optimistic approach's representatives. Deidda and Fattouh (2002) re-estimate King and Levine's (1993a) findings by applying the threshold regression model and found support for the non-linear effect of financial development on economic growth. Manganelli and Popov (2013) show that the effect of financial development on economic growth is non-linear in the Rajan and Zingales (1998) dataset: The effect weakens for very large financial markets. Cecchetti and Kharroubi (2012) also found that financial development has an inverted U-shape effect. Ben Gamra (2009) shows that partial financial liberalisation has a stronger positive effect on economic growth than full liberalisation in a sample of East Asian economies. Owen and Temesvary (2014) found that the impact of different types of bank lending on economic growth depends on the level of development of the country's banking sector.

Kaminsky and Reinhart (1999) and Ayadi, Arbak, Naceur and De Groen (2015) suggest a possible negative channel of financial development effect on economic growth through triggering financial instability. Loayza and Ranciere (2005) found evidence for the coexistence of a positive relationship between financial intermediation and output in the long-run and a negative short-run relationship due to financial instability. Rousseau and Wachtel (2011) argue that the positive effect of financial deepening weakens over time regardless of a country's level of development. Beck, Degryse and Kneer (2014) reconsider findings of Beck *et al.* (2000) and Levine et al. (2000). The authors suggest that a larger financial sector increases growth and reduces volatility over the long run, while stimulating growth at the cost of higher volatility over short-term horizons. Arcand *et al.* (2012) found similar results using several estimation techniques and controlling for the endogeneity of financial development. Ayadi *et al.* (2015) found that credit to the private sector and bank deposits are negatively associated with growth, whilst stock market size and liquidity were important in the growth of northern and southern Mediterranean countries for the period 1985 to 2009.

Calderón and Liu (2003) suggest that financial deepening contributes more to growth in developing countries than in industrial countries and shows that financial development leads to economic growth indicating the existence of a bi-directional Granger causality. A similar result is found by Masten, Coricelli and Masten (2008) who analyse a sample of European countries and show that less developed countries gain more from financial development. Rioja and Valev (2004) found that financial development has a strong and positive effect on economic growth only for countries with intermediate levels of development. Ang (2011) proposes empirical evidence suggesting that financial liberalisation can slow technological progress due to the reallocation of talent from the innovative sector to the financial sector.

Roux and Moyo (2015) investigated the relationship between financial liberalisation and economic growth in 15 SADC countries by applying fixed effect model, generalised method of moments (GMM) and the fully-modified OLS (FMOLS) cointegration test to annual data for the period 1985-2011. The results revealed that there is a positive relationship between financial liberalisation and economic growth in SADC but there is no long-run relationship between the two variables. The study suggested that the relationship between financial liberalisation, which is a key indicator of financial development, and economic growth is a short-run phenomenon.

Ductor and Grechyna (2015) evaluated the interdependence between financial development and real sector output and the effect on economic growth. Using panel data for 101 developed and developing countries over the period 1970 to 2010, the authors show that the effect of financial development on economic growth depends on the growth of private credit relative to the real output growth. The findings further suggest that the effect of financial development on growth becomes negative, if there is rapid growth in private credit not accompanied by growth in real output. The study concluded that there is empirical evidence that supports the theories that postulate the existence of an optimal level of financial development given by the characteristics of an economy.

Previous studies, such as Ahmad and Malik, 2009; Becker and Sivadasan (2006); Brafu-Insaidoo and Biekpe (2011), have focused on the use of cross-country data to establish the relationship between the financial sector and economic growth. Levine (2004) reviewed the theory and

empirical findings of other researchers and concluded that the bulk of existing research suggests that countries with better functioning banks and markets grow faster since better functioning financial systems ease the external financing constraints that impede firm and industrial expansions, suggesting that this is one mechanism through which financial development matters for growth.

Levine (1997) suggests that the initial level of financial development is a good predictor of subsequent rates of economic growth, physical capital accumulation, and economic efficiency improvements. Beck *et al.* (2000) evaluated the empirical relation between the level of financial intermediary development and (i) economic growth, (ii) total factor productivity growth, (iii) physical capital accumulation, and (iv) private savings rates. The study found that (1) financial intermediaries exert a large, positive impact on total factor productivity growth, which feeds through to overall GDP growth and (2) the long-run links between financial intermediary development and both physical capital growth and private savings rates are tenuous.

Carlin and Mayer (2003) used the OECD countries as a sample to examine the empirical relationship between financial structure and industrial growth and found that the difference in financial structure has an impact on the real economy by affecting growth and investments of different industries. Using sectoral data, Braun and Larrain (2005), Larrain (2006) and Raddatz (2006) show empirically that financial development lowers output volatility in manufacturing industries with high external dependence and liquidity needs. This conclusion is, however, contrary to the findings of Levchenko, Ranciere and Thoenig (2009) who show that financial liberalisation increases volatility, especially in financially vulnerable sectors.

Naceur *et al.* (2017) examined how financial development affects the sources of growth—productivity and investment—using a sample of 145 countries for the period 1960-2011. The study in analysing financial depth also captured access, efficiency, stability, and openness dimensions of financial development and observed that financial development does not appear to be a magic bullet for economic growth. The study contradicts earlier findings of an unambiguously positive relationship between financial development, investment, and productivity and asserts that the relationship is more complex. The study thus concludes that the

influence of the different dimensions of financial development on the sources of growth varies across income levels and regions.

Bist (2018) investigated the long-run relationship between financial development and economic growth using panel unit root and panel cointegration analysis in 16 selected low-income countries for the period from 1995 to 2014. The cointegration analysis showed that there exists a long-run cointegrating relationship between financial development and economic growth. The long-run panel estimates indicate that financial development has a positive and significant impact on economic growth. Additionally, time-series analysis on single country basis indicated that financial development has a positive impact on economic growth in majority of the countries.

Another study by Yartey and Komla (2007) examined the economic importance of stock markets in Africa. The results indicated that the stock markets have contributed to the financing of the growth of large corporations in certain SSA countries. The study adopted an econometric investigation technique to assess the impact of stock markets on growth in selected African countries, and found inconclusive evidence even though stock market value traded seem to be positively and significantly associated with growth. The study suggested that African stock exchanges now face the challenge of integration and need better technical and institutional development to address the problem of low liquidity. The study recommended preconditions for successful regional approaches including the harmonisation of legislations such as bankruptcy and accounting laws and a liberalised trade regime. The study, additionally, recommended that steps which improve the legal and accounting framework, enhance private sector credit evaluation capabilities, and strengthen public sector regulatory oversight would also be beneficial.

Cantore *et al.* (2014) indicate that whereas intensive industrialisation refers to an increase of manufacturing value added based on drivers that strengthen manufacturing industries (in terms of productivity and structural change), extensive industrialisation is an increase of manufacturing value added based on a driver (total employment) that does not promote a transition in which the manufacturing sector assumes a leading role. The authors concluded that intensive rather than

extensive industrialisation enhances economic growth and that not every dollar for additional industrialisation matters for development.

4.3.2 Empirical Studies on Sub-Saharan Africa

The financial development and economic growth nexus has received an extensive attention in Africa (Abu-Bader & Abu-Qarn, 2008; Agbetsiafa, 2004; Akinlo & Egbetunde, 2010; Ghirmay, 2004; Kakilli-Acaravci *et al.*, 2009; Odhiambo, 2007; Owusu & Odhiambo, 2015). Agbetsiafe (2004) finds causality running from financial development to economic growth in all the seven African countries investigated. The results by Ghirmay (2004) provided evidence in support of finance-led growth in eight out of the thirteen sub-Saharan countries examined. Abu-Bader and Abu Qarn (2008) also using data from Egypt, Morocco and Tunisia obtained results which support the long-run relationship from finance to economic growth. Akinlo and Egbetunde (2010) using data from ten countries, found out that financial development causes economic growth in four countries while economic growth causes financial development in one of the countries. However, the study indicated that a bi-directional relationship exists between financial development and economic growth was found in five countries. Kakilli-Acaravci *et al.* (2009) used panel data from 24 sub-Saharan African countries from 1975 to 2005 to examine the relationship between financial development and economic growth. Their results indicate no long-run association between these two variables when subjecting it to panel co-integration analysis. Their empirical results show a bidirectional causal relationship between economic growth and the financial depth indicator of domestic credit provided by the banking sector. Ayub (2012) investigated the association between financial development and economic growth in South Africa for the period 1963 to 2008, using five indicators to measure the relationship under Vector Auto-regression (VAR) and Vector Error Correction Model (VECM) techniques, and concluded that, there exists a bi-direction causality between economic growth and financial development. The findings were in line with the views put forward by other researches; Adu *et al.* (2013) that a result from causality is independent of the choice of indicators used.

Akinboade (1998) also examined the relationship between financial development and economic growth in Botswana. Two indicators were used to examine Granger causality between real per capita income and financial development. An error-correction method was 38 adopted following the tests for unit roots and co-integration. The study suggests that per capita income in Botswana

and the financial development indicators cause one another, supporting the view the bi-directional hypothesis view that economic growth causes and is caused by financial development in Botswana. Agbetsiafa (2004) found that each of the financial development indicators and economic growth are integrated at the first order. The co-integration test results show that financial development and economic growth are linked in the long-run in seven of the eight countries in the sample. Causality tests indicate a preponderance of uni-directional causality from finance to growth in six of the countries.

Odhiambo (2008) examine the dynamic causal relationship between financial depth and economic growth in Kenya by including savings as an intermitting variable – thereby creating a simple tri-variate causality model. Using the co-integration and error-correction techniques, the empirical results of this study reveal that there is a distinct uni-directional causal flow from economic growth to financial development. The results also reveal that economic growth causes savings, while savings drive the development of the financial sector in Kenya. The study, therefore, warns that any argument that financial development unambiguously leads to economic growth should be treated with extreme caution. Odhiambo (2010), using co-integration and error-correction models, found strong support for the positive impact of interest rate reforms on financial development in South Africa. The study also found that financial development, which results from interest rate reforms, did not Granger cause investment and economic growth.

Enisan and Olufisayo (2009) examined the long-run and causal relationships between stock market development and economic growth for seven countries in sub-Saharan Africa. Using the autoregressive distributed lag bounds test, the study found that stock market development is co-integrated with economic growth in Egypt and South Africa. The study suggested that stock market development has a significant positive long-run impact on economic growth. The Granger causality test based on a vector ECM further shows that stock market development causes economic growth in Egypt and South Africa. However, the Granger causality in the context of VAR shows evidence of a bi-directional relationship between stock market development and economic growth for Cote d'Ivoire, Kenya, Morocco and Zimbabwe. In Nigeria, there is weak evidence of growth-led finance using market size as the indicator of stock market development.

Baliamoune-Lutz (2013) analysed the relationship between financial system development and economic development. Using cointegration and vector autoregressive estimations on annual data from Africa, the study examined the nature of the relationship between financial development and income. The study found mixed results on both the short- and the long-run relationships between the two variables. Further, the study found that finance causes income, and income also causes finance, indicating bi-directional causality. The results additionally indicated that neither the short-run effects nor the long-run relationship seem to linearly depend on the level of financial development or the stage of development.

Further, David, Mlachila and Moheeput (2014) analysed the links between financial and trade openness and financial development in Sub-Saharan African (SSA) countries using panel dataset. The study observed that trade openness is more important for financial development in countries with better institutional quality. David *et al.* (2014) suggest that factors such as distortions in domestic financial markets, relatively weak institutions and/or poor financial sector supervision can lead to insignificant associations between financial development and growth. The study recommends that policy makers in Africa should be cautious about expectations regarding immediate gains for financial development from greater international integration, since such gains are more likely to occur through indirect channels.

4.3.3 Empirical Literature on Ghana

Like other part of the world, Ghana is not left out on the research on the nexus between financial development and economic growth. Various researches have contributed to the literature on financial development and economic growth, some of which are necessary for reviewing.

A study by Quartey (2005) sought to primarily investigate the interrelationship between financial sector development and poverty reduction in Ghana using time-series data from the from 1970-2001. The findings indicate that, first, even though financial sector development does not Granger-cause savings mobilisation in Ghana, it induces poverty reduction; and second, that savings do Granger-cause poverty reduction in Ghana. The results showed that the effect of financial sector development on poverty reduction is positive but insignificant. This the author contends that it is due to the fact that financial intermediaries in Ghana have not adequately

channelled savings to the pro-poor sectors of the economy because of government deficit financing, high default rate, lack of collateral and lack of proper business proposals. The study observed that a long-run cointegration relationship exists between financial sector development and poverty reduction.

Quartey and Prah (2008) conducted a study to find out whether financial development in Ghana conformed to either the supply-leading, demand-following or Patrick‘s Stages of development hypotheses. A bi-variate vector auto-regression (VAR) model was estimated in four scenarios, after which Granger-causality test, Impulse Response Function and Variance Decomposition analyses were conducted for each respective scenario of the VAR. The study found some evidence in support of demand following hypothesis, when growth of broad money to GDP ratio is used as a measure of financial development, there is no significant evidence to support either the supply-leading or demand-following hypothesis when growth in domestic credit ratio are used as proxies for financial development. Also, in all the four scenarios, there the study indicated no statistical evidence to support Patrick‘s Stages of development hypothesis in Ghana. The authors concluded that, Patrick‘s Stages of development hypothesis cannot be tested in Ghana.

Esso (2010) conducted a research on the co-integrating and causal relationship between financial development and economic growth in ECOWAS countries using the ratio of credit of private sector to gross domestic product (GDP) indicator. The study used data from the World Bank for the period 1960 to 2005, Ghana has a positive long-run relationship between financial development and economic growth. The study concluded that financial development leads to economic growth in Ghana and further contended that the relationship could not be universal across countries because the results are country-specific.

Frimpong and Adam (2010) conducted a study to examine if financial sector development causes investment and growth. The researchers used credit to private sector as a per cent of GDP, bank liquid reserve to asset ratio and liquid liability as a per cent of GDP to proxy for financial sector development. Using cointegration approach, the study found the existence of stable long-run relationship between growth rate and financial sector development proxies used.

Again in Ghana, Adu *et al.* (2013) investigated the long-run effects of financial development on economic growth in Ghana. The researchers, using the autoregressive distributed lag model (ARDL) to analyse four indicators to measure financial development and economic growth. The study concluded that both the credit to the private sector as ratios to GDP and total domestic credit are conducive for growth, while broad money stock to GDP ratio is not growth-inducing. The broad money supply to GDP ratio rather showed a negative effect with the Supply – Leading Phenomenon but confirmed the Demand-Following Phenomenon. Their finding also indicates that expansionary fiscal and monetary policies resulting in excess money supply could be inimical to growth. Adusei (2013) conducted an investigation into the relationship between economic growth and financial development in Ghana using time-series data from the period 1971-2010. In analysing the nexus between economic growth and financial growth, the author used the Fully Modified Ordinary Least Squares (FMOLS) and Error Correction Method (ECM) techniques to conclude that using the domestic credit to GDP ratio and the broad money supply as a ratio of GDP hampered economic growth in both long run and short run. The author employed three measures of financial development: domestic credit as a share of GDP; domestic credit to private sector as a share of GDP and broad money supply as a share of GDP. Consequently, Adu *et al.* (2013) suggest that the growth effect of financial development is sensitive to the choice of proxy.

Kwarteng (2015) also examined the causal relationship between financial development and economic growth in Ghana using time series econometric procedures by employing four proxies of financial development and applying Granger causality test, Cointegration and Vector Error Correction Model (VECM). The study found a uni-directional relationship between financial development and economic growth but observed that the issue as to whether finance follows in the direction of economic growth or lead to economic growth depends on the proxy of financial development as suggested by other studies (Adu *et al.*, 2013; Bara, 2017). The study further concluded that a positive long run relationship between financial development and economic growth in Ghana.

Ofori-Abebrese, Pickson and Diabah (2017) further applied ARDL approach and Granger causality test to investigate the relationship and the causal direction between financial development and economic growth in Ghana for the period 1970-2013. The study showed that the amount of credit from domestic sources to the private sector maintained a positively significant nexus with the growth of the economy whereas the domestic deposit was not the case. The study thus concluded that there is a dependence of the Ghanaian economy on changes in domestic credit to private sector whilst a uni-directional causality runs from the variations in economic growth to the domestic deposit in Ghana.

Eshun *et al.* (2014) examined the financial determinants of private investment in Ghana, using annual time series data from 1970 to 2010. Based on the autoregressive distributed lag (ARDL) bounds testing procedure to cointegration, the paper finds existence of cointegration among the variables. The study found that credit to the private sector has a positive and statistically significant effect on private investment in Ghana.

4.3.4 Financial Reforms and the Finance-Growth Association

Studies on the impact of financial reforms on economic growth also show mixed results. Misati and Nyamongo (2012) recognised the growth reducing effects of financial liberalisation dominance and advocates for the need for institutional reform measures and management of financial openness for SSA countries. Regarding financial liberalisation, Moyo *et al.*, (2014) notes that the bank based nature of the financial systems in the SSA makes the region vulnerable to systemic bank failures and this could have a contagious effect on their economies. Most of the countries in the SSA region embarked structural and financial reforms in the early 1980s and the late 1990s and financial liberalisation featured prominently and this has been attributed an enhancement of the financial sector in the region (Bawumia, 2010; Buchs & Mathisen, 2008; Nissanke & Aryeetey, 1998). This thus support the position that financial liberalisation promote economic growth (Gorlach & Roux, 2013; McKinnon, 1973; Roux & Moyo, 2015; Shaw, 1973). Berthélemy and Varoudakis (1995) explored the relationship between financial liberalisation and economic growth and concluded that financial factors such as interest rate liberalisation could lead to high or low economic growth outcomes. Levine and Zervos (1999) used cross-sectional data from 47 countries for the period from 1976 to 1993 to investigate the impact of stock market

activity on economic growth, capital stock growth, productivity growth, and the private savings rate. The study found a strong positive relationship between stock market liquidity and real GDP growth, capital stock growth and productivity growth. Adu *et al.* (2013) investigated the long-run growth effects of financial development in Ghana confirmed that the impact of financial development on economic growth in Ghana depends on the indicator used to proxy financial development.

Owusu and Odhiambo (2015) examined the relationship between financial sector reforms and sustainable economic growth in Ghana. The study found that in the long run, financial sector reforms have an insignificant impact on economic growth in Ghana. The paper concluded that increase in capital stock, not financial sector policy reforms, affects economic growth in Ghana. The realisation of mixed empirical evidence shows that there is inconclusive position on the effects of financial reforms on economic growth.

4.4 The Knowledge Gap

The literature review examined the conceptual, theoretical issues and empirical findings on the finance-growth association. The researcher observed that there is knowledge gap and the study intends to contribute to filling the opening as explained below.

Cross-country studies that have been carried out have concentrated on the regional level analysis and ignore the heterogeneity and country-specific differences, in terms of financial development and growth in the SSA. These studies do not reveal the characteristics and dynamics of financial development and growth of the individual countries. However, for regions such as the SSA, where there is substantial differences in the levels of financial development and economic growth though the region has witnessed mostly common policy directions. The study aims to add to the body of studies that focus on specific developments within a specific country by focusing the effect of financial developments on the sources of growth and ultimately economic growth in Ghana.

There are limited studies on the role and impact of economic and financial reforms on growth of the real sectors of the individual countries of the SSA region as noted earlier. An empirical examination of the causality hypothesis for Ghana and the emerging nature of the finance-growth

relationship post reforms and effects of financial developments on the real sector contribute new knowledge to the finance-growth nexus.

Some studies (Adu *et al.*, 2013; Adusei, 2013; Ofori-Abebrese *et al.*, 2017) have examined the finance-growth association in Ghana. Capital accumulation and industrial sector advancement have been identified as important sources of growth (Beck *et al.*, 2000; Levine, 1997; Naceur *et al.*, 2017). To the researcher's knowledge, no study has contextualised the impact of financial development on capital accumulation, industrial sector growth in Ghana, in spite of the interconnectedness of finance and real sector components of economic growth. This knowledge deficiency can be overcome through empirical estimations, which the study intends to do.

This thesis contributes to the empirical literature on the long-run association between finance on one hand and industry growth on the other with time series data from Ghana. The study thus adds to the empirics on relationship between finance and growth in terms of real sector development in Ghana.

4.5 Chapter Summary

This chapter provided a review of the available theoretical and empirical literature on financial development and economic growth. The literature indicated that the studies on finance and economic growth have been undertaken over long period ago. The various studies point out that there is a relationship between financial system improvements and economic growth. Finance affects the economy by causing improvements in capital investments in the real sector based on theories of endogenous growth models. Specifically, the review highlighted the foundational basis for the studies on finance and growth, the role of finance in the economy, the direction of causality between finance and growth and the associated criticisms, existence of optimal thresholds and stability positions for finance, methods and approaches for examining the finance-growth nexus and concluded with empirical evidence as contained in past researches on the finance-growth association.

This chapter highlighted the determinants of financial development based on widely used indicators within the financial systems of economies. The literature points to the following factors as determining the state of financial development including: liquid liabilities and deposits

(savings); private, bank and non-banking financial assets; net interest margin and overhead costs; stock market capitalisation and associated stock trading ratios; political, geographical and other macro-economic conditions; among others. The variables that have been widely used in empirical studies include private credit, broad money supply total and size of financial sector credit.

The literature also shows that the beyond a certain threshold too much financial development lead to sub-optimal growth of the economy. Some studies pointed to the fact the at inefficiencies can lead to declining growth though the financial system could be well-endowed in terms of size or deepening. This underlines the need to the need to assess routinely assess whether financial developments are augmenting the components of growth or otherwise. This assessment would enable managers of the economy to establish strategies and policies for ensuring optimal benefits of improvements in financial innovations.

The literature revealed that financial development has an impact on economic growth and enhances the sources of growth through increased financial intermediation services to firms and entrepreneurs. The literature on the direction of causality of the finance-growth nexus indicate divergent positions as to whether finance causes growth or vice versa; or otherwise. The literature makes mention of four main hypotheses on the direction of causality as supply-leading, demand-following, bi-directional and irrelevance hypothesis. While literature has largely supported the argument that financial development leads to growth, others authors critique that finance does not lead to growth and the debate is still on-going. Various studies have used different methods and approaches in examining the impact and association between financial development and economic growth. While the majority have focused on cross-country studies, there is currently growing literature that focus on country-specific studies.

The literature indicates that as a result of the propositions that financial development is good for growth, most countries have embarked on financial research reforms aimed at improving the financial sector of the economy. The reforms were mostly targeted at liberalising the financial sector from what had been described repressive financial system that had emanated from specific policies. The financial repression was deemed as a major source of weakening and collapsing

financial sectors, which in turn hampered economic growth. Since these propositions many developing countries, especially in the SSA region, have made attempts to structure their economies through reforms and strategic policies to make the financial sector a revolving instrument for growth. The overall impact of failed financial sector policies in the SSA region have been has been well documented.

While the study acknowledges the relevance of reviewing existing theories and concepts, their associations and the results of empirical studies, it is imperative to detail the fundamental empirical estimations and methods employed. The next chapter thus critically reviews the literature existing research methodologies for analysing the key concepts and associations outlined in Chapter One. The review provides a range of methodological strategies that have been used in the study. After appraising the theoretical models, the chapter develops the empirical concepts and estimation approaches employed for addressing each of the issues under investigation in this study.

CHAPTER FIVE

DATA AND RESEARCH METHODOLOGY

5.1 Introduction

This chapter discusses the methodology for the study as well as a description of the data used and estimation techniques. The analysis is based on Ghana's economic growth and financial development data for the period 1965 to 2016. The methodology revolves around assessing the impact of indicators of financial development on economic growth and particularly, the industrial sector in Ghana. The analysis is in line with the theoretical propositions on how financial development affects the growth of the economy, particularly, the real sectors or the components of growth. The study also draws from other studies on finance-growth perspectives (Beck *et al.*, 2000; Levine, 2005; Naceur *et al.*, 2017). Accordingly, the study investigates the association between Ghana's economic growth and financial sector developments. Given that finance is good for economic growth and against the background that financial reforms have been implemented in Ghana since the late 1980s upon recommendations from the World Bank and the IMF that financial reforms could lead to economic growth of countries of the SSA region.

The assessment of the impact of financial development on economic growth is undertaken to take into account the developments in Ghana's economy after what has been termed as extensive financial sector reforms. Against the notion that stable and improved financial intermediation within an economy provide good grounds for the growth of the real sectors of the economy, the study focuses on using various statistical estimations to find out the impact financial development on Ghana's economic growth and its components. The methodology for the study is based on the concept that finance is an important tool for economic growth and positively affects the economy through the channels of capital accumulation and industry growth. The concept of growth maximising financial development threshold and long-run stable growth levels as suggested by Arcand *et al.* (2012).

The chapter thus present a review of literature on methodologies that have been employed by previous studies and further outline empirical models and estimation techniques used in this

current study. The review provides arguments in support as well as criticisms of the various estimation models and methodologies.

The rest of the chapter is organised as follows. Section 5.2 provides the methodological approach and financial development indicators used in the study. The subsequent sections provide the derivation of the model, the estimation techniques, data sources, definition and justification of variables used in the study.

5.2 Methodological Approach

The analysis of the impact of financial development on economic growth is based on time series data on financial sector development indicators and relevant macro-economic and economic growth variables. The methodology derives from approaches used in other previous studies that have examined the finance-growth association (Adu *et al.*, 2013; Arcand *et al.*, 2012; Beck *et al.*, 2000; Ductor & Grechyna, 2015; Huang, 2010; King & Levine, 1993b, 1993a, Levine, 1997, 2004; Loayza & Ranciere, 2005; Naceur *et al.*, 2017; Ofori-Abebrese *et al.*, 2017; Quartey, 2005; UNCTAD & UNIDO, 2011). These approaches are useful in determining the finance-growth nexus and as such thus provide the necessary condition for examining the impact of financial development on real sectors of the economy. The analysis also assesses the link between capital accumulation, industrial sector and financial development to determine the extent to which financial developments in Ghana have affected economic growth. Fundamentally, the methodological approach is theoretically premised on the pioneering proposition of Schumpeter (1911), and subsequently McKinnon (1973) and Shaw (1973). The thesis further follows a deductive approach, starting with a review of existing theoretical and empirical literature, mainly derived from the theory of endogenous growth model of Solow (1956).

The analysis starts with examining the theoretical and empirical foundations of financial development and growth. The analyses in Chapters Six, Seven and Eight are undertaken to determine the major financial drivers of capital accumulation, industrial sector advancement, manufacturing productivity and economic growth. These factors are financial and macro-economic in nature. The analysis of the impact of the financial development on capital accumulation, industrial output growth, manufacturing productivity and economic growth are

estimated using the linear regression estimation techniques within the GMM estimation technique. The study examined the short-run and long-run impacts of financial development on economic growth indicators by employing the Vector Autoregressive Regression (VAR) within the Autoregressive Distributed Lag (ARDL) approach. The study further assesses the direction of causality between financial development and economic growth indicators using the Engle-Granger causality testing approach with VAR models.

The reaction of economic growth and the real sector, particularly industrial and manufacturing, to shocks in financial development indicators and other macro-economic variables is also analysed using the Bayesian Vector Auto Regression (BVAR) methodology. The Bayesian Vector Auto Regression (BVAR) model is applied to examine the reaction of economic growth and its components to variations in the financial development indicators and to assess the sensitivity of economic growth to financial development and macro-economic shocks. The analysis indicates the stimulation of an economic reaction function for Ghana. The results are expressed in terms of impulse response functions and variance decomposition. In view of the fact that economic decision is determined by monetary or regulatory policy, the response of economic policy to changes in economic growth is also analysed, within the context of financial sector developments in Ghana. This is achieved by estimating the economic reaction function, with lagged financial development indicators and output gap as the explanatory variables.

This analysis entails simulating economic, capital accumulation and industrial value-added reaction functions for Ghana. The results are expressed in terms of impulse response functions and variance decomposition. Given that the performance of the economy and improvement in investment and industrial value-added are based are influenced by changes in macro-economic and general economic environment, the response of growth indicators to variations in macro-economic indicators is also analysed.

The maximising behaviour and optimal financial development thresholds were estimated from a joint analysis of the growth indicators and macro-economic variables that affect the depth of financial development and the reaction of economic policy to changes in financial sector.

5.3 Empirical Model Estimation of the Impact of Financial Development on Growth

The empirical model for examining the impact of financial development indicators on economic growth variables involves three main techniques. The study employs the two stage least squares regression estimation to determine the impact of financial development using a baseline equation. For robustness checks, the study uses the financial development indices created from the Principal Component Analysis (PCA) to check the overall impact of the financial development indicators on growth. Additionally, the estimates the model GMM technique and by adding monetary policy rate, inflation rate and government spending put the analysis within the context of a macro-economic environment.

5.3.1 Baseline Equation Estimation for Finance-Growth Framework

The empirical model for examining the impact of financial development indicators on economic growth variables is derived from the growth dynamics equation. The specification of the baseline equation is based on the endogenous growth model approach (Solow, 1956), theoretical literature and follows regression models used in other studies (Beck *et al.*, 2000; Binh, Park, & Shin, 2005; Choong, Baharumshah, Yusop, & Habibullah, 2010; Levine, 2005; Naceur *et al.*, 2017). Accordingly, the baseline equation is formulated as shown in equation (5.1).

$$\boldsymbol{G_{i,t} = \alpha + \delta Y_{t-1} + \beta FD_t + \gamma' X_t + \varepsilon_t} \quad (5.1)$$

Where G_{it} is the measure of either the level of growth of capital accumulation, industrial sector advancement, manufacturing productivity or economic growth. Capital accumulation, industrial sector advancement and manufacturing productivity serve as the components of economic growth and are considered as sources of growth. Y_{t-1} represents the initial real per capita GDP and serves as a measure of the tendency for growth rates to converge over time, FD_t represents proxies for financial development and are either domestic credit to private sector/GDP, total domestic credit provided the financial sector/GDP, broad money supply/GDP or the overall financial sector deposits/GDP. In the robustness checks, FD_t also equals to the financial development index generated by the Principal Component Analysis (PCA) procedure. X_t represents a vector of other factors associated with economic growth and serve as control variables in the models. The control variables include the following initial per capita GDP, the trade-to-GDP ratio, gross capital formation, industrial value-added/GDP, government

expenditure to GDP, growth in labour force (proxied by annual population growth) and output gap. ε_t is the time-varying error term, and i and t represent the specific growth component measure and time period, respectively. α, δ, β, γ' and σ are the coefficients of the constant, initial per capita GDP, financial development indicator and state of financial sector reforms, respectively. β is the coefficient of interest and measures the impact of financial development indicators on each respective component of economic growth.

The control variables considered in this model include the output gap. The output gap is included to capture the effects of aggregate demand on economic growth measures. A large output gap can impact on a country's finances and economic policy reactions, mainly through higher incidence of unemployment. The World Bank (2012) has indicated that modern financial systems with limited liability encourage risk-taking incentives in financial institutions, and these incentives can be exacerbated by badly designed regulations and safety nets.

- ***Model With Structural Adjustment and Financial Reforms***

Quite a number of the countries in the SSA region introduced structural adjustment policies and particularly financial sector reforms. Ghana implemented structural adjustment policies in the early 1980s and financial sector reforms became a significant part of the structural reforms in the late 1980s. The financial reforms aimed to promote economic growth through the implementation of financial liberalisation policies.

The objective for the implementation of the financial reforms was that financial liberalisation promotes financial development through the removal of credit restrictions and interest rate controls, increasing access to credit in a more competitive financial market and broadening the range of financial intermediation institutions.

The expectation is thus that the enhanced financial development would have a positive effect on growth. Equation (5.1) is a time series model used to examine the impact of financial development on growth. To capture the effects of the structural adjustment and financial reforms a dummy variable was introduced. The estimated model that captures the effect structural adjustment and financial development on economic growth in Ghana becomes:

$$G_{it} = \alpha + \delta Y_{t-1} + \beta FD_t + \gamma' X_t + \sigma FR_t + \varepsilon_t \quad (5.2)$$

$$G_{it} = \alpha + \delta Y_{t-1} + \beta FD_t + \gamma' X_t + \sigma SR_t + \varepsilon_t \quad (5.3)$$

Where, FR_t represents the financial reforms dummy to account for the state of financial development induced by financial reforms. The financial reform dummy was assigned the value of 1 for the period after 1990 up to 2016 and 0 for earlier periods. SR_t is a dummy variable for dummy and caters for the structural breaks that caused the implementation of extensive economic and financial reforms in Ghana from 1984 towards the late 1980s. The structural reform dummy was assigned the value of 1 for the period after 1984 up to 2016 and 0 for earlier periods. The Chow breakpoint test (Chow, 1960) is applied to test the existence of structural break in the data. Equation 5.1 is applied both with and without structural breaks. The structural break period is 1965—1984 and the without structural break period is 1984-2016. The literature on financial reforms in Ghana suggests that the Pre-FINSAP era is considered as a period when Ghana's financial sector was not developed. The post-FINSAP era represents a period when Ghana's financial sector is perceived as developed. The study adopts the two groups to represent the level of financial development.

5.3.2 Generalised Methods of Movements (GMM) Estimations

To ensure the robust estimations, the study adopts the Generalised Method of Movements (GMM) estimation technique to estimate the dynamic panel models to examine the associations between the financial development indicators and the respective components of growth. The estimation of linear regression models containing heteroskedastic error of unknown functional form is one of the critical problems encountered in the econometric literature (Choong *et al.*, 2010). The form of the heteroskedasticity, however, is unknown empirically and ignorance of the problem in the estimations (such as estimated generalised least squares – EGLS) and according to Roy (2002), this would lead to inefficient estimators, which in turn can lead to erroneous inferences. The issue has been widely discussed in the context of both time series and cross-sectional studies (see Choong *et al.*, 2010). To address this econometric problems, the study follows (Choong *et al.*, 2010; Ductor & Grechyna, 2015) and used the recently developed

dynamic panel generalised method of moments (GMM) technique to estimate the regressions and achieve the stated objectives. Accordingly, the time series model equations 5.1, 5.2 and 5.3 are re-written using the first difference as suggested by Arellano and Bond (1991) and Blundell and Bond (1998) and the growth equation transforms into the following equation:

$$\Delta G_{it} = \alpha + \delta \Delta Y_{t-1} + \beta \Delta FD_t + \gamma' \Delta X_t + \Delta \varepsilon_t \quad (5.4)$$

This specification assumes homogeneity of the parameters for the years under examination. Ductor and Grechyna (2015) observe that the effect of financial development on economic growth is likely to be time and state dependent. Arellano and Bond (1991) point out that there is a strong autoregressive structure in the residual term. Choong *et al.* (2010) note that existence of strong autoregressive structure may not be surprising because when the model estimation uses annual data, business-cycle effects may spread over several years. To address this limitation, these business-cycle effects can be taken into account by assuming $\mu_t = \rho \mu_{t-1} + \varepsilon_t$, where $|\rho| < 1$, and ε_t is a white noise disturbance term.

$$G_{it} = (1 - \alpha + \rho) G_{it} - + \rho(1 - \alpha) Y_{t-2} + FD_t \beta - \rho FD_{t-1} \beta + X_t \gamma' - \rho X_{t-1} + \varepsilon_t \quad (5.5)$$

First differences are required in order to eliminate the country-specific effects. From Equation (5.5), the lagged difference in per capita GDP is correlated with the disturbance term and this may produce an endogeneity of the explanatory variables, X_t. Caselli *et al.* (1996) found that a number of studies have neglected the consistency problems that arise from the simultaneous presence of the country-specific effect and the lagged dependent variable or any regressor that correlated with the country-specific effect. This would be the case if Equation (5.5) was estimated using fixed or random effect models. Besides, Blundell and Bond (1998) argue that persistence in the explanatory variables may adversely affect the small sample and asymptotic properties of the difference estimator. To overcome this problem, the difference estimator further combined with an estimator in levels to produce a system estimator.

The inclusion of instrumental variables in the estimation is required in addressing this econometric problem. Specifically, Arellano and Bond (1991) proposed some steps to overcome the problem. The first step is to eliminate the time effect, ***f*** by subtracting from each variable its cross average in period **t**. Secondly, the variables should be transformed into first differences to eliminate the individual effect as follows:

$$\Delta G_{i,t} = (1 - \alpha + \rho)\Delta G_{i,t-1} - +\rho(1 - \alpha)\Delta Y_{t-2} + \Delta FD_t\beta - \rho\Delta FD_{t-1}\beta + \Delta X_t\gamma' - \rho\Delta X_{t-1}\gamma' + \Delta\varepsilon_t \quad (5.6)$$

Arellano and Bond (1991) essentially proposed estimating Equation (5.6) with GMM using lagged levels of the endogenous variables as instruments. Nonetheless, the selection of instruments is important. The GMM difference estimator uses the lagged levels of the explanatory variables as instruments under the condition that the disturbance term is not serially correlated and that the levels of the explanatory variables are weakly exogenous implying that they are uncorrelated with future error terms. If the condition that the explanatory variables are weakly exogenous failed to hold, which is more likely to happen in the present context as the higher economic growth may promote more financial development, both FD_t and FD_{t-1} are correlated with the disturbance term in Equation (5.6). Thus only levels of variables lagged two (2) years or more may be used as instruments. Accordingly, the following moment conditions are used to calculate the difference estimator:

$$E\left[G_{i,t-s}(\varepsilon_t - \varepsilon_{t-1})\right] = 0 \text{ for } s \geq 2,\ t = 3, \dots, T \quad (5.7)$$

$$E[X_{t-s}(\varepsilon_t - \varepsilon_{t-1})] = 0 \text{ for } s \geq 2,\ t = 3, \dots, T \quad (5.8)$$

This is necessary for the estimation as the equation in levels uses the lagged differences of the explanatory variables as instruments under two conditions. First, the error term is not serially correlated. Second, although there may be correlations between the levels of the explanatory variables and the country-specific or time-specific error term, there is no correlation between the difference in the explanatory variables and the error term. This yields the following stationarity properties:

$$E\left[G_{i,t+\rho}\eta_i\right] = E\left[G_{i,t+q}\eta_i\right] \text{ and } E\left[X_{t+\rho}\eta_i\right] = E\left[X_{t+q}\eta_i\right] \quad \text{for all } \rho \text{ and } q \tag{5.9}$$

The additional conditions for the regression in levels are as follows:

$$E\left[(G_{t-s} - G_{t-s-1})(\eta_i + \varepsilon_t)\right] = 0 \text{ for } s = 1 \tag{5.10}$$

$$E\left[(X_{t-s} - X_{t-s-1})(\eta_i + \varepsilon_t)\right] = 0 \text{ for } s = 1 \tag{5.11}$$

The GMM system estimator is obtained using the moment conditions in Equations (5.7), (5.8), (5.10), and (5.11). Blundell and Bond (1998) proposes that the validity of the instruments used in estimation the regressions can be examined by two different statistical tests. The first is the Sargan test aimed at examining the null hypothesis that the instruments used are not correlated with the residuals. The second test, proposed by Arellano and Bond (1991), examines the hypothesis that the residuals from the estimated regressions are first-order correlated but not second-order correlated. The use of these moment conditions and application of the GMM procedure can generate consistent and efficient parameter estimates (Choong *et al.*, 2010; Ductor & Grechyna, 2015).

The GMM has become an important estimation procedure in many areas of applied economics and Arcand *et al.* (2012) observes that the GMM technique is increasingly being applied to macro panel data, including in the area of financial development and growth. Chaussé (2010) observes that the GMM method depends on only moment conditions and it is thus a reliable estimation procedure for many models in economics and finance. The GMM method further assumes that the disturbance terms are independent, homoscedastic across countries and over time, and prevents serial correlation (see Roux & Moyo, 2015).

It has been observed and argued that the GMM technique works well when the data feature a large number of observations (N) relative to the time period (T) to avoid asymptotic imprecision and biases (Barajas, Chami & Yousefi, 2016; Roodman, 2006). Thus Samargandi, Fidrmuc, and Ghosh (2013) indicate that when the N is small and T is large, the GMM captures only the short-

run dynamics. Accordingly, the study additionally augments the GMM with the ARDL model approach to run the short- and long-run estimations.

5.3.3 Estimating the Short- and Long-Run Associations

The study further assesses the short- and long-run impact of financial development on economic growth using the Vector Auto Regressive (VAR) within the Autoregressive Distributed Lag (ARDL) approach. The purpose of this is to determine the short- and long-run behaviour and relationship between financial development and each respective component of economic growth. The ARDL approach follows a series of procedures to determine the short- and long-run associations.

5.3.3.1 Cointegration with ARDL

The estimation of a model to establish the relationship between the variables of interest draws on recent development in cointegration and the Error Correction Model (ECM). The bounds testing approach to cointegration advocated by Pesaran, Shin and Smith (2001) is used to examine the presence of a long-run equilibrium relationship between financial development indicators and the control variables on one hand, and the respective components of economic growth on the other. It has been suggested that the bounds testing approach cointegration is superior to other cointegration tests when the order of integration of the explanatory variables are either I(0) or I(1). According to Tang, Shahbaz and Arouri (2013), confirming the order of integration is a pre-requisite for almost all time series analysis. Thus the study applies the Augmented Dickey–Fuller (ADF), the Phillips–Perron (PP) unit root tests to determine the order of integration for each series. Additionally, the unit root test will be applied with two breaks developed by Lumsdaine and Papell (1997) to confirm the order of integration.

After determining the order of integration, the bounds testing approach to cointegration, developed by (Pesaran *et al.*, 2001), is employed within the autoregressive distributed lag (ARDL) framework to investigate the existence of a long-run equilibrium relationship between the variables of interest as stated in Equation (5.1). It has been noted by Tang *et al.* (2013) that the bounds testing approach has certain advantages over the conventional cointegration techniques. Noting thus that unlike the conventional cointegration techniques, the bounds testing approach can be applied to the model irrespective of whether the variables are purely I(0) or

purely I(1). Pesaran and Shin (1999) further suggest that the Monte Carlo analysis exhibits that the ARDL cointegration approach has superior properties in small sample. Based on the ARDL approach, the model for bounds testing approach to cointegration can be can be applied to Equation 5.1 and formulated as follows:

$$\Delta G_{it} = a + \pi_1 \mathrm{G}_{\mathrm{i,t-1}} + \pi_2 \mathrm{GDPGC}_{\mathrm{t-1}} + \pi_3 \mathrm{FD}_{\mathrm{i,t-1}} + \pi_4 X_{\mathrm{t-1}} + \sum_{i=1}^{p} b_{1,i} \Delta G_{i,t-i} + \sum_{i=1}^{p} b_2 \Delta FD_{t-i} + \sum_{i=1}^{p} b_3 \Delta GDPGC_{t-i} + \sum_{i=1}^{p} b_4 \Delta X_{t-i} + \varepsilon_t \quad (5.12)$$

The ARDL bounds test approach is being referred to estimate Equation 5.1, using the ordinary least squares (OLS) method. The ARDL procedure uses the F-test in the bounds test for determination of the existence of a long-run relation-ship (Pesaran *et al.*, 2001), and further tests for the joint significance of lagged level variables involved in the estimation. The null hypothesis of the non-existence of a long-run relationship for the equation of H_o: $\pi_1 = \pi_2 = \pi_3 = \pi_4 = 0$; and the alternative hypothesis remains as H_o: $\pi_1 \neq \pi_2 \neq \pi_3 \neq \pi_4 \neq 0$.

5.3.3.2 Long-run Cointegration: Vector Error Correction Model (VECM)

When the cointegration association has been determined by the bounds testing approach, the long-term and the error correction model within the ARDL estimation can be obtained. The error correction model (ECM) is therefore applied, in reference to reference to Equation (5.4). Accordingly, a general error correction model (VECM) is formulated as follows:

$$\Delta G_{i,t} = a + \sum_{i=1}^{p} \theta_{1,i} \Delta G_{i,t-i} + \sum_{i=1}^{p} \theta_2 \Delta \mathrm{GDPGC}_{t-i} + \sum_{i=1}^{p} \theta_3 \Delta \mathrm{FD}_{t-i} + \sum_{i=1}^{p} \theta_4 \Delta X_{t-i} + \varepsilon_t \quad (5.13)$$

The short-term dynamics are captured by the error correction model as follows:

$$\Delta G_{i,t} = a + \sum_{i=1}^{p} \theta_i \Delta G_{i,t-i} + \sum_{i=1}^{p} \delta \Delta \mathrm{GDPGC}_{t-i} + \sum_{i=1}^{p} \vartheta \Delta \mathrm{FD}_{t-i} + \sum_{i=1}^{p} \sigma \Delta X_{t-i} + \lambda ECT_{t-i} + \varepsilon_t \quad (5.14)$$

where λ is the speed of the adjustment parameter showing the convergence pace from short-run towards long-run. To ensure the convergence of the short-run dynamics related to the long run equilibrium, Uddin, Sjö and Shahbaz (2013) indicate that the sign of the lagged error correction

coefficient must be negative and statistically significant. To ensure the application of correct statistical methods to the model, Uddin *et al.* (2013) suggests that a diagnostic analysis is conducted.

5.3.3.3 Test of Causality

Finally, the multivariate Granger causality test within the vector error-correction model (VECM) is employed to verify the direction of Granger causality between the variables of interest. The Granger causality test is applied to examine the null hypothesis that financial development indicators do not cause economic growth in Ghana.

Engle and Granger (1987) point out that where two or more variables are I(1) and also cointegrated, it can be concluded that there exist a causal association in a certain direction at least. As such, subsequent to establishing the order of integration and cointegration, the study established the finance-growth causal direction by employing the Engle-Granger causality technique. The Engle-Granger testing approach is robust, superior and applicable in situations of both large and small samples (Odhiambo, 2008; Owusu & Odhiambo, 2015). Based on the Vector Error Correction Model (VECM), the causality test model is formulated as follows:

$$\Delta G_{i,t} = \alpha + \sum_{i=1}^{p} b_{0,i}\Delta G_{i,t-i} + \sum_{i=1}^{p} b_1 \Delta \mathrm{FD}_{t-i} + \lambda ECT_{t-i} + \varepsilon_t \quad (5.15)$$

$$\Delta FD_t = \alpha + \sum_{i=1}^{p} b_0 \Delta FD_{t-i} + \sum_{i=1}^{p} b_1 \Delta \mathrm{G}_{i,t-i} + \lambda ECT_{t-i} + \varepsilon_t \quad (5.16)$$

Where G_t represents the respective economic growth indicator or component; FD represents the financial development Indicators in the model; Δ indicates first differences; $i = 1 \ldots p$ represents the optimal lag length determined by Schwarz Information Criteria (SIC); ECT_{t-i} equals to the estimated lagged error correction term obtained from the cointegrating relationship of Equation (5.6); b_0, b_1 and λ are the adjustment coefficients; and μ_t is the disturbance term expected to have no correlation with zero means. The decision rule for the Engle-Granger causality test is that the null hypothesis is rejected where the p -value of the computed F -statistic is less than 10.0 per cent, 5.0 per cent or 1.0 per cent.

The results of the ADF and PP Unit roots test, ARDL bounds test and the Walt test of short-run causality are presented in Tables 5.6, 5.7 and 5.8.

After determining the financial drivers and impact of financial development indicator, the reaction of economic growth to shocks in these variables is then assessed. The reaction of economic growth to financial development and macro-economic shocks is assessed using the BVAR method.

5.3.4 Bayesian Vector Auto Regression (BVAR) Specification and Estimation

The Bayesian Vector Auto Regression (BVAR) model is applied to analyse the reactions of GDP growth, capital accumulation and industrial value-added to macro-economic shocks and financial development indicators; and to forecast macro-economic and financial development variables. The prior distributions employed in the BVAR estimation and analyses are set following the procedure developed Litterman (1986a). Accordingly, the ordinary BVAR is specified following Litterman (1998) and is expressed as shown in equation (5.17).

$$Y_t = c + A_1 Y_{t-1} + \cdots A_p Y_{t-1} + \mu_t \tag{5.17}$$

Where Y_t represents vector of endogenous variables with linear dynamics $A_1 \ldots \ldots A_p$ is a vector of autoregressive coefficients and μ_t is an n-dimensional Gaussian white noise with covariance matrix $E(\mu_t \mu_t^1) = \varphi, c = (c_1 \ldots, c_n)$ is an n-dimensional vector of constants.

The Bayesian VAR allows prior information about the variables of interest to be incorporated into the system of equations (Bańbura, Giannone, & Reichlin, 2010). The use of prior information assists in mitigating the problem associated with estimations that are performed using a relatively short time span of data. The relatively short time span of the Ghanaian data used in this study highlights the need for a BVAR approach. The prior information is based on the researcher's belief in the parameters of interest. The prior distributions are set following the procedure developed in Litterman (1986) with modifications proposed by Kadiyala & Karlsson (1993) and Sims and Zha (1998). The basic principle behind it is that all the equations are centred on the random walk with drift as shown by the regression equation (5.18).

$$Y_t = c + Y_{t-1} + \mu_t \tag{5.18}$$

The prior distributions are based on the idea that recent lags provide more reliable information than the distant lags. The prior beliefs are also based on the facts that own lags explain a large proportion of the variation of a given variable rather than lags of other variables in the system (Bańbura *et al.*, 2010). The coefficients $A_1 \ldots \ldots A_p$ are assumed to be *a priori* independent and normally distributed. Under the baseline specification, prior beliefs are imposed by setting the coefficient restrictions for the mean and the variance. The mean for the prior distribution is shown by equation (5.19).

$$E\left[(A_K)_{iJ}\right] = \begin{cases} \delta_i, & j=i,k=1 \\ 0, & otherwise \end{cases} \tag{5.19}$$

The prior mean δ is typically set to 1 in the traditional Minnesota prior to accounting for the persistence of the data, but if the VAR is estimated in first difference, δ should be set to 0.

Similarly, the prior variance distribution is shown by equation (4.18).

$$\left[(A_K)_{iJ}\right] = \begin{cases} \dfrac{\lambda^2}{k^2}, & j=i \\ \varphi \dfrac{\lambda^2}{k^2}\dfrac{\sigma_i^2}{\sigma_j^2}, & otherwise \end{cases} \tag{5.20}$$

The shrinkage parameter φ in equation (4.18) measures the tightness of the prior when $\varphi = 0$, the prior is imposed exactly and the data do not influence the estimates, while as $\varphi = 1$, the prior becomes loose and the prior information does not influence the estimates, which will approach the standard OLS estimates. The parameter λ controls the tightness of the prior distribution around the random walk. The parameter λ also governs the relative importance of the prior beliefs with respect to the information contained in the data. The case where $\lambda = 0$ indicates that the posterior equals the prior. This scenario means that the data do not influence the estimates. However, the case where $\lambda = \infty$, suggests that the posterior expectations coincide with the

Ordinary Least Squares (OLS) estimates. The factor $\frac{\sigma_i^2}{\sigma_j^2}$ is a scaling parameter. The scaling parameter accounts for the different scale and variability of the data.

The estimated results are presented in terms of impulse response functions and variance decomposition. The BVAR model was chosen to facilitate the structural analysis of economic growth and industrial value-added dynamics and to forecast key variables that are critical in the simulation analysis of optimal industrial and economic growth. The BVAR model is preferable to structural models since it does not impose restrictions on the parameters. As a result, it provides general representation which facilitates the capturing of complex data relationships (Sims, 1980). Moreover, the VAR modelling has generally been applied in macro-economic and fiscal reaction functions (Burger, 2011; Dolado, María-Dolores, & Naveira, 2005; Medeiros, 2012; Mupunga, 2014; Ostry, Celasun, & Debrun, 2007).

The VAR models also allow for the incorporation of discretionary fiscal policy responses in economic and growth projections. The VAR estimations generate an empirical distribution function of growth levels. This distribution function can be used to monitor the evolution of growth by computing the corresponding moments of the simulated data. The Generalised VAR model facilitates analysis of potential volatility interactions between markets. The Generalised VAR model specification allows for non-orthogonalised impulses (Pesaran & Shin, 1998). Orthogonalised impulse response function analysis of structural vector authoregressive (VAR) is subject to the problem of ordering of variables and according to Kim (2009) different response functions are obtained when the order of variables are changed in the VAR system. Pesaran and Shin (1998) propose an ordering invariant approach in the generalised impulse response function.

5.3.5 Generalised Impulse Response Functions (GIRF)

The impulse response function (IRF) and forecast error variance decomposition (FEVD) can be applied in analysing the results from VAR models (Hassan, Sanchez, & Yu, 2011). Mostly the impulse response function traces the effect of a one-time shock to one of the innovations on current and future values of endogenous variables (Gil-Lafuente, Gil-Lafuente, & Merigo'-Lindahl, 2012; Lada & Wojcik, 2007). The generalised impulse responses fully incorporate the

correlation structure between impulses and this is advantageous (Duncan & Kabundi, 2011). Many studies have employed GIRF in analysing effect of one-time shock on endogenous variables (Diebold & Yilmaz, 2010; Huang, Hwang, & Yang, 2008; Mupunga, 2014; Bara, 2017). Lin (2006) indicates that the generalised impulse response functions are uniquely determined and are thus invariant to re-ordering of the VAR.

The forecast error variance decomposition permits inferences to be drawn regarding the proportion of the movement in a particular time-series due to its own earlier 'shocks' on 'shocks' arising from other variables in the VAR (Enders, 1995). The impact of a 'shock' in a particular variable in a VAR system is traced through the system of equations to determine the effect on all of the variables, including future values of the shocked variable (Shan & Jianhong, 2006). Thus breaking down the variance of the forecast errors for each variable following a shock to a particular variable makes it possible to identify variables that are substantially affected. The study follows other earlier works (Bara, 2017; Mupunga, 2014) and estimates impulse responses using the Pesaran and Shin's generalised impulse response approach to orthogonalise the shocks ahead of the Cholesky method as Lin (2006) indicate that the GIRF addresses the problem of dependence on ordering of variables.

5.3.6 Economic Policy Reaction Function

The second part of the analysis consists of estimating the economic policy reaction function. As indicated in Chapter Three, the macro-economic reaction function assesses how the government responds to changes in the general economy and particularly real sector growth. The need for the macro-economic reaction function is particularly important in view of the fact that one of government's core objectives is to stimulate, sustain growth and minimise incidence of unemployment. Drawing from Taylor (1993) and Bohn (2008)B, the economic reaction function is modified and specified as shown in equation (5.21).

$$G_{i,t} = \alpha_0 + \rho FD_{t-1} + \gamma ygap_t + X_t\beta + \varepsilon_t \quad (5.21)$$

Where G_{it} is growth indicator and represents either economic growth rate, capital accumulation growth share in GDP or industrial output share in GDP, ρ is the macro-economic reaction

parameter and measures the response of the respective growth indicators to developments in the financial sector, α is the constant variable, $\gamma ygap_t$ is the output gap and $X_t\beta$ is a set of other macro-economic determinants of growth and ε_t is an error term. The specification shows how governments react to investment, industrial productivity or economic growth or otherwise given the structure of macro-economic shocks facing the economy.

The macro-economic reaction function is not intended at predicting the economic or government policy responsiveness or behaviour. However, it is included in this analysis to serve as an unknown and reference for assessing optimal economic growth management policies. It addresses the question of what would be the real sector growth dynamics when the economy is stabilising, and inflation rates and output exhibit similar historical behaviour. With respect to the expected coefficients from the macro-economic reaction function, a zero or negative value indicates that governments fail to respond effectively, or even have a perverse reaction of decreasing growth or growth components. A positive economic policy response also suggests that the government has been making concerted efforts to improve growth indicators (Bohn, 2008).

The output gap is included to control for cyclical fluctuations, and political and institutional variables in line with other studies (Dolado *et al.*, 2005; Judd & Rudebusch, 1998; Mendoza & Ostry, 2008; Mupunga, 2014; Ostry *et al.*, 2007). The government expenditure is a priori expected to respond positively to real sector growth dynamics. A positive and significant coefficient of the lagged real sector indicator or variable in the macro-economic reaction function denotes the government's commitment to reduce or maintain stable real sector growth dynamics. Moreover, a positive and significant coefficient of the lagged real sector indicator or variable can be interpreted as a government that engages in macro-economic austerity to augment and sustain growth or output levels. It is however noted that government policy reactions are also affected by other economic factors and the level of economic activity. Government's productive expenditures such as spending on education, infrastructure or some other form of productive capital promotes growth while non-productive spending could undermine growth (Barro, 2006; Barro & Sala-i-Martin, 1992; Barro & Sala-I-Martin, 1995).

5.3.7 Stable Financial Development and Economic Growth Dynamics

The stability of the financial development indicators as well as the growth components are empirically assessed by determining whether the respective financial development indicators and economic growth component process means are reverting towards the desired targets or maximising levels. The inter-temporal constraints place restrictions on the relative orders of integration of financial development and the economic growth indicators rather than impose that indicators are stationary. Accordingly, the study tests for the stability of finance and growth indicators by estimating an autoregressive, AR (1), process and adopts the approach used by Faraglia *et al.* (2008) shown in Equation (5.22).

$$G_{i,t}^{*} = \alpha_t + \beta X_{t-1} + \varepsilon_t \tag{5.22}$$

Where $G_{i,t}^{*}$ is the respective financial development indicator share in GDP or economic growth component ratio. The autoregressive equation (5.22) is consist with the general rule with a respective growth target of $\alpha/(1-\beta)$. The implication from equation 5.22 is that if $\beta \geq 1$, $G_{i,t}^{*}$ is unstable and has no well-defined average. In such circumstances the financial indicator or growth component ($G_{i,t}^{*}$) would follow explosive dynamics. Also if $\beta = 0$, $G_{i,t}^{*}$ shows no autoregressive behaviour and aside from temporary shocks, ε_t is stable with a value α (Faraglia *et al.*, 2013). Ideally, $\beta = 0$ is expected to be between 0 and 1.

5.3.8 Growth Maximising Financial Development Thresholds

The study also assesses the relationship between financial development and growth to determine the optimal point beyond which financial development can dampen economic growth. This is achieved by estimating a model that relates the economic growth rate to a chosen financial development indicator ratio to GDP. Since the study seeks to determine whether there exists a non-linear relationship between financial development and economic growth, a quadratic equation is estimated and plotted consistent with the approach taken by other researchers (Arcand *et al.*, 2012; Bezemer *et al.*, 2014.; Cecchetti & Kharroubi, 2012; Ductor & Grechyna, 2015). Accordingly, following Arcand *et al.* (2012) and Ductor and Grechyna (2015) following Arcand *et al.* (2012), the study analyses the non-monotonic relationship between financial

development and economic growth by adding the square of financial development index. The model is specified in equation (5.23).

$$G_t = \alpha + \beta_1 FDIndex_t + \beta_2 FDIndex_t^2 + \beta_3 X_t + \varepsilon_t \quad (5.23)$$

Where G_t is the economic growth rate, $FDIndex$ is the financial development indicator used as a percentage of GDP. X_t represents a given number of other control variables such as the monetary policy rate, output gap, government spending and gross fixed capital formation are included to improve the model diagnostics. It should, however, be noted that the purpose is not to determine the determinants of economic growth but to use the link between finance and growth to determine the optimal growth maximising finance threshold.

5.3.9 Engine of Growth Analysis

The study draws on the principle of the Kaldor Law (1960) and examines the relationship between financial development indicators, industrial or manufacturing growth on one hand and economic growth on the other hand. The essence of this analysis is to determine whether financial development and industrial output improvements have been the engine of growth. The first Kaldor Law, fundamentally, describes the relationship between the GDP growth rate and manufacturing growth rate as follows:

$$GDPGR_t = \alpha + \beta MANGR_t + Z_t + \varepsilon_t \quad (5.24)$$

Where $GDPGR_t$ is GDP growth rate and $MANGR_t$ is manufacturing growth rate, Z_t represents time effects, i.e., time-specific effects that can influence the GDP and manufacturing value added relationship over time. ε_t is the error term.

Holland *et al.* (2012) suggests that in order to account for some persistency in the growth rate and thus capture possible autocorrelation effects, the study follows Cantore *et al.* (2014) and estimates Equation 5. 10 with a lagged dependent variable as:

$$GDPGR_t = \alpha_t + \delta GDPGR_{t-1} + \beta X_t + Z_t + \varepsilon_t \quad (5.25)$$

Where $GDPGR_{t-1}$ represents the lagged GDP growth is rate and X_t is industrial and manufacturing growth rate or a financial development indicator, Z_t represents time effects, i.e., time-specific effects that can influence the GDP and manufacturing value added relationship over time. The most important coefficient in this equation is β, which represents the variation of GDP growth rate when the financial development indicator or industrial and manufacturing growth rate varies. If the financial development indicator ratio or manufacturing growth rate varies by 1.00 per cent, β signifies the variation of GDP that derives from the respective percentage increase in financial development or industrial and manufacturing.

The engine of growth hypothesis is tested on the basis of the Fagerberg-Verspagen (1999) technique. The study tests whether the coefficients of financial development indicators and industrial and manufacturing growth β are positive and whether they are larger than their respective shares in GDP. If the coefficients are larger than the respective shares in GDP and if this difference is significant, it is interpreted as (not definitive) support for the engine of growth hypothesis. The Fagerberg-Verspagen test does not represent definitive evidence of the engine of growth hypothesis. First, even if the manufacturing sector coefficient is higher than the manufacturing value-added share, other sectors may be characterised by higher impacts. Secondly, it does not tell us anything about the causality of impacts of manufacturing growth and economic growth. See Lavopa & Szirmai (2012) for a detailed discussion on this issue.

5.4 Description of Variables Used

The study principally used four (4) dependent variables to examine the impact of financial development on economic growth and industrial sector of the economy. These four (4) dependent variables are per capita gross domestic product (GDP) as a measure of economic growth, capital accumulation, industrial value-added (IDVA) and manufacturing value-added (MVA) as shares of GDP as components of economic growth. The study adopted ten (10) explanatory variables of which four are proxies for financial development. These include domestic credit to private sector, total domestic credit provided by the financial sector, broad money supply, financial sector deposits, gross capital formation, industrial value-added, trade

openness, government expenditure, monetary policy rate and inflation rate. The dependent and explanatory variables are explained in the sub-sections below.

5.4.1 Real Per Capita Gross Domestic Product (GDPGC)

The Gross Domestic Product (GDP) per capita is used as a measure of economic growth and serves as dependent variable in the study. GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources (World Bank, 2018). The GDP per capita rate is used as a measure of the economic growth and the standard of living of a country. All countries aim increasing the rate of economic growth and improving the standard of living of the population.

5.4.2 Industrial Value-Added as Share of GDP (IDVA)

The Industrial value-added (IDVA) is the total contribution of the industrial sector to gross domestic product (GDP). The industrial sector comprises value added in mining, manufacturing, construction, electricity, water, and gas (World Bank, 2018). In this study the IDVA is expressed as a percentage share of GDP. The IDVA is used both as a dependent and explanatory variable to examine the impact of the financial development on economic growth.

5.4.3 Manufacturing Value-Added as Share of GDP (MVA)

The manufacturing value-added is the total contribution of the manufacturing sector to gross domestic product (World Bank, 2018). The manufacturing component is a major contributor to the total industrial output and Asante (2013) suggests that it has various linkages for growth and poverty reduction in Ghana. MVA is used as a dependent variable to find out the extent of impact of financial development on manufacturing growth and further examine whether the manufacturing sub-sector is the engine of growth in the Ghanaian economy.

5.4.4 Domestic Credit to Private Sector as Share of GDP (DCPS)

Domestic credit to private sector refers to financial resources provided to the private sector by financial institutions, such as through loans and advances, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment (World

Bank, 2018). The study uses domestic credit to private sector as share of gross domestic product as an indicator of financial development. DCPS captures the amount of resources extended to businesses and firms in Ghana by the banking sector and other non-bank financial institutions. The DCPS is used as an explanatory variable in the model estimation and analysis examining the impact of financial development on economic growth.

5.4.5 Domestic Credit Provided by the Financial Sector as Share of GDP (DCFS)

Domestic credit provided by the financial sector refers to the total credit extended to the various sectors on a gross basis, with the exception of credit to the central government, which is net (World Bank, 2018). The financial sector includes monetary authorities and deposit money banks, as well as other financial corporations where data are available (including corporations that do not accept transferable deposits but do incur such liabilities as time and savings deposits). DCFS is measured as a share of GDP and used as an independent variable to examine the impact of the overall credit provided by financial sector on economic growth. It is also an indicator of the extent of financial development.

5.4.6 Broad Money Supply as Share of GDP (BMS)

Broad money is the sum of currency outside banks; demand deposits other than those of the central government; the time, savings, and foreign currency deposits of resident sectors other than the central government; bank and traveller's checks; and other securities such as certificates of deposit and commercial paper (World Bank, 2018). Principally, it consists of currency held outside the banking system plus interest-bearing total deposit liabilities of banks and other financial institutions. Broad money ratio (M2/GDP) is an indicator of financial deepening and is thus used as a measure of financial development.

5.4.7 Financial Sector Deposit as Share of GDP (FSD)

Financial Sector Deposit consists of demand, time and saving deposits in deposit money banks and other financial institutions as a share of GDP.

5.4.8 Gross Fixed Capital Formation as Share of GDP (GCF)

Gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories (World Bank, 2018). The variable is used as a measure of capital accumulation in the study and also employed both as

a dependent and explanatory variable. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and "work in progress." According to the System of National Accounts (1993), net acquisitions of valuables are also considered capital formation. GCF, as a share of GDP is used as a proxy for investment in Ghana.

5.4.9 Trade Openness (Import plus Export, as Share of GDP (GCF)

Trade is defined as the sum of exports and imports of goods and services measured as a share of gross domestic product (World Bank, 2018). Trade openness increases a country's exposure to vulnerabilities to external shocks and has the tendency to lower revenue and growth. By incorporating trade openness as an explanatory variable, the study does not only attempt to underline the potential importance of trade openness for economic growth but also seeks to find out the impact of openness on Ghana's industrial growth (Beck, 2002).

5.4.10 Government Consumption Expenditure as Share of GDP (GE)

The general government final consumption expenditure (formerly general government consumption) includes all government current expenditures for purchases of goods and services—including compensation of employees (World Bank, 2018). It also includes most expenditure on national defence and security, but excludes government military expenditures that are part of government capital formation. Studies on finance-growth associations have included government consumption as a percentage of GDP as a control variable (Adusei, 2013; Saci, Giorgioni & Holden, 2009; Shahbaz, 2009; Zang & Kim, 2007).

5.4.11 Monetary Policy Rate (MPR)

Monetary policy rate is set by the Monetary Policy Committee of the Bank of Ghana. The policy rate involves the use of different measures with the aim of regulating the value, supply and cost of money in consonance with the expected level of economic activity. The common objectives of any monetary policy may include price stability, maintenance of balance of payments equilibrium, creation of employment, output growth, and sustainable development. In Ghana, monetary policies have evolved from the use of direct instruments such interest controls, credit

and sectoral credit controls and reserve requirements. It has been argued that such policies contributed massively to financial repression in Ghana before the financial reforms (Quartey & Afful-Mensah, 2014). The monetary policy rate influences the lending in Ghana as financial institutions use the prime rate as a base rate in the determination of the cost of credit. The rate is included in the analysis to put the respective estimations within a monetary policy context.

5.4.12 Inflation Rate as Share of GDP (INF)

Inflation refers to the general rise in the price of goods and services in the economy. Inflation measured by consumer price index (CPI) is defined as the change in the prices of a basket of goods and services that are typically purchased by specific groups of households. Inflation is measured in terms of the annual growth rate and in index, using a specific year as a base. Inflation measures the erosion of living standards. A consumer price index is estimated as a series of summary measures of the period-to-period proportional change in the prices of a fixed set of consumer goods and services of constant quantity and characteristics, acquired, used or paid for by the reference population. Following Levine (2004), the study uses inflation as a control variable as Rousseau and Wachtel (2002) show that the positive impact of financial development on growth diminishes with higher rates of inflation.

5.4.13 Output Gap

The output gap is used as a proxy for the unemployment gap. The unemployment rate affects the economic well-being and therefore influences the response of government to changes in the growth of the economy. Kasekende and Brownbridge (2010) recommend the inclusion of the output gaps as a tool in targeting of monetary policy. Konuki (2008) points out that reasonably accurate potential output and output gap estimates are necessary to conduct prudent monetary and fiscal policies as they help in evaluating demand-pull inflationary pressures, as these are most likely to arise when an economy is operating above potential. They also provide a framework for assessing the fiscal stance from the Keynesian point of view that a fiscal expansion (contraction) is desirable when output is below (above) potential. However, it is hard to measure potential output because it is an unobserved variable.

The output gap is computed as the difference between actual GDP and potential GDP. The percentage GDP gap is the actual GDP minus the potential GDP divided by the potential GDP. This is measured as shown in equation (5.26).

$$\text{Percentage Output gap} = \frac{GDP_{Actual} - GDP_{Potential}}{GDP_{Potential}} \quad (5.26)$$

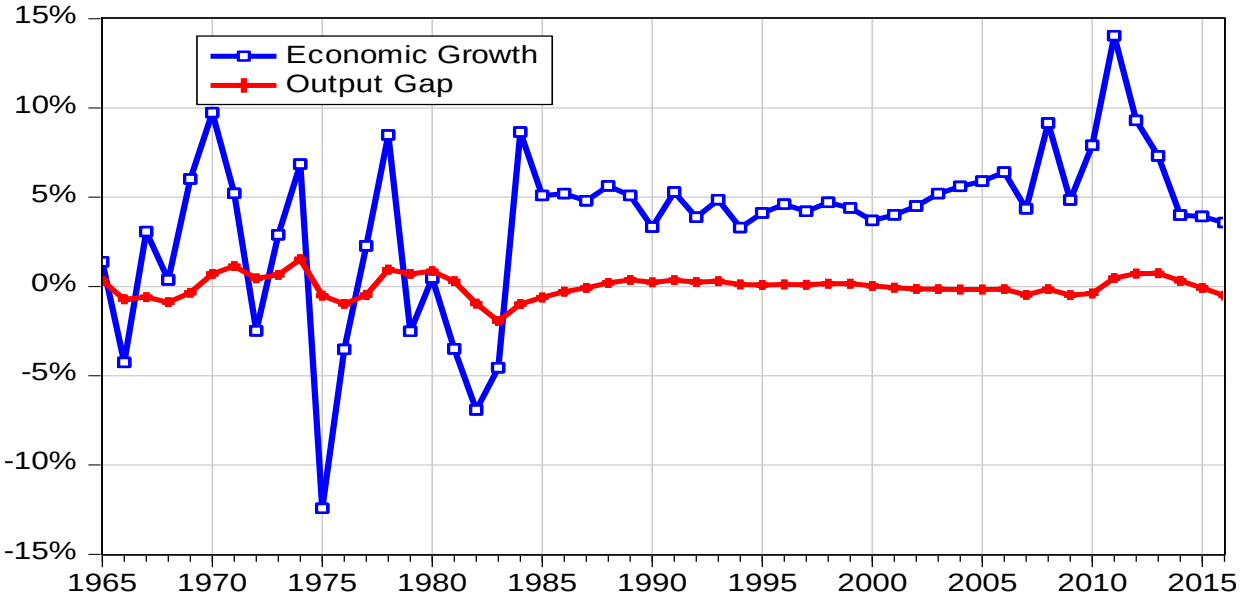
The Hodrick-Prescott Filter (HPF) is used to extract the trend component logarithm of real GDP used to proxy for potential GDP. The HPF decomposes a time series into growth and cyclical components $Y_t = Y_t^g + Y_t^c$, where Y_t is the natural log of GDP, and Y_t^g and Y_t^c are the growth and cyclical components, respectively. The HPF is given by:

$$\min_{Y_t^g} = \sum_{t=1}^{T}(Y_t - Y_t^g)^2 + \gamma \sum_{t=1}^{T}[\left(Y_{t+1}^g - Y_t^g\right) - \left(Y_t^g - Y_{t-1}^g\right)]^2 \quad (5.27)$$

The parameter γ in equation (5.27) controls for the smoothness of Y_t^g. The minimisation of equation (5.27) provides a mapping from Y_t to Y_t^g with Y_t^c determined residually. The estimate of potential output using the HP filter depends on the choice of the smoothing parameter (γ). Researchers typically set γ to 1 600 and 14 000 for annual data and quarterly data, respectively (Razzak & Dennis, 1999).

The results from Figure 5.1 show negative percentage output gap in the mid-1960s, between 1983 and 1984, between 2006 and 2008 and in recent times from 2015 to 2016. These negative percentages indicate downturn in economic performance for the indicated period though economic growth has been on an increasing trajectory and this suggests an inverse relationship between economic growth and output gap. The negative associations are indications that economic policies have been pro-cyclical with government responding to the dampness of economic activity in the identified periods, particularly in 1983.

Figure 5.1: Trend in Economic Growth and percentage output gap



Source: Researcher's own computations

5.4.14 Financial Development Index from Principal Component Analysis (PCA)

As a means of checking the robustness of the estimates based on the four alternative proxies for financial development, the study creates two sub-indexes from these proxies using the method of principal components.

Essentially the principal components analysis takes N specific indicators and produces new indices (the principal components) $X_1, X_2, \ldots X_N$ that are mutually uncorrelated. Each principal component, as a linear combination of the N indicators, captures a different dimension of the data. Typically the variances of several of the principal components are low enough to be negligible, and hence the majority of the variation in the data will then be captured by a small number of indices. This chapter uses the first principal component, which accounts for the greatest amount of the variation in the original set of indicators, in the sense that the linear combination corresponding to the first principal component has the highest sample variance, subject to the constraint that the sum-of-squares of the weights placed on the (standardised) indicators is equal to one. The conventional measures of financial development on which the principal component analysis is based are the domestic credit to private sector, total credit

provided by the financial sector, broad money supply and financial sector deposits as respective percentage shares of GDP.

The results of principal components from which the two indexes for financial development are created are presented in Tables 5.1 and 5.2. The two indexes created from the first four principal components explain about 94 per cent of the total variance in the original data. Thus the PCA procedure has been able to reduce the dimension of financial development indicators by half while preserving 94 per cent of the information in the data. Further, the sub-indexes created are orthogonal to each other and thus have zero correlations among themselves suggesting that all the two indexes can be included in a single equation.

Table 5.1: Principal Component Analysis

Principal Component	Eigenvalues Value	Difference	Proportion (%)	Cumulative Value	Cumulative Proportion
1	3.287300	2.815089	0.8218	3.287300	0.8218
2	0.472211	0.267547	0.1181	3.759511	0.9399
3	0.204664	0.168838	0.0512	3.964174	0.9910
4	0.035826	---	0.0090	4.000000	1.0000

Table 5. 2: Scoring Coefficients for Principal Components

Component Variable	PC 1*	PC 2**	PC 3	PC 4
LNBMS	0.530299	-0.090050	-0.523482	-0.660788
LNDCFS	0.438319	0.879995	0.096000	0.155787
LNDCPS	0.501781	-0.303966	0.789301	-0.181176
LNFSD	0.524286	-0.353702	-0.306194	0.711523

Source: Researcher's own computations. Note: * and ** represents the FDIndex1 and FDIndex2, respectively.

As shown in Table 5.1, the first principal component, FDIndex1, explains 82 per cent of the total variance in the data while FDIndex2 explains 12 per cent. Following Adu *et al.* (2013) and using

scoring coefficient of 0.3 or higher to determine the significance of factor score, the first principal component, FDIndex1 could be thought of as representing the variables all the four indicators namely; domestic credit to private sector, total domestic credit offered by the financial sector, broad money supply and financial sector deposit. In the same vein, the second principal component represents three indicators namely; total domestic credit offered by the financial sector, domestic credit to private sector and financial sector deposit. The scoring coefficient on broad money supply is far lower than 0.3 and is thus treated as not significant.

5.4.15 Apriori Expectations

The relevant explanatory variables identified in literature and their expected signs are shown in Table 5.3.

Table 5.3: Description of model variables and expected impact on dependent variables.

Variable	Description	Expected Sign
$IDVA_t$	Industrial Value-added to GDP ratio	+
MVA_t	Manufacturing Value-added to GDP ratio	+
$DCPS_t$	Domestic Credit to Private Sector-to-GDP ratio	+/-
$DCFS_t$	Domestic Credit provided of financial sector to GDP ratio	+/-
BMS_t	Broad Money Supply to GDP (M2/GDP) ratio	+/-
FSD_t	Financial Sector Deposits-to-GDP ratio	+/-
$FDIndex1_t$	Financial Development Index 1 (PCA)	+/-
$FDIndex2_t$	Financial Development Index 2 (PCA)	+/-
GCF_t	Gross Fixed Capital Formation	+/-
$TOPEN_t$	Trade openness (M+X/GDP) ratio	+/-
GE_t	General government final consumption expenditure	+
MPR_t	Monetary Policy Rate	+/-
INF_t	Inflation rate, Consumer Price Index (CPI)	-
FSR_t	Financial Sector Reforms (Dummy Variable)	+

Table 5.3 shows that *a priori*, a positive coefficient is expected between industrial value-added and manufacturing value-added on economic growth on one side. On the other hand, positive coefficients are also expected between government expenditure, financial sector reforms and economic growth. The financial development indicators have mixed impacts depending on several factors that happen within the economy. For instance, when financial resource usage and financial intermediations are efficient, they can positively impact on growth (Levine, 1997, 2005; Levine *et al.*, 2000). On the other hand, if enterprises fail to either utilise available financial resources or make bad investment decisions, it can dampen economic growth (Arcand *et al.*, 2012; Beck, 2012b). Accordingly, the expected signs for the financial development indicators and other control variables such as trade openness, capital formation and government consumption are mixed.

5.5 Data Sources, Descriptive Statistics and Diagnostic Tests

5.5.1 Data Sources

The study used annual time series data for six variables over the period of 1965 to 2016. The data is based on the IMF World Economic Outlook, April (2018) and the World Bank's World Development Indicators (2018) databases. The IMF and the World Development database include contain wide range growth indicators nearly the entire IMF member countries. With the exception of Financial Sector Deposits—which was obtained from FRED Economic Data—all others were obtained from the World Bank's World Development Indicators Database, 2108. With the exception of population growth rate, all the variables were expressed as a percentage of GDP. Also, all data have been converted into natural logs. On account of theoretical and empirical literature reviewed, the variables used for the study are described in section (5.4).

The descriptive statistics and the pairwise correlations for the data used in the study are shown in Tables 5.4 and 5.5.

Table 5.4: Descriptive Statistics

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
GDPGC	773.96	731.14	1279.14	525.49	188.97	52
IDVA	21.49	21.26	28.94	6.47	5.91	52
MVA	9.75	9.97	15.54	3.73	2.62	52
DCPS	8.85	8.22	20.44	1.54	5.35	52
DCFS	26.87	26.1	39.30	16.38	5.98	52
BMS	23.19	22.59	34.20	11.30	6.38	52
GCF	16.62	15.16	31.78	3.38	7.78	52
TOPEN	55.93	44.95	116.05	6.32	29.16	52
GE	12.28	11.89	20.89	5.86	3.15	52
INF	28.57	18.08	122.87	3.03	27.15	52
MPR	20.37	19.00	45.00	7.00	9.67	52

Source: Researcher's own computations

Table 5.5: Pairwise Correlations

	GDPGC	DCPS	DCFS	BMS	GCF	IDVA	MVA	TOPEN	GE	INF	MPR
GDPGC	1.00										
DCPS	0.87	1.00									
DCFS	0.55	0.63	1.00								
BMS	0.72	0.81	0.73	1.00							
GCF	0.62	0.78	0.32	0.70	1.00						
IDVA	0.52	0.68	0.46	0.68	0.85	1.00					
MVA	-0.41	-0.3	0.03	-0.20	-0.28	0.10	1.00				
TOPEN	0.57	0.80	0.47	0.76	0.92	0.86	-0.24	1.00			
GE	0.78	0.63	0.48	0.56	0.54	0.62	-0.06	0.43	1.00		
INF	-0.39	-0.50	-0.17	-0.26	-0.45	-0.47	-0.12	-0.45	-0.39	1.00	
MPR	-0.23	-0.13	-0.28	-0.07	0.26	0.27	-0.24	0.30	-0.18	0.14	1.00

Source: Researcher's own computations.

For the pure cross-sectional data, for which there is one observation per year for the period 1965-2016, the study computes growth of the measures of interest for the time series data by running a least-squares regression of the logarithm of real per capita GDP and all variables employed in the analysis on a constant. This procedure is more robust to differences in the serial correlation properties of the data than simply using the geometric rate of growth (Watson, 1992). Accordingly, all variables are transformed into natural logarithmic forms.

5.5.2 Stationary Tests

The study adopted both the Augmented Dickey-Fuller (ADF) and the Phillips-Perron tests of Unit-Roots to examine the stationary of the variables used of the model. The variables were all converted into natural logs before the unit root tests. The results of the Unit-Root tests are reported in Tables 5.6. Both tests show that all the variables are non-stationary the level, hence not integrated at order zero; I(0). The variables are however proved to be stationary at the first difference and therefore are al integrated at order one, I(1). The results as displayed in Table 5.6 prove that cointegration analysis can be performed on the model since non-stationarity at level and stationary at first difference of the variables is a necessary condition.

Table 5.6: Unit Root Tests for all variables used in the study.

Variable	ADF Unit Root Test		Phillips-Perron Test	
	Level	First Difference	Level	First Difference
Log of per capita GDP (Economic Growth)	-0.5228 (0.9792)	-5.3867*** (0.0003)	-0.4920 (0.9809)	-5.3480*** (0.0003)
Log Industrial Value-added/GDP	-2.1269 (0.5188)	-7.1185*** (0.0000)	-2.1554 (0.5434)	-7.1189*** (0.0000)
Log of Manufacturing Value-added/GDP	-2.5735 (0.2936)	-7.6193*** (0.0000)	-2.7422 (0.2249)	-7.9367*** (0.0000)
Log of Domestic Credit to Private Sector/GDP	-1.6663 (0.7517)	-6.6318*** (0.0000)	-1.6514 (0.7581)	-6.6335*** (0.0000)
Log of Domestic Credit Provided by the Financial Sector/GDP	-2.5110 (0.3218)	-5.8560*** (0.0001)	-2.5110 (0.3218)	-5.8560*** (0.0000)
Log of Broad Money Supply/GDP	-1.7827 (0.6986)	-7.0887*** (0.0000)	-1.9165 (0.6314)	-7.0887*** (0.0000)
Log of Financial Sector Deposits/GDP	-0.5487 (0.8725)	-5.7428 (0.0000)***	-0.8569 (0.7938)	-5.7388 (0.0000)***
Log Gross fixed capital formation/GDP	-2.7958 (0.2055)	-7.4881 (0.0000)***	-2.8040 (0.2025)	-7.6305*** (0.0000)
Loge of Trade Openness (M+X/GDP)	-2.3165 (0.4176)	-5.2767 (0.0004)***	-2.1221 (0.5214)	-4.8773*** (0.0013)
Log Government Expenditure/GDP	-2.5282 (0.3139)	-6.0987 (0.0000)***	-2.0437 (0.5639)	-6.9937*** (0.0000)
Log of Inflation	-3.2541* (0.0857)	-9.5212*** (0.0000)	-3.2526* (0.0860)*	-10.2931*** (0.0000)
Log of Monetary Policy Rate	-1.8292 (0.6758)	-6.8849*** (0.0000)	-1.8657 (0.6575)	-6.8879*** (0.0000)

Source: Researcher's Own Computations, Note: ***, ** and * represent 1%, 5% and 10% levels of significance, respectively. Figures in parenthesis are MacKinnon (1996) one-sided p-values.

The study therefore proceeded to use the ARDL Bounds test procedure to estimate the model since the time series data are all integrated at the first difference.

5.5.3 Cointegration Tests

The study adopted the ARDL Bounds test procedure to examine the short-and long-run associations between financial development indicators, and control variables and the growth variables (Dependent variables: capital accumulation, Industrial productivity, manufacturing output and per capita GDP). The results of the ARDL Bounds tests indicate that there is a cointegration, and for that matter long-run association, between the dependent variables and the explanatory variable which include indicators of financial development. These results indicate that the variables used in this study are conintegrated and that they have long-run associations; and accordingly the Vector Error Correction Model can be estimated. Table 5.7 show the results of the cointegration tests.

Table 5.7: Test of Cointegration (ARDL Bounds Test)

Dependent Variable	F-Statistic	Level of Significance	Lower Bound	Upper Bound	Decision
$GCF_{i,t}$ (Capital Accumulation)	5.85***	10% 5% 1%	1.83 2.06 2.54	2.94 3.24 3.86	Evidence of Cointegration
$IDVA_{i,t}$ (Industrial Growth)	4.79***	10% 5% 1%	1.83 2.06 2.54	2.94 3.24 3.86	Evidence of Cointegration
$MVA_{i,t}$ (Manufacturing Growth)	3.35**	10% 5% 1%	1.83 2.06 2.54	2.94 3.24 3.86	Evidence of Cointegration
$GDPGR_{i,t}$ (Economic Growth	3.72**	10% 5% 1%	1.88 2.14 2.65	2.99 3.3 3.97	Evidence of Cointegration

Source: Researcher's own computations.

Table 5.7 indicates the results of the ARDL Bounds tests for cointegration. The tests reject null hypothesis that there is no cointegrating association between the dependent and explanatory variables at the 0.05 level of significance. This indicates that the variables used in this study are conintegrated and that they have long-run associations; and accordingly the long-run regression can be estimated. The study accordingly examined the long-run interaction of the financial indicators and the control variables with the dependent growth variables by applying the ARDL

and ECM to estimate the cointegration regression using Equation 5.13 to determine the general trend of the growth models in the long-run.

5.5.4 Test of Short Run Causality (Wald Tests)

The study performed the Wald Test to confirm whether there is short-run causality running from the explanatory variables to dependent variables or vice versa as suggested by the ARDL error correction model that produced the long-run results. Table 5.8 shows the results of the respective Wald Tests of the ARDL short- and long-run cointegration estimates.

Table 5.8: Wald Short Run Causality Test Results

Dependent Variable	F-Statistic	F-Stats Prob.	Chi-Square	Chi-Square Prob.	Decision
$GCF_{i,t}$ (Capital Accumulation)	10.86***	F(18,30) 0.0000	195.58***	Chi-Sq.(18) 0.0000	Evidence of Short-Run Causality
$IDVA_{i,t}$ (Industrial Growth)	11.83***	F(21,28) 0.0000	248.60***	Chi-Sq.(21) 0.0000	Evidence of Short-Run Causality
$MVA_{i,t}$ (Manufacturing Growth)	10.86***	F(18,30) 0.0000	195.58***	Chi-Sq.(18) 0.0000	Evidence of Short-Run Causality
$GDPGR_{i,t}$ (Economic Growth	12.36***	F(21,30) 0.0000	205.56***	Chi-Sq.(21) 0.0000	Evidence of Short-Run Causality

Source: Researcher's own computations. Note: ***, ** and * represent 1% , 5% and 10% levels of significance.

The test results in Table 5.8 indicate that the respective coefficients of the explanatory variables at lags 2, numbering 21, of the respective estimations are not zero. The test proves that there is short-run causality running from financial development indicators and the control variables to the respective dependent variables.

5.5.5 Structural Breaks

The test for structural breaks was conducted using the Chow test. The tests for structural breaks are relevant given the crisis period that Ghana went through in the 1980s which necessitated initiation of reform policies by the IMF and the World Bank in the early and late 1980s. Table 5.9 shows the Chow test results for structural breaks. The results of the Chow Test form the basis

for the final estimations of the impact of financial development on economic growth in Ghana indicated in section 11.6.

Table 5.9: Structural Breaks (Chow Test)

Year	F-Statistic	Prob. F(8,36)	Log Likelihood Ratio
1983	2.397934	0.0347**	22.21151
1990	0.595829	0.7748	6.465937

Source: Researcher's own computations. Note: * denotes rejection of null hypothesis of no structural breaks at 5% level of significance.

The results of the structural breaks test in Table 5.9 suggest the existence of a weak structural break in 1983. This break reflects the beginning of the economic crisis that beset Ghana in the 1980s through to 1988 when reforms in the financial sector were implemented. The crisis resulted in slowdown in economic growth and formed the bases for the implementation of structural adjustment programmes and financial sector reforms in Ghana in order to stimulate growth of the economy. Since the test identified structural break in the trend of real GDP in 1983. Following Adu *et al.* (2013), the study then models this break by constructing a shift dummy taking the value zero (0) before the breakpoint (i.e. 0 for 1965–1983) and one (1) at the breakpoint and beyond (i.e. 1 for 1984–2016). The 1984 break- point identified corresponds to the year immediately following the implementation of the ERP policies which resulted in a significant shift in real GDP growth from -4.56 per cent (1983) to 8.64 per cent (1984). Killick (2010) suggests that it is conventional to split the SAP and ERP era into two periods: 1984-86 and 1987-89, the former concentrating on macro-economic stabilisation and the latter on the longer term, structural developmental issues.

5.6 Chapter Summary

This chapter described the methodology applied in this study, the estimation techniques employed and data sources. The methodology consists of modelling industrial sector growth and economic growth and their determinants which are mainly macro-economic and financial development variables. Given that these variables are stochastic in nature, the methodology also revolves around modelling their stochastic properties and interactions with GDP and industrial value-added-to-GDP ratio.

In terms of the estimation procedure, the study applied the mean-variance approaches of the CaR and regression analysis using BVAR and Monte Carlo simulations. The econometric tests are undertaken to simulate the response of the economy to macro-economic shocks. The same tests are applied to examine the response of government to decreases in economic growth and its components which is undertaken by estimating the economic reaction function.

The methodology adopted in this study consists of three stages. The stages include determining the financial drivers of economic growth and reaction of the economy to macro-economic shocks. The methodology also includes an analysis of the relationship between financial development and the components of growth. This analysis is undertaken to determine the optimal or tipping point beyond which financial developments affect growth; such a point provides valuable information on optimal financial sector management.

To assess the impact of financial development on real sector growth, the study uses gross fixed capital formation, industrial advancement and manufacturing output growth as components of economic growth. The variable economic growth equals to the rate of real per capital GDP growth. The next three chapters examine the relationships between financial development indicators and gross fixed capital formation, industrial advancement and manufacturing output growth in Ghana. Gross fixed capital formation, industrial advancement and manufacturing output growth are considered as the sources of economic growth (Beck *et al.*, 2000; Naceur *et al.*, 2017; UNCTAD, 2014).

CHAPTER SIX

FINANCIAL DEVELOPMENT AND CAPITAL ACCUMULATION IN GHANA

6.1 Introduction

The large number of theoretical literature on the finance growth-nexus shows that financial developments and the level of intermediary services offered by the financial system within the economy can reduce the costs of acquiring information about firms and managers, and lower the costs of conducting transactions (Gertler, 1988; Levine, 1997; Levine *et al.,* 2000). Accordingly, better and efficient financial intermediation can effectively enhance the provision of more accurate information about production technologies and exert corporate governance. Thus better financial intermediaries can enhance resource allocation and accelerate growth (Boyd & Prescott, 1986; Greenwood & Jovanovic, 1990; King & Levine, 1993b, Levine 2000). Again, the facilitation of risk management practices, improving the liquidity of assets and credit availability to the private sector, and reducing trading costs, the financial systems can promote investment in higher-return activities (Obstfeld, 1994; Bencivenga & Smith, 1991; Greenwood & Smith, 1997). Thus, the study attempts to shed some empirical light on whether financial developments have affected the capital accumulation in the economy of Ghana based on the propositions that emerge from the theoretical literature. This chapter of the study, specifically, examines whether financial developments in Ghana has induced economic growth through increased capital accumulation. The analysis is premised on the fact that innovations motivated by investment has positive externalities that go far beyond the productivity gains achieved in the same sector, contributing widely to productivity growth in other sectors and thus fuelling overall economic growth (UNIDO, 2103). Financial sector development is important not only for fostering the economic growth process, but also for dampening the volatility of the growth process (Beck, 2012; Beck *et al.,* 2012). Efficient financial systems can alleviate the liquidity constraints on firms and facilitate long-term investment, which ultimately reduces the volatility of investment and growth (Philippe Aghion et al., 2010).

The primary measures of financial development for this analysis are domestic credit to private sector, total domestic credit provided by the financial sector, broad money supply and total

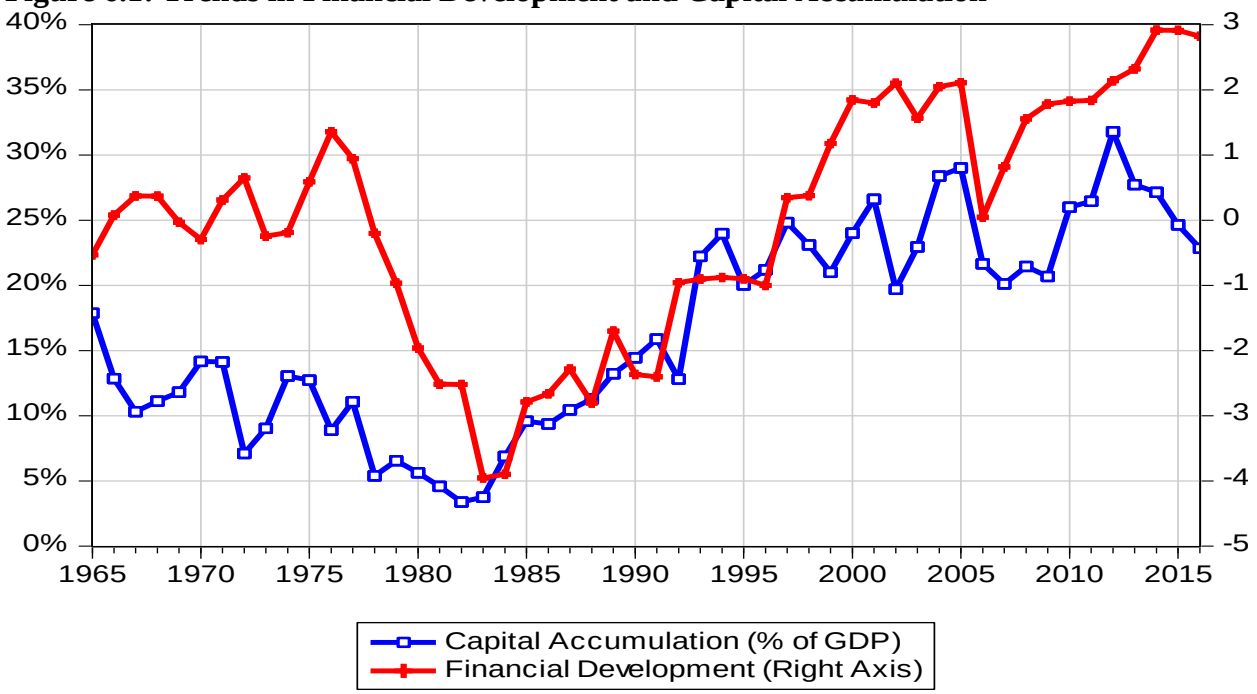
financial sector deposits. The full details of the financial development indicators are as specified in Chapter Five and all the indicators are expressed as percentage shares of GDP.

This chapter of the study examines the impact of financial development on capital accumulation in Ghana and uses gross fixed capital formation as a component of economic growth and captures the degree of investment in the economy. The variable economic growth equals to the rate of real per capital GDP growth. To assess the strength of an independent relationship between growth and financial development, the study introduces control variables as suggested by the finance-growth literature. The logarithm of initial real GDP per capita is introduced to control for economic convergence. The growth of labour force is included to control for growth in human capital. The study uses the trade-to- GDP ratio, the ratio of government consumption to GDP, and the level of inflation and monetary policy rate to control for the macro-economic state in the economy.

6.2 Financial Developments and Capital Accumulation in Ghana

Figure 6.1 shows the relationship between financial developments and capital accumulation in Ghana over the period 1965 to 2016.

Figure 6.1: Trends in Financial Development and Capital Accumulation



Source: Researcher's own computations.

The graphical display in Figure 6.1 shows that though there was declining investment towards the mid-1960s, sharp improvements but unstable seemed to characterised investment in Ghana. The trend in investment showed consistent declines towards the early 1980s. These declines give the indication that the financial shallowing that characterised the financial system at the time affected investments in Ghana. The financial developments in Ghana had been relatively volatile between 1965 and the mid-1980s and the poor performance of the financial system reduced both public and private investments. The relatively poor performance of the financial sector between 1976 towards 1984 seems to have substantially declined capital formation in Ghana. Though investments growth exhibit volatilities, it seems to have recorded relative higher rates in response to the improvements in the financial system in the post-reform era of 1984—2016. This observation is consistent with the view of Brownbridge, Gockel and Harrington (2000) that policy reforms and growth of the economy in the 1980s brought about some modest recovery in public investment.

Amidst the seeming volatilities, the capital formation growth in the post financial reform era 1984 and 2016 has witnessed relatively higher shares in GDP. The share of capital formation in GDP in the pre financial reform period of 1984—2016 recorded an average of 9.51 per cent and recorded inconsistent declines from a peaked at 17.87 per cent in 1965. The post reform era of 1984-2016 witnessed an average capital formation share in GDP of approximately 21.07 per cent and recorded at highest rate of 31.78 per cent in 2012. Financial developments may have contributed to the relative improvement in investment growth in the post financial reform period although, since 2013, its share in GDP has witnessed consistent decline to a 22.84 per cent in 2016. The later declining trend is consistent with the observation by the Bank of Ghana (2016) that the overall level of savings and investments in Ghana has remained comparatively low despite increasing financial sector stability and deeper financial intermediation. The relationship and the impact of financial developments on capital formation in Ghana are assessed empirically in the regression results presented below.

6.3 Results and Analysis

The study used the GMM estimation technique to run the regression using Equation (5.4) in Chapter Five with gross fixed capital formation to GDP as the dependent variable. The GMM regression estimation is undertaken using each financial development indicator together with a

set of other control variable. Finally, the study estimates the short- and the long-run estimation measuring the behaviour and impact of the financial development on capital accumulation from the medium-term towards the long-term, using the financial development indices produced from the PCA approach. The short- and long-run models are estimated using the ARDL cointegration approach.

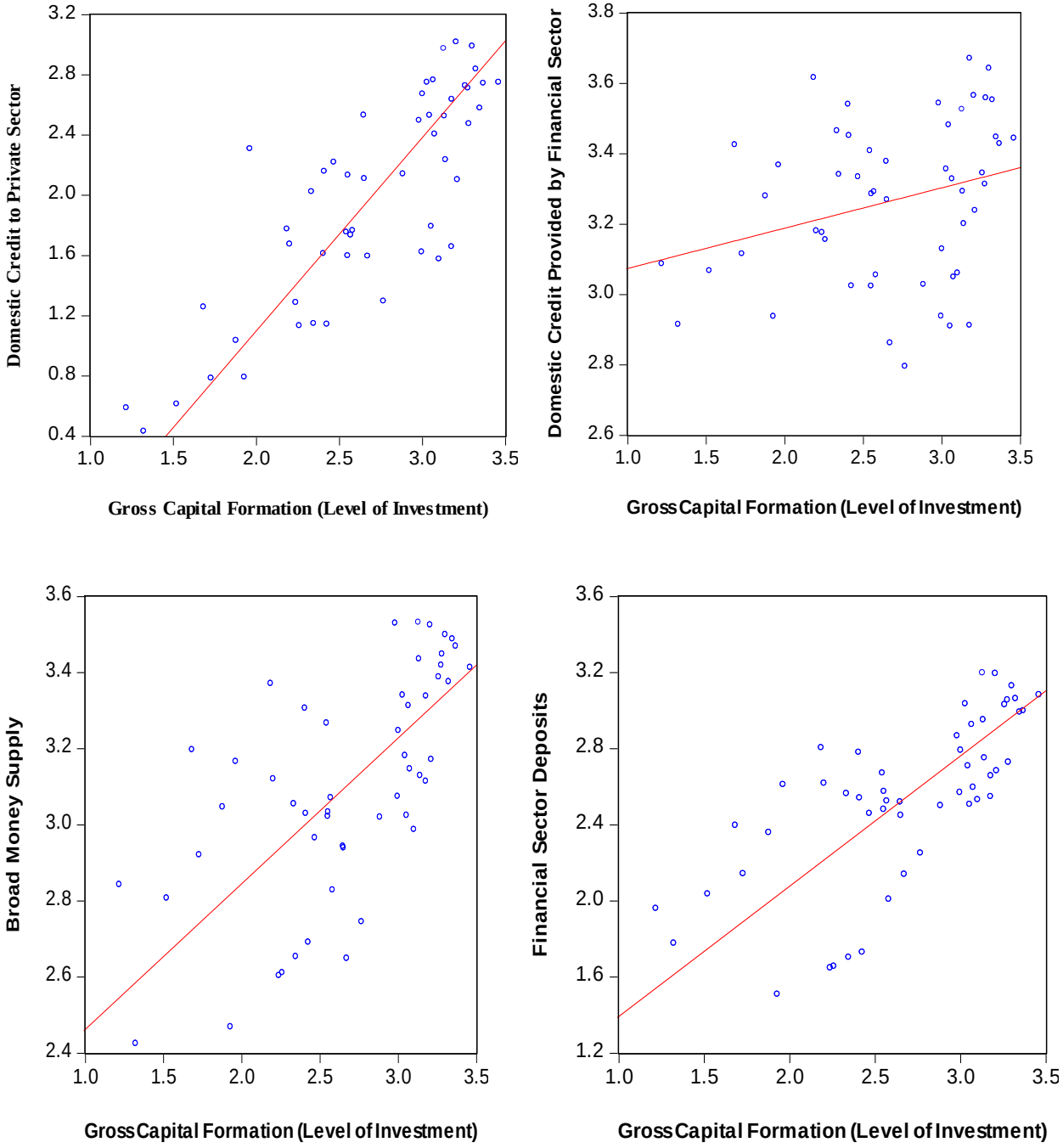
6.3.1 Unconditional Correlations

The analysis of Figures 6.2 indicates data plots display in simple scatter plots between each of the financial indicators and capital accumulation. The data included for each financial dimension—access to credit, depth of financial system and openness of the financial sector—are represented in the logarithmic forms as discussed in the data in Chapter Five. As shown in the scatter plots and the orthogonal regression line, there is evidence of a relatively strong relationship between the financial indicators and capital formation in Ghana. Domestic credit to private sector shows a relatively stronger positive association with capital formation.

6.3.2 Baseline Regression Results

The results of the parsimonious baseline equation specification are estimated using Equation (5.4) and within the context of financial and structural reforms. The variables of interest are the financial development indicators and their impacts on capital accumulation. The regression results are presented in Tables 6.1 and 6.2.

Figure 6.2: Scatter Plots of Financial Development Indicators and Capital Accumulation



Source: Researcher's own computations.

6.3.2.1 Domestic Credit to Private Sector and Capital Accumulation

The regression results from Tables 6.4 and 6.5 present the relationship between domestic credit to private sector and capital accumulation. The results show that there is a positive but statistically insignificant association between domestic credit to private sector and capital

accumulation within the context of financial and structural reforms. This is consistent with the findings of Eshun *et al.* (2014), Frimpong and Marbuah (2010), and Sakyi *et al.* (2016) who also found that credit to private sector has no significant effect on private investment in the short-run. The results, however, show that the impact of private credit increased marginally as a result of the implementation of structural adjustments policies in Ghana. The insignificant impact gives the indication that perhaps improvements in financial resources and credit allocations to the private sector are not robustly enhancing capital formation in Ghana. Such conditions may occur when the financial system consider investments as more riskier or offer lower lending returns as well as when the private sector reduces or declines borrowing from the banks and other financial institutions (Brownbridge *et al.*, 2000). This gives the indication that policy interventions and the general macro-economic environment in the post-reform era has only had marginal impact on capital accumulation in Ghana with regards to private credit provided to private sector enterprises. This conclusion is consistent with the observations that domestic private investors and small enterprises face financing constraints in the bank credit markets (Beck & Demirguc-Kunt, 2006; Brownbridge *et al.*, 2000).

6.3.2.2 Total Domestic Credit Provided by the Financial Sector and Capital Accumulation

The parsimonious baseline results indicate a negative and statistically significant relationship between total domestic credit offered by the financial sector and capital accumulation. The results show that the impact of the negative association was higher between within the context of structural adjustment suggesting that policy reforms and conditions in the macro-economic environment have rather dampened capital growth at a higher magnitude in the short to medium term. This development is suggestive of the fact that there may be inefficiencies in the financial sector and financial intermediaries are offering financing bad or riskier investment projects. The negative association thus implies that increases in the total volume of credit offered by the financial sector may dampen capital growth and investment, to some extent.

Table 6.1: GMM Estimation of Capital Accumulation and Financial Development Indicators, Financial Reforms (1965-2016)

Variables	Dependent Variable: GCF (Capital Accumulation)					
	DCPS Model (1)	**DCFS Model (2)**	**BMS Model (3)**	**FSD Model (4)**	**FDIndex1 Model (5)**	**FDIndex2 Model (6)**
C	0.908[0.584]	0.176 [1.577]	0.126***[0.080]	-0.0003[-0.002]	-1.383[-0.654]	-0.054[-0.034]
LnDCPS	0.079 [0.661]					
LnDCFS		-0.352** [-2.559]				
LnBMS			-0.289 [-1.067]			
LnFSD				-0.076 [-0.343]		
LnFDIndex1					-0.058 [-1.313]	
LnFDIndex2						-0.099*** [-2.785]
LnGDPGC	-0.284 [-1.067]	0.059 [0.232]	0.017 [0.062]	-0.088 [-0.354]	0.111 [0.351]	-0.085 [-0.389]
LnIDVA	0.055 [0.230]	0.181 [0.808]	0.167 [0.616]	0.140 [0.521]	0.215 [0.802]	0.108 [0.509]
LnTopen	0.563*** [4.351]	0.615*** [6.241]	0.600*** [4.652]	0.585*** [4.182]	0.611*** [4.969]	0.612*** [6.670]
LnGE	0.383* [1.762]	0.200 [1.068]	0.250 [1.124]	0.306 [1.475]	0.208 [0.919]	0.252 [1.493]
LnMPR	-0.092 [-0.921]	-0.112 [-1.279]	-0.149 [-1.266]	-0.128 [-1.022]	-0.152 [-1.391]	-0.080 [-0.959]
LnINF	0.033 [0.613]	0.022 [0.407]	0.041 [0.580]	0.028 [0.491]	0.029 [0.478]	0.021 [0.407]
LnPGR	0.238 [1.086]	-0.032 [-0.163]	0.009 [0.035]	0.141 [0.475]	-0.022 [-0.082]	0.048 [0276.]
FSR	0.308** [2.667]	0.257** [2.139]	0.383*** [2.735]	0.347*** [1.809]	0.355*** [2.811]	0.205 [1.595]
Test Diagnostics	R^2 =0.93 D-Watson =1.9 J-Stats =0.00	R^2 =0.93 D-Watson =2.05 J-Stats =0.00	R^2 =0.93 D-Watson =2.00 J-Stats =0.00	R^2 =0.93 D-Watson =1.9 J-Stats =0.00	R^2 =0.93 D-Watson =2.0 J-Stats =0.00	R^2 =0.94 D-Watson =2.0 J-Stats =0.00

Source: Researcher's own computations.

Table 6.2: GMM Estimation of Capital Accumulation and Financial Development Indicators, Structural Reforms (1965-2016)

Variables	Dependent Variable: GCF (Capital Accumulation)					
	DCPS Model (1)	**DCFS Model (2)**	**BMS Model (3)**	**FSD Model (4)**	**FDIndex1 Model (5)**	**FDIndex2 Model (6)**
C	-1.003[0.642]	-1.421 [-1.160]	-1.597[-1.079]	0.624[0.519]	-2.016[-0.959]	-1.089 [-1.142]
LnDCPS	0.094 [0.777]					
LnDCFS		-0.417*** [-3.073]				
LnBMS			0.082 [0.339]			
LnFSD				0.327** [2.304]		
LnFDIndex1					-0.005[-0.126]	
LnFDIndex2						-0.132*** [-5.008]
LnGDPGC	0.077 [0.280]	0.421* [1.842]	0.155 [0.569]	-0.240 [-1.056]	0.256 [0.796]	0.187 [1.259]
LnIDVA	0.491* [1.704]	0.611** [2.292]	0.524* [1.897]	0.376 [1.628]	0.545* [1.726]	0.542** [2.638]
LnTopen	0.325** [2.424]	0.386*** [3.046]	0.354** [2.468]	0.322** [2.626]	0.376** [2.521]	0.338*** [3.066]
LnGE	0.115 [0.463]	-0.068 [-0.359]	0.079 [0.333]	0.205 [1.058]	0.037 [0.146]	0.008 [0.059]
LnMPR	-0.139 [-1.023]	-0.179 [-1.557]	-0.163 [-1.359]	-0.184* [-1.864]	-0.160 [-1.228]	-0.180* [-1.867]
LnINF	0.039 [0.833]	0.027 [0.546]	0.025 [0.469]	0.019* [0.392]	0.029 [0.656]	0.029 [0.641]
LnPGR	-0.013 [-0.049]	-0.324 [-1.284]	-0.018 [-0.061]	0.115 [0.429]	-0.-081 [-0.263]	-0.277 [-1.299]
SR	0.394** [2.689]	0.370*** [2.892]	0.407*** [3.113]	0.464*** [4.193]	0.393*** [2.863]	0.389 [3.359]
Test Diagnostics	R^2 =0.93 D-Watson =1.5 J-Stats =0.00	R^2 =0.94 D-Watson =1.9 J-Stats =0.00	R^2 =0.93 D-Watson =1.5 J-Stats =0.00	R^2 =0.93 D-Watson =1.7 J-Stats =0.00	R^2 =0.92 D-Watson =1.5 J-Stats =0.00	R^2 =0.94 D-Watson =2.09 J-Stats =0.00

Source: Researcher's own computations.

6.3.2.3 Broad Money Supply and Capital Accumulation

The baseline regression results show that the relationship between broad money supply (M2/GDP) and investment is negative but statistically insignificant when consideration is given to financial reforms. The inverse association between broad money supply and investment is consistent with the findings of Eshun *et al.* (2014). The association, however, changes to be positive although the impact is insignificant from the perspective of structural and the general macro-economic situation. During the early 1980s, the economy experienced financial shallowing with M2 falling from 26.0 per cent of GDP in the mid-1970s to only 13.0 per cent in the mid-1980s. The reduction suggested that financial intermediation became shallower and resulted in risk-aversion demand for physical wealth, increased informal financial activities and capital flight (Brownbridge *et al.*, 2000). Similarly, increases in broad money supply experienced in the post financial reform era have somehow resulted in high level of financial intermediation has resulted in risk-loving attitudes and may have caused banks and financial institutions to embark on competitive strategies to invest in high return risky projects and this is resulting in adverse effects on capital accumulation. The results imply that policy interventions have played an essential role in minimising the negative effect of broad money supply on capital formation, albeit insignificantly. The results further suggest that broad money supply does not significantly affect capital accumulation.

6.3.2.4 Financial Sector Deposits and Capital Accumulation

The impact of growth in financial sector deposits on capital formation, has been negative but statistically insignificant in the estimation with financial reforms. On the other hand the results indicate a relatively strong statistically significant positive association between financial sector deposits and capital accumulation. The positive change may be attributable to the implementation of policy reforms in Ghana in the period under examination particularly, between the 1984-2016 period. The impact implies that the financial system is supporting the investment activities through facilitation of project and investment-related transactions.

6.3.2.5 Financial Development Indices and Capital Formation

Tables 6.1 and 6.2 also provide the regression results indicating the impact of the financial development indicators on capital formation using each of the indices produced using the principal component analysis. This regression serves as a robustness check in the parsimonious

equation estimations and is also relevant in understanding the combined impact of the financial development indicators and its interactions with the macro-economic variables within the capital accumulation model framework using Equation (5.4). The results show that both FDIndex1 and FDIndex2 show negative association between financial development and capital accumulation in both financial and structural reform scenarios. The negative association is, however, statistically significant for the FDIndex2 and this suggests that inefficiencies in the expanding financial sector may be having adverse effect on capital accumulation in Ghana. The negative association of both indices means that the total credit offered in the economy play a dominating role in determining rate of impact of the financial sector on capital accumulation. This negative association between total credit offered in the economy and capital accumulation gives an indication that financial institution may be either inefficient or are lending sizeable levels of credit to groups other than the real sectors of the economy. To this extend the overall size of credit offered by the financial intermediary sector could weaken economic growth in Ghana. Adusei (2013) argues that a negative association between total credit and economic growth smacks of excessive liberalisation of the financial intermediary sector resulting in over-lending or careless lending. De Gregorio and Guidotti (1995) have observed that over-lending or careless lending could actually trigger a reduction in economic growth, due to its association with high, but less efficient, investment. This result is consistent with the view of Beck (2012) that large number of creditors, compared to a real sector, undermine market discipline and encourage banks to take too much risk, ultimately resulting in fragility (see Carletti, 2008).

6.3.3 Short- and Long-run Regression Results

The study further uses the ARDL and the VAR estimation techniques to determine the short- and long-run associations between financial development and capital accumulation in Ghana using Equation (5.13). The conintegration test results presented in Tables 5.7 and 5.8 in Chapter Five indicated the existence of short- and long-run association between the financial development and capital accumulation. Accordingly, the short- and long-run impacts are tested using the VECM within the ARDL approach to estimate the cointegration and VECM regressions. The results are presented in Tables 6.4 and 6.5.

6.3.3.1 Diagnostic Checks and Model Stability

The regression results for the short-run and long-run models are essentially significant and do not suffer from any serial correlation. The adjusted R-squared, F-tests and the Durbin Watson test imply suitability of the model and do not suggest autocorrelation of the residuals. All the variables used in the analysis were integrated of order 1, I(1). Moreover, the signs of the main explanatory variables are as expected. Furthermore the model shows no heteroskedasticity as shown by the results in Table 6.3.

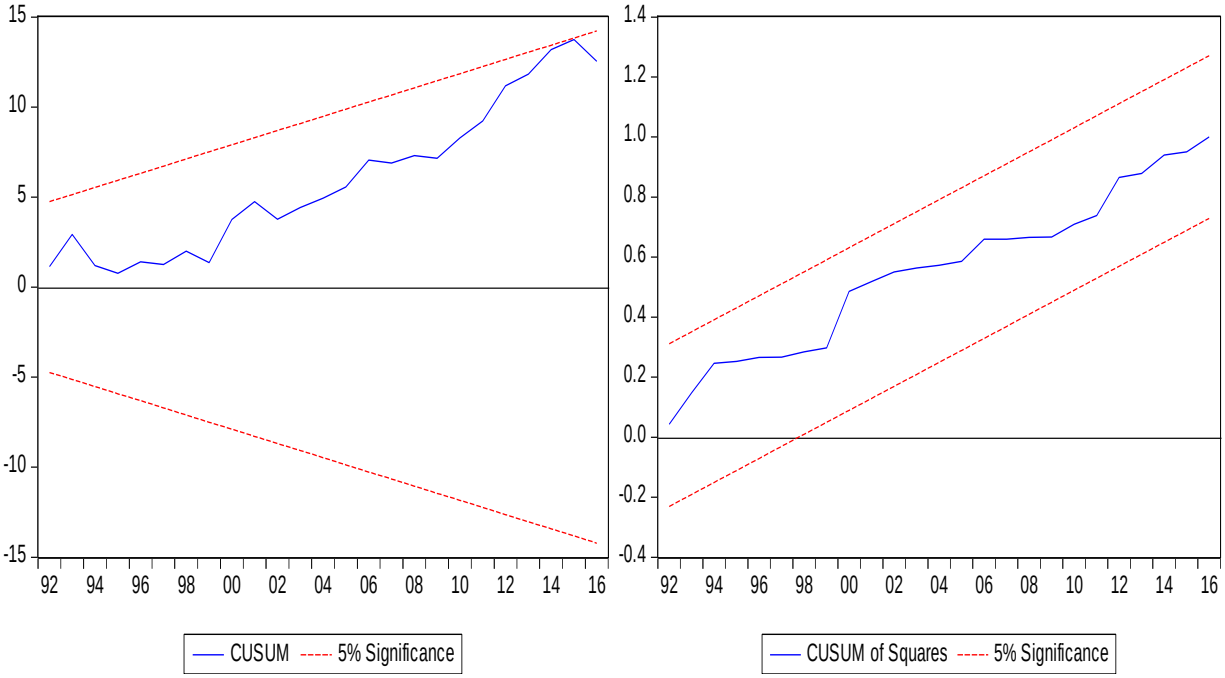
Table 6.3: Heteroskedasticity Test: (Breusch-Pagan-Godfrey)

F-statistic	0.966728	Prob. F(22,27)	0.5273
Obs* R-Squared	22.03117	Prob. Chi-Square(22)	0.4580
Scaled explained SS	4.733243	Prob. Chi-Square(22)	1.0000

Source: Researcher's own computations.

The results in Table 6.3 show no evidence of heterosdasticity. To reject the null hypothesis of heteroskedasticity, a probability value (or p-value) of less than 0.05 is required. Nevertheless, the heteroskedasticity tests based on the Breusch-Pagan-Godfrey test in Table 5.5 and 5.6 report p-values anywhere close to 5 per cent. Accordingly, the hypothesis no heteroskedasticity cannot be rejected, implying that heteroskedasticity does not seem to be a problem in the regression specification. The structural stability of the results from the short- and long-run ARDL estimations were examined using the Cumulative Sum of Recursive residuals (CUSUM) and the CUSUM of square (CUSUMSQ) tests proposed by Brown *et al.* (1975) to assess the parameter constancy. The results are shown in Figure 6.3.

Figure 6.3: CUSUM Test of Stability for Investment Model



Source: Researcher's own computations.

In Figure 6.3, the results from the CUSUMSQ and CUSUM show that the estimated ARDL short- and long-run results are stable. The results indicate the absence of any instability of the coefficients because the plot of the CUSUMSQ and CUSUM statistic are confined within the 5.0 per cent critical bounds of parameter stability.

6.3.3.2 Specification of the Short-Run Cointegration Investment Model

As a precondition for examining the long-run causality, the coefficient of the cointegrating equation [CoinEq(-1)] must be negative in sign and statistically significant. Since the coefficient of the cointegration equation is -1.303*** and statistically significant, it is concluded that there is long-run causality running between the explanatory variables to capital formation. Based on the short-run results, the Cointegrating Regression Model equation is formulated in Equation (6.1).

CointEq. = LNGCF - (0.1036*FDINDEX1 - 0.0910*FDINDEX2 - 0.7564*LNGDPGC - 0.5001*LNIDVA + 0.5868*LNTOPEN + 0.7217*LNGE - 0.0399*LNMPR + 0.0611*LNINF + 0.2632*LNPGR + 0.1970*FSR + 4.7033). (6.1)

6.3.3.3 Analysis of Short-run Impact of Financial Developments on Capital Accumulation

The results of short-term effects of financial development as well as the control variables on capital accumulation in Ghana are summarised in Table 6.4.

Table 6.4: Estimated ARDL Short Run Coefficients and Error Correction Estimate

Dependent Variable: Capital Accumulation (GCF)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNGCF(-1))	0.144	0.116	1.242	0.2247
D(FDINDEX1)	0.135**	0.055	2.444	0.0213
D(FDINDEX2)	-0.029	0.054	-0.542	0.5922
D(LNGDPGC)	1.034*	0.572	1.804	0.0823
D(LNGDPGC(-1))	3.007***	0.723	4.157	0.0003
D(LNIDVA)	0.334	0.223	1.498	0.1456
D(LNIDVA(-1))	0.635**	0.246	2.580	0.0156
D(LNTOPEN)	0.250	0.162	1.542	0.1347
D(LNGE)	-0.134	0.219	-0.613	0.5446
D(LNGE(-1))	-0.665***	0.234	-2.835	0.0086
D(LNMPR)	-0.360**	0.140	-2.564	0.0162
D(LNINF)	0.079*	0.041	1.921	0.0653
D(LNPGR)	-0.801**	0.366	-2.186	0.0376
D(FSR)	0.256**	0.119	2.152	0.0405
CointEq(-1)	-1.303***	0.167	-7.775	0.0000
R2 = 0.83, Adj. R2 = 0.70, F-Statistic: 6.33, Prob.(F-Stat) = 0.000, D-Watson: 1.99				

Source: Researcher's own computations. Note: ***, **, * represent 1%, 5% and 10% levels of significance, respectively.

The results indicate that the short-run association of financial development index 1 and capital accumulation is positive and statistically significant. The result of significant association between capital accumulation and financial development index 1 suggests that domestic credit to

private sector exert a dominant influence of capital formation in the Ghanaian economy in the short-term. The results indicate that a 1.00 per cent rise in the financial development is accompanied by about 0.135 percentage unit expansion in the capital formation in the short-run. The results imply that increases in the rate of private credit to business and enterprises result in capital advancement. The finding is similar to what was observed in the long-run period and may suggest that Ghanaian financial institutions offer relatively effective intermediary services, through private credit and high liquidity, which increase capital formation and induce greater investment efficiency of private enterprises, thereby impacting on growth positively.

On the other hand, financial development index 2 showed a negative but statistically insignificant association with capital formation. This suggests that finance could negatively affect capital formation in some instances and there may be reasons accounting for this development. Firstly, the existence of inefficiencies on the financial system as may be the case as a result of over-lending or careless lending can adversely impact on short- and long-term growth of capital. Secondly, bad or poor investment projects and continuous financing of such projects may ultimately cause investment growth to dampen. Thirdly, diversion of project-specific funds or credit may result in a decline of investment though the growth in the size of credit may be high. The study thus concludes that the negative associations between some financial development indicators and capital accumulation observed in the parsimonious equation estimation in Table 6.1 and 6.2 do have dominating influence on capital formation in both the short- and long-run.

The study employed five control variables in view of the consideration that they are relevant variables in shaping capital formation. The industrial value-added, which is a proxy for industrial sector growth, was found to relate positively with the pace of capital formation although the association is insignificant in the short-run. The short-run results, however, indicate that consistent growth of the industrial sector lead to statistically significant positive improvement in capital formation at the 5.0 per cent level. The level of trade openness showed a positive but statistically insignificant impact on capital accumulation. This implies that though trade is good for capital growth, the level of trade openness does not significantly influence capital growth in the Ghanaian economy in the short-run. Government spending and growth in monetary policy rate showed negative associations with capital formation. The results indicate that progressive

increases in the government spending significantly affect capital formation negatively at the 1.0 per cent level. In the same way, increases in the monetary policy rate negatively impact capital formation at the 5.0 per cent significant level. Also, the population growth demonstrated a negative and statistically significant relationship with capital formation in the short-run. Given its coefficient of minus 0.801, it implies 1.0 per cent boost in population growth is matched by approximately 0.8 per cent decrease in capital accumulation. Surprisingly, the results showed a positive and statistically significant association between inflation rate and capital formation. This is thus inconsistent with view that in most situations, higher rates of inflation become a disincentive in the economy. Finally, the findings suggest that financial and structural reforms in Ghana have positively affected the extent of capital formation or investment. This implies that policy reforms implemented in the early and late 1980s have resulted in improvement in investment in Ghana.

6.3.3.4 Analysis of Long-run Impact of Financial Development on Capital Accumulation

The results of long-run impact of financial development on capital accumulation are presented in Table 6.5. The long-run results confirm the statistically significant positive association between financial development index 1 and capital formation observed in the short-run. The positive impact is attributable to increases in private credit and financial sector liquidity, as measured by financial sector deposits. The results indicate that a 1.0 per cent rise in financial development index 1 is accompanied by about 0.103 per cent expansion in the capital formation in the long-run. The positive impact of financial development on capital accumulation in Ghana is consistent with developments in Ghana. During the pre-reform period in Ghana, the financial system was used as a conduit for financing large-scale investment projects that were mainly initiated by the government through the use of credit allocation controls and interest rate ceilings policies in support of the rapid industrialisation strategy. Also, in the post-reform period, the financial system has played an important role in advancing greater proportion of credit to the private sector and has thus provided finance for various public and private investments in Ghana. The finding is consistent with Lu *et al.* (2008) who found a long-run positive relationship between financial development and capital accumulation.

Table 6.5: Estimated ARDL Long Run Coefficients

Dependent Variable: Capital Accumulation (GCF)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDINDEX1	0.103**	0.043	2.388	0.0242
FDINDEX2	-0.091**	0.036	-2.461	0.0205
LNGDPGC	-0.756**	0.312	-2.417	0.0227
LNIDVA	-0.500*	0.271	-1.842	0.0763
LNTOPEN	0.586***	0.113	5.154	0.0000
LNGE	0.721***	0.249	2.890	0.0075
LNMPR	-0.039	0.066	-0.603	0.5513
LNINF	0.061*	0.033	1.819	0.0800
LNPGR	0.263	0.196	1.342	0.1906
FSR	0.196**	0.082	2.377	0.0248
C	4.703**	1.979	2.376	0.0248
R2 = 0.83, Adj. R2 = 0.70, F-Statistic: 6.33, Prob.(F-Stat) = 0.000, D-Watson: 1.99				

Source: Researcher's own computations. Note: ***, **, * represent 1%, 5% and 10% levels of significance, respectively.

The results further confirm the negative association between capital formation and financial development index 2 observed in the short-run estimates which indicated a statistically significant negative relationship in the long-run. The results indicate that a 1 per cent rise in financial development index 2 is causes about 0.091 per cent decline in the capital formation in the long-run. The results suggest that financial development can strongly contribute positive to capital formation but can equally lead to reduction in capital formation in some instances. Thus the results give an indication of the existence of an optimal size of financial intermediation beyond which capital growth can dampen. Equally, inefficiencies in the financial sector that manifests through poor, bad or riskier investment decision, and sometimes corruption can slowdown investment growth. These findings are similar to what was observed in the short-run period and may suggest that Ghanaian financial institutions offer relatively effective

intermediary services which increase capital formation and induce greater investment efficiency of private enterprises, thereby impacting on growth positively, to some extent. Financial development can be both good and bad in determining the extent of capital growth or investment.

With regards to the control variables, industrial sector growth showed a negative and statistically significant association with capital formation in Ghana at the 10.0 per cent level in the long-run. The negative long-run association between capital formation and industrial sector growth is inconsistent with the short-run observation. The results indicate that a given 1.0 per cent rise in industrial sector growth leads to a 0.50 per cent decline in capital formation in the long-term. This implies that the long-term impact of growth of the industrial sector shows a dampening effect on capital formation in Ghana.

The level of trade openness showed a positive and statistically significant impact on capital accumulation in the long-run. This implies that trade is good for capital growth in both the medium-term towards the long-term, and the advancement in trade significantly influences capital growth in the Ghanaian economy in the long-run. Government spending showed positive association with capital formation in the long-run. The results thus give the indication that the negative association between government spending and capital formation may be perhaps a short-term phenomenon since in the long-run improved government spending significantly affect capital formation at the 1.0 per cent level. The results indicate that a given 1.0 per cent rise in government spending increases capital accumulation by 0.72 per cent in the long-term at the 1.0 per cent significance level. The results thus suggest that an increase in government consumption expenditure may significantly contribute to the growth of the real sector. This revelation is in line with Barro (2006) and Barro and Sala-I-Martin (2006, 1995) that government productive spending such as spending on education, infrastructure or some other form of productive capital promotes growth.

On the other hand, increases in the monetary policy rate maintained the negative relationship with capital formation although this association is not significant in the long-term. This is consistent with theory as increases in the lending rates have the potential to negatively affect growth of the real sector. Also, the population growth demonstrated a positive but statistically insignificant relationship with capital formation in the long-run. This implies that in the long-run,

population growth is good for capital formation although the results show that this association is insignificant. The positive and statistically significant association between inflation rate and capital formation showed persistence in the long-run results. This suggests that there may be some inefficiency in the economy that is corrected by higher rates of inflation. Finally, the long-run findings confirm that financial reforms in Ghana have positively affected the extent of capital formation. This implies that consistent financial reforms in the Ghanaian economy have augured well for investment in capital.

6.3.3.5 The Direction of Causality of Financial Development Indicators and Capital Accumulation

The test results give the indication that more than two of the variables are I(1) and cointegrated means that a causal relationship exists in one direction according to Engle and Granger (1987). The study, therefore, conducted Granger causality test to ascertain the direction of the causal relationship between capital growth and financial development indicators using Equation (5.16). The results of the Granger-causality tests are presented in Table 6.6.

The results from Table 6.6, suggests that the null hypothesis that changes in domestic credit to private sector do not Granger causes capital growth cannot be rejected. This implies that changes in domestic credit to private sector do not significantly explain variations in capital accumulation in Ghana. The alternate null hypothesis that investment does not Granger cause the level of domestic credit to private sector is rejected at the 1.0 per cent level of significance. This implies that changes in level of investment or capital accumulation substantially explain the variations in domestic credit to private sector in Ghana. The results also suggest that the rate of growth of investment in Ghana informs the rate level of credit provided to the private sector enterprises. Therefore, it is concluded that there is a uni-directional relationship between domestic credit to the private sector and capital accumulation in Ghana with growth running form investment to private credit.

Similarly, the financial indicators—broad money supply and total financial sector deposits—have uni-directional associations with capital accumulation with growth running from increased investment. The null hypotheses that broad money supply and financial sector deposits do not Granger cause capital accumulation cannot be rejected as indicated in Table 6.6. However, the null hypotheses that the level of investment does not Granger cause variations in broad money

supply and financial sector deposits are jointly rejected at the 1.0 per cent level of significance. This means that the rate of investment within the economy of Ghana significantly causes variations in the level of money supply and financial sector deposits in Ghana.

Again, the null hypothesis of no causality running from total domestic credit provided by the financial sector to industrial growth cannot be rejected. Further to this, the null hypothesis that the level of investment does not Granger cause changes in the volume of credit provided by the financial sector cannot also be rejected. Thus, the result demonstrates that there is no direction of causality existing between the two and suggests the expansion in the size of financial sector credit is not substantially causing growth of investments in Ghana.

Table 6 6: Pairwise Granger Causality Test, Finance-Investment nexus

Null Hypothesis	No. of Obs	F-Statistic	Probability
LDCPS does not Granger Cause LGCF	50	0.044	0.9567
LGCF does not Granger Cause LDCPS		6.281***	0.0039
LDCFS does not Granger Cause LGCF	50	1.122	0.3343
LGCF does not Granger Cause LDCFS		1.710	0.1924
LBMS does not Granger Cause LGCF	50	0.519	0.5983
LGCF does not Granger Cause LBMS		8.705***	0.0006
LFSD does not Granger Cause LGCF	50	0.330	0.7202
LGCF does not Granger Cause LFSD		9.389***	0.0004
FDINDEX1 does not Granger Cause LNGCF	50	0.539	0.5870
LNGCF does not Granger Cause FDINDEX1		7.922***	0.0011
FDINDEX2 does not Granger Cause LNGCF	50	1.261	0.2931
LNGCF does not Granger Cause FDINDEX2		0.856	0.4315
LIDVA does not Granger Cause LGCF	50	2.728*	0.0762
LGCF does not Granger Cause LIDVA		2.648*	0.0818

Note: ***, **, * represent 1%, 5% and 10% levels of significance, respectively.

The uni-directional causality running from capital accumulation to financial development is confirmed further by the rejection of the null hypothesis that capital formation does not Granger-

cause FDIndex1 at the 1.0 per cent level of significance. It is thus concluded that there is a uni-directional association between financial development in Ghana and capital accumulation with growth running from investment.

These results from Table 6.6 underscore the irrelevance of financial sector in causing capital accumulation in Ghana. On the other hand the results imply that the financial sector is growing as a result of increasing investments in Ghana. The trend gives the indication that businesses may not be financing investment projects with funds from the financial sector. This gives the indication that investments and capital growth in Ghana are influenced by factors other than developments in the financial. Therefore it is concluded that financial developments in Ghana do not cause variations in capital formation in Ghana. It is further concluded that there is a uni-directional causal association running from capital accumulation to financial development. The finding of uni-directional causality running from capital accumulation to financial development, particularly when capital accumulation is measured by gross capital formation, is consistent with the 'demand following' hypothesis. The findings are consisted with the position that when the economy is expanding demand for financial services becomes higher and this result in expansion of the financial sector (Chow & Fung, 2013; Robinson, 1952). Thus the study concludes based on the results that the lack of empirical support for uni-directional causality running from financial development to capital accumulation and accordingly, suggests that the study rejects the 'supply-leading' capital growth hypothesis in Ghana. The conclusions are consistent with Lu *et al.* (2008) who concludes that in terms of the relationship between financial development and capital accumulation, all the models suggest that financial development is cointegrated with capital accumulation. Lu *et al.* (2008), however, observes that the direction of causality could also be ambiguous but notes that it is either bi-directional or growth runs from capital accumulation to financial development.

Concerning the other control variables of the model, the results show that the level of trade openness and level of government expenditure within the economy Granger cause capital accumulation in Ghana. The null hypotheses that trade openness and government spending do not Granger cause investment growth in Ghana are rejected at the level of 10.0 per cent. Similarly, the null hypotheses that capital accumulation does not Granger cause variations in volume of trade and government expenditure are rejected. This result implies that not only do the

sizes of trade and government expenditure promote capital accumulation in Ghana; investment also causes growth of exports and imports as well as the increases in government spending.

On the basis of the results reported in Table 6.6 and the discussions thereafter, the study rejects null hypothesis of no causal link between financial development and capital accumulation and accepts the alternative hypothesis that there is a causal link between the development of the financial sector and capital accumulation in Ghana. The study concludes that that there is a uni-directional causal relationship with causality running from capital accumulation to financial development, and not vice versa, in Ghana.

6.4 Chapter Summary

This chapter provided an empirical analysis on the impact of financial development and other control variables on capital formation in Ghana utilising annual time series data from 1965-2016. The analysis was undertaken to determine the financial drivers that influence capital formation in Ghana. Understanding the extent of impact of the factors that influence capital accumulation is important in the formulation of optimal growth management policies. The analysis was undertaken by applying the capital formation dynamics equation and estimating the short-run and long-run associations of financial development indicators as well as other macro-economic variables with capital accumulation. This was done to determine the impact of investments on growth and as well ascertain specific policy issues required to ensure a sustainable capital formation in Ghana. The regression model was derived from the concept that financial development promotes investment and the development of the real sectors of the economy. The variables that were empirically tested as drivers of capital accumulation are those that are financial in nature and particularly measure the extent of financial development. These variables are domestic credit to private sector, domestic credit provided by the financial sector, broad money supply and financial sector deposits and also included the financial development indices produced from the PCA approach. Other control variables such as, industrial value-added, trade openness, government expenditure, monetary policy rate, inflation and population growth rates were also included to improve the model diagnostics.

The parsimonious results show that domestic credit to private sector has a positive but statistically insignificant association with capital formation in Ghana while total credit to offered

by the financial sector, broad money supply and financial sector deposits show negative relationships with capital accumulation. The results thus imply that, the nature and extent of association between financial development and capital accumulation is sensitive to the type of financial development indicator used in the estimation. These notwithstanding, the findings suggest that although domestic credit provided to the private sector may show insignificant effect in the short-run it plays a dominating role in influencing the extent of capital formation in the long-run. The results point out that overall impact of financial development (FDindex1) on capital accumulation in Ghana is positive and statistically significant at the 5.0 per cent level, both in the short- and long-runs. As indicated in Table 6.5, a 1.0 per cent increase in financial development leads to 0.103 per cent increase in capital accumulation in Ghana. The results further indicate that although inefficiencies in the financial system, in the short-run, may not significantly negatively affect capital accumulation, the adverse impact are significant in the long-run.

With regards to the direction of causality, the results show that there exit a uni-directional causal relationship between financial development and capital formation. The causality runs from capital formation to financial development suggesting that it is rather improvements in investment and for that matter capital formation that is resulting in growth of the financial sector in Ghana. On the basis of the results reported in Table 6.6 and the discussions thereafter, the study abandoned the null hypothesis of no causal link between financial development and capital accumulation. The study thus accepted the alternative hypothesis that there is a causal link between the financial development and capital accumulation in Ghana. The study concludes that that there is a uni-directional causal relationship running between financial development and capital accumulation in Ghana. However, the causality is running from capital formation or expansion in investment to financial development and not vice versa.

The analysis of results in this Chapter proves that financial development positively influences capital formation significantly. The findings imply that, as a source of growth, capital accumulation contributes to economic growth in Ghana. The next chapter examines the influence of financial development on industrial sector advancement, which is also classified as a source of growth.

CHAPTER SEVEN

FINANCIAL DEVELOPMENTS AND INDUSTRIAL OUTPUT DYNAMICS IN GHANA

7.1 Introduction

Financial development has been noted as an important determinant of economic growth. The high rate of interdependence of the economy with other sectors of economic development, however, makes the effect of financial development on economic growth unclear (Ductor & Grechyna, 2015). This notwithstanding, theoretical literature suggests a potential relationship between financial development and industrial growth. This relationship, according to Binh *et al.*, (2005) stems from a possibility that desirable funding sources for corporate investment could be different for projects with different characteristics. Thus the state of development of capital markets as well as improvements in the traditional financial sector within the economy creates the environment for financing innovative and high risk or low risk projects. This theoretical position implies that the state of financial development within the economy can affect the structure of industries that are deemed as important and serve as sources of growth. This chapter examines whether financial developments in Ghana have affected the growth of the industrial sector and specifically tests the relationship between financial development indicators and industrial sector growth.

The channels through which financial development contributes to economic growth have been widely discussed in the literature. Related theories can be characterised by optimistic and sceptical approaches. According to the optimistic approach, better financial systems mobilise savings and facilitate efficient allocation of resources (Greenwood *et al.*, 2010; King & Levine, 1993a, 1993b), reduce agency costs and enhance innovation activities (Philippe Aghion et al., 2005), and contribute to high-return investments through risk-sharing (Bencivenga & Smith, 1991; Greenwood & Jovanovic, 1990; Saint-Paul, 1992). According to the sceptical approach, financial development may lead to high systemic risk (Allen & Carletti, 2006; Gai *et al.*, 2008; Gennaioli *et al.*, 2012; Wagner, 2007), sub-optimal low savings (Jappelli & Pagano, 1994), sub-optimal high allocation of labour to the financial sector (Bolton *et al.*, 2016; Philippon, 2010), overheated economic capacity (Zeira, 1999), or the exertion of inefficiently high cost on the

economy (Santomero & Seater, 2000). These theoretical findings, according to Ductor and Grechyna (2015) suggest that the causal effects of financial development should be considered jointly with the state of development in other sectors that govern economic growth. UNIDO (2013) observes that innovations motivated by investment has positive externalities that go far beyond the productivity gains achieved in the same sector, contributes widely to productivity growth in other sectors and thus fuelling overall economic growth.

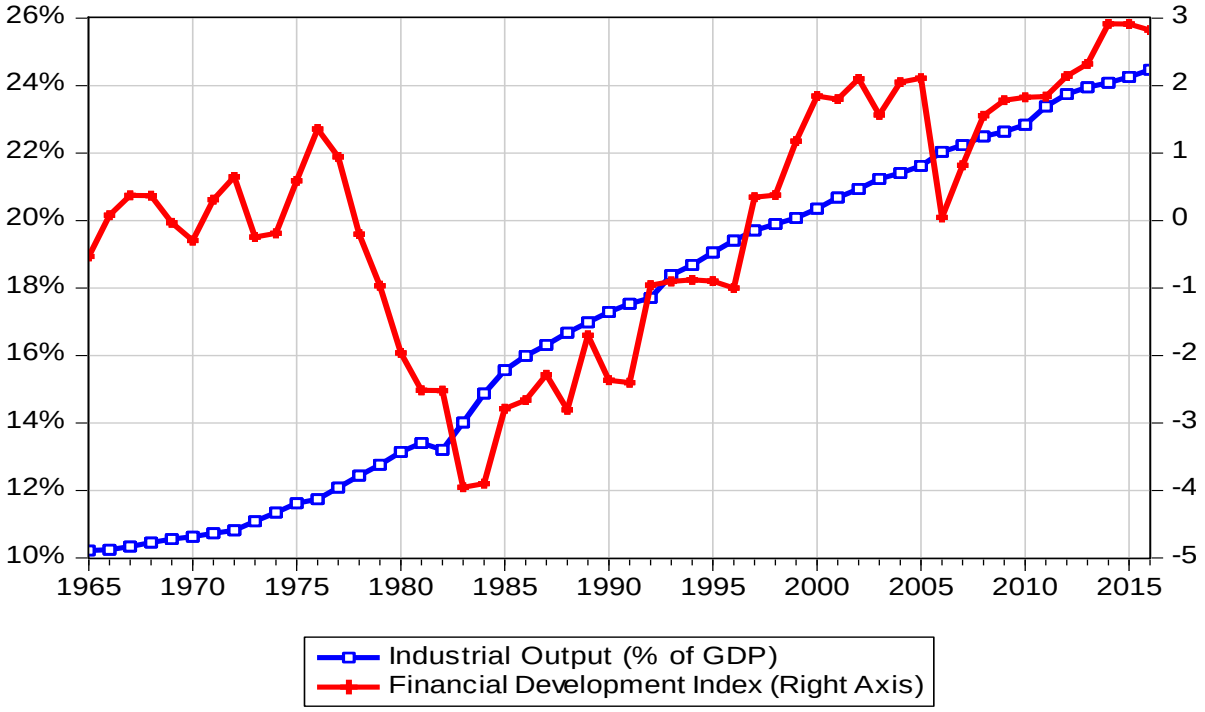
The primary measures of financial development for this analysis are domestic credit to private sector, total domestic credit provided by the financial sector, broad money supply and total financial sector deposits. Additionally, the study uses new financial development indices produced using the principal component analysis as other measures of financial development. All the financial development indicators are expressed as percentage shares of GDP. The impact of impact of financial development on real sector growth is assessed using industrial value-added-to-GDP ratio as a component of economic growth and the dependent variable. The variable economic growth equals to the rate of real per capital GDP growth. This chapter looks at the relationship between financial development indicators and industrial sector growth in Ghana.

To assess the strength of an independent relationship between industrial growth and financial development, the study again introduces control variables as suggested by the finance-growth literature. The logarithm of initial real GDP per capita is introduced to control for economic convergence. The growth of labour force is included to control for the human development. The study uses the trade-to-GDP ratio, the ratio of government consumption to GDP, the level of inflation and monetary policy rate to control for the macro-economic state in the economy.

7.2 Financial Development and Industrial Output Growth in Ghana

Figure 7.1 shows the relationship between industrial output and financial development in Ghana over the period 1965 to 2016. The display in Figure 7.1 shows that industrial output growth have remained largely stable and has responded steadily to increases in financial development in Ghana. The financial development in has been relatively volatile between 1965 and the mid-1980s while industrial output growth have shown a quite stable increasing trend indicating moderate decline between 1981 and 1983.

Figure 7.1: Financial Developments and Industrial Output Growth in Ghana



Source: Researcher's own computations.

The relatively poor performance of the financial sector between 1976 towards 1984 seems to have marginally declined industrial output in Ghana. This implies that volatilities do not strongly affect industrial sector activities. This development in the financial sector was characterised by what was referred to as financial shallowing (Aryeetey *et al.*, 1997; Gockel, 1995) and consistent with the description of the presence of financial repression (McKinnon, 1973; Shaw, 1973). Industrial output growth has since the minor decline in 1983 witnessed progressive increases in the financial reform era 1984 and 2016. The share of industrial output in GDP in the pre financial reform period of 1965-1984 recorded an average of 17.5 per cent and peaked at 23.40 per cent in 1975. The post reform era of 1984-2016 witnessed an average share in GDP of approximately 24.00 per cent and recorded at highest rate of 28.94 per cent in 2012. Financial developments may have contributed to the relative improvement in industrial output growth in the post financial reform period though, since 2002, a key component of the industrial sector, manufacturing seems to declining consistently in the face of rising financial development indicators. The empirical findings of the regression results may shares some light on the impact of the financial development on industrial output in Ghana.

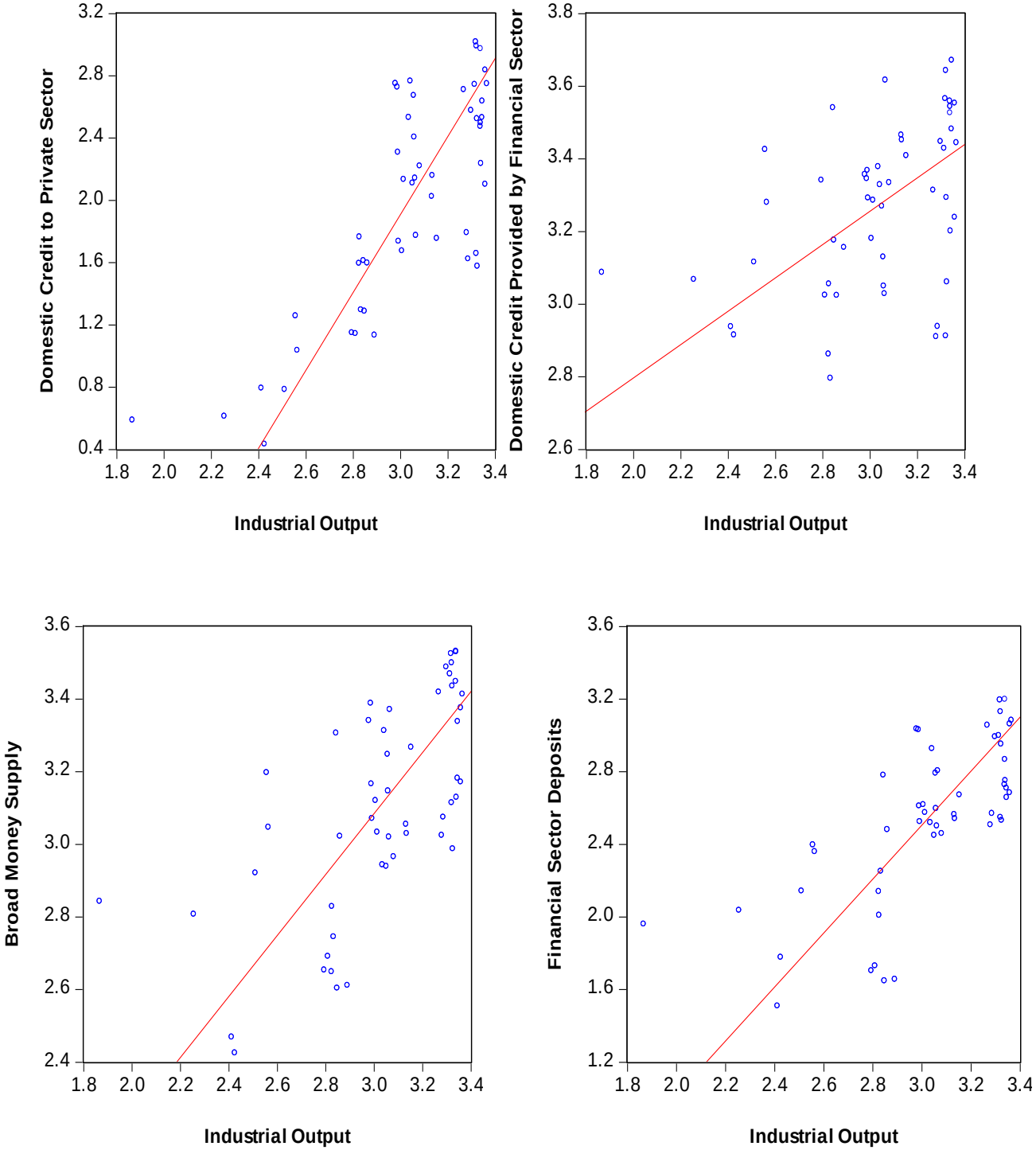
7.3 Results and Analysis

The ordinary least squares (OLS) methodology within the GMM was applied to run the regression Equation (5.4) in Chapter Five with industrial value added to GDP ratio as the dependent variable. The parsimonious estimation uses only one financial development indicator together with a set of other control variables at a time. In addition to the parsimonious regression estimation and as robustness check, the study uses the FDIndex1 and FDIndex2 developed from the PCA to further determine the impact of financial development on industrial productivity using the new indices. Accordingly, the study estimates the short- and the long-run estimation measuring the behaviour and impact of the finance on industrial output growth from the medium-term towards the long-term by applying the ARDL cointegration estimation approach.

7.3.1 Unconditional Correlations

Figure 7.1 indicate an analysis of data plots display in simple scatter plots between each of the financial development indicators and industrial sector growth. The data included for each financial dimension—access to credit, depth of financial system and openness of the financial sector—are represented in the logarithmic forms as discussed in the data in Chapter Five. As shown in the scatter plots and the orthogonal regression line, there is evidence of a relatively strong relationship between the financial development indicators and industrial output growth in Ghana.

Figure 7.2: Scatter Plots of Financial Development and Industrial Output Growth



Source: Researcher's own computations.

7.3.2 Baseline Regression Results

The results of the parsimonious baseline equation specification are estimated using Equation 5.4 with industrial value-added as the dependent variable with interaction with financial and

structural reforms in Ghana to capture the effect of the reforms on the industrial sector. The variables of interest are the financial development indicators and their impacts on industrial sector growth. These regression results examining the impact of financial development indicators on industrial sector growth are presented in Tables 7.1 and 7.2.

7.3.2.1 Domestic Credit to Private Sector and Industrial Output

Tables 7.1 and 7.2 present the regression results on the relationship between domestic credit to private sector and industrial output. The results show is a positive and statistically significant association between domestic credit to private sector and industrial sector growth in the estimation within the context of financial reforms at the 10.0 per cent level, although the financial sector reforms seem to have adversely affected industrial sector growth, albeit insignificantly. The results, however, show that a positive but statistically insignificant association between domestic credit to private sector and industrial growth within the perspective of structural reforms. The findings suggest that although financial sector seems to have dampened industrial sector growth, private sector credit has significantly impacted on growth of industries in Ghana.

7.3.2.2 Total Domestic Credit Provided by the Financial Sector and Industrial Output Growth

The parsimonious baseline results show a positive but statistically insignificant relationship between total domestic credit offered by the financial sector and industrial output growth in both the structural and financial reforms interactive scenarios. The results further indicate that though the impact of total credit increased marginally in the structural reform context, the effect was not statistically significant as evident in Tables 7.1 and 7.2. The results, thus, suggest that though policy interventions and the general macro-economic happenings have resulted in improved total credit offered in the Ghanaian economy, the development has not caused total credit provided to significantly impact industrial output growth.

Table 7.1: GMM Estimation of Industrial Productivity and Financial Development Indicators, Financial Reforms (1965-2016)

Variables	Dependent Variable: IDVA (Industrial Productivity)					
	DCPS Model (1)	**DCFS Model (2)**	**BMS Model (3)**	**FSD Model (4)**	**FDIndex1 Model (5)**	**FDIndex2 Model (6)**
C	3.860***[4.192]	2.961*** [4.234]	2.983***[4.389]	3.502***[4.791]	4.182***[4.446]	3.087***[4.417]
LnDCPS	0.117* [1.890]					
LnDCFS		0.143 [1.570]				
LnBMS			0.185 [1.065]			
LnFSD				0.299*** [3.556]		
LnFDIndex1					0.053** [2.128]	
LnFDIndex2						0.012 [3.887]
LnGDPGC	-0.574*** [-4.00]	-0.484*** [-3.959]	-0.507*** [-3.548]	-0.632*** [-4.533]	-0.610*** [-4.231]	-0.423*** [-3.583]
LnGCF	0.023 [0.224]	0.086 [0.730]	0.073 [0.606]	0.049 [0.522]	0.087 [0.780]	0.054 [0.471]
LnTopen	0.351*** [2.722]	0.366*** [3.075]	0.375*** [2.899]	0.384*** [4.217]	0.328** [2.462]	0.407*** [3.791]
LnGE	0.533*** [4.808]	0.495*** [4.418]	0.493*** [4.524]	0.479*** [4.526]	0.517*** [4.888]	0.480*** [4.174]
LnMPR	-0.027 [-0.359]	-0.047 [-0.710]	-0.024 [-0.306]	0.026 [0.374]	-0.006 [-0.082]	-0.057 [-0.813]
LnINF	0.026 [0.711]	0.012 [0.309]	0.0003 [0.006]	-0.006 [-0.153]	0.006 [0.138]	0.013 [0.335]
LnPGR	0.006 [0.048]	0.030 [0.181]	0.061 [0.388]	0.179 [1.478]	0.139 [0.965]	-0.041 [-0.243]
FSR	-0.001 [-0.013]	0.008 [0.096]	-0.055 [-0.591]	-0.140* [-1.738]	-0.055 [-0.720]	0.009 [0.102]
Test Diagnostics	R^2 =0.91 Adj. R^2 =0.89 D-Watson =1.4 J-Stats =0.00	R^2 =0.91 Adj. R^2 =0.89 D-Watson =1.3 J-Stats =0.00	R^2 =0.91 Adj. R^2 =0.89 D-Watson =1.4 J-Stats =0.00	R^2 =0.92 Adj. R^2 =0.91 D-Watson =1.6 J-Stats =0.00	R^2 =0.91 Adj. R^2 =0.89 D-Watson =1.6 J-Stats =0.00	R^2 =0.90 Adj. R^2 =0.89 D-Watson =1.2 J-Stats =0.00

Source: Researcher's own computations.

Table 7.2: GMM Estimation of Industrial Productivity and Financial Development Indicators, Structural Reforms (1965-2016)

Variables	Dependent Variable: IDVA (Industrial Productivity)					
	DCPS Model (1)	**DCFS Model (2)**	**BMS Model (3)**	**FSD Model (4)**	**FDIndex1 Model (5)**	**FDIndex2 Model (6)**
C	2.603***[3.168]	1.906*** [3.806]	2.137*** [3.005]	2.493**[2.573]	2.848**[2.686]	1.925*** [0.199]
LnDCPS	0.075 [1.447]					
LnDCFS		0.133 [1.466]				
LnBMS			0.043 [0.327]			
LnFSD				0.073 [0.749]		
LnFDIndex1					0.025 [1.041]	
LnFDIndex2						0.028 [1.171]
LnGDPGC	-0.463*** [-3.533]	-0.414*** [-4.008]	-0.392*** [-2.849]	-0.448*** [-2.751]	-0.480*** [-3.163]	-0.351*** [-3.872]
LnGCF	0.139* [1.849]	0.201* [1.981]	0.150* [1.981]	0.122 [1.564]	0.150* [1.957]	0.207* [1.965]
LnTopen	0.399*** [4.108]	0.395*** [3.789]	0.435*** [4.394]	0.435*** [5.351]	0.401*** [3.633]	0.416*** [4.377]
LnGE	0.443*** [6.040]	0.417*** [5.727]	0.416*** [5.176]	0.431*** [5.478]	0.444*** [5.594]	0.397*** [5.547]
LnMPR	0.109** [2.140]	0.107* [1.983]	0.094* [1.794]	0.085 [1.588]	0.095* [1.743]	0.107** [2.074]
LnINF	0.005 [0.150]	-0.005 [-0.153]	-0.006 [-0.162]	-0.005 [-0.156]	-0.004 [-0.139]	-0.005 [-0.169]
LnPGR	0.183* [1.928]	0.229** [2.115]	0.172* [1.785]	0.185** [2.108]	0.226** [2.278]	0.195* [1.713]
SR	-0.277*** [-4.893]	-0.286*** [-5.484]	-0.280*** [-4.957]	-0.255*** [-3.652]	-0.262*** [-4.454]	-0.300*** [-6.00]
Test Diagnostics	R^2 =0.93 Adj. R^2 =0.92 D-Watson =1.7 J-Stats =0.00	R^2 =0.94 Adj. R^2 =0.92 D-Watson =1.7 J-Stats =0.00	R^2 =0.93 Adj. R^2 =0.92 D-Watson =1.6 J-Stats =0.00	R^2 =0.94 Adj. R^2 =0.92 D-Watson =1.5 J-Stats =0.00	R^2 =0.94 Adj. R^2 =0.92 D-Watson =1.7 J-Stats =0.00	R^2 =0.94 Adj. R^2 =0.92 D-Watson =1.7 J-Stats =0.00

Source: Researcher's own computations.

7.3.2.3 Broad Money Supply and Industrial Output

The parsimonious baseline results displayed in Tables 7.1 and 7.2 show a positive but statistically insignificant relationship between broad money supply and industrial growth although the extent of impact marginally reduces within the perspective of the structural reforms. This implies that the impact of the broad money in the economy, though statistically insignificant in this instance, results in positive growth of industries.

7.3.2.4 Financial Sector Deposits and Industrial Growth

With regards to financial sector deposits, the parsimonious results indicate a strong statistically significant positive association with industrial growth for the period 1965 to 2016 under financial reform policies. The structural reforms seem not to have substantially impacted on liquidity of the financial sector as the indicate a statistically insignificant positive association between increases in financial sector deposits and industrial growth. This implies that, at some point, rising financial sector deposits can be detrimental for industrial growth. The post-reform era in Ghana has witnessed substantial improvements in the bank deposits and the findings suggest that though the financial reforms have improved capital adequacy of banks the impact on industrial growth is negative and limited.

The results show that financial reforms and structural reforms have, largely, adversely affected industrial productivity, with the adverse effect of structural reforms being strongly significant. The indication, thus, suggest that policy interventions and the general macro-economic happenings have rather reduced the rate of the positive impact of domestic credit to private sector on industrial growth as well as the level of significance of the private credit in Ghana. The decline in the impact of domestic credit can partly be attributed to the liberalisation of the financial sector and interest rates. The removal of sectoral credit allocation controls and competitive interest rates implied increased cost of credit which may jointly minimise the amount of private credit and discouraged credit advances to the industrial sector. The parsimonious results further indicated that the impact of financial sector reforms on industrial growth in Ghana has been negative although this effect was statistically insignificant. But within the context of structural reforms in Ghana, the results indicate that structural adjustment and

reforms that exposed the industrial sector competitive financial markets caused massive significant declines in industrial productivity.

7.3.2.5 Financial Development Indices and Industrial Growth

The results of Tables 7.1 and 7.2 also provide the regression results indicating the impact of the financial development on industrial growth using each of the indices produced from the principal component analysis. This regression serves as a robustness check in the parsimonious equation estimations and is also relevant in understanding the combined or interactive impact of the financial development indicators and its interactions with the macro-economic variables within the industrial output model framework using Equation 5.4. The results show that both FDIndex1 and FDIndex2 show positive association between financial development and industrial growth both within the context of structural and financial reforms. The overall impact of financial development, as measured by FDIndex1, shows a statistically significant positive association with industrial sector growth. This implies that financial developments have significantly impacted on the industrial sector through the dominating effect of growth in private credit and sound financial system intermediation. This is consistent with the policy environment within which the sector has operated. The existence of credit controls and interest rate ceiling for private sector enterprises, in the early 1960s, implied increased credit for the industrial sector. The finding is consistent with the conclusions by Beck *et al.* (2000) that financial intermediation has large, significant impact on productivity growth. The results, however, robustly show that structural reforms in the Ghanaian economy has strongly and significantly impacted on industrial sector growth, albeit unfavourably.

7.3.3 Short- and Long-run Regression Results

The study further uses the ARDL and the VAR technique to determine the short- and long-run associations between financial development and industrial output growth in Ghana using Equation (5.13) from Chapter Five. The test is carried out using the ARDL approach to estimate the cointegration and VECM regressions. The results are presented in Tables 7.4 and 7.5.

7.3.3.1 Diagnostic Checks and Model Stability

The regression results for the short-run and long-run models are essentially significant and do not suffer from any serial correlation. The adjusted R-squared, F-tests and the Durbin Watson test imply suitability of the model and do not suggest autocorrelation of the residuals. All the

variables used in the analysis were integrated of order 1, I(1). Moreover, the signs of the main explanatory variables are as expected. Furthermore the model shows no evidence of serial correlation and heteroskedasticity as shown by the results in Tables 7.3.

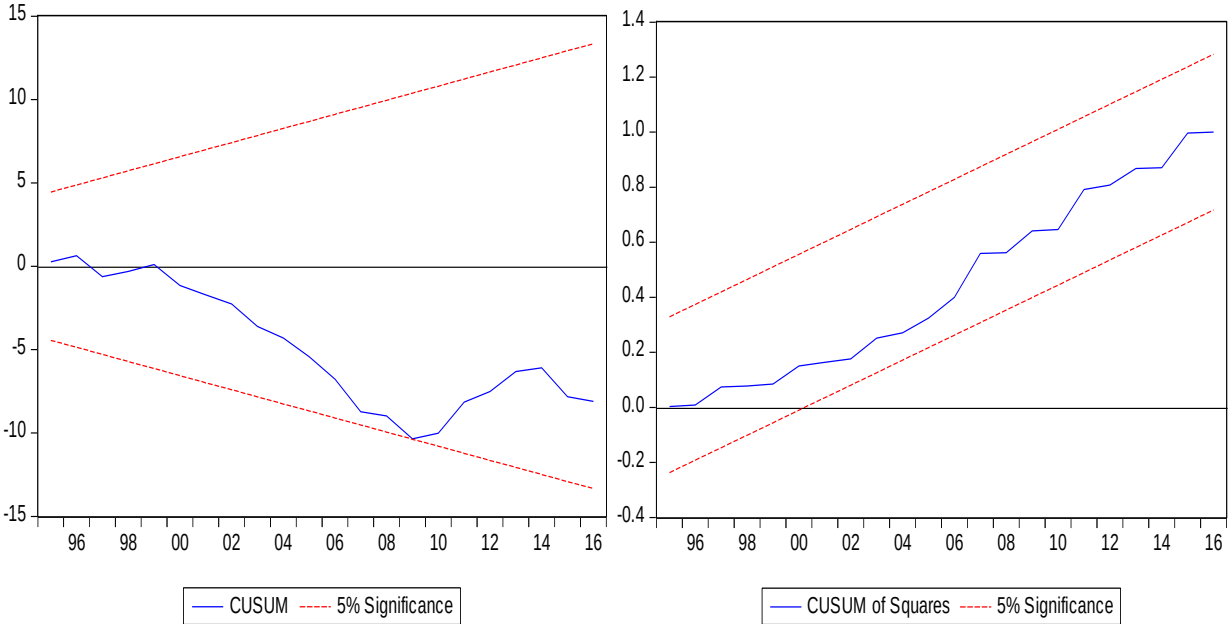
Table 7.3: ARDL Model Heteroskedasticity Test: (Breusch-Pagan-Godfrey), Industry

F-statistic	0.658242	Prob. F(27,22)	0.8500
Obs* R-Squared	22.34273	Prob. Chi-Square (27)	0.7198
Scaled explained SS	3.295469	Prob. Chi-Square (27)	1.0000

Source: Researcher's own computations.

The results in Table 7.3 show no evidence of heteroskedasticity. To reject the null hypothesis of heteroskedasticity, a probability value (or p-value) of less than 0.05 is required. Nevertheless heteroskedasticity test based on Breusch-Pagan-Godfrey test in Table 7.4 reports p-value anywhere close to 5.0 per cent. Accordingly, the hypotheses of no heteroskedasticity cannot be rejected, implying that heteroskedasticity does not seem to be a problem in the regression specification. The CUSUM test further shows that the model is relatively stable in the long-run.

Figure 7.3: Cusum Test of Stability for Industrial Output Model



Source: Researcher's own computations.

As can be observed from Figure 7.2 the CUSUM test indicates that the model is stable within the 5% level of significance.

7.3.3.2 Specification of the Short-Run Cointegration Model

As a precondition for examining the long-run causality, the coefficient of the cointegrating equation [CoinEq (-1)] must be negative in sign and statistically significant. Since the coefficient of the cointegration equation is -1.124 and statistically significant at the 1.0 per cent level, it is concluded that there is long-run causality running from financial development to industrial output. Based on the short-run results, the Cointegrating Industry Regression Model equation is formulated in Equation (7.1):

CointEq = LNIDVA - (0.0981*FDINDEX1 - 0.0190*FDINDEX2 - 1.0065*LNGDPGC + 0.0997*LNGCF + 0.2003*LNTOPEN + 0.3959*LNGE + 0.2325*LNMPR - 0.1669*LNINF - 1.0933*LNPGR - 0.0979*FSR + 8.5501). (7.1)

7.3.3.3 Analysis of Short-run Impact of Financial Developments on Industrial Output

The results of short-term effects of financial development as well as the control variables on industrial output in Ghana are summarised in Table 7.4.

Table 7 4: Estimated ARDL Short Run Coefficients and the Error Correction Estimate

Dependent Variable: Industrial Output (IDVA)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FDINDEX1)	0.014	0.039	0.365	0.7186
D(FDINDEX1(-1))	-0.102***	0.031	-3.256	0.0036
D(FDINDEX2)	-0.021	0.031	-0.672	0.5083
D(LNGDPGC)	-0.292	0.373	-0.783	0.4420
D(LNGDPGC(-1))	0.711	0.461	1.540	0.1378
D(LNGCF)	-0.021	0.106	-0.206	0.8381
D(LNTOPEN)	0.485***	0.110	4.405	0.0002
D(LNTOPEN(-1))	0.203**	0.082	2.470	0.0217
D(LNGE)	0.191	0.112	1.704	0.1023
D(LNMPR)	0.288**	0.122	2.357	0.0277
D(LNMPR(-1))	0.190*	0.093	2.029	0.0547
D(LNINF)	-0.076**	0.028	-2.672	0.0139
D(LNINF(-1))	-0.065**	0.030	-2.172	0.0409
D(LNPGR)	-5.042***	1.010	-4.988	0.0001
D(LNPGR(-1))	4.349***	0.919	4.728	0.0001
D(FSR)	0.005	0.098	0.060	0.9524
D(FSR(-1))	-0.190*	0.108	-1.759	0.0923
CointEq(-1)	-1.124***	0.172	-6.503	0.0000
R2 = 0.92, Adj. R2 = 0.83, F-Statistic: 9.87, Prob.(F-Stat) = 0.000, D-Watson: 2.50				

Source: Researcher's own computations. Note: ***, **, * represent 1%, 5% and 10% levels of significance, respectively.

The results indicate that the short-run association of financial development index 1 and industrial output is positive but statistically insignificant. This development may not be misleading as financial indicators such as credit to the private sector businesses in the short-term may not result

in substantial impact on industrial output. The insignificant impact may further imply that businesses may also not be able to immediately change outputs in the local business economy as initial investments take time and have variant success rates and maturity dates in terms of making significant contributions to growth. Further, there insignificant impact of financial developments on the industrial output, as suggested by FDIndex1, implies that the removal of credit allocation and competitive interest rates may have resulted in reduction the amount of credit offered to the industrial sector, thus lowering the impact of the financial sector on industry.

In the same manner, financial development index 2 also indicates a negative and statistically insignificant association with industrial output growth. This suggests that, to some extent, financial development could negatively affect industrial growth in the short-run. This situation may arise in instances where there exist poor investment decisions and outcomes or inefficient financial intermediation with regards to the offering of credit in the economy. The study thus concludes that there exists positive association between some financial development indicators and industrial output growth in the short-run. The results of the short- and long-run regressions are consistent with the parsimonious equation estimation in Table 7.1 and 7.2 with domestic credit to private sector and financial sector deposit significantly contributing to industrial sector growth in Ghana.

With regards to the other control variables, gross capital formation showed a negative but statistically insignificant association with industrial growth. The negative effect that capital accumulation has on industrial advancement is consistent with theory since new investment is a drain on industrial or manufacturing businesses. Trade to-GDP ratio, which is a proxy for the level of trade openness, and government expenditure both showed positive relationships with industrial growth although only trade openness demonstrates statistical significance at the 1.0 per cent level in the short-run. The volume of trade, as determined either exports or imports, is a proxy of growth-enhancing interactions of economies. The results show that a 1.0 per cent rise in the volume of trade would increase industrial advancement by 0.485 per cent in the short-term. The effects of trade exhibit in the areas of specialisation, exchange of ideas through exports or acquiring foreign technology through quality imports and serve as a conduit for knowledge dissemination and resource transfer among countries. These bases make trade important for the

growth of the industrial sector. Therefore, this finding is in line with the views that highly open economies should exhibit higher growth rates (Barro & Sala-I-Martin, 1995; Edwards, 1992; Grossman & Helpman, 1995). Exports plus imports as share of GDP (trade volume) used to measure the extent of openness of the economy to international trade and economic activities showed a strong positive and statistically significant correlation with Ghana's industrial growth. The short-run results indicated that in Government expenditure has a positive but statistically insignificant impact on industrial even though the parsimonious estimation showed a strong significant positive association.

Also, increases in the monetary policy rate showed to have had a statistically significant positive impact on industrial growth in Ghana in the short-run while inflation and population growth rates maintained statistically significant negative relationships with industrial sector growth. The positive association between monetary policy rate and industrial growth seem to be at variance with theory in view of the fact that high prime rate indirectly increases the cost of borrowing to industrial sector enterprises. The results showed that while 1.0 per cent rise in monetary policy rate leads to a 0.288 percentage unit points increase in industrial growth inflation and population growth respectively dampen industrial advancement by 0.076 per cent and 5.042 per cent unit points with a unit percentage rise in each.

The result of the error correcting model (ECM) indicates an adjustment to the equilibrium state after a shock. The lagged error term coefficient is negative (-1.124847), as required and is strongly significant at the 1.0 per cent level. This serves to further affirm the presence of long-run association between financial development and industrial growth. Again, it suggests that about 1.124 percentage units of the distortions created by unit shocks in the preceding year can be restored in the current year.

7.3.3.4 Analysis of Long-Run Impact of Financial Development on Industrial Output

The results of long-run impact of financial development on industrial output growth are presented in Table 7.5. The long-run result is consistent with the finding in the short-run. There results confirm the statistically significant positive association between financial development index 1 and industrial output increases observed in the short-run. The results show that industrial output increases by 0.098 percentage unit points with a 1.0 per cent rise in financial development

index 1 in the long-run. The results, thus, suggest that financial development can strongly contribute positively to industrial growth. This finding is consistent with the conclusion by Beck and Levine (2002) that overall financial development boost industry growth and new establishment formation.

Table 7 5: Estimated ARDL Long Run Coefficients

Dependent Variable: Industrial Output (IDVA)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDINDEX1	0.098**	0.036	2.674	0.0138
FDINDEX2	-0.019	0.027	-0.684	0.5006
LNGDPGC	-1.006***	0.158	-6.367	0.0000
LNGCF	0.099	0.133	0.748	0.4620
LNTOPEN	0.200*	0.098	2.028	0.0548
LNGE	0.395***	0.121	3.258	0.0036
LNMPR	0.232***	0.081	2.852	0.0093
LNINF	-0.166***	0.055	-3.032	0.0061
LNPGR	-1.093***	0.286	-3.821	0.0009
FSR	-0.097	0.074	-1.318	0.2009
C	8.550***	1.032	8.277	0.0000
R^2 = 0.92, Adj. R^2 = 0.83, F-Statistic: 9.87, Prob.(F-Stat) = 0.000, D-Watson: 2.50				

Source: Researcher's own computations. Note: ***, **, * represent 1%, 5% and 10% levels of significance, respectively.

The results further confirm the negative association between financial development index 2 and industrial output growth although the relationship is statistically insignificant in the long-run. Thus, the results give an indication that, at some point, too much finance or poor financial intermediation can result in adverse growth of industries. This hints of the possibility of the existence of an optimal size of financial intermediation beyond which additional financing could negatively affect industrial growth. These findings are similar to what was observed in the short-

run period and may suggest that Ghanaian financial institutions offer relatively effective intermediary services which increase industrial sector growth and induce greater investment efficiency of private enterprises, thereby impacting on industrial output growth positively. The findings thus give the indication that private credit and financial sector deposits are relevant for growth of the industrial sector. The findings are also in line with the results of Rajan and Zingales (1998) and Fisman and Love (2002) in whose studies financial development is found to affect industrial growth. The evidence in this study is also consistent with Guiso, Sapienza and Zingales (2004) and Gagliardi (2009) who find a positive impact of financial development on firm growth in Italy, as well as with Morón, Salgado and Seminario (2013), who obtain the same findings in Peruvian manufacturing industry.

With regards to the control variables, growth of gross fixed capital formation demonstrates a positive but statistically insignificant association with industrial growth in Ghana. This implies capital formation is good for industrial advancement but the indication is that there has not been substantial investment to cause significant growth of the industrial sector. The level of trade openness and government spending showed positive and statistically significant impacts on industrial growth in the long-run and this is consistent with the short-run situation. This implies that trade has promoted industrial development, both in the medium-term towards the long-term, though the import component is higher in the Ghanaian economy. Government spending showed positive association with industrial output growth in the long-run. The results thus give the indication that increased government spending in the short-term in the Ghanaian economy can cause greater growth of the industrial sector. The results indicate that a given 1.0 per cent rise in government spending increases industrial sector growth by 0.396 per cent in the long-term at the 1.0 per cent significance level. The results show that government consumption expenditure has a strong positive and statistically significant relationship with industrial growth, suggesting that an increase in government consumption expenditure may significantly contribute to the growth of the real sector, within the Ghanaian economy. This is consistent with the observation by Barro (2006), and Barro and Sala-I-Martin (2006, 1995) that productive government spending promotes growth.

The long-run results further confirmed the short-run statistically significant positive association between monetary policy rate and industrial growth in Ghana. This is inconsistent with theory as increases in the monetary policy rate indirectly affect the lending rates in the economy and ordinarily this development should negatively impact growth of the real sector. Also, the population growth and inflation rate growth demonstrated a negative and statistically significant relationship with industrial growth in the long-run. This implies that in the long-run, population growth is detrimental to industrial output growth although the results show that this association is significant. The negative and statistically significant association between inflation rate and industrial output growth observed in the long-run is similar to the findings in the short-run results. This negative association is consistent with theory as higher rates of inflation affect the demand of goods and services offered by the industrial sector.

Finally, the long-run findings confirm that financial reforms in Ghana have negatively affected growth of the industrial sector, although the adverse impact is statistically not significant. This implies that consistent financial reforms in the Ghanaian economy have not augured well for industrial growth in Ghana. This result is in line with the developments in the Ghana in view of the fact that prior to the financial reforms, the industrial sector received direct support from government through direct financing and the provision of controlled credit to the sector by the banking system.

7.3.3.5 The Direction of Causality of Financial Development Indicators and Industrial Output

The Wald restrictions test results in Table (5.16) indicate that there is a causal relationship running between the explanatory variables and the dependent variable. Engle and Granger (1987) notes that if more than two of the variables are I (1) and cointegrated then a causal relationship exists in one direction. Accordingly, the study conducted Granger causality test to ascertain the direction of the causal relationship between industrial output growth and financial development indicators and the other control variables. The results of the Granger-causality tests are presented in Table 7.6.

From Table 7.6, it is evident that the null hypothesis that changes in domestic credit to private sector do not Granger cause variations in industrial output growth was rejected at 10.0 per cent level of significance. Similarly, the null hypothesis that changes in industrial sector output do not

Granger cause variations in credit provided to private business is rejected at the 5.0 per cent level of significance. This implies that changes in both domestic credit to private sector and industrial output explain the variations in their respective growth levels in Ghana. This observation is similar to the impact of domestic credit to private sector as the endogenous variable within the short- and long-run models. Therefore, it is concluded that there is a bi-directional relationship between domestic credit to the private sector and industrial sector growth in Ghana. This conclusion is similar to Lu *et al.*, (2008) who found a bi-directional causal association between private credit and industry in China.

Again, the null hypothesis of no causality running from total domestic credit provided by the financial sector to industrial output growth is also rejected at the 10.0 per cent level of significance. Also, the null hypothesis that the volume of total credit provided by the financial sector does not Granger cause industrial output is rejected at the 10.0 per cent significance level, giving the indication that a bi-directional relationship exists between them.
Similarly, broad money supply and industrial output growth have bi-directional causal associations. The null hypotheses that broad money supply does not Granger cause industrial output can be rejected as indicated in Table 7.6. In the same way, the null hypothesis that industrial sector output variations do not Granger cause the level of money supply is rejected at the 10.0 per cent significance level.

It can, however, be inferred from the results that financial sector deposits do not cause Granger-cause industrial output growth as the null hypothesis is not rejected. This means that changes in financial sector deposits do not explain the changes in industrial output growth in Ghana. The results however indicate that industrial output growth cause changes in the level of financial sector deposits and suggests a uni-directional relationship between the two.

As a robustness check, the direction of causality between industrial growth and financial development is examined using the financial development indices. As evident from the results in Table 7.6, the null hypotheses that financial development index 2 does no Granger cause industrial sector growth is rejected at the 5.0 per cent level of significance. Similarly, the null hypothesis that industrial sector output variations does not Granger cause financial development

index 1 is strongly rejected at the 1.0 per cent significance level. These findings imply that there exist a bi-directional causal relationship between financial development and industrial output growth.

Table 7 6: Pairwise Granger Causality Test, Finance-Industry nexus

Null Hypothesis	No. of Obs	F-Statistic	Probability
LDCPS does not Granger Cause LIDVA	50	2.435*	0.0990
LIDVA does not Granger Cause LDCPS		3.247**	0.0481
LDCFS does not Granger Cause LIDVA	50	2.825*	0.0698
LIDVA does not Granger Cause LDCFS		2.472*	0.0958
LBMS does not Granger Cause LIDVA	50	2.892*	0.0658
LIDVA does not Granger Cause LBMS		8.266***	0.0009
LFSD does not Granger Cause LIDVA	50	0.071	0.9312
LIDVA does not Granger Cause LFSD		5.002**	0.0109
FDINDEX1 does not Granger Cause LNIDVA	50	1.992	0.1485
LNIDVA does not Granger Cause FDINDEX1		6.223***	0.0041
FDINDEX2 does not Granger Cause LNIDVA	50	3.586**	0.0359
LNIDVA does not Granger Cause FDINDEX2		0.11436	0.8922

Note: ***, **, * represent 1%, 5% and 10% levels of significance, respectively.

These results from Table 7.6 show that, with the exception of financial sector deposits, all the measures of financial development adopted in this study have bi-directional causal associations with industrial sector output. This causal association is confirmed by the robustness checks using the financial development indices. The study thus concludes that there is a bi-directional causal relationship between financial development and industrial output growth in Ghana. The general trend of bi-directional causal associations between financial development and industrial output growth supports both the ‘demand following’ and ‘supply leading’ hypotheses. The results thus imply that the financial sector developments and investments jointly influence each other within the Ghanaian economy.

With regards to the other control variables of the model, the results show that the level of trade openness and level of government expenditure within the economy have uni-directional causal associations with industrial sector output growth in Ghana. The null hypotheses that trade openness does not Granger cause industrial output improvement in Ghana is rejected at the level of 5.0 per cent. This reveals that there is uni-directional causal relationship running from trade openness to industrial growth in Ghana. The null hypothesis that industrial output improvements in Ghana do not Granger cause trade advancement in Ghana cannot be rejected. Also, the null hypotheses that government spending does not Granger cause investment growth in Ghana cannot be rejected at the level of 10.0 per cent. Rather, the null hypothesis that industrial output advancement does not Granger cause variations in government expenditure is rejected. This result implies that industrial sector growth cause increases in government spending in Ghana; also, the industrial sector improvements do not cause growth of exports. Imports forms the largest part of the trade component in Ghana (Exports forms has averaged around 34.0 per cent of GDP from 2007 to 2016 while imports have averaged 48.0 per cent for the same period.

On the basis of the results reported in Table 7.6 and the discussions thereafter, the study abandoned the null hypothesis of no causal link between financial development and industrial output growth. The study, thus, accepts the alternative hypothesis that there is a causal link between the development of the financial sector and industrial output growth in Ghana. The study concludes that that there is a bi-directional causal relationship is running between financial development and industrial sector growth in Ghana. In particular, both the finance-led and growth-led finance hypotheses prevail in Ghana when industrial growth is measured by Industry value-added as share of GDP. This conclusion is, to some extent, consistent with the indication by Carlin and Mayer (2003) that the nature of financial structure impact on the real economy by affecting growth and investments of different industries.

7.4 Chapter Summary

This chapter provided an empirical analysis on the impact of financial development and other control variables on industrial output growth in Ghana. The analysis uses annual time series data from 1965-2016 on Ghana. The analysis was undertaken to determine the impact of financial development indicators on industrial sector growth in Ghana. The industrial sector is considered as a component and source of economic growth. The need to examine the impact of financial

development on industrial sector growth is motivated by the fact that there have been major structural and financial reforms aimed at promoting real sector growth in Ghana. Accordingly, understanding the extent of impact and dynamics of financial development indicators and industrial output growth is important in determining an optimal policy response for industrial development in Ghana and other economies with similar conditions. The analysis was undertaken by applying the industrial output growth dynamics from Equations (5.4) using GMM estimation procedure and later estimated the short-run and long-run associations from Equation (5.13) using the ARDL cointegration approach. Additionally, the analysis involved the use of Engle-Granger causality test to determine the causal direction of the financial development and industrial output growth association. The regression model was derived from the concept that financial development promotes economic growth and the development of the real sectors of the economy. This was done to ascertain specific policy issues required to ensure a sustainable economic growth in Ghana pioneered by industrial sector growth. The variables that were empirically tested as drivers of industrial output growth are those that are financial in nature and particularly measure the extent of financial development. These variables are domestic credit to private sector, domestic credit provided by the financial sector, broad money supply and total financial sector deposits. In addition, the financial development indicators included two financial development indices that were generated using the principal components analysis and used as robustness check in examining the impact of financial development. Other control variables such trade openness, government expenditure, monetary policy rate, inflation rate and labour force growth rate were also included to improve the model diagnostics.

The results of the parsimonious regression equation showed that domestic credit to private sector and financial sector deposits have statistically significant positive associations with industrial productivity growth. The results indicate that private credit and the extent of financial sector deposit in the financial system have a dominating effect on industrial growth in Ghana. This positive association between financial development and industrial output growth was confirmed by the financial development indices 1 and 2 as the FDIndex1 showed a statistically significant positive association. The results, however, showed that the impact of the financial development on industrial output within the context of structural reforms has not been significant. The parsimonious results further indicated that the impact of financial sector reforms on industrial

growth in Ghana has been negative although this effect was statistically insignificant. But within the context of structural reforms in Ghana, the results indicate that change in the structure of the economy has strongly and resulted in declines in industrial productivity. With regards to the other control variables, trade openness and government spending proved to have statistically significant positive associations with industrial sector growth under the parsimonious estimation.

The cointegration results showed that in both the short- and the long-run, financial development demonstrate a positive association with industrial sector growth. The results, however, suggested that, to some extent, inefficiencies in the financial system can cause the industrial sector to slow down. This gives the indication that financial development beyond a certain point can lead negative growth of the industrial sector. The results also confirmed that the level of trade openness and government spending are positively associated with industrial sector growth in Ghana.

The study also sought to determine the direction of causality between financial development and industrial growth using the Engle-Granger causality test. The test indicated that there exists a bi-directional causal relationship between financial development and industrial sector growth in Ghana. The study therefore rejected the hypothesis that there exists no causal link between financial development and industrial sector growth and accepted the alternative. The implication is that industrial sector advancement promotes the growth of the financial system in Ghana while the financial intermediation also enhances industrial productivity growth.

The results imply that in order for government to improve the pace of pace of industrial advancement the financial sector must be stimulated in terms of the provision of credit facility to the private sector and promote private savings and use of financial intermediaries in greater portions for regular and business transactions. There is the need for government and financial institutions to come up with monitoring and services scheme for managing post-credit situations of enterprises in the industrial sector to minimise the occurrence of non-performing loans while and as a way of ensuring success of industrial firms.

The analysis of results in this Chapter proves that financial development positively influences industrial sector growth in Ghana significantly. The findings imply that, as a source of growth, the industrial sector enhances economic growth in Ghana. The next chapter examines the influence of financial development on manufacturing productivity, which is also classified as a source of growth.

CHAPTER EIGHT

FINANCIAL DEVELOPMENT AND MANUFACTURING OUTPUT IN GHANA

8.1 Introduction

The postulations of Schumpeter (1911) underpin the importance of the financial sector in promoting economic growth through real sector growth. The impacts of the financial sector in stimulating economic growth through its long-term effect on productivity cannot be overemphasised (Neusser & Kugler, 1998). Financial intermediaries can improve the allocative efficiency of investment due to their capacity to effectively acquire and process information about the innovative activities of private sector businesses and entrepreneurs (King & Levine, 1993b; see also Galetovic, 1996) or about the aggregate state of technology (Greenwood & Jovanovic 1990) and thereby to fund the most promising projects. The impact of financial intermediation has been assessed by including additional regressors which measure financial deepening. Such measures are based on rough aggregate financial indicators, like M2, total all credit issued in the economy, or bank deposits. The evidence produced by this approach shows that increased financial intermediation or a reduction in financial repression has a significant and positive effect on economic growth (Atje & Jovanovic, 1993; King & Levine, 1993a,1993b; Roubini & Sala-i-Martin, 1992; among others). Lavopa and Szirmai (2012) show that the manufacturing sector of economies receive substantial investments in research and development.

The indication that better financial systems mobilise savings and facilitate efficient allocation of resources, reduce agency costs and enhance innovation activities, and contribute to high-return investments through risk-sharing provide the basis manufacturing productivity growth. Ductor and Grechyna (2015) advocate that the causal effects of financial development should be considered jointly with the state of development in other sectors that govern economic growth. Studies by Beck, Demirgüç-Kunt and Maksimovic (2005, 2008) imply that financial and institutional developments facilitate firm growth, especially for small firms. This position is re-emphasised by the findings of other studies that financial development facilitates growth with causality running from financial development to industry growth (Rajan & Zingales, 1998;

Fisman & Love, 2002). Guiso *et al.* (2004) indicate further that financial market development facilitates corporate growth.

The relationship between financial development and growth is invariably investigated at the aggregate level without specific focus on impact of finance on firm growth (Topcu & Çoban, 2017). Knowing the interaction between financial developments and manufacturing productivity improve the empirics on the impact of finance on real sector growth. Gagliardi (2009) shows that local financial development affects firm growth positively. Similarly, Morón *et al.* (2013) found that there is a significant positive association between regional financial development and growth of firms in the manufacturing sector. The authors concluded that financial deepening has a significant and positive impact on surviving firms' growth.

The impact of impact of financial development on real sector growth is assessed using manufacturing value-added-to-GDP ratios as components of economic growth and the dependent variable. This chapter looks at the relationship between financial development indicators and manufacturing productivity growth in Ghana.

8.2 Financial Development and Manufacturing Productivity in Ghana

Figure 8.1 shows the relationship between financial development and manufacturing productivity in Ghana over the period 1965 to 2016. The display in Figure 8.1 shows that manufacturing productivity growth demonstrated volatilities and followed a close trend with financial sector developments between 1965 and early 1980s. With the exception of a sharp decline in financial development in 2006, Figure 8.1 depicts that there have been consistent improvements with relatively lower volatilities in financial sector performance in the post-reform period of 1984—2016. Manufacturing productivity witnessed a higher sharp increase in 1985 after the lowest decline in 1983 and remained largely stable between the late 1980s till 2006 since which the sub-sector has recorded consistent decreases in productivity. The similarities in the volatilities between financial development and manufacturing productivity in the pre-reform era of 1965—2016 confirms the fact the period manufacturing activities largely determined credit allocation in Ghana as a result of credit controls and interest rate ceiling regime implemented by government during the time. To that extent, the financial sector followed the trend of manufacturing success and productivity. Hence, the decline in manufacturing productivity in 1975 resulted in consistent

financial system failure from 1977 to in 1983. This was part of the reason for the implementation of financial sector reforms in Ghana.

Figure 8 1: Financial Developments and Manufacturing Productivity Growth in Ghana

Source: Researcher's own computations.

In the post-reform era of 1984 and 2016, trends in financial development and manufacturing productivity seem to follow different trajectories. This indication is consistent with the observation by Levine (1997) that it is difficult to conclude that the financial system merely - and automatically - responds to industrialization and economic activity, or that financial development is an inconsequential addendum to the process of economic growth. While financial sector has been on an increasing path since 1984, manufacturing productivity seems to be largely declining consistently in Ghana. Share of manufacturing productivity in GDP in the post financial reform period of 1965-1984 recorded an average of 10.93 per cent and peaked at 15.54 per cent in 1975. The post reform era of 1984-2016 witnessed an average share in GDP of approximately 9.02 per cent and recorded at highest rate of 12.44 per cent in 1985. Since 1985, the manufacturing sub-sector has been recorded marginal improvements in 1993 and 2006 at 10.50 per cent of GDP. The declining ratio of manufacturing in the post-financial reform period of 1984—2006 gives the indication that perhaps reforms have resulted in lower growth of manufacturing industries in

Ghana. The component of manufacturing productivity in the industrial sector has been declining consistently and more investments shifting in other sub-sectors as evident from the increased share of industry to GDP in the post-reform era. Financial developments may have contributed to the relative improvement in industrial output growth in the post financial reform period though, since 2002, a key component of the industrial sector, manufacturing seems to declining consistently in the face of rising financial development indicators. The analysis below presents the findings of the regression results and analysis of the impact of the financial development on manufacturing productivity in Ghana

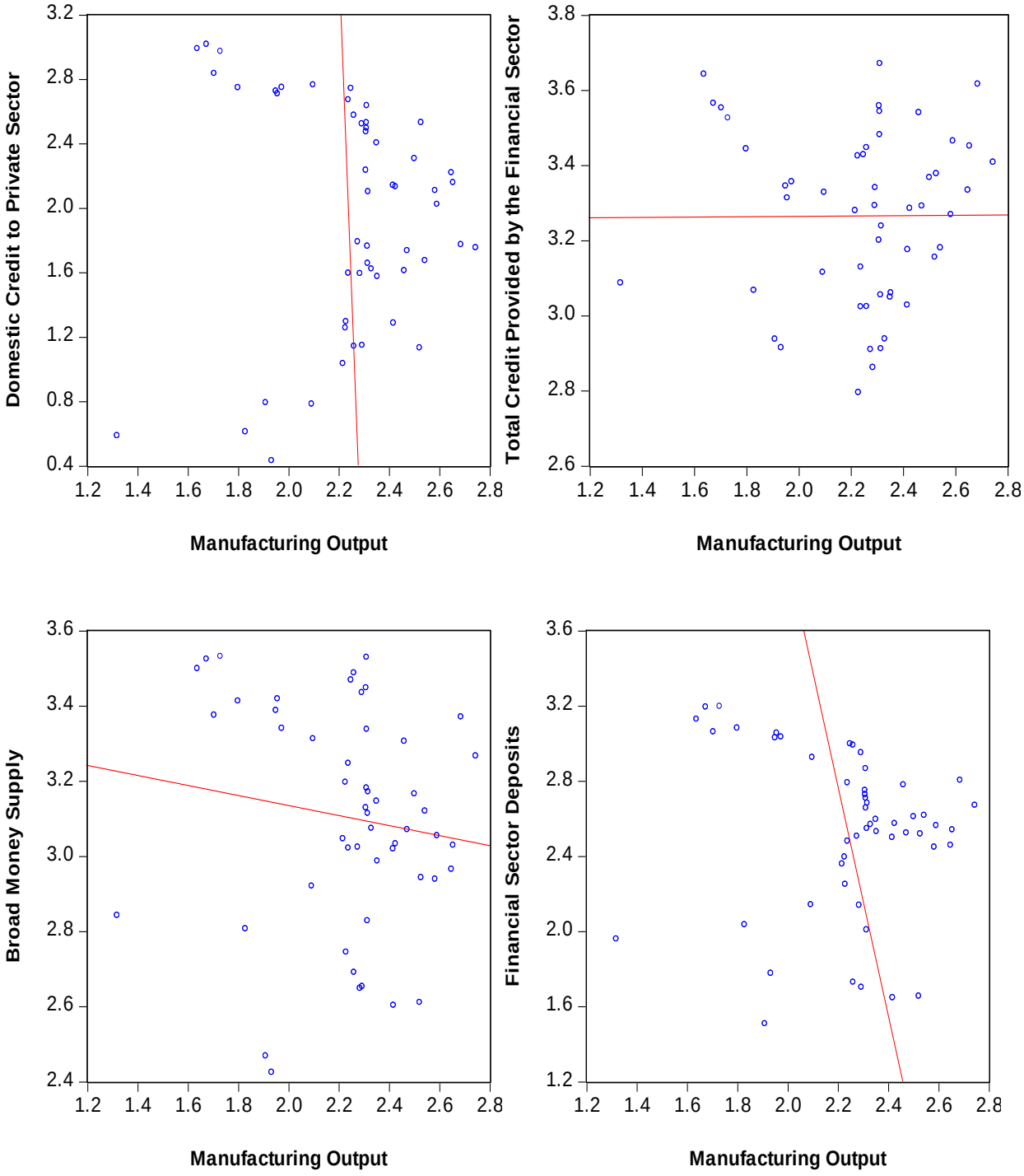
8.3 Results and Analysis

The Ordinary Least Squares methodology within the GMM was applied to run the regression Equation (5.4) in Chapter Five with manufacturing value added to GDP ratio as the dependent variable. The parsimonious estimation uses only one financial development indicators together with a set of other control variables at a time. In addition to the parsimonious regression estimation and as robustness check, the study uses the FDIndex1 and FDIndex2 developed from the PCA analysis to determine the overall impact of financial development on industrial productivity. The study thus estimates the short- and the long-run estimation measuring the behaviour and impact of the finance on industrial output growth from the medium-term towards the long-term by applying the ARDL cointegration estimation approach.

8.3.1 Unconditional Correlations

Figure 7.1 indicate an analysis of data plots display in simple scatter plots between each of the financial development indicators and manufacturing productivity growth. The data included for each financial dimension—access to credit, depth of financial system and openness of the financial sector—are represented in the logarithmic forms as discussed in the data in Chapter Five. As shown in the scatter plots and the orthogonal regression line, there is no strong evidence of a relationship between the financial indicators and manufacturing productivity growth in Ghana.

Figure 8.2: Scatter Plots of Financial Development and Industrial Output Growth



Source: Researcher's own computations.

8.3.2 Baseline Regression Results

The results of the parsimonious baseline equation specification are estimated using Equation 5.4 with manufacturing value-added as the dependent variable with the estimation interacted with financial and structural reform dummies to capture the impact of policy reforms on manufacturing in Ghana. The variables of interest are the financial development indicators and their impacts on manufacturing sector growth. These regression results assessing the impact of financial development indicators on manufacturing output growth are presented in Tables 8.1 and 8.2.

8.3.2.1 Domestic Credit to Private Sector and Manufacturing Productivity

Tables 8.1 and 8.2 present the regression results on the relationship between domestic credit to private sector and industrial output. The results show that there is a positive but statistically insignificant association between domestic credit to private sector and manufacturing productivity in Ghana in the estimation with financial reforms. The results, however, indicate that in the total credit to private sector shows a statistically positive significant association with manufacturing productivity growth in Ghana at the 5.0 per cent level when the estimation is considered from the perspective of structural reforms in Ghana. The results thus suggest that policy interventions and the general macro-economic happenings have increased the rate of positive impact of domestic credit to private sector on manufacturing productivity growth as well as the level of significance of the private credit in Ghana.

8.3.2.2 Total Domestic Credit Provided by the Financial Sector and Manufacturing Productivity

The parsimonious baseline results show a negative but statistically insignificant relationship between total domestic credit offered by the financial sector and manufacturing productivity growth in both the financial and structural reform-interacted estimations. The results further indicate that though the negative impact of total credit on manufacturing productivity the effect is not statistically significant as evident in Tables 8.1 and 8.2. The results, thus, suggest that though policy interventions and the general macro-economic happenings have resulted in improved total credit offered in the Ghanaian economy, the expansion has rather negatively impacted on manufacturing productivity.

Table 8.1: GMM Estimation of Manufacturing Output and Financial Development Indicators, Financial Reforms (1965-2016)

Variables	Dependent Variable: MVA (Manufacturing Output)					
	DCPS Model (1)	**DCFS Model (2)**	**BMS Model (3)**	**FSD Model (4)**	**FDIndex1 Model (5)**	**FDIndex2 Model (6)**
C	12.231***[7.839]	12.064*** [11.5000]	11.978***[10.781]	12.333***[11.832]	12.108***[8.265]	11.749***[11.826]
LnDCPS	0.046 [0.407]					
LnDCFS		-0.199 [-1.491]				
LnBMS			0.094 [0.359]			
LnFSD				0.282 [1.405]		
LnFDIndex1					0.009 [0.2002]	
LnFDIndex2						-0.087** [-2.41]
LnGDPGC	-1.631*** [-6.775]	-1.478*** [-8.426]	-1.615*** [-7.930]	-1.77 [-7.945]	-1.603*** [-7.147]	-1.529*** [-9.335]
LnGCF	-0.084 [-0.645]	-0.143 [-1.016]	-0.061 [-0.436]	-0.068 [-0.638]	-0.070 [-0.497]	-0.187 [-1.423]
LnTopen	0.442** [2.241]	0.542*** [3.289]	0.447** [2.397]	0.435*** [2.888]	0.453** [2.334]	0.556*** [3.912]
LnGE	0.304* [1.859]	0.257 [1.660]	0.290* [1.746]	0.284* [1.766]	0.289* [1.716]	0.261** [1.771]
LnMPR	-0.314*** [-3.750]	-0.336*** [-4.171]	-0.309*** [-3.622]	-0.248** [-2.643]	-0.316*** [-3.817]	-0.311*** [-3.713]
LnINF	-0.023 [-0.575]	-0.027 [-0.582]	-0.034 [-0.633]	-0.045 [-0.923]	-0.029 [-0.610]	-0.028 [-0.597]
LnPGR	-0.467** [-2.651]	-0.612*** [-3.243]	-0.432* [-1.643]	-0.269 [-1.077]	-0.458* [-1.756]	-0.603*** [-4.094]
FSR	-0.186* [-1.939]	-0.195* [-1.938]	-0.214 [-1.800]	-0.319** [-2.217]	-0.195* [-1.926]	-0.245** [-2.078]
Test Diagnostics	R^2 =0.81 D-Watson =1.1 J-Stats =0.00	R^2 =0.81 D-Watson =1.2 J-Stats =0.00	R^2 =0.81 D-Watson =1.2 J-Stats =0.00	R^2 =0.83 D-Watson =1.4 J-Stats =0.00	R^2 =0.91 D-Watson =1.6 J-Stats =0.00	R^2 =0.90 D-Watson =1.2 J-Stats =0.00

Table 8.2: GMM Estimation of Manufacturing Output and Financial Development Indicators, Structural Reforms (1965-2016)

Variables	Dependent Variable: MVA (Manufacturing Output)					
	DCPS Model (1)	**DCFS Model (2)**	**BMS Model (3)**	**FSD Model (4)**	**FDIndex1 Model (5)**	**FDIndex2 Model (6)**
C	13.887***[4.680]	9.632*** [4.558]	13.515***[4.176]	11.743*** [-4.379]	12.236***[3.594]	9.863*** [4.517]
LnDCPS	0.185**[2.564]					
LnDCFS		-0.173 [-1.363]				
LnBMS			0.252 [1.375]			
LnFSD				0.049 [0.308]		
LnFDIndex1					0.012 [0.263]	
LnFDIndex2						-0.048* [-1.751]
LnGDPGC	-1.754*** [-5.869]	-1.207*** [-5.849]	-1.648*** [-5.323]	-1.454*** [-5.583]	-1.483*** [-4.107]	-1.297 [-6659]
LnGCF	0.108 [0.911]	0.066 [0.407]	0.138 [1.047]	0.122 [0.799]	0.142 [1.060]	0.042 [0.255]
LnTopen	-0.013 [-0.097]	0.346** [2.488]	-0.024 [-0.148]	0.144 [1.359]	0.101 [0.503]	0.319** [2.724]
LnGE	0.120* [1.724]	0.026 [0.266]	0.115 [0.974]	0.070 [0.642]	0.078 [0.550]	0.0553 [0.612]
LnMPR	-0.137 [-1.238]	-0.058 [-0.554]	-0.176 [-1.346]	-0.126 [-0.989]	-0.133 [-1.199]	-0.069 [-0.633]
LnINF	-0.048 [-0.541]	-0.115 [-1.215]	-0.063 [-0.668]	-0.081 [-0.819]	-0.076 [-0.778]	-0.108 [-1.149]
LnPGR	-0.667 [-0.884]	0.002 [0.003]	-1.038 [-1.128]	-0.519 [-0.680]	-0.610 [-0.823]	-0.068 [-0.105]
FSR	0.001 [0.005]	-0.079 [-0.705]	-0.044 [-0.335]	-0.039951 [-0.282]	-0.022 [-0.170]	-0.094 [-0.900]
Test Diagnostics	R^2 =0.88 D-Watson =1.8 J-Stats =0.00	R^2 =0.92 D-Watson =1.7 J-Stats =0.00	R^2 =0.87 D-Watson =1.7 J-Stats =0.00	R^2 =0.87 D-Watson =1.9 J-Stats =0.00	R^2 =0.87 D-Watson =1.6 J-Stats =0.00	R^2 =0.88 D-Watson =1.8 J-Stats =0.00

Source: Researcher's own computations.

8.3.2.3 Broad Money Supply and Manufacturing Productivity

The parsimonious baseline results displayed in Tables 8.1 and 8.2 show a positive but statistically insignificant relationship between broad money supply and industrial growth although the extent of impact was relatively higher in the structural break period of 1984-2016. This implies that the impact of the broad money in the economy, though statistically insignificant in this instance, results in positive growth of manufacturing possibly due to the relationship that broad money has with demand of goods and services.

8.3.2.4 Financial Sector Deposits and Manufacturing Productivity

The results indicate that financial sector deposits were positively associated with manufacturing productivity albeit statistically insignificant for both estimations. This implies that higher financial sector deposit can facilitate manufacturing productivity growth. The results suggests that the post-reform era in Ghana has led to increases in improvements in bank deposits and the findings suggest that the impact on manufacturing productivity has been insignificant.

8.3.2.5 Financial Development Indices and Manufacturing Productivity

The results of Tables 8.1 and 8.2 also provide the regression results indicating the impact of the financial development on manufacturing productivity using each of the indices produced from the principal component analysis. This regression serves as a robustness check in the parsimonious equation estimations and is also relevant in understanding the combined impact of the financial development indicators and its interactions with the macro-economic variables within the manufacturing productivity model framework using Equation (5.4). The results show that while FDIndex1 shows a statistically insignificant positive association with manufacturing productivity, FDIndex2 indicate a statistically significant negative association in both estimations. The results point to a dominating negative effect exerted by the volume and nature of total credit provided by the financial sector within the economy.

The results in Tables 8.1 and 8.2 indicate that, with the exception of total domestic credit provided by the financial sector—which indicates a negative relation—all the measures of financial development show a positive association with manufacturing productivity growth. The results portray that domestic credit to private sector only shows statistical significance in the structural adjustment period and broad money supply together with financial sector deposits all show statistically insignificant positive relationships with manufacturing productivity growth in

the parsimonious estimations. This implies that with the exception of total credit offered by the financial sector, improvements in financial development indicators in Ghana enhance manufacturing productivity albert the impact has not been substantial.

These notwithstanding, the overall impact of financial development, as measured by FDIndex2, show a statistically significant negative association with manufacturing productivity growth. The findings either suggest the existence of inefficiencies in the allocation of credit by the financial system or a bias against the allocation of credit to the manufacturing industries in Ghana. This negative association between financial development and manufacturing productivity growth gives the indication that Ghana's financial system is perhaps financing unproductive high risk manufacturing projects. The findings showed that the impact of financial reforms on manufacturing productivity has been negative and rather slowed down the growth of the manufacturing sector in Ghana. To this end, the findings suggest that the removal of state participation and control of credit allocation among other policies in the manufacturing sector seem to have resulted in declining manufacturing output growth in Ghana.

8.4.1 Short- and Long-run Regression Results

The study further there uses the ARDL and the VAR technique to determine the short- and long-run associations between financial development and capital accumulation in Ghana using Equation (5.13) from Chapter Five. The test is carried out using the ARDL and VECM with the ARDL approach to estimate the cointegration and VECM regressions. The results are presented in Tables 8.3 and 8.4.

8.4.1.1 Diagnostic Checks and Model Stability

The regression results for the short-run and long-run models are essentially significant and do not suffer from any serial correlation. The adjusted R-squared, F-tests and the Durbin Watson test imply suitability of the model and do not suggest autocorrelation of the residuals. All the variables used in the analysis were integrated of order 1, I(1). Moreover, the signs of the main explanatory variables are as expected. Furthermore the model shows no evidence of serial correlation and heteroskedasticity as shown by the results in Tables 8.3.

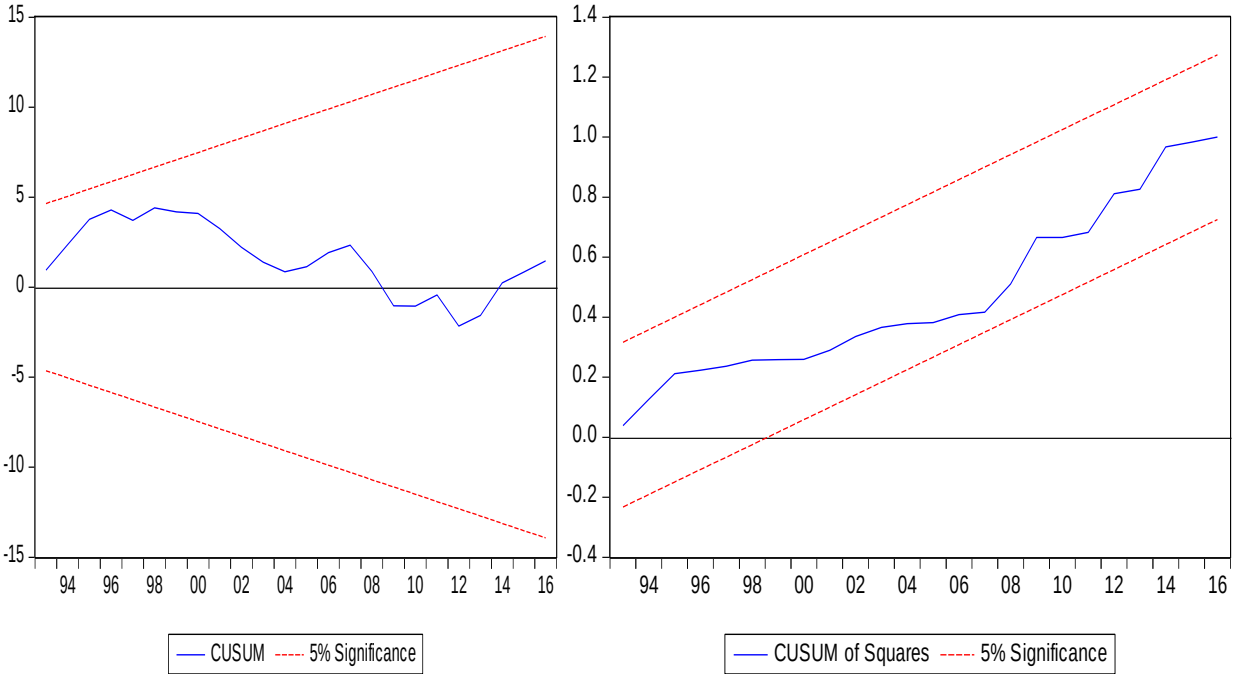
Table 8.3: ARDL Model Heteroskedasticity Test: (Breusch-Pagan-Godfrey), Manufacturing

F-statistic	1.509303	Prob. F(25,24)	0.1585
Obs* R-Squared	30.56131	Prob. Chi-Square (25)	0.2040
Scaled explained SS	8.791201	Prob. Chi-Square (25)	0.9989

Source: Researcher's own computations.

The results in Table 8.3 show no evidence of heterosdasticity. To reject the null hypothesis of heteroskedasticity, a probability value (or p-value) of less than 0.05 is required. Nevertheless, the heteroskedasticity test based on the Breusch-Pagan-Godfrey test in Table 8.3 report p-values greater than the 5.0 per cent benchmark. Accordingly, the hypothesis no heteroskedasticity cannot be rejected, implying that heteroskedasticity does not seem to be a problem in the regression specification. The graphical representation of CUSUM and CUSUM square tests are presented in Figure 8.2 for the long run OLS model. As evident from the figures, the null hypothesis that the regression model is correctly specified cannot be rejected since the plots lie within the critical bounds at the 5.0 per cent level of significance for both the CUSUM and CUSUM square.

Figure 8.2: CUSUM Test of Stability for Manufacturing Model



Source: Researcher's own computations.

The test results as can be observed from Figure 8.1, imply that the plots of both the CUSUM and CUSUM square are with the boundaries and thus confirm the stability of the long-run coefficients of the regressors.

8.4.1.2 Specification of the Short-Run Cointegration Model

As a precondition for examining the long-run causality, the coefficient of the cointegrating equation [CoinEq(-1)] must be negative in sign and statistically significant. Since the coefficient of the cointegration equation is -1.11*** and statistically significant, it is concluded that there is long-run causality running from the explanatory variables to capital formation. Based on the short-run results, the Cointegrating Regression Model equation is formulated Equation (8.1).

Cointeq = LNMVA - (0.0463*FDINDEX1 - 0.1234*FDINDEX2 - 2.2934*LNGDPGC - 0.4626*LNGCF + 0.5614*LNTOPEN + 0.2880*LNGE - 0.3918*LNMPR - 0.0660*LNINF - 2.0776*LNPGR -0.0725*FSR + 19.0515). (8.1)

8.4.1.3 Analysis of Short-run Regression Results

The results of short-term effects of financial development as well as the control variables on manufacturing productivity growth in Ghana are summarised in Table 8.4. The results indicate that the short-run association of financial development index 1 and manufacturing productivity is positive but statistically insignificant. This development indicates that credit offered to private enterprises is not significantly affecting manufacturing productivity growth in Ghana, although theory suggests that the impact of private credit on manufacturing productivity, for instance, may not be fully felt in the economy in the short-term. The insignificant impact may further imply that businesses may also not be immediately change outputs in the local business economy as initial investments take time and have variant success rates and maturity dates in terms of making significant contributions to growth.

Table 8.4: Estimated ARDL Short-Run Coefficients and the Error Correction Estimate.

Dependent Variable: Manufacturing Productivity (MVA)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FDINDEX1)	0.051	0.040	1.289	0.2097
D(FDINDEX2)	-0.123***	0.041	-2.967	0.0067
D(FDINDEX2(-1))	-0.116***	0.035	-3.263	0.0033
D(LNGDPGC)	-1.215***	0.422	-2.876	0.0083
D(LNGDPGC(-1))	3.134***	0.708	4.421	0.0002
D(LNGCF)	-0.515***	0.132	-3.875	0.0007
D(LNTOPEN)	0.715***	0.115	6.213	0.0000
D(LNTOPEN(-1))	0.471***	0.105	4.461	0.0002
D(LNGE)	-0.263**	0.135	-1.943	0.0637
D(LNGE(-1))	-0.248*	0.133	-1.865	0.0745
D(LNMPR)	-0.277**	0.113	-2.437	0.0226
D(LNMPR(-1))	0.328***	0.101	3.228	0.0036
D(LNINF)	-0.003	0.029	-0.111	0.9121
D(LNINF(-1))	-0.088**	0.038	-2.313	0.0296
D(LNPGR)	-7.163***	1.323	-5.411	0.0000
D(LNPGR(-1))	5.695***	1.183	4.813	0.0001
D(FSR)	-0.080	0.095	-0.842	0.4078
CointEq(-1)	-1.114***	0.162	-6.864	0.0000
R^2 = 0.84, Adj. R^2 = 0.68, F-Statistic: 5.31, Prob.(F-Stat) = 0.000, D-Watson: 2.28				

Source: Researcher's own computations. Note: ***, **, * represent 1%, 5% and 10% levels of significance, respectively.

On the other hand, financial development index 2 indicates a negative and statistically significant association with manufacturing productivity growth. This suggests that, at some point, financial development could negatively affect manufacturing productivity increases. This situation may arise in instances where there exist poor investment decisions and outcomes or inefficient financial intermediation with regards to the offering of credit in the economy. The results suggests that a 1.0 per cent unit increases in financial development index 2 dampens

manufacturing productivity by 0.123 percentage point decrease in manufacturing productivity in Ghana. The findings thus suggests that although financial development causes manufacturing productivity to increase the existence of inefficiencies in credit allocation have resulted in declining manufacturing output in the short-term. The study thus concludes that there exists insignificant positive association between financial development indicators and manufacturing output growth in Ghana and that at some point expansion in financial intermediation provided by the financial system causes declines in manufacturing productivity. The results of the short- and long-run regressions are consistent with the parsimonious equation estimation in Table 8.1 and 8.2 with domestic credit to private sector and total credit provided by the financial sector significantly contributing to manufacturing productivity growth in Ghana.

With regards to the other control variables, gross capital formation showed a negative and statistically significant association with manufacturing. The negative effect that capital accumulation has on manufacturing productivity growth is consistent with theory since new investment is a drain on manufacturing businesses. The fact the association between capital formation and manufacturing growth is significant implies that manufacturing firms are financing improvements in productivity by themselves through plough back of profits.

Trade to-GDP ratio showed a statistically significant positive relationship with manufacturing productivity at the 1.0 per cent level in the short-run. The volume of trade, as determined either exports or imports, is a proxy of growth-enhancing interactions of economies. The results show that a 1 per cent rise in the volume of trade would increase manufacturing productivity by 0.715 per cent in the short-term. The effects of trade exhibit in the areas of specialisation, exchange of ideas through exports or acquiring foreign technology through quality imports and serve as a conduit for knowledge dissemination and resource transfer among countries. These bases make trade important for the growth of the manufacturing industries. Therefore, this finding is in line with the views that highly open economies should exhibit higher growth rates (Barro & Sala-I-Martin, 1995; Edwards, 1992; Grossman & Helpman, 1995). Exports plus imports as share of GDP (trade volume) used to measure the extent of openness of the economy to the rest of the world has a strong positive and statistically significant correlation with Ghana's manufacturing growth.

Government spending showed a statistically significant negative association manufacturing productivity and the findings indicate that a unit increase in government expenditure dampens manufacturing productivity by 0.263 unit points. This finding is consistent with the observation by Barro (2006), and Barro and Sala-I-Martin (2006, 1995) that non-productive spending could undermine growth. The results show that government consumption expenditure has a strong negative and statistically significant relationship with manufacturing productivity growth in the short-run, suggesting that an increase in government consumption expenditure in Ghana is significantly causing declines in growth of the real sector. The results may imply that government may also be spending on purchases from other markets other than from within the local economy.

On the other hand, increases in the monetary policy rate showed to have a relatively strong statistically significant negative impact on manufacturing productivity growth in Ghana in the short-run while inflation rate maintained statistically insignificant negative relationships with manufacturing growth. The strong statistically significant negative positive association between monetary policy rate and manufacturing sector growth emphasise the unhealthy influence that the cost of credit has on productive industries. Increasing monetary policy rates indirectly affect the cost of credit in the economy. Against the fact that substantial manufacturing companies depend on borrowing to finance expansion the negative association between manufacturing growth and monetary policy rate is not surprising. The rate of inflation and population growth rates equally showed negative associations with manufacturing productivity growth although the former indicates a statistically insignificant relationship.

The result of the error correcting model (ECM) indicates an adjustment to the equilibrium state after a shock. The lagged error term coefficient is negative (-1.11), as required and is strongly significant at the 1.0 per cent level. This serves to further affirm the presence of long-run association between financial development and manufacturing productivity growth. Again, it suggests that about 1.11 percentage units of the distortions created by unit shocks in the preceding year can be restored in the current year.

8.4.1.4 Analysis of the Long-run Impact of Financial Developments on Manufacturing Productivity.

The results in Tables 8.5 report the results of the ARDL vector error correction model for examining the long-run impact of financial development indicators on manufacturing output.

Table 8.5: Estimated ARDL Long-Run Coefficients

Dependent Variable: Manufacturing Productivity (MVA)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
FDINDEX1	0.046	0.034	1.334	0.1947
FDINDEX2	-0.123***	0.039	-3.13	0.0045
LNGDPGC	-2.293***	0.202	-11.304	0.0000
LNGCF	-0.462***	0.100	-4.594	0.0001
LNTOPEN	0.561***	0.093	5.995	0.0000
LNGE	0.287*	0.167	1.720	0.0982
LNMPR	-0.391***	0.081	-4.825	0.0001
LNINF	-0.065	0.053	-1.226	0.2317
LNPGR	-2.077***	0.374	-5.545	0.0000
FSR	-0.072	0.082	-0.873	0.3910
C	19.051***	1.290	14.765	0.0000
R^2 = 0.84, Adj. R^2 = 0.68, F-Statistic: 5.31, Prob.(F-Stat) = 0.000, D-Watson: 2.28				

Source: Researcher's own computations. Note: ***, **, * represent 1%, 5% and 10% levels of significance, respectively.

The results give an indication that all the variables of interest maintain their short-run growth relationships in the long-run. It can thus be observed that financial development index 1 has a positive but statistically insignificant association with manufacturing productivity growth just as was the case with both the parsimonious and short-run results. This confirms that financial development in Ghana has not significantly affected manufacturing productivity though domestic credit seems to have substantially improved manufacturing production in Ghana. This finding

implies that manufacturing industries are not benefiting substantially from improvements in domestic credit to enterprises; total credit provided by the financial sector, high financial sector deposits and increased financial deepening in Ghana.

With regards to financial development index 2, the long-run results also confirmed the both the parsimonious and short-run results which indicated strong statistically significant negative association with manufacturing. This gives the indication that inefficiencies in the financial system in Ghana have at some time hampered growth of the manufacturing and thus minimising the positive impacts resulting from improvements in domestic credit to private sector, broad money supply and financial sector. The significant negative impact of financial development on manufacturing productivity can thus be attributed to possible inefficiencies in the total credit provided by the financial sector. The thus concludes that the growth potential of manufacturing productivity in Ghana is greatly limited by poor financial intermediation services provided by the financial system in Ghana. The study thus concludes that inefficiencies in the total credit offered by the financial system exert a dominating negative impact on manufacturing productivity growth in Ghana. This conclusion is confirmed by the concurrent findings running from the parsimonious, short-run to the long-run regression results. It must however be pointed that the results indicate that the impact of domestic credit provided to enterprises have had statistically significant effect on manufacturing productivity growth in the structural break period of 1984-2016. This suggests that the level of financial deepening and credit to private enterprises is facilitating the growth of the manufacturing sector. This finding once again echoes the position of studies that highlight that the impact of financial sector deepening on firm performance and growth is stronger for small and medium-sized enterprises (Beck *et al.,* 2005, 2008).

The results confirm the parsimonious and short-run regression finding that increases in the monetary policy rate strongly hamper growth of manufacturing productivity. The long-run results indicate that a 1.0 per cent increase in the monetary policy rate dampen manufacturing productivity growth by 0.391 percentage points in the long-term. Similarly, the results indicate that inflation, population growth also negatively impact manufacturing productivity in the long-term though the effect of inflation shows to be insignificant.

The long run results further confirm that trade continues to be an important factor in the growth of manufacturing in Ghana. The results show that that trade openness in the Ghanaian economy is highly statistically significant and has positive association with manufacturing sector growth. The results also confirm the adverse impact that government consumption expenditure has on manufacturing productivity as the findings indicate a strong statistically significant negative relationship with manufacturing growth in Ghana in the long-term. This finding suggests that that prolonged and unsustainable increases in government consumption expenditure may significantly affect manufacturing advancement negatively. This revelation gives a strong indication that excessive government spending hampers manufacturing growth and may lead to significant failure of local enterprises especially when a greater proportion of such expenditures not spent on local manufactured products. The negative association also suggest that government may not be spending adequately on locally manufactured products and thus increases in government expenditure are adversely affecting manufacturing sector growth. The long-run result further confirms that though financial reforms have, to some extent, not augured well for the manufacturing productivity growth in Ghana, the impact is not statistically significant.

8.4.1.5 The Direction of Causality of Financial Development Indicators and Manufacturing Output

The Wald restrictions test in Table 5.3 in Chapter Five showed that there is a causal relationship running between the explanatory variables and the manufacturing productivity. As noted earlier, Engle and Granger (1987) point that if more than two of the variables are I(1) and cointegrated then a causal relationship exists in one direction. The study adopted that Granger causality test approach to ascertain the direction of the causal relationship between financial development measures and the other control variables on one hand, and manufacturing productivity. The results of the Granger-causality tests are presented in Table 8.6.

The results of Table 8.6 show that the null hypothesis that domestic credit to private sector does not Granger cause variations in manufacturing output growth cannot be rejected. However, the null hypothesis that manufacturing output growth does not Granger cause variations in domestic credit to private sector is rejected at the 10.0 per cent level of significance. This implies that there is growth running from manufacturing output to financial development in Ghana and not the other way round. It is thus concluded that there is a uni-directional causal relationship

running from manufacturing output growth to domestic credit provided to the private sector enterprises.

The results, however, show that there is a causal relationship running from broad money supply to manufacturing output growth in Ghana and not vice versa. The null hypothesis that changes in broad money supply do not Granger cause variations in manufacturing output growth is rejected at the 5.0 per cent level of significance. On the contrary, the null hypothesis that changes in manufacturing productivity do not Granger cause variations in broad money supply cannot be rejected. The results point out the existence of a uni-directional causal relationship running from broad money supply to manufacturing sector growth in Ghana.

In sharp contrast to the aforementioned causal relationships between domestic credit, broad money and manufacturing output; the results of Table 2 indicate that there is no causal relationship between neither total credit provided by the financial sector nor level of financial sector deposits and manufacturing advancement. As can be observed, the null hypotheses that domestic credit provided by the financial sector and financial sector deposits do not Granger cause manufacturing output growth; and vice versa cannot be rejected. This suggests that the developments of total credit provided by the financial system and the level of financial sector deposits in Ghana are not responsible for variations in manufacturing sector output; and vice versa. This conclusion is similar consistent with the view of Neusser and Kugler (1998) measure of long-run causality indicates that this causality is due to a growth rather than a cyclical effect.

The financial development indices and manufacturing productivity showed no statistical significance of Granger causing each other. The hypothesis of either the financial development indices Granger causing manufacturing productivity or vice versa cannot be rejected. This goes to confirm that overall financial development in Ghana is not significantly affecting the manufacturing production in Ghana.

Another variable of interest hereto is the casual association between the level of manufacturing and capital formation. The result indicates that there is a uni-directional causal relationship between manufacturing output and capital formation in Ghana. The null hypotheses that

manufacturing sector output does not Granger cause capital formation is rejected at the 5.0 per cent level of significance while the reverse cannot be rejected, as evident in Table 8.6.

Table 8.6: Pairwise Granger Causality Test, Finance-Manufacturing nexus

Null Hypothesis	No. of Obs	F-Statistic	Probability
LDCPS does not Granger Cause LMVA	50	2.195	0.1230
LMVA does not Granger Cause LDCPS		3.146*	0.0526
LDCFS does not Granger Cause LMVA	50	1.389	0.2597
LMVA does not Granger Cause LDCFS		0.135	0.8737
LBMS does not Granger Cause LMVA	50	3.420**	0.0414
LMVA does not Granger Cause LBMS		1.303	0.2816
LFSD does not Granger Cause LMVA	50	1.115	0.3367
LMVA does not Granger Cause LFSD		0.153	0.8579
FDINDEX1 does not Granger Cause LNMVA	50	2.210	0.1215
LNMVA does not Granger Cause FDINDEX1		0.788	0.4606
FDINDEX2 does not Granger Cause LNMVA	50	0.379	0.6865
LNMVA does not Granger Cause FDINDEX2		0.150	0.8604
LGCF does not Granger Cause LMVA	50	0.908	0.4103
LMVA does not Granger Cause LGCF		2.488*	0.0944*

Note: ***, **, * represent 1%, 5% and 10% levels of significance, respectively.

These results from Table 8.6 show that, domestic credit to private sector and broad money supply—as measures of financial development— have uni-directional causal associations with manufacturing output growth in Ghana. The causal relationship is running from manufacturing to financial development and not the other way around. This general trend of uni-directional causal associations between manufacturing output growth and financial development does support the 'demand following' hypothesis. The results thus imply that the manufacturing sector growth is causing financial developments in Ghana.

With regards to the other control variables of the model, the results show that the level of trade openness and manufacturing output growth have uni-directional causal association with growth running from the former to the latter in Ghana. The null hypotheses that trade openness does not

Granger cause improvements in manufacturing sector output in Ghana is rejected at the level of 10.0 per cent level of significance while the reverse cannot be rejected. Hereto, considering the fact that the rate of importation is substantially higher than the level of exports in Ghana, the implication is that this causal relationship emphasises the dominating impact of importation on Ghana's economy. Also, the null hypotheses that government spending does not Granger cause manufacturing growth in Ghana; or vice versa, cannot be rejected.

On the basis of the results reported in Table 8.6 and the discussions thereafter, the study rejects the null hypothesis and accepts the alternative hypothesis that there is a causal link between the development of the financial sector and manufacturing output growth in Ghana. However the causal relationship is running from manufacturing to financial development and not vice versa. In particular, the growth-led finance hypotheses prevail in Ghana, when manufacturing productivity growth is measured by manufacturing value-added as share of GDP.

8.5 Chapter Summary

This chapter provided an empirical analysis on the impact of financial development and other control variables on manufacturing output growth in Ghana using annual time series data from 1965-2016. The analysis was undertaken to determine the impact of financial development indicators on manufacturing productivity which us deemed as a factor that influences economic growth in Ghana. Knowing how finance is affecting the sources of growth is essential in determining appropriate policies needed to enhance growth components of the economy. Understanding the finance and real sector growth dynamics is relevant in the formulation of optimal growth management policies for industrial development in Ghana and other economies with similar conditions.

The analysis begun by applying the manufacturing productivity growth dynamics from Equations (5.4) using GMM estimation procedure and later estimated the short-run and long-run associations from Equations (5.13) using the ARDL cointegration approach. The regression model was derived from the concept that financial development promotes economic growth and the development of the components of the economy. Additionally, the analysis involved the testing of the causal direction of the association between financial development and manufacturing productivity and employed the Engle-Granger causality test to determine the

causal direction. This was done to ascertain specific policy issues required to ensure a sustainable economic growth in Ghana pioneered by manufacturing productivity growth.

The variables that were empirically tested as drivers of manufacturing productivity growth are those that are financial in nature and particularly measure the extent of financial development. These variables are domestic credit to private sector, domestic credit provided by the financial sector, broad money supply and total financial sector deposits. In addition, the financial development indicators included two financial development indices that were generated using the principal components analysis and used as robustness check in examining the impact of financial development. Other control variables such trade openness, government expenditure, monetary policy rate, inflation rate and labour force growth rate were also included to improve the model diagnostics.

The results of the parsimonious regression equation reported in Tables 8.1 and 8.2 showed that domestic credit to private sector, broad money supply and financial sector deposits have statistically insignificant positive associations with manufacturing productivity growth. Only domestic credit to private sector showed positive statistical significance in view of the structural reforms just as observed under the perspective of financial sector reforms with all the other indicators maintaining their association. The statistically insignificant positive association between financial development and manufacturing productivity was confirmed by the financial development index 1 which also indicated a statistically insignificant positive relationship. On the other hand, total domestic credit provided by the financial sector also showed a statistically insignificant negative association with manufacturing productivity growth. The negative impact of total credit manifested in the financial development index two as the FDIndex2 showed a statistically significant negative association in the face of both financial and structural reforms. The results thus give the indication that though domestic credit to private sector significantly contribute positively to manufacturing productivity, the adverse effect of the overall credit provided by the financial sector dampen manufacturing productivity growth in Ghana as evident in Table 8.2. The parsimonious results further indicated that the impact of financial sector reforms on manufacturing productivity growth in Ghana has been negative and the effect is statistically significant for the 1965 to 2016 period. The results indicate that structural reforms, to a larger extent, have adversely affected productivity in the manufacturing sector, although the

impact is statistically insignificant. With regards to the other control variables, trade openness and government spending proved to have statistically significant positive associations with manufacturing productivity growth as evident in the parsimonious estimation reported in Tables 8.1 and 8.2. The results showed further that increases in the monetary policy rate strongly inversely affect manufacturing production.

The cointegration results showed that in both the short- and the long-run, financial development confirmed the positive but statically insignificant association with manufacturing productivity growth. The results however suggested that inefficiencies in the financial sector or financial development cause financial development dampen manufacturing productivity at certain point as the study show a statistically significant negative association between financial development and manufacturing growth. The results also confirmed that the level of trade openness and government spending are positively associated with manufacturing growth in Ghana.

The study also sought to determine the direction of causality between financial development and manufacturing productivity growth using the Engle-Granger causality test. The test indicated a uni-directional causal relationship between financial development and manufacturing productivity growth in Ghana, with growth in the financial sector, largely, caused by manufacturing productivity improvement. The results showed that broad money supply growth causes growth of in manufacturing productivity in Ghana. The study therefore rejected the hypothesis that there exists no causal link between financial development and manufacturing productivity growth and accepted the alternative.

The analysis of results in this Chapter proves that financial development positively influences manufacturing productivity growth in Ghana although the impact is not significant. The findings imply that, as a source of growth, the manufacturing sub-sector enhances economic growth in Ghana, although at a sub-optimal rate. The next chapter examines the impact of financial development on per capital GDP growth and also critically assesses the contribution of capital accumulation and industrial sector to economic growth of Ghana. Capital accumulation and industrial sector advancement are considered as sources of growth in the analysis.

CHAPTER NINE

FINANCIAL DRIVERS OF ECONOMIC GROWTH IN GHANA

9.1 Introduction

This chapter presents the results of the financial drivers of economic growth in Ghana. The analysis was undertaken by applying economic growth and industrial value-added dynamic models, and examining the long-run relationships of the dependent variables with the indicators of financial development. Understanding the long-run, short-run associations as well as the direction of causality between economic output, industrial growth and financial development is necessary to ascertain the extent of influence and impact of the financial system on the economy of Ghana. The analysis of the associations is essential to the development of specific policy that may be required in the determination of an optimal industrial growth strategy. From the economic growth and industrial value-added dynamics equation derived in chapter four, the major drivers of industrial growth, within the context of financial system, have been noted to be domestic credit to private sector, total domestic offered by the financial sector, broad money supply and including other control variables namely; gross fixed capital formation, trade openness, government expenditure and inflation rate. This chapter, therefore, empirically tests the significance of these variables in explaining economic growth and industrial value-added dynamics in Ghana.

The empirical and methodological strategies followed in this chapter involves the application of the Autoregressive Distributed Lags (ARDL) estimation procedures to economic growth and industrial value-added models specified in Chapter four. This is done to analyse the contribution of each factor to economic growth and industrial output dynamics. After that, an analysis of the associations and impacts of the explanatory variables on industrial value-added productivity and growth from 1965 to 2016 is undertaken. This chapter starts with the preliminary data analysis and diagnostic tests for the variables used in the study. After that the results of the short-run, long-run associations and the direction of causality are analysed on the basis of the regression results.

9.2 Results and Analysis

The Generalised Methods of Movements (GMM) estimation technique of the ordinary Least Squares (OLS) methodology was applied to run the regression equation (4.14) in Chapter Four. The GMM technique is useful in dealing with the problem of endogeneity bias in equations whether there are lagged dependent variables or not otherwise.

9.2.1 The Financial Determinants

The financial development indicators employed in this analysis are domestic credit to private sector, total domestic credit provided by the financial sector, broad money supply and financial sector deposits. The study also uses the financial development index computed using the principal component analyses as a single indices for measuring all the financial development indicators.

9.2.2 Finance and the Sources of Growth

The sources of growth indicators, representing real sector advancement in the economy, included in the model are gross fixed capital formation and industrial value-added. The literature and theoretical models point out the fact that economic agents may form financial intermediaries to mitigate the economic consequences of information and transaction costs (Levine *et al.*, 2000). To this extent, financial intermediaries emerge to lower the costs of researching potential investments, exerting corporate control, managing risk, mobilising savings, and conducting exchanges. This Levine *et al.* (2000) suggests that, by providing these services to the economy, financial intermediaries influence savings and allocation decisions in ways that may alter long-run growth rates.

9.2.3 The Macro-economic Economic Factors

The variables that are included in the model to capture the general macro-economic environment are government consumption expenditure, the monetary policy prime rate, inflation rate. The level of responsiveness by the macro-economic managers of the economy is measured by the state of financial reforms in Ghana. The labour force growth rate is included in the model as a human development indicator. This indicator influences the real per capita growth of the economy.

9.2.4 Baseline Regression Results and Analysis

The financial drivers of the economic growth are empirically tested to assess their individual marginal impacts on economic growth. The test is conducted using the parsimonious baseline equation specification of equation (5.2). The individual regression equations takes into account the financial development indicators which are the primary variables of interest and well as the other macro-economic variables that were employed as control variables. The essence is to identify the individual impacts of each of the financial development indicators on economic growth within the context of the broad model specification. The there was a structural break of the economy of Ghana in the year 1983 as indicated by the Chow test presented in Table 5.9 in chapter 5. The regression results are thus further estimated the capture the impacts of the financial indicators after the structural policies by shifting the dummy variable to begin from 1984 to capture for the beginning of the implementation of structural adjustment programmes in Ghana. The results on the impacts of financial development on growth are estimated with dummy variables for financial and structural reforms to capture their respective impacts on economic growth in Ghana. The results of the GMM estimations assessing the impact of financial development on economic growth in Ghana are presented in Tables 9.1 and 9.2.

Table 9.3 presents the regression results for the short- and long-run impacts of the respective effects of the financial development indicators as well as the macro-economic control variables on economic growth by applying the ARDL estimation approach using the model in equation (5.4).

Table 9.1: GMM Estimation of Economic Growth and Financial Development Indicators, Financial Reforms (1965-2016)

Variables	**DCPS Model (1)**	**DCFS Model (2)**	**BMS Model (3)**	**FSD Model (4)**	**FDIndex1 Model (5)**	**FDIndex2 Model (6)**
C	5.809***[16.991]	5.227***[7.454]	5.018***[7.997]	5.178***[11.012]	6.130***[17.444]	6.111***[12.037]
LnDCPS	0.271*** [3.938]					
LnDCFS		0.266** [2.437]				
LnBMS			0.343** [2.539]			
LnFSD				0.368*** [4.795]		
LnFDIndex1					0.082*** [3.781]	
LnFDIndex2						0.024 [0.756]
LnGCF	-0.077 [-1.076]	0.026 [0.223]	0.008 [0.063]	-0.026 [-0.345]	0.034 [0.355]	-0.044 [-0.418]
LnIDVA	-0.374*** [-3.595]	-0.449*** [-3.129]	-0.447*** [-3.004]	-0.528*** [-3.986]	-0.458*** [-3.650]	-0.441*** [-2.830]
LnTopen	0.034 [0.402]	0.143 [1.390]	0.156 [1.652]	0.217*** [2.830]	0.091 [1.024]	0.221* [1.979]
LnGE	0.534*** [4.502]	0.572*** [3.576]	0.547*** [3.257]	0.497*** [3.506]	0.521*** [3.970]	0.594*** [3.115]
LnMPR	-0.047 [-0.749]	-0.142** [-2.550]	-0.091 [-1.320]	-0.027 [-0.481]	-0.048 [-0.801]	-0.182*** [-3.242]
LnINF	0.0402 [1.542]	0.011 [0.384]	-0.011 [-0.311]	-0.011 [-0.411]	0.0003 [0.011]	0.013 [0.469]
LnPGR	0.133 [1.245]	0.147 [0.950]	0.203 [1.623]	0.268** [2.298]	0.284** [2.225]	0.020 [0.134]
FSR	0.117*** [2.761]	0.188** [2.178]	0.059 [0.618]	-0.043 [-0.620]	0.045 [0.673]	0.220** [2.470]
Test Diagnostics	R^2 =0.87 Adj. R^2 =0.84 J-Stats =0.00	R^2 =0.81 Adj. R^2 =0.77 J-Stats =0.00	R^2 =0.82 Adj. R^2 =0.79 J-Stats =0.00	R^2 =0.86 Adj. R^2 =0.83 J-Stats =0.00	R^2 =0.86 Adj. R^2 =0.83 J-Stats =0.00	R^2 =0.78 Adj. R^2 =0.73 J-Stats =0.00

Source: Researcher's own computations.

Table 9.2: GMM Estimation of Economic Growth and Financial Development Indicators, Sructural Reforms (1965-2016)

Variables	**DCPS Model (1)**	**DCFS Model (2)**	**BMS Model (3)**	**FSD Model (4)**	**FDIndex1 Model (5)**	**FDIndex2 Model (6)**
C	5.531***[16.627]	4.633***[5.936]	4.778***[8.736]	5.362***[13.850]	6.052***[17.363]	5.626***[9.239]
LnDCPS	0.299*** [4.265]					
LnDCFS		0.302** [2.262]				
LnBMS			0.387*** [3.761]			
LnFSD				0.354*** [5.865]		
LnFDIndex1					0.087*** [4.852]	
LnFDIndex2						0.008 [0.212]
LnGCF	0.022 [0.284]	0.225 [1.547]	0.056 [0.649]	-0.077 [-0.869]	0.073 [0.910]	0.136 [1.094]
LnIDVA	-0.478*** [-3.318]	-0.670*** [-4.636]	-0.492*** [-3.187]	-0.446*** [-2.788]	-0.494*** [-3.288]	-0.670*** [-3.660]
LnTopen	0.061 [0.502]	0.227* [1.892]	0.164* [1.690]	0.181* [1.984]	0.096 [0.935]	0.339*** [2.757]
LnGE	0.532*** [4.391]	0.581*** [3.370]	0.543*** [3.264]	0.493*** [3.586]	0.518*** [3.993]	0.605*** [2.780]
LnMPR	0.032 [0.546]	-0.008 [-0.118]	-0.053 [-0.736]	-0.075 [-1.096]	-0.018 [-0.268]	-0.046 [-0.676]
LnINF	0.036 [1.436]	-0.002 [-0.076]	-0.016 [-0.451]	-0.006 [-0.204]	-0.002 [-0.080]	-0.0001 [2.175]
LnPGR	0.184 [1.541]	0.251 [1.402]	0.246* [1.866]	0.217** [2.028]	0.314** [2.460]	0.078 [0.411]
SADummy	-0.060 [-0.819]	-0.133 [-1.619]	-0.025 [-0.402]	0.062 [0.725]	-0.019 [-0.286]	-0.130* [-1.911]
Test Diagnostics	R^2 =0.86 Adj. R^2 =0.83 J-Stats =0.00	R^2 =0.78 Adj. R^2 =0.73 J-Stats =0.00	R^2 =0.82 Adj. R^2 =0.78 J-Stats =0.00	R^2 =0.86 Adj. R^2 =0.83 J-Stats =0.00	R^2 =0.86 Adj. R^2 =0.83 J-Stats =0.00	R^2 =0.74 Adj. R^2 =0.68 J-Stats =0.00

Source: Researcher's own computations.

The regression models are essentially significant and do not suffer from any serial correlation. The adjusted R-squared, F-tests and the Durbin Watson test imply suitability of the model and do not suggest autocorrelation of the residuals. All the variables used in the analysis were integrated of order 1, I(1). Moreover, the signs of the main explanatory variables are as expected. Furthermore the model shows no evidence of serial correlation and heteroskedasticity as shown by the results of both serial correlation and heteroskedasticity tests in Table 5.5.

Table 9.3: Serial Correlation Test: (Breusch-Godfrey)

F-statistic	1.410477	Prob. F(2,37)	0.2568
Obs* R-Squared	3.683729	Prob. Chi-Square (2)	0.1585

Source: Researcher's own computations.

Table 9.4: ARDL Model Heteroskedasticity Test: (Breusch-Pagan-Godfrey)

F-statistic	0.961336	Prob. F(12,39)	0.5001
Obs* R-Squared	11.87022	Prob. Chi-Square (12)	0.4562
Scaled explained SS	6.023357	Prob. Chi-Square (12)	0.9149

Source: Researcher's own computations.

The results in Table 5.5 show no evidence of heteroskedasticity. To reject the null hypothesis of heteroskedasticity, a probability value (or p-value) of less than 0.05 is required. Nevertheless, the heteroskedasticity tests based on Breusch-Pagan-Godfrey tests in Table 5.5 reports p-values anywhere close to 5 per cent. Accordingly, the hypothesis of no heteroskedasticity cannot be rejected, implying that heteroskedasticity does not seem to be a problem in the short-run regression specification.

9.2.5 Analysis of Regression Results

9.2.5.1 Financial Development Indicators and Economic Growth

The results of Tables 9.1 and 9.2 indicate the regression results on the relationship between domestic credit to private sector and economic growth. The results show that there is a positive

and statistically significant association between all the four indicators of financial development and economic growth. The results show that unit percentage increases in domestic credit provided to private sector enterprises; total domestic credit provided by the financial system to various groups in the economy; broad money supply; and financial sector deposits, respectively increase economic growth between respective ranges of 0.271—0.299 percentage units, 0.266—0.302 percentage units, 0.343—0.387 percentage units, and 0.354—0.368 percentage units.

The results suggest that, the positive impacts of the rest of the financial development indicators on the economy increased in terms of percentage unit points as a result of the implementation of structural reforms in Ghana. Within the context of structural adjustments reforms in Ghana, results indicate that the financial developments have positively impacted on economic growth at higher rates. With the exception of total financial sector deposits, the impacts of credit to private sector, total credit provided by the financial system and broad money supply enhanced growth by 0.299 percentage points, 0.302 percentage points, and 0.387 percentage points, respectively. These increases may be attributable to the structural reforms as well as the financial sector reform policies that were implemented in Ghana from the middle of the 1980s. To a larger extent, the results in Tables 9.1 and 9.2 are not significantly different and show only marginal improvements in the degree of impact of the various financial development indicators.

The results of Tables 9.1 and 9.2 also indicate the two indices of financial development developed using the PCA which further measure the overall impact of the financial development indicators on economic growth using single indices. This regression is relevant in understanding the combined impact of the financial development indicators and its interactions with the macro-economic variables on economic growth. The results show that there is a positive and statistically significant association between financial development and economic growth in Ghana. The results indicate that unit increases in financial development index 1 increase economic growth by between 0.082 and 0.087 percentage unit points in Ghana. The results suggest that the impact of financial development on the economy has been higher as a result of economic reforms in Ghana. This confirms that financial reforms seem to have led to

the increase the rate of the positive impact of financial development on the Ghanaian economy within the context of this model, particularly, in terms of its significant positive effects of domestic credit to private sector and the overall size on credit provided by the financial system. The results imply that efficiency in the financial system in has promoted economic growth in Ghana. It is thus concluded that financial development indicators are robust determinants of economic growth in Ghana. These findings are consistent with conclusions of Adu *et al.* (2013), Beck *et al.* (2000), Bist (2018) and Levine *et al.* (2000) that financial intermediary development has an economically large impact on economic growth.

9.2.5.2 The Macro-economic Environment and Economic Growth

The parsimonious regression results on the drivers of economic presented in Tables 9.1 and 9.2 also provide information about the impact of macro-economic factors on economic growth in Ghana. The results poignantly show that industrial sector growth, government expenditure and trade are robust determinants of economic growth in Ghana.

The results show that although gross fixed capital formation, to a larger extent, has positive association with economic growth, it seems to be sensitive to the models specification used. Gross capital formation seems to be negatively associated with economic growth with increases in financial sector deposits and private credit. The post-reform era period indicates that increasing financial deposits are statistically significant and negatively correlated with economic growth. This situation may not be misleading as increasing financial sector deposits may imply that the increases are as a result of failure of the financial system in offering credit to the real sectors of the economy. But on the whole, the results indicate that gross fixed capital formation has statistically insignificant mixed (positive and negative) association with economic depending on the financial on the financial development indicator used in the model estimation, as shown by the results.

The second real sector indicator or source of economic growth variable in the model is the industrial value-added ratio to GDP. The industrial value-added indicator has consistently shown a statistically significant negative association with economic growth. This negative association is confirmed by statistically significant negative relationships in all the estimations of the financial development models. The estimations indicate that the coefficient measuring

the negative impact of the industrial advancement on economic growth ranges between minus 0.374 to minus 0.670 percentage unit points. This negative association may be as a result of the numerous failed attempts by Ghana in its efforts at industrialisation which have predominantly been financed through state financing expenditure. Almost all government initiated industrial projects in Ghana in both the pre- and post-reform periods seems to have failed to succeed and positively contribute to the economy. Most of these failed state-owned companies and projects have been diversified and have run into financial distress and structural reforms seem not to have led to the industrial sector making significant positive contribution to economic growth. This development is gives some credence to the observation by Lall (1995) that reforms alone are unlikely to lead to the anticipated results of a long-term resurgence in economic activity, as significant and costly de-industrialization is likely to accompany such reforms. Also, the huge proportions of the non-performing loans that have characterised both the pre-reform and post-reform periods in Ghana were owned owed by the public and private sectors enterprises, respectively.

Further, the results also indicate that though the effect of the extent of trade openness on Ghana's economic growth has been positive but largely statistically insignificant. The trade openness indicator has consistently shown a statistically insignificant association with economic growth under the overall assessment period. Trade openness only show statistical significance in the financial sector deposits model suggesting that the ability of financial house to facilitate transactions within the economy enhances economic growth. The results show that structural changes in the economy have caused significant positive impact on growth of the economy due to increase in the level of trade openness in Ghana. On the whole, increases in the level of trade openness enhance economic growth in Ghana within the range of 0.164 and 0.339 percentage unit points. This implies that although the Ghanaian economy has witnessed increased import component of trade in Ghana, the level of trade openness has contributed to economic growth in the country. This is further suggestive of the fact that financial development have rather facilitated import trade at a higher rate than to that of growth of the real sectors, particularly industrial and manufacturing, of the economy of Ghana.

Another relevant control variable in the estimations is government final consumption in the economy. The results show consistently statistically significant positive relationship between government spending and economic growth in Ghana under the overall assessment period. The robustness of government expenditure on economic growth is demonstrated by its range of impact of between 0.493 and 0.605 percentage unit points. However, the results indicate that the rate of the positive impact has been relatively higher for the within the perspective of structural reforms. This highlights the importance of government spending on the growth of the economy of Ghana.

The government monetary policy rate or the prime rate shows consistently negative association with economic growth. However, the results show that the negative impact has been strongly significant from the perspective of financial sector reforms as indicated in the total credit model (2). This indication is perhaps due to the fact that in the post-reform era, the provision of financial services and credit to private sector has been substantially influenced by the almost independent and largely privately-owned financial institutions. The prime rate is set by the Bank of Ghana and serves as the base rate for the determination of lending rates by the financial institutions in Ghana. Thus increases in the monetary policy rate indirectly increase the cost of credit offered by the financial sector to all groups within the economy and this as indicated by the results is detrimental for economic growth.

Surprisingly, the effect of inflation on the economy shows largely statistically insignificant mixed (positive and negative) associations with economic growth in the estimation in both financial and structural reforms frameworks. This may be due to the fact that Ghana has experienced extremely high ratio of money supply and perhaps increases inflation that have resulted as a result of the increased money in circulation has been positive and negative for economic growth, albeit insignificantly.

The impact of the growth in labour force in Ghana has been statistically significantly positive for economic growth of the economy in the estimation for the period of 1965 to 2016. The impact of population on growth the economy shows, largely, statistically significant positive relationship with economic growth under both financial and structural reform scenarios. The

positive association for this period may be as a result of the rapidly increasing labour of Ghana coupled with the fact that there is human capital have been found to enhance growth.

On the whole, the impact of financial sector reforms on economic growth show has been positive and statistically significant. Financial reforms show a strong positive statistically significant effect on economic growth, with its impacts on the economy resulting from improvements in private credit and total credit offered by the financial sector. The results in Table 9.2 seems to give the indication that structural changes in the economy have dampen economic growth as the structural reform dummy variable indicates a statistically significant negative association with growth.

9.3 Short-Run and Long-Run ARDL Estimation

In order to check the robustness of the regression estimation displayed in Table 9.5, the study estimates the short and long-run associations using the ARDL approach. Tables 9.4 and 9.5 show the results of the short- and long-run tests.

Table 9.5: Estimates of ARDL Short Run Coefficients and Error Correction Term

Dependent Variable: Economic Growth (GDPGC)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNGDPGC(-1))	0.780***	0.063	12.221	0.0000
D(LNDCPS(-1))	-0.092**	0.038	-2.405	0.0228
D(LNDCFS)	0.037	0.044	0.848	0.4031
D(LNDCFS(-1))	-0.097**	0.046	-2.110	0.0435
D(LNBMS)	-0.057	0.074	-0.772	0.4462
D(LNBMS(-1))	0.125**	0.056	2.219	0.0344
D(LNFSD)	-0.170**	0.068	-2.502	0.0182
D(LNGCF)	0.098***	0.033	2.892	0.0072
D(LNIDVA)	-0.097**	0.045	-2.156	0.0395
D(LNTOPEN)	-0.038	0.046	-0.831	0.4127
D(LNTOPEN(-1))	0.038	0.030	1.257	0.2186
D(LNGE)	0.154***	0.041	3.710	0.0009
D(LNMPR)	0.048**	0.022	2.135	0.0413
ECT(-1)	**-0.220*** **	**0.063**	**-3.453**	**0.0017**
R^2 = 0.68, Adj. R^2 = 0.47, F-Statistic: 3.13, Prob.(F-Stat) = 0.003, D-Watson: 1.8				

Source: Researcher's own computations. Note: ***, **, * represent 1%, 5% and 10% levels of significance, respectively.

The ARDL short run estimation reported in Table 9.5 confirm the statistically insignificant positive impacts of both domestic credit and total credit on economic growth in the short-run. The results further indicate that there statistically insignificant negative relation between broad money supply and economic growth. The short-run results, however, indicate a statistically significant negative association between financial sector deposits and economic growth. The negative associations between the aforementioned financial development indicators and economic growth suggest that, at some point, financial developments can have adverse impact on economic growth. The lagged GDPGC has a positive impact on economic growth and this

is an indication of a self-propelling tendency for economic growth based on previous period growth levels. With regards to the sources of growth, the short-run results indicate a positive association between capital formation and economic growth. The results further confirm the statistically significant negative impact of industrial growth on the economy of Ghana.

Table 9 6: Estimates of ARDL Long Run Coefficients

Dependent Variable: Economic Growth (GDPGC)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNDCPS	0.747***	0.203	3.673	0.0010
LNDCFS	0.161	0.269	0.599	0.5533
LNBMS	-0.349	0.483	-0.723	0.4755
LNFSD	-0.203	0.336	-0.603	0.5509
LNGCF	0.446**	0.185	2.401	0.0230
LNIDVA	-0.440*	0.218	-2.014	0.0533
LNTOPEN	-0.423*	0.227	-1.859	0.0731
LNGE	0.454***	0.132	3.428	0.0018
LNMPR	0.219**	0.094	2.313	0.0280
C	6.288***	0.589	10.667	0.0000
R^2 = 0.68, Adj. R^2 = 0.47, F-Statistic: 3.13, Prob.(F-Stat) = 0.003, D-Watson: 1.8				

Source: Researcher's own computations. Note: ***, **, * represent 1%, 5% and 10% levels of significance, respectively.

The ARDL long-run estimation reported in Table 9.6 confirm the positive impacts of both domestic credit and total credit on economic growth observed in the parsimonious regression estimations in Tables 9.1 and 9.2. However, among the four indicators of financial development, only domestic credit to private sector has a long-run statistically significant positive impact on economic growth in Ghana. This is consistent with the conclusion by Rachdi and Mbarek (2011) that financial development and real GDP per capita are positively and strongly correlated. The results further confirm the statistically insignificant negative

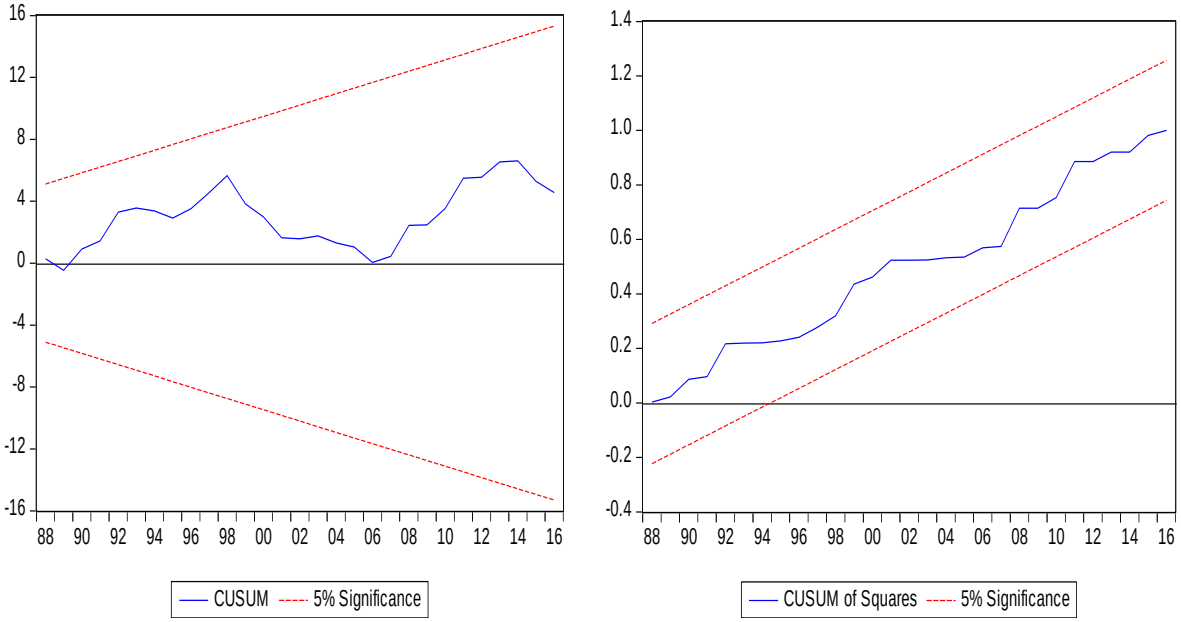
impact of both broad money supply and financial sector deposits on economic growth just as observed in the short-run estimation. This further confirms that inefficiencies in the financial system can hamper the long-term growth of an economy if such inadequacies are not resolved in the short- to medium-term. The results also confirm that the numerous failed attempts towards the industrialisation have had statistically significant adverse impact on the economy of Ghana.

With regards to the sources of growth, the long-run results indicate a positive association between capital formation and economic growth in Ghana and this is consistent with similar findings by Appienti, Ofori, Damptey and Kusi (2016), Hu and Khan (1997), and Lu *et al*. (2008). The results indicate that 1.00 per cent improvement in capital accumulation increases economic growth by 0.446 percentage unit. This indicates that investment robustly contribute to growth of the economy both in the short-term and long-term. The observation is consistent with other studies that argue that capital accumulation plays a dominant role in economic growth (Chow, 1993; Hu & Khan, 1997; Krugman, 1994; Lu *et al.*, 2008; Wang & Yao, 2003). The result further indicates that government expenditure is an important positive determinant of economic growth both in the short- and long-runs. This finding is consistent with Barro (2006), and Barro and Sala-I-Martin (2006, 1995) indicating that productive government spending promotes growth.

9.3.1 Stability of the ARDL Short- and Long-run Model

The stability of the ARDL model is checked using the CUSUM tests. The test results are presented Figure 9.1. The test results as can be observed from Figure 9.1, imply that the plots of both the CUSUM and CUSUM square are with the boundaries and thus this confirms the stability of the long-run coefficients of the regressors.

Figure 9.1: CUSUM Stability Test of Economic Growth Model



Source: Researcher's own computations.

9.4 Robustness Checks with Financial Development Indices (GMM Estimation)

To ascertain the robustness of our findings, the finance and economic growth Equation is estimated re-estimated using the GMM technique with the financial development indicators. The results are reported in Table 9.6. The J-statistic of 0.00 which is less than .05 indicates that the model fits the data well. As can be observed, the GMM model confirms the robustness of the findings that FDIndex1 has positive and statistically significant relationship with economic growth in Ghana at the 1.0 per cent level of significance. The indication of positive association between finance and growth in Ghana is consistent with studies such as (Adu *et al.*, 2013; Esso, 2010; Frimpong & Adam, 2010; Ofori-Abebrese *et al.*, 2017) who indicate that private credit and total credit offered in the economy promote economic growth. However, as evident in Tables 9.5, 9.6 and 9.7, FDIndex2 show negative and statistically significant association with economic growth at the 95% confidence level. The results in Table 9.7 suggest that the marginal effect of financial development on economic growth is minus 0.043 meaning, increasing financial development index 2 tends to decrease growth of the economy by 0.043 per cent. The inefficiencies in the financial development can dampen economic growth is consistent with other empirical studies (Adusei, 2013; Wang, Li, Abdou & Ntim, 2015) and Hasan, Wachtel, and Zhou (2009), who found negative association between financial

development and economic growth. Against the backdrop that FDindex1 indicates a positive association and FDindex2 on the contrary suggest a negative association suggest that there may exist inefficiencies in the financial system in Ghana that are adversely impacting on economic growth in Ghana. The historical records that Ghana has experienced high non-performing loans in its financial system may be the probable cause for the negative association of financial development and growth. This observation is consistent with the argument by Hasan *et al.* (2009) that the high non-performing loans in China have adversely caused negative association between financial development and economic growth. Similarly, the conclusion re-enforces the observation by Adusei (2013) that the negative finance-growth relationship in Ghana is caused by the lax supervision of the government, which leads to over-lending and careless-lending in banking sectors.

Table 9 7: GMM Estimation of Financial Development and Economic Growth

Dependent Variable: Economic Growth (GDPGC)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.163***	0.348	17.691	0.0000
FDINDEX1	0.095***	0.020	4.594	0.0000
FDINDEX2	-0.043**	0.018	-2.350	0.0236
LNGCF	-0.004	0.094	-0.043	0.9652
LNIDVA	-0.459***	0.125	-3.665	0.0007
LNTOPEN	0.109	0.078	1.394	0.1706
LNGE	0.507***	0.133	3.790	0.0005
LNMPR	-0.023	0.063	-0.366	0.7161
LNINF	-0.001	0.030	-0.051	0.9591
LNPGR	0.277***	0.128	2.152	0.0373
FSR	-0.006	0.060	-0.105	0.9168
R^2 = 0.86, Adj. R^2 = 0.83, J-Statistic: 0.00, D-Watson: 1.3				

Source: Researcher's own computations. Note: ***, **, * represent 1%, 5% and 10% levels of significance, respectively.

The results confirm the earlier indication that although financial developments promote economic growth, the existence of inefficiencies in the financial system or too much finance can equally result in adverse impact on economic. This is consistent with studies (Arcand *et al.*, 2012; Cecchetti & Kharroubi, 2012; Ductor & Grechyna, 2015; Loayza & Ranciere, 2005) that suggest that financial development can adversely affect economic growth beyond some point. The findings from the estimations are further consistent with the conclusion of Loayza and Ranciere (2005) that a positive long-run relationship between financial intermediation and output growth co-exists with a mostly negative short-run relationship.

9.5 Direction of Causality between Financial Development and Economic Growth

The results of the Engle-Granger causality tests run using Equation (5.15) are reported in Table 9.6. The test determines the direction of causality in the finance-growth association. The results also entail examining the direction of causality of the sources of growth which are also variables of interest in this analysis.

The results of Table 9.8 show that the null hypothesis that domestic credit to private sector does not Granger cause variations in economic growth is rejected at the 5.0 per cent level of significance. However, the null hypothesis that economic growth does not Granger cause variations in domestic credit to private sector cannot be rejected. This implies that there is growth running from domestic credit to private enterprises to economic growth in Ghana and not the other way round. It is thus concluded that there is a uni-directional causal relationship between private credit and economic growth with growth running from domestic credit to private sector to economic growth in Ghana. This conclusions of a uni-directional relation between financial development and economic growth in Ghana is consistent with the findings of Agbetsiafa (2004) and Ofori-Abebrese *et al.* (2017). However, the conclusion is inconsistent with that of Quartey and Prah (2008) that there is no significant evidence to suggest the existence of a causal association between private credit and economic growth.

On the other hand, the causality tests indicate that broad money supply and total credit provided by the financial sector do not Granger cause economic growth as the hypotheses both indicators respectively causing economic cannot be rejected. The reverse proved to be the case. The results show that the causal relationship running from economic growth to both total credit

provided by the financial sector and broad money supply. The hypotheses that economic growth does not Granger cause total credit and broad money supply are rejected at the 10.0 per cent level of significance. The findings suggest that growth in the size of financial intermediation is caused by expansion in the economy of Ghana. Against this background, it is concluded that there is a uni-directional causal association between economic growth and total credit, and broad money supply as evident in Table 9.8. This conclusion is confirmed by the rejection of the hypothesis that economic growth does not Granger cause the financial development, as measured the FDindex1 and indicated in Table 9.8.

In contrast to the uni-directional association between economic growth and the other financial development indicators, financial sector deposits demonstrated a bi-directional causal association. As can be observed in Table 9.8, the null hypotheses that financial deposits does not Granger cause economic growth and vice versa are, respectively, rejected at the 10.0 per cent and 5.0 per cent levels of significance. It is thus concluded that there is a bi-directional causal relationship between total financial sector deposits and economic growth in Ghana. This implies that expansion in the total size of financial services promote economic growth and in the same way when the economy is growing it positively influence the financial sector activities.

The revelation that domestic credit to private sector and total financial sector cause economic growth while in a similar manner economic growth also lead to expansion in the size of total credit and broad money supply, the study concludes that there exist a bi-directional association between financial development and economic growth. This findings complements the propositions that economic growth is relevant for financial development and economic growth inevitably requires well-functioning and efficient financial system (Blackburn & Hung, 1998; Greenwood & Smith, 1997; Levine, 1997, 2004). Further, This conclusion is consistent with the argument of Wood (1993), Demetriades and Hussein (1996), Akinboade (1998), Luintel and Khan (1999), Rousseau and Vuthipadadorn (2005), Apergis *et al.* (2007) and Frimpong and Adam (2010), that there exists a bi-directional association between finance and growth. The findings add to that of other studies (Chuah & Thai, 2004) on African and other emerging economies that found support the bi-directional hypothesis. These results imply that countries

should continue to promote financial development while pursuing the needed reforms to develop the real sector and enhance rapid economic growth.

Table 9.8: Pairwise Granger Causality Test, Finance-Growth nexus

Null Hypothesis	No. of Obs	F-Statistic	Probability
LNDCPS does not Granger Cause LNGDPGC	50	4.952**	0.0114
LNGDPGC does not Granger Cause LNDCPS		2.397	0.1025
LNDCFS does not Granger Cause LNGDPGC	50	0.176	0.8385
LNGDPGC does not Granger Cause LNDCFS		2.901*	0.0653
LNBMS does not Granger Cause LNGDPGC	50	0.473	0.6256
LNGDPGC does not Granger Cause LNBMS		2.994*	0.0602
LNFSD does not Granger Cause LNGDPGC	50	2.964*	0.0617
LNGDPGC does not Granger Cause LNFSD		4.477**	0.0168
FDINDEX1 does not Granger Cause LNGDPGC	50	1.376	0.2628
LNGDPGC does not Granger Cause FDINDEX1		3.358**	0.0437
FDINDEX2 does not Granger Cause LNGDPGC	50	0.933	0.4008
LNGDPGC does not Granger Cause FDINDEX2		0.412	0.6643
LNGCF does not Granger Cause LNGDPGC	50	2.749*	0.0747
LNGDPGC does not Granger Cause LNGCF		1.724	0.1898
LNIDVA does not Granger Cause LNGDPGC	50	3.158**	0.0520
LNGDPGC does not Granger Cause LNIDVA		0.906	0.4111
LIDVA does not Granger Cause LGCF	50	2.728*	0.0762
LGCF does not Granger Cause LIDVA		2.648*	0.0818
LGDPGC does not Granger Cause LMVA	50	1.306	0.2809
LMVA does not Granger Cause LGDPGC		2.531*	0.0908

Note: ***, **, * represent 1%, 5% and 10% levels of significance, respectively.

The results of the Granger causality tests give the indication that the nature of the causal association between financial development and economic growth is sensitive to the type of financial development indicator used. This indication of the causal association between economic growth and financial development sensitivity to the financial indicator used is also is

similar to what was observed by Adusei (2013), Kwarteng (2015) and Ofori-Abebrese *et al.* (2017).

In this analysis the study is also interested in determining the causal direction between the sources of growth and economic growth. The results show that the null hypotheses that capital accumulation and industrial output growth do not Granger cause economic growth can both be rejected at the 10.0 per cent significance level. On the other hand, the null hypothesis that economic growth does not Granger cause capital accumulation and industrial output growth cannot be rejected as reported in Table 9.8. This exhibits the presence of a uni-directional causal relationship between the sources of growth—investment and industrial sector growth—and economic growth. The indication of a uni-directional causal association running from capital formation to economic growth is inconsistent with the suggestion by Appienti *et al.* (2016) that a bi-directional relationship exists between the two. The results thus imply that the sources of growth, as measured by the gross fixed capital formation and industrial sector output growth, are casing growth of the Ghanaian economy. Inversely, the results imply that economic growth is not significantly causing investment and growth of the industrial sector even though they are important sources of growth in the Ghanaian economy.

Another variable of interest in this analysis is the casual association between the level of industrial output and capital accumulation. The result indicates that there is a bi-directional causal relationship between industrial output and capital accumulation in Ghana. The null hypotheses that industrial sector output and capital accumulation do not Granger cause each other, or vice versa, are rejected at the 10.0 per cent significance level. This finding implies that improvement in the level of investment in Ghana can positively affect growth of the industrial sector. Similarly, growth of the industrial sector is significant for continuous growth of capital in Ghana.

Further, an examination of the casual association between the level of manufacturing productivity and per capita GDP is desirable. The result indicates that there is a uni-directional causal relationship between manufacturing output and economic growth in Ghana with growth running from manufacturing output to economic growth. The null hypotheses that

manufacturing sector output does not Granger cause economic growth is rejected at the 10.0 per cent level of significance while the reverse cannot be rejected, as evident in Table 9.8. The finding suggests that though growth of the manufacturing sub-sector seems to be declining, it is significantly causing growth of the Ghanaian economy.

9.6 Chapter Summary

The This chapter provided an empirical analysis on the impact of financial development and other control variables that are also financial in nature, and on economic growth in Ghana utilising annual time series data from 1965-2016. The analysis was undertaken to determine how financial development indicators impact economic growth in Ghana. Understanding the extent of impact of the factors that influence economic growth dynamics is important in the formulation of optimal growth management policies. The analysis was undertaken by applying the economic growth dynamics equation and first estimating the baseline regression using each of the financial development indicators and the control variables as explanatory variables to assess the individual interaction with the model. The second step applied the model involving all the financial development indicators and the control variables in a single model to the joint impacts when all the financial development indicators are interacted. This was done to ascertain specific policy issues required to ensure a sustainable economic growth in Ghana. The regression model was derived from the concept that financial development promotes economic growth and the development of the real sectors of the economy. The variables that were empirically tested as drivers of economic growth are those that are financial in nature and particularly measure the extent of financial development. These variables are domestic credit to private sector, domestic credit provided by the financial sector, broad money supply and financial sector deposits. Other control variables such gross fixed capital formation, industrial value-added, trade openness, government expenditure, monetary policy rate, inflation rate, labour force growth rate and the state of financial reforms in Ghana were also included to improve the model diagnostics.

The results show that there are all the financial development indicators within the individual regression framework show statistically significant positive associations with economic growth in Ghana. The extent of positive impact on economic growth ranges between 0.266 and 0.632 with the highest impact occurring in the post-financial and structural reform era of 1984 to

2016. The study employed the principal component analysis technique to produce two indices to capture a single index for financial development and used as the overall indicator of financial development. The overall impact of financial development on economic growth was found to also to be positive and statistically significant. The short-run and long-run estimations indicate that private credit and total credit have positive associations with economic growth but only private credit has a statistically significant relationship with growth in the long-run. Growth in broad money and financial sector deposits were found to be negatively associated with economic growth in the short- and long-runs. This was confirmed by using the financial development indices and re-estimating the finance-growth equation using the GMM technique. The negative association gives the indication that though financial developments are good for growth, at some point, to much finance or inefficiencies in financial intermediation can dampen economic growth.

The results further indicated that gross fixed capital formation, industrial value-added and the monetary policy rate had negative association with economic growth. The impact of gross capital formation in the post-reform era is however positive though statistically insignificant. The negative impact of industrial growth on economic growth is far lower in the 1984-2016 period. The extent of trade openness showed positive but statistically insignificant association with economic growth within the 1965 to 2016 period. The results however indicated that from 1984 to 2016, the extent of trade openness has had a statistically significant negative impact on Ghana's economic growth. Government expenditure showed a consistent statistically significant positive association with economic growth.

The study showed that there is causal association running from domestic private credit to economic growth. Similarly, the results showed that there is a causal relationship running from economic growth to total credit and broad money supply. These findings suggest uni-directional causal associations between the three financial development indicators and economic growth. Financial sector deposits and economic growth suggested the existence of a bi-directional association between them. The findings further indicated the presence of a uni-directional association between both investment and industrial output with growth running from the two sources of growth to economic growth. As sources of growth, the results show

that capital accumulation and industrial sector growth are causing economic growth in Ghana and not the other way round, as evident in the causality test presented in Table 9.8.

The major policy implication from the analysis is the need continue to monitor and sustain development of the financial sector policies and improve the efficiency and allocation of credit to the private sector businesses since the results show that the financial development indicators as positively associated with Ghana's economic growth. Also, the findings suggest the existence of inefficiencies in the financial system in Ghana. This may be as a result of high non-performing loans or caused by the financing of high risk or poor investments within the economy by the financial system.

The next chapter presents the results of the reaction of economic growth and the sources of growth to financial development indicators and macro-economic shocks. This analysis is undertaken by applying the BVAR and VAR methodology for modelling the links between economic growth on one hand, and the financial development indicators and macro-economic variables.

CHAPTER TEN

REACTION OF ECONOMIC GROWTH TO FINANCIAL DEVELOPMENTS AND MACRO-ECONOMIC SHOCKS

10.1 Introduction

The growth of the economy and variations in the economic output can be assessed in terms of reaction of the economy to changes in financial development indicators and the other control or conditioning variables. This may be important in developing management and relevant policies to bring about changes in economic output. There is thus a potential that financial development variables and macro-economic shocks can substantially change the dynamics of the components of growth and thus the accumulation of GDP. The variations in financial development indicators and macro-economic shocks could be a result of policy on private sector financial management as well as developments in the general macro-economic environment. The variations in the macro-economic environment include monetary policy rate, the level of inflation and government expenditure amongst others. As such an understanding of how economic growth and the sources of growth react to financial development indicators and macro-economic shocks is critical to maximising and sustaining growth from deviating from its steady state of equilibrium. Variations in financial indicators and shocks to macro-economic variables could result in improving growth dynamics and provide a basis for an optimal and efficient growth management policy. It is, therefore, critical to complement an analysis of the drivers of economic growth by assessing the reaction of economic model to shocks in financial variables and macro-economic environment. This could provide a means of reducing the vulnerability and substantial volatility of economic growth path to such shocks by informing management policies and monitoring such indicators as credit availability, depth and efficiency of financial systems as well as other macro-economic variables, monetary policies and decisions that affect growth of the economy.

The analysis of the sensitivity of GDP growth to financial sector developments and macro-economic shocks is important for understanding an efficient present and future path of economic growth and most likely causes of its possible adverse developments. This understanding enables authorities to develop a set of contingency plans that can be effectively

deployed should adverse scenarios materialise, and through such policy interventions could ensure continued sustainable economic growth. Against this background, this chapter builds on the econometric models for analysing the impact of financial development indicators and macro-economic variables on economic growth developed in Chapter Four, and use these models to simulate the reaction of the economy to financial development and macro-economic shocks. This chapter starts by a brief review of economic growth dynamics and macro-economic shocks to put the analysis into context. After that, the result of the response of the economy to financial development and macro-economic shocks is analysed using the BVAR methodology.

10.2 Growth Variations, Financial Developments and Macro-economic Shocks

As observed in the literature, growth of the economy is sensitive to variation in several factors. The study is motivated by the fact that changes in the financial development indicators as well as macro-economic factors cause the economy to grow. The economy responds to changes in the financial development variables as well as the macro-economic factors by different degrees and levels of persistence in the economy. The study uses the BVAR approach to assess the reaction of the general economy to financial development and macro-economic shocks in Ghana.

10.3 BVAR Estimation Results

The study applies the BVAR methodology to assess the reaction of economic growth and its components to financial developments and macro-economic shocks in the general economy. The study used the same variables employed in estimating the impact of financial development indicators and the control variables on economic growth stated in chapter 5. The financial development indicators are the domestic credit to private sector, domestic credit provided by the financial sector, broad money supply and total financial sector deposits. Other variables such as trade openness, government expenditure, level of investment—proxied by gross fixed capital formation—and inflation rate were further included in the estimation to improve the diagnosis. Table 10.1 shows the results of the BVAR estimation.

Table 10.1: VAR Estimates with per capita GDP, Capital Accumulation and Industrial Value-Added/GDP Ratio as Dependent Variables

Variable	Economic Growth	Capital Growth	Industrial Sector Growth
Lagged per capita GDP	0.616480 [3.60194]	0.283600 [0.33217]	-0.953141 [-1.60365]
Lagged Domestic Credit to Private Sector	0.049320 [1.19811]	0.208274 [1.01426]	0.103635 [0.72497]
Lagged Domestic Credit of Financial Sector	-0.140080 [-2.53503]	-0.349652 [-1.26848]	-0.019467 [-0.10145]
Lagged Broad Money Supply	-0.009932 [-0.09180]	-0.104995 [-0.19454]	0.081900 [0.21798]
Lagged Financial Sector Deposits	0.193090 [2.11931]	0.017600 [0.03872]	-0.349348 [-1.10415]
Lagged Gross Fixed Capital Formation	-0.052672 [-1.42127]	-0.525464 [-2.84237]	0.110431 [0.85807]
Lagged Industrial Value-added	0.065132 [0.91740]	0.465449 [1.31424]	0.199860 [0.81063]
Lagged Trade Openness (X+M/GDP)	0.063678 [1.47595]	0.856815 [3.98114]	0.232208 [1.54986]
Lagged Government Expenditure	-0.015843 [-0.27182]	0.0178 [0.0627]	-0.323982 [-1.60067]
Lagged Monetary Policy Rate	-0.051134 [-1.23116]	0.224943 [1.08570]	0.318618 [2.20905]
Lagged Inflation Rate	0.000983 [0.08797]	-0.146187 [-2.62211]	-0.184353 [-4.74994]
R-squared	0.65	0.71	0.68
Adj. R-squared	0.37	0.48	0.43
S.E of equation	0.04	0.18	0.12
F-statistic	2.35	3.10	2.74

Source: Researcher's own computations, Figures in Brackets are t-statistic values

10.4 Analysis of BVAR Estimation Results

The BVAR estimation results are used to analyse and assess the calibrated effects of other lagged endogenous variables on economic growth, capital accumulation and industrial output growth which are the primary variables of interest in the analysis. The analysis looks at the persistence of the endogenous variables conditional on the marginal effects of other endogenous variables. This analysis predetermines and gives an indication of how long the shocks to financial development indicators and macro-economic shocks may possibly last on economic growth and the respective components under assessment in this study.

10.4.1 BVAR Analysis on Economic Growth

The results show persistence in the economic growth rate of about 61.64 per cent. This result implies that all the financial indicators and macro-economic shocks are expected to have long-lasting impact on the economic growth. Domestic credit to private and financial sector deposits show persistence of positive 4.93 per cent and 19.31 per cent, respectively. On the other hand, total credit provided by the financial sector and broad money supply both demonstrate negative persistence of 14.00 per cent and 0.1 per cent, respectively. The negative persistence may possibly be due to a situation whereby financial houses offering greater portions of loans to sectors that are not productive in nature or are financing high risk or bad investments that ultimately dampen economic growth. The negative persistence of further indicates the existence inefficiencies in the provision of financial services by the financial system.

The coefficient for the gross fixed capital formation was found to have a negative persistence on economic growth in the medium term. This is consistent with theory since in the short to medium term investments are a drain on the economy. The level of industry value-added indicates a positive persistence of 6.51 per cent on economic growth. The level of trade openness and government expenditure show persistence of 6.37 per cent and 1.58 per cent respectively. The monetary policy rate shows persistence of 5.11 per cent on economic growth in Ghana. Surprisingly, the inflation rate shows a relatively lower positive rate 0.001 per cent in the economy.

10.4.2 BVAR Analysis on Capital Accumulation

The results show negative persistence in the capital accumulation of about 52.55 per cent in the economy, an indication that initial investment is a drain on economic growth. The result implies that all the financial indicators and macro-economic shocks are expected to have long-lasting impact on the capital accumulation. Domestic credit to private and financial sector deposits show persistence of positive 20.83 per cent and 1.76 per cent, respectively, on capital accumulation. Total credit provided by the financial sector and broad money supply indicates persistence of negative 34.96 per cent and 10.50 per cent, respectively. The negative persistence may possibly be due to financial houses offering not channelling financing towards long-term investment projects within the economy. The negative persistence also give an

indication of the existence of inefficiencies in the financial system that may be hampering capital formation.

The coefficient for economic growth shows a positive persistence of 28.36 per cent on gross fixed capital formation. This is in line with theory as increases in national income augments the capacity of the economy to engage in more investment projects. The advancement in industrial productivity also shows positive persistence of 46.55 per cent on capital accumulation. The extent of trade openness and government final consumption expenditure show respective persistence of 85.68 per cent and 1.78 per cent towards improved investment. The monetary policy rate shows persistence of 22.49 per cent on capital formation in Ghana. The rate of inflation shows a relatively stronger negative persistence of 14.62 per cent in the economy.

10.4.3 BVAR Analysis on Industrial Productivity

The results show positive persistence in industrial value-added of 19.99 per cent in the economy. The result implies that all the financial indicators and macro-economic shocks are expected to have long-lasting impact on the industrial productivity in Ghana. Domestic credit to private and broad money supply show positive persistence of 10.36 per cent and 8.19 per cent, respectively, on industrial sector growth. Total credit provided by the financial sector and financial sector deposits demonstrate persistence of negative 1.95 per cent and 34.93 per cent, respectively. The negative persistence implies that rising financial sector deposits do not auger well for industrial growth in Ghana. The inverse persistence of financial sector deposits are perhaps due to the fact that increasing deposits are indications that the financial system may not be lending to the industry sector businesses or are suggestive of the financial system not financing long-term projects in the economy. Higher deposits also discourage overall demand in the economy and this has an adverse impact on consumption of industrial sector products and services.

The coefficient for economic growth shows highly negative persistence of 93.32 per cent on industrial value-added growth. This may not be surprising in view of the fact that Ghana has on a number of occasions made attempts at industrialisation but have to a larger extent failed. These industrial sector projects, particularly, undertaken between 1965 and 1983 were largely financed by the Government of Ghana and given that most of the attempts towards

industrialisation have failed the high negative persistence may be consistent with the development within the economy. Most of such companies have either been diversified or completely collapsed. The advancement in gross fixed capital formation and the extent of trade openness of the Ghanaian economy show respective positive persistence of 11.04 per cent and 23.22 per cent on industrial sector growth. The rate of government spending shows a negative persistence of 32.40 per cent on industrial sector growth. This gives the indication that government expenditure may be hurting growth of the industrial sector considering the fact that Ghana importation forms the greater part of trade. The monetary policy rate shows a positive persistence of 31.86 per cent on industrial sector growth in Ghana. This may be possibly explained by the fact that financial institutions tend to offer more loans to the private sector at higher lending rates than when rates are lower. The rate of inflation shows a stronger negative persistence of 18.43 per cent on industrial output growth.

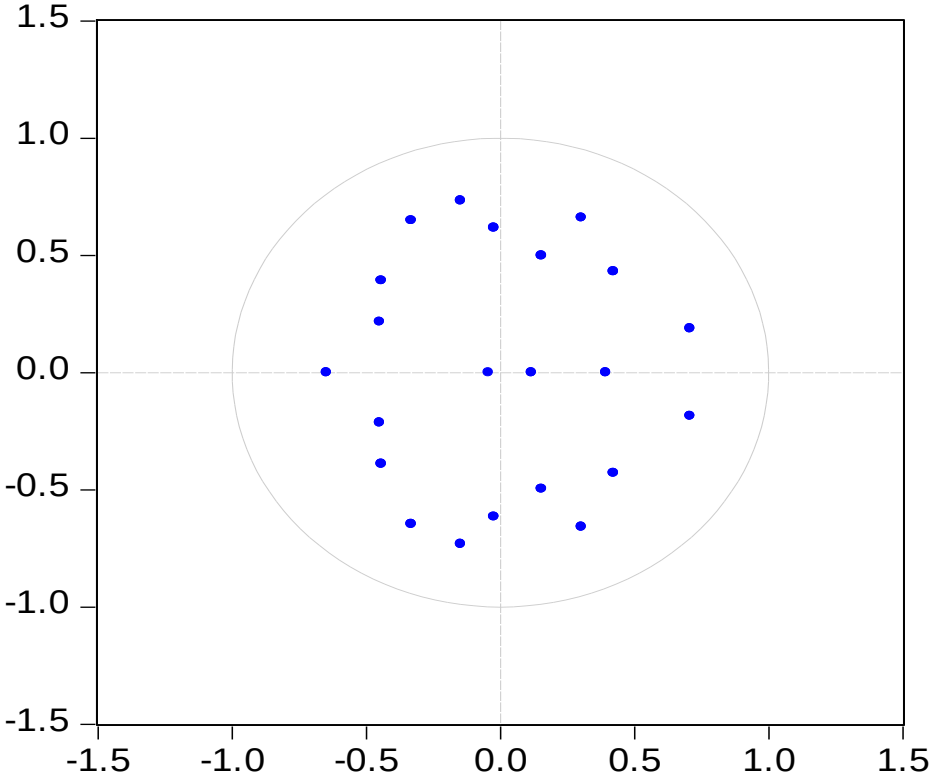
10.5 Sensitivity Analysis VAR Estimation Results

For sensitivity analysis, alternative prior distributions were used in the BVAR analysis. The analysis for alternative distributions shows some minor changes in the estimates of the coefficients. The signs of the estimated coefficients, however, remain the same implying that the conclusions reached using the Minnesota prior are valid.

10.6 Model Stability

The stability of the VAR model was tested using the Inverse Roots of the Autoregressive (AR) Characteristic Polynomial. The stability results for the BVAR using the Minnesota prior distribution are shown in Figure 10.1. The graph in Figure 10.1 shows that no root lies outside the unit circle and accordingly, all inverse roots are smaller than one. This indicates that the BVAR model satisfies the stability condition and thus is stationary.

Figure 10 1: Autoregressive (AR) Characteristic Polynomial Stability Test



Source: Researcher's on Computations.

10.7Response of Growth to Financial Development and Macro-economic Shocks

The reaction of economic growth to financial developments and the other macro-economic shocks was also analysed using the impulse response function, which traces the effect of a one-time shock to one of the innovations on current and future values of the endogenous variables. The simulated impulse-response functions (IRFs) measure the dynamic marginal effects of each shock on all of the variables over time. The analysis of the impulse response function results in this section of the thesis is limited to economic growth, capital accumulation and industrial output growth which are the variables of interest. As such, the interpretations are mainly focused on the calibrated marginal effects of the other lagged endogenous variable on the on these variables of interest. Figures 10.2, 10.3 and 10.4 show the results from the impulse responses of the real per capita GDP, capital accumulation and industry output growth to the financial development indicators and macro-economic shocks that were identified using the unrestrictive VAR.

10.7.1 Response of Economic Growth to Financial Development and Macro-economic Shocks

The results from the impulse response function suggest that in the initial to medium term, shocks to domestic credit to private sector and broad money supply significantly increase the economic growth in Ghana. The dominant impact of private credit, however, reduces and dampens economic growth towards its original state. This may be due to the poor outcomes of investment projects that characterised Ghana's post-independence agenda to embark on extensive industrialisation. Domestic credit to bad projects could cause a reduction in economic growth. A clear indication from the results, however, is that credit to private sector generally promotes economic growth.

Figure 10.2: Response of Economic Growth to Financial Development Indicators

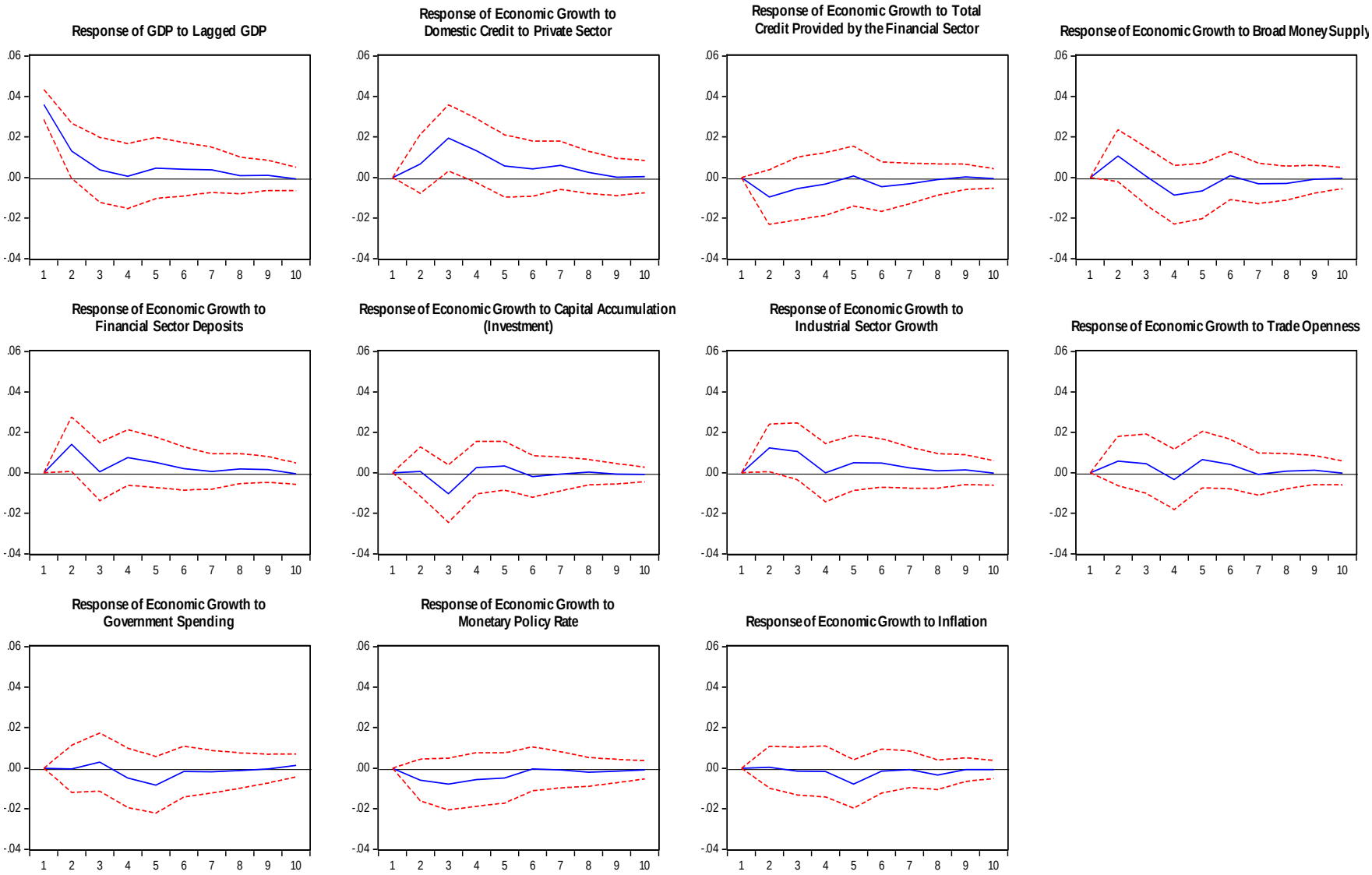


Figure 10.3: Response of Capital Accumulation to Financial Development Indicators

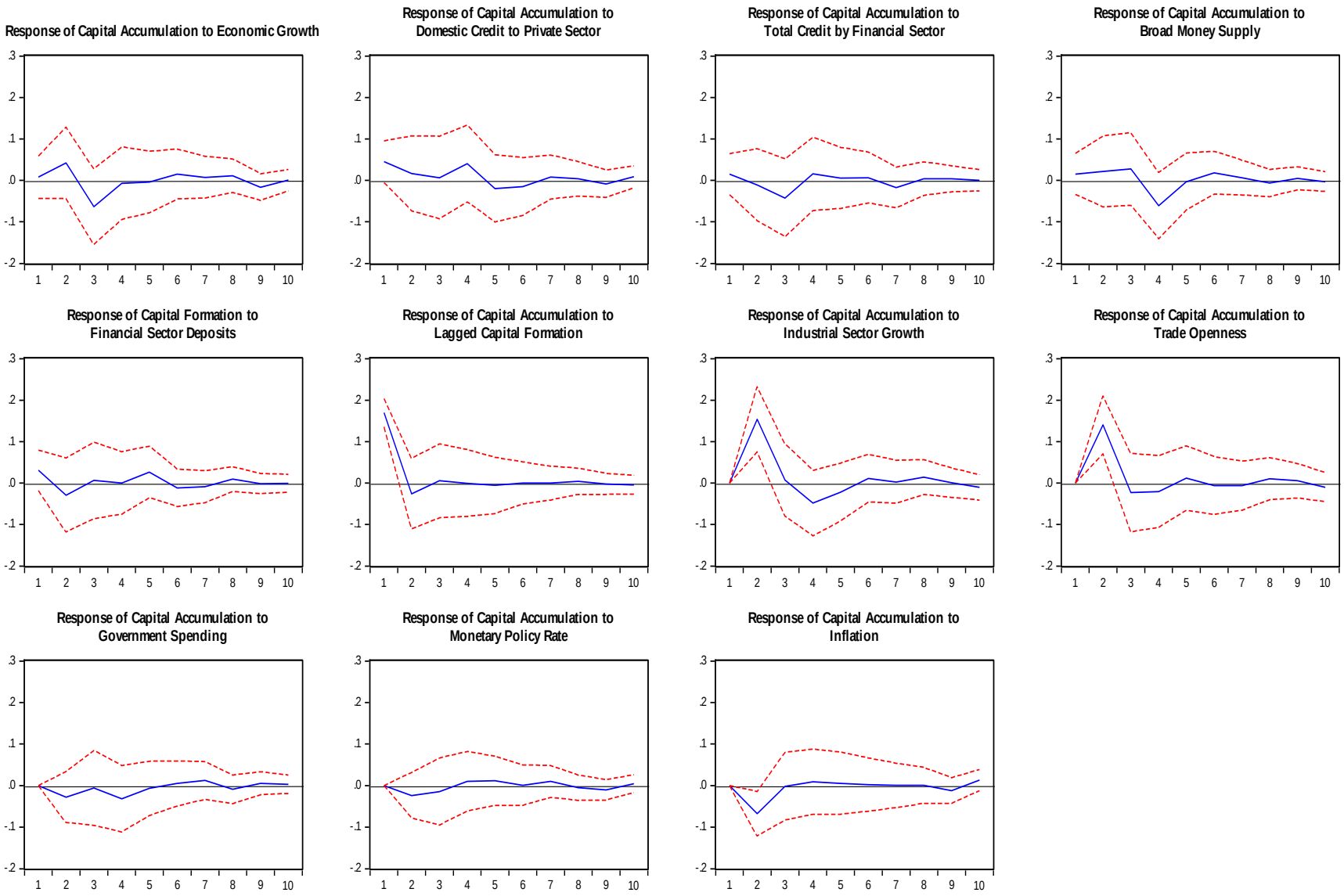
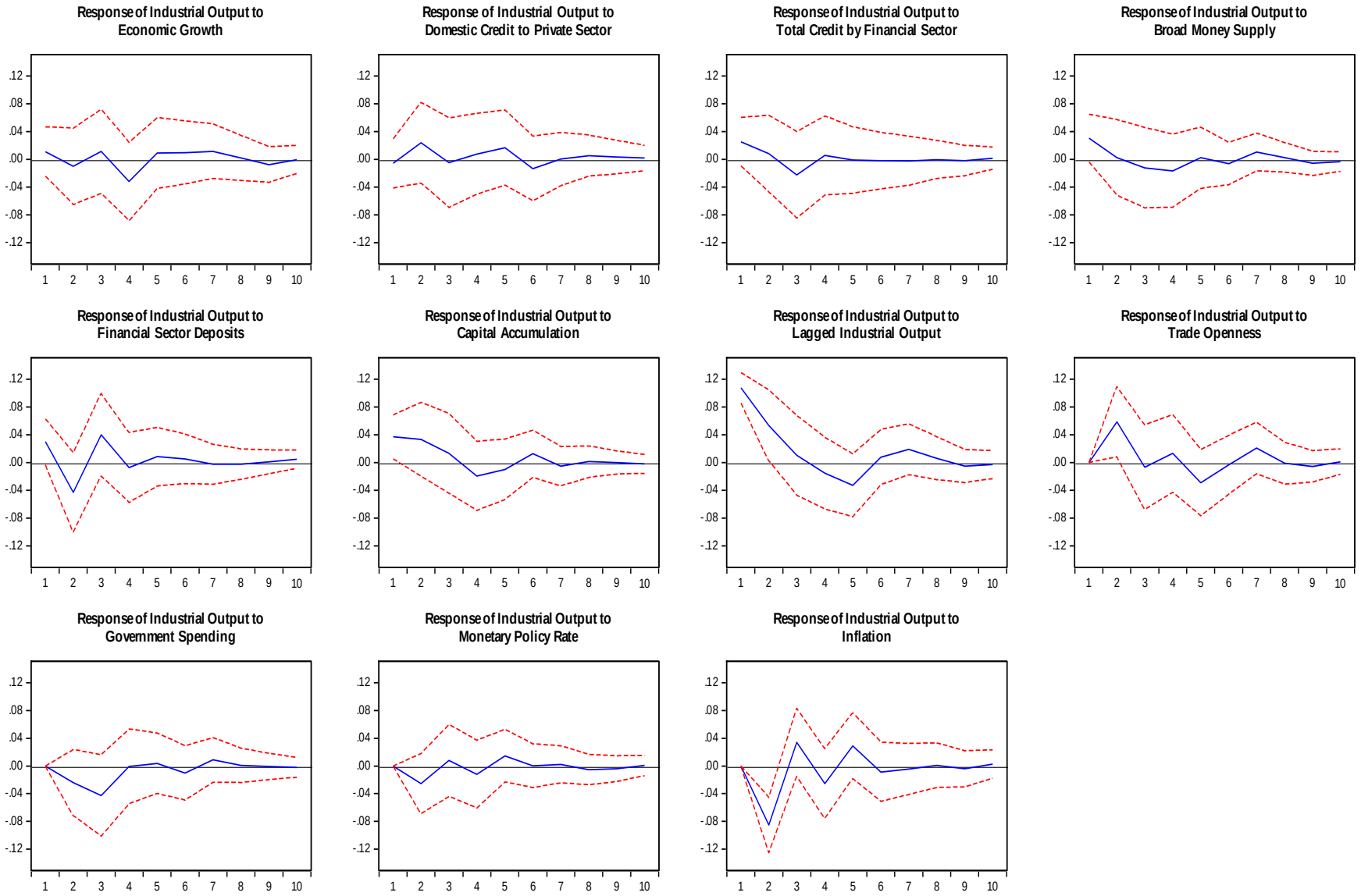


Figure 10.4: Response of Industrial Output to Financial Development Indicators



The response of the economy to domestic credit tends to initially dampens economic growth but induces steady rises in economic output. Ghana's financial system underwent crises and this possibly explains the initial to midterm response dynamics in economic growth. Highly developed financial systems can trigger reductions in economic growth due to its association with high, but less efficient investments. The result implies that failures and inefficiencies in the total credit offered in the economy can weaken economic growth.

The results also show that the economic growth initially rises to shocks in capital formation. This implies that investments have the potential to increase economic growth but can equally drag growth downwards when such investment projects go bad. This suggests that it is good for the economy to monitor and ensure the success investments, financed either the state or private sector, to maintain stable growth. This underscores the importance of creating s business-friendly macro-economic environment as well as the provision of business monitory and advisory services.

The industry value-added shock shows significant stimulation to economic growth. The results indicate that industrial dynamics causes economic growth to surge and dampens growth in the medium term. This may be due to decreasing importance of the real sector to the growth of the economy. Inflation rate shock seems to have only marginal effects on economic growth and its variations does not significantly deviates economic growth from its path. The figure indicates that in the long-run almost the financial developments indicators and the control variables employed in this study of play vital roles at various degrees in determining the rate of growth and movement of economic growth towards a stationary point. The results indicate that progressively positive shocks from economic growth itself would cause a relatively unstable growth toward a stationary point in the long-run.

10.7.2 Response of Capital Accumulation to Financial Development and Macro-economic Shocks

The results indicate that credit to private sector initially slows down capital accumulation but causes investments to improve towards the medium-term. This indication suggests that investments seem to fluctuate with the amount of private credit provided in the economy and that capital accumulation takes time to positively respond to increases in private credit. The

result suggests that further consistent shocks from private credit stabilises capital accumulation. Also, the results further initial shocks from total credit and financial sector deposits causes investment to decline, at a relatively substantial rate, in Ghana. These developments share some light the assertion by Brownbridge *et al.* (2000) that financial shallowing and the subsequent contraction of the banking system in the pre-reform era resulted in a slowdown of investment in Ghana. The results further show that initially shocks in broad money does not seem to stimulate capital formation though it later dampens investment growth.

The results also show that capital accumulation rises substantially to initial shocks to both industrial output growth and the rate of trade openness. This implies that the initial drive to embark on extensive industrialisation resulted in high level of investment in Ghana. The higher response of investment to shocks in industrial output growth gives the indication that industrial sector growth can be a potential source of advancing capital in Ghana. The results demonstrate that capital formation declines sharply to shocks to industrial output growth as well as trade.

The figure indicates that in the long-run almost the financial developments indicators and the control variables employed in this study of play vital roles at various degrees in determining the rate of growth and the path of capital growth towards a stationary point.

10.7.3 Response of Industrial Output Growth to Financial Development and Macro-economic Shocks

The results show that initial shock to private credit increases industrial output growth albeit moderately. However, initial shocks to total credit, broad money and total deposits lead to declines in industrial output. This development gives an indication of the financial repression experienced in Ghana in the pre-reform stage.

The results also show that shock to capital accumulation causes industrial output to decline. This development is consistent with literature as initial increase in investment may hamper industrial productivity. On the other hand, industrial output growth responds positively to the extent of trade openness. This underscores the importance of trade for industrial sector growth. This implies that trade could be used as a potential source of industrial growth in Ghana. The

path of industrial output growth suggests that possible adverse effect of trade exists in the Ghanaian economy as evident in the declining responses to subsequent shocks to trade. The results additionally indicate that industrial output growth strongly responds to shocks in inflation. This indication suggests that initial increases in the rate of inflation could be detrimental to industrial growth. This may not be surprising due the adverse implication of higher inflationary rates on the cost of credit and demand for industrial produce and services.

10.8 Contribution of Financial Sector Indicators and Macro-economic Shocks to Growth

The contribution of each financial development and macro-economic shock to the respective components of economic growth was analysed using the variance decomposition. The variance decompositions examine the importance of each of the shocks as a component of the overall variance of each of the variables over time. The results are shown in Tables 6.2.

10.8.1 Variance Decomposition of Economic Growth

The results from the variance decomposition of economic growth show that approximately 18.0 per cent of the variance in economic growth is explained by changes in the ratio of domestic credit to the private sector. The variance decomposition also shows that the total domestic credit provided by the financial system contribute 4.30 per cent while broad money supply and financial sector deposits, respectively, contribute 6.53 per cent and 7.55 per cent. The results poignantly show that about 39.75 per cent, of the variation in the economic growth rate is due to changes in the volume of gross domestic output itself. The higher contribution of the gross domestic output is attributable to the initial level of national output. The rate of capital formation and government spending, respectively, explain about 3.35 per cent and 2.86 per cent of the variation in economic growth. The level of industrial output contributes a relatively higher rate of 8.25 per cent to variations in economic growth. This indication is from the results result perhaps highlights the importance of private credit and the real sector in the economy. This outcome points to the fact that the industrial sector activities can have significant bearing on sustainability of Ghana's economic growth and needs to be boosted. Variations in the monetary policy rate and inflation rate, respectively, account for 4.13 per cent and 2.13 per cent of changes in economic growth. The inflation rate makes marginal contribution to changes in the economy perhaps due to its relative level of insignificance in the long-run.

10.8.2 Variance Decomposition of Capital Accumulation

The results from the variance decomposition of capital formation show that changes in domestic credit to private sector only account for approximately 3.0 per cent of the variation in capital formation or investment. The variance decomposition also shows that the total domestic credit provided by the financial system account for 2.30 per cent while broad money supply and financial sector deposits, respectively, contribute 5.2 per cent and 3.3 per cent to the variations in capital formation. The results show that about 30.2 per cent, of the variation in the investment is due to variations in gross fixed capital formation itself. The higher contribution is perhaps due to the initial level of investment. Variations in industrial productivity and trade contribute substantially to the variations in capital formation in Ghana at respective rates of 27.0 per cent and 19.4 per cent. The higher industrial output contribution gives the indication that increased capital formation has been highly influenced by improvement industrial productivity and suggests that firms re-invest significant portions of their profits in purchasing new capital. The relatively higher contribution of trade underpins the dominance of trade in the Ghanaian economy. The results further indicate that GDP growth and government spending contribute about 2.4 per cent and 2.0 per cent, respectively to the variation in capital accumulation. Variations in the monetary policy rate and inflation rate, respectively, account for 1.2 per cent and 4.6 per cent of the variation in capital formation. The monetary policy rate seems to only contribute marginally to changes in the capital accumulation due to its relative level of insignificance in the long-run.

10.8.3 Variance Decomposition of Industrial Output

The results from the variance decomposition of industrial output growth indicate that changes in domestic credit to private sector accounts for a paltry 2.3 per cent of the variation in industrial output variations. The results show that changes in financial sector deposits contribute a relatively high percentage rate of 7.1 per cent for the variations in industrial output. Total domestic credit provided by the private sector and broad money supply, respectively, account for approximately 2.0 per cent and 1.3 per cent to the changes in industrial output.

Table 10.2: Variance Decomposition Economic Growth.

Period	S.E.	D(LGDPGC)	D(LDCPS)	D(DCFS)	D(LBMS)	D(FSD)	D(LGCF)	D(LIDVA)	D(LTOPEN)	D(LGE)	D(LMRR)	D(LINF)
1	0.04	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.05	68.73	2.04	4.39	5.35	9.21	0.02	7.02	1.56	0.01	1.65	0.01
3	0.05	51.62	14.75	4.30	3.99	6.86	3.71	9.13	1.85	0.31	3.36	0.08
4	0.06	45.43	18.33	4.11	5.79	7.78	3.46	8.03	1.97	0.98	3.94	0.15
5	0.06	41.52	17.39	3.72	6.44	7.74	3.44	7.92	2.95	2.80	4.21	1.85
6	0.06	40.73	17.37	4.17	6.27	7.63	3.43	8.29	3.34	2.79	4.09	1.85
7	0.06	40.25	17.94	4.32	6.38	7.48	3.37	8.28	3.29	2.81	4.03	1.83
8	0.06	39.87	17.91	4.31	6.53	7.51	3.34	8.22	3.27	2.82	4.08	2.11
9	0.06	39.78	17.86	4.29	6.53	7.55	3.34	8.25	3.31	2.82	4.12	2.12
10	0.06	39.74	17.84	4.30	6.53	7.55	3.35	8.25	3.30	2.86	4.13	2.13

Source: Researcher's own computations.

Table 10.3: Variance Decomposition of Capital Accumulation

Period	S.E.	D(LGCF)	D(LDCPS)	D(LDCFS)	D(LBMS)	D(FSD)	D(LIDVA)	D(LGDPGC)	D(LTOPEN)	D(LGE)	D(LMRR)	D(LINF)
1	0.17	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.29	38.24	0.81	0.10	0.00	1.81	29.04	0.03	23.02	0.89	0.65	5.35
3	0.30	35.17	0.75	1.93	3.13	2.14	26.70	1.80	21.73	0.86	0.83	4.92
4	0.32	31.90	2.23	2.01	5.20	2.11	27.21	2.02	20.11	1.77	0.85	4.54
5	0.32	31.32	2.53	2.01	5.10	2.74	27.06	2.12	19.85	1.78	0.95	4.48
6	0.32	30.98	2.68	2.02	5.11	3.05	26.99	2.28	19.67	1.78	0.94	4.43
7	0.32	30.74	2.73	2.29	5.08	3.15	26.80	2.28	19.55	1.90	1.03	4.40
8	0.32	30.57	2.72	2.28	5.17	3.16	26.86	2.28	19.53	1.97	1.04	4.37
9	0.32	30.39	2.77	2.28	5.26	3.14	26.69	2.38	19.43	1.98	1.14	4.47
10	0.32	30.25	2.84	2.27	5.24	3.13	26.66	2.37	19.43	1.98	1.15	4.61

Source: Researcher's own computations.

Table 10.4: Variance Decomposition of Industrial Output

Period	S.E.	D(LIDVA)	D(LDCPS)	D(LDCFS)	D(LBMS)	D(FSD)	D(LGCF)	D(LGDPGC)	D(LTOPEN)	D(LGE)	D(LMRR)	D(LINF)
1	0.12	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.18	51.88	1.82	0.00	0.00	5.90	0.49	4.82	10.14	1.68	1.91	21.31
3	0.19	44.99	1.59	1.74	1.01	7.69	0.65	4.54	8.78	6.01	1.79	21.16
4	0.20	43.50	1.52	1.95	1.01	7.43	1.07	6.15	8.57	5.58	2.00	21.17
5	0.21	41.98	1.98	1.85	0.95	7.07	1.00	6.51	9.73	5.19	2.32	21.37
6	0.21	41.58	2.27	1.86	1.27	6.96	1.18	6.44	9.60	5.33	2.28	21.19
7	0.22	41.18	2.22	1.90	1.24	7.02	1.40	6.43	10.26	5.35	2.23	20.71
8	0.22	41.15	2.28	1.90	1.24	7.04	1.40	6.41	10.23	5.34	2.29	20.67
9	0.22	41.07	2.28	1.89	1.23	7.08	1.40	6.49	10.25	5.32	2.32	20.62
10	0.22	41.03	2.28	1.90	1.25	7.13	1.40	6.48	10.24	5.32	2.31	20.60

Source: Researcher's own computations.

The variance decomposition further shows that about 41.0 per cent, of the variation in the industrial output is caused by changes in the level of industrial productivity itself, perhaps as a result of initial start-up productions. Variations in capital formation only contribute a relatively lower rate to changes in industrial output at the rate of 1.4 per cent. The relatively higher contribution of trade underpins the dominance of trade in the Ghanaian economy. The results further indicate that GDP growth and government spending contribute about 6.5 per cent and 5.3 per cent, respectively to the variation in industrial productivity. The relatively higher contribution of government expenditure makes buttress the relevance of local purchases by the state in promoting industrial sector growth. Changes in trade also make a substantial contribution to the variation in industrial output accounting for 10.2 per cent of the variations.

The decomposition results give the strongest indication that inflation contributes substantially to the variation in industrial output and accounts for the 20.6 per cent of the variation. Higher inflation rate is detrimental to industrial growth as it affects the overall demand of manufactured goods or services. The results thus may not be misleading and emphasise the need to keep inflation within rates that are healthy in order to boosts demand of manufactured. Higher rates of inflation can pose a greater threat to industrial growth in economies as it has the potential to significantly dampen industrial productivity. The monetary policy rate accounts for 2.3 per cent of the changes in industrial output.

10.9 Chapter Summary

This chapter has examined the reaction of economic growth to financial development indicators as well as macro-economic shocks using the BVAR methodology and time series data for Ghana. Determining the response of economic growth to financial development and other macro-economic shocks is necessary to for maintaining sustainable development of the sources of growth as it provides valuable information for management of the economy. The results suggest that given the country's historical performance and associations between financial development and economic growth, improving the level of domestic credit to the private sector as well as increasing the overall size of financial intermediation would significantly increase the economic growth in Ghana.

The results showed that the financial development indicators can have long-lasting impact on the economic growth. Domestic credit to private and financial sector deposits show positive persistence of 4.93 per cent and 19.31 per cent, respectively in the economy. Inefficiencies in the rate of financial intermediation were found to show negative persistence in the economy. Poor allocation of finances and excessive money supply can negatively affect economic growth as demonstrated by the respective persistence rates of 14.00 per cent and 0.1 per cent. The results imply that capital accumulation can have a negative persistence in the economy. Domestic credit to private shows a stronger positive persistence on capital accumulation while inefficiencies in the allocation of total credit provided by the financial sector imply a relevant negative persistence of 34.96 per cent. Also, industrial output growth show positive persistence of approximately 20.00 per cent in the economy. The negative persistence implies inefficiency

in the allocation of credit by the financial system in Ghana. The inverse persistence of financial sector deposits are perhaps due to the fact that increasing deposits are indications that the financial system may not be lending to the industry sector businesses or are suggestive of the financial system financing long-term projects in the economy.

The results from the impulse response function showed that in the initial to medium term, shocks to domestic credit to private sector, broad money supply and financial sector deposits increase the economic growth in Ghana. As a source of growth, the shocks to industrial output increases economic growth while in the initial to medium term, capital accumulation decreases economic growth. The results from the impulse response function further showed that in the initial to medium term, shocks to domestic credit to private sector and financial sector deposits decrease capital accumulation in Ghana. Shocks to industrial output substantially increase capital accumulation in the initial to medium term. The results from the impulse response function also indicate that in the initial to medium term, shocks to domestic credit to private sector increase industrial output productivity while in the initial to medium term, shocks in financial sector deposits, total credit and broad money supply decrease industrial output. Shocks to capital accumulation substantially decreases industrial output in the initial to medium term.

The results from the variance decomposition of economic growth show that approximately 18.00 per cent, 4.30 per cent, 6.53 per cent and 7.55 per cent of the variance in economic growth is explained by the respective changes in the ratios of domestic credit to the private sector, total credit, broad money supply and financial sector deposits. Industrial sector growth also makes a comparatively greater contribution to the variations in economic growth. The results from the variance decomposition of economic growth further showed that the relative contribution of the financial development indicators to capital formation minimal as compared to that of industrial output and trade openness. Private credit, total credit, broad money supply respectively contribute 2.84 per cent, 2.27 per cent, 5.24 per cent and 3.13 per cent to the variation in capital formation. Industrial output and trade openness respectively contribute 27.00 per cent and 20.00 per cent to the variations in capital accumulation. Regarding industrial output changes, private credit, total credit, broad money supply respectively

contribute 2.28 per cent, 1.90 per cent, 1.25 per cent and 7.13 per cent to the variation in industrial output. The decompositions analysis exposed that inflation seems to account for a greater variation in the variations in the industrial sector output.

The major policy implication from the analysis is that private sector credit shows stronger stimulation in impacting economic growth as well as the sources of growth indicators. There is therefore the need for the Government of Ghana to work to improve accessibility to credit to businesses in Ghana. Also, the results showed that the industrial sector is a greater contributor and cause of substantial variation in the economic growth of Ghana and accordingly there is the need for government to create the enabling business environment for firms to succeed. The next chapter presents the results of the economic policy responses by the Government of Ghana to dynamics in financial sector, capital accumulation and industrial output. This analysis is undertaken by applying the VAR and BVAR methodologies for modelling the links between economic growth on one hand, and the financial development indicators and macro-economic variables.

CHAPTER ELEVEN

OPTIMAL GROWTH MAXIMISING FINANCIAL DEVELOPMENT AND ECONOMIC REACTIONS IN GHANA

11.1 Introduction

This chapter presents an analysis to find out the response of economic growth to financial development, capital accumulation and industrial output dynamics as well as determines the maximising behaviour as well as the optimal levels of financial development for the respective components of growth. The analysis is undertaken by investigating the relationship between financial development and economic growth. Specifically, the analysis shares further light on the quite recent debate on the existence a threshold beyond which finance can be detrimental for growth. This debate takes its roots from Minsky (1974) and Kindleberger (1978) and more recently inspired by Deidda and Fattouh (2002) and Rioja and Valev (2004). The study is motivated by the need to ascertain whether there have been instances where financial development has resulted in lower growth rates in Ghana. To determine this it is important to test whether there is a threshold above which financial depth starts having a dampening impact on economic growth. Recent studies suggest that financial development increases growth up to a point, beyond which finance can dampen economic growth (Arcand *et al.*, 2012; Cecchetti & Kharroubi, 2012; Diamond & Rajan, 2005). Knowing the optimal financial development threshold provides a basis for formulating policies that ensure optimum benefit of the advances in the level of financial intermediation. In the light of these empirical base, the study attempts to find out the thresholds that have resulted in optimum growth of the economy of Ghana and also determine if there exist a point beyond which financial developments in Ghana causes growth to decline.

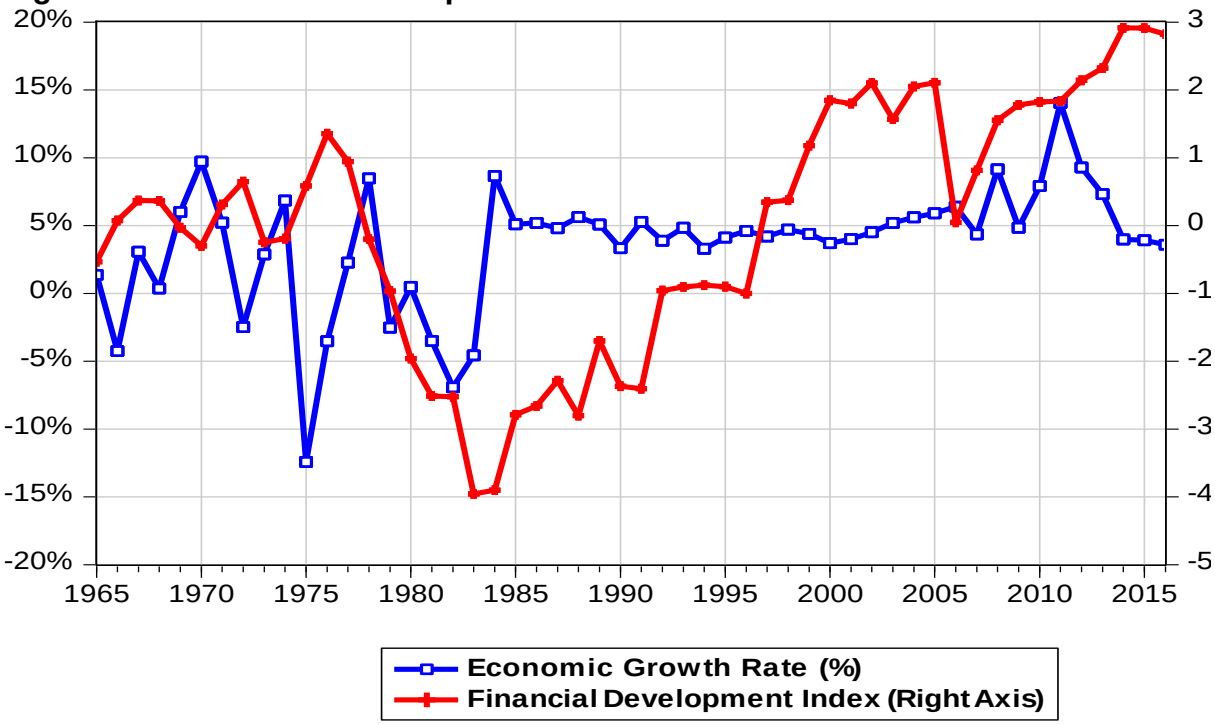
The results from the analysis can be used to assess different economic policy strategies that ensure achievement of optimal financial development targets. While debate on whether there exists an optimal point at which further increases in financial development has an impact on growth has stimulated a number of researches, there is still no definite answer to the question in literature (Arcand *et al.*, 2012; Beck *et al.*, 2012; Cecchetti & Kharroubi, 2012; Naceur *et al.*, 2017; Rajan & Zingales, 1998; World Bank, 2012).

The analysis starts by examining the relationship between financial development and economic growth. After that, econometric results of nonlinear growth equation (5.21) specified in the methodology are analysed and used to fit the curve for determining the optimal growth maximising financial development indicators adopted in this study. For robustness checks, the uses the financial development indices produced from the principal component analysis to further examine the optimal growth maximising behaviour of the financial indicators.

11.2 Financial Development and Economic Growth in Ghana

Figure 11.1 displays the trend behaviour of the relationship between economic growth and financial developments in Ghana over the period 1965 to 2016.

Figure 11 1: Financial Developments and Economic Growth in Ghana



Source: Researcher's own constructs.

The results in Figure 11.1 show that economic growth rates have been volatile between 1965 and the mid-1980s while financial development was also moderate and followed a similar trend. The financial sector performance seems to have declined substantially from 1976 towards 1984 and its dampening shock perhaps reduced the economic growth steadily from 1978 to its lowest point in 1983 at minus 12.40 per cent. This development in the financial

sector was referred to as the sector exhibiting substantial signs of financial shallowing and repression, and according hampering economic growth (Aryeetey *et al.*, 1997; Brownbridge & Gockel, 1998; Gockel, 1995; McKinnon, 1973; Shaw, 1973). Economic growth picked up after 1983 and after what has been referred to as extensive financial sector reforms, financial development in Ghana witnessed consistent improvements although the sector also suffered from the 2007 financial crisis just like most other countries within the SSA region. Economic growth in Ghana seem to have been relatively stable between 1984 and 2007 amidst consistently increasing financial sector performance, witnessed increased growth beyond 2007 and peaked at 14.0 per cent in 2011, and since then has been decreasing at increased financial sector deepening. There is, however, a potential endogeneity problem where the growth in financial development may be attributed to a response by economic policy to stimulate growth amidst what seems to be a clear declining economic activity around 1983. The consistently positive and relatively higher economic growth rates in the post-reform era in Ghana, to some extent, have been attributed to the consistent financial sector policy reforms and liberalisations, thus confirming the Mckison-Shaw hypothesis. The developments in the financial sector have resulted in effective financial intermediation and more prudent investments in the Ghanaian economy (Bawumia, 2010). As a result the economic growth rates of Ghana have largely been positive and higher as compared to the pre-FINSAP era as evident in Figure 11.1 and the growth maximising regression results in Table 11.1. There is, however, the indication from the data and as evident from the Figure 11.1, that economic growth rate in Ghana have been declining since 2012 amidst rising increases in the financial development indicators. The decline suggests that possibly rising financial development does not monotonously guarantee progression in economic growth and this gives the indication that there is perhaps a growth maximising threshold or a stabilising position for financial development.

11.3 Determining the Stable Financial Development Dynamics

The rate and level of improvements in financial development indicators could play an important role in the path towards economic growth. This makes its relevant for policy makers to monitor development in the financial sector by examining some benchmarks in analysing financial development and economic growth. Though there seems to be no known standard optimal levels for financial development, it may be relevant in determining the rate that stabilises the economy and thus lead to optimal growth. The average ratios of domestic credit

to private sector and total credit provided by the financial sector to GDP, for instance, stand at 42.0 per cent and 35.0 per cent, respectively, for the SSA region. The need to ensure optimum benefit of financial makes it imperative to find the rates that stabilises economic growth. There is the possible tendency and need to monitor and target financial development indicator levels given the fact that some studies have found negative associations between financial development and economic growth.

The study tests the stability of the financial development indicators by using the autoregressive financial development equation. The autoregressive equation was used to estimate a long-run stable financial development targets for each of the financial development indicators. Table 11.1 provides the results from the autoregressive equation specified in equation 5.34, in Chapter Five.

Table 11.1: Testing Financial Development (FD) Indicator Stability: Autoregressive Equation AR (1)

Variable	Stability Positions			
	DCPS/GDP	**DCFS/GDP**	**BMS/GDP**	**FSD/GDP**
Constant (α)	0.291	6.344**	1.596	0.394
Lagged Coefficient (β)	0.991***	0.772***	0.942***	0.988***
Stable Rate (%), $\alpha/(1-\beta)$	**33.73**	**27.88**	**27.62**	**35.06**
Diagnostic Tests	R^2=0.90, D-W=2.1, Prob. (F)=0.00	R^2=0.59, D-W=1.7, Prob. (F)=0.00	R^2=0.83, D-W=1.9, Prob. (F)=0.00	R^2=0.89, D-W=1.8, Prob. (F)=0.00

Source: Researcher's own computations. Note: * represent significance at 10%, ** significance at 5% and *** significance at 1%.

The results from the AR (1) financial development equation show the stable positions for each of the financial development indicators for Ghana. The results indicate that the respective stable positions private credit, total credit, broad money supply and overall financial sector deposit to be approximately 34.00 per cent, 28.00 per cent, 28.00 per cent and 35.00 per cent.

Though the challenge with these ratios is that it does not take into account the monetary policy response, they provide a considerably good guide for examining optimal positions.

11.4 Determining the Stable Economic Growth Dynamics

Knowing the stable position for economic growth as well as the components of economic growth is relevant for examining their respective paths towards optimal levels. Accordingly, the study further estimates the stable positions for economic growth rate as well as the stable level of the industrial value-added-to-GDP ratio. Again, study tests the stability of the economic growth as well as the industrial and manufacturing components of growth for Ghana using the autoregressive economic growth equation. The autoregressive equation was the used to estimate a long-run stable growth targets for the respective growth components. Table 11.2 provides the results from the autoregressive equation specified in equation 5.34, in Chapter Five.

Table 11.2: Testing Growth Stability: Autoregressive Equation AR (1)

Variable	Stability Positions		
	Economic Growth	**Industrial Productivity**	**Manufacturing Output**
Constant (α)	2.244***	2.043	1.165
Lagged Coefficient (β)	0.389***	0.910***	0.870***
Stable Rate (%), $\alpha/(1-\beta)$	**3.67**	**22.85**	**8.99**
Diagnostic Tests	R^2=0.15, D-W=2.0, Prob. (F)=0.00	R^2=0.80, D-W=1.7, Prob. (F)=0.00	R^2=0.72, D-W=1.9, Prob. (F)=0.00

Source: Researcher's own computations. Note: * represent significance at 10%, ** significance at 5% and *** significance at 1%.

The results from the AR (1) growth equation show the stable positions for economic growth, industrial output and manufacturing productivity for Ghana. The results indicate that the respective stable positions of economic growth rate, industrial output to GDP and manufacturing productivity to GDP ratios to be approximately 4.00 per cent, 23.00 per cent and 9.00 per cent. Though the challenge with these ratios is that it does not take into

consideration the economic policy response, they provide a guide for examining optimal positions.

11.5 Growth Maximising Econometric Results

This section presents the empirical results of the growth maximising financial development coefficients. At first a regression equation assessing the maximising financial drivers of economic growth is estimated in line with the specification in equation (4.34) in Chapter Five. The results of the growth maximising impact of financial development on economic growth in Ghana are illustrated in Table 11.3.

Table 11.3: Maximising Determinants of Economic Growth for Ghana

Variable	Model (1965-2016)	Model (1984-2016)
Constant	6.327*** [39.389]	6.795*** [14.041]
Financial Development Index 1	0.085*** [4.872]	0.138*** [4.721]
Financial Development Index 1 Squared	0.015*** [3.236]	0.015** [2.518]
Financial Development Index 2	-0.078*** [-4.727]	-0.063*** [-3.939]
Financial Development Index 2 Squared	-0.025 [-0.916]	0.044 [1.338]
Capital Formation	-0.025 [-0.358]	0.101 [1.037]
Industrial Sector Growth	-0.341*** [-3.976]	-0.264** [-2.724]
Trade Openness	0.115 [1.481]	-0.161** [-1.246]
Government Spending	0.438*** [5.186]	0.408*** [5.886]
Monetary Policy Rate	-0.055* [-1.833]	-0.008 [-0.168]
Financial Sector Reforms Dummy	-0.011 [-0.220]	-0.079** [-2.109]
Diagnostic Tests	R^2= 0.90, Adj. R^2= 0.87 Durbin-Watson = 1.4 J-Statistics = 0.00	R^2= 0.94, Adj. R^2= 0.92 Durbin-Watson = 1.6 J-Statistics = 0.00

Source: Researcher's own computations based on E-views Note: The Figures in parenthesis are probability values, * represent significance at 10%, ** significance at 5% and *** significance at 1%.

The results from the econometric analysis of the maximising determinants of economic growth show the financial development index 1 and financial development index 1 squared have positive and statistically significant impact on economic growth while financial development index 2 indicate a statistically significant negative impact on growth. Financial development indices 1 and 2 are orthogonal to each other and therefore the changes in sign of the respective indices emphasise the dynamism of financial development indicators in impacting the components of economic growth. The negative coefficient on changes in industrial sector growth suggest that government was pursuing a counter-cyclical policy by persistently financing failing industrial projects and in response to declining output and firm collapses that characterises Ghana's industrial sector. The coefficient for the financial development indicates that for every percentage point increase in the financial development indices the growth rate of per capita income rises by 0.085 per cent. The results confirm that the positive impact of the financial developments in Ghana have been higher in the post-reform era of 1984-2016 and the indication is that unit improvements in financial development have caused economic growth to increase by 0.138 percentage unit points. But similarly, the findings also suggest that, at some point, increased finance can equally have adverse effects on growth. This is inferred from the negative and statistically significant negative coefficient for financial development index 2 which indicates a decline in economic growth by 0.078 per cent with a given unit rise in the index.

These results are consistent with findings in literature on cross-country growth analysis which find a positive effect of financial development on growth (Levine *et al.* 2000) and also support the argument by Arcand *et al.* (2012) who shows that at some point too much finance can harm growth. Although the result, in relation to government spending, is inconsistent with the observation by Barro (1999) that growth is inversely related to government consumption, it is consistent with Barro (2006), and Barro and Sala-I-Martin (2006, 1995) indicating that productive government spending promotes growth.

Although it is common practice to regress economic growth on an array of potential determinants as shown in Table 11.3, Mupunga (2014) notes that the usefulness of this approach has increasingly been questioned by a number of empirical studies (Levine & Renelt, 1992; Sala-i-Martin, 1997). As suggested by Bosworth and Collins (2003), it is necessary to focus only on a core set of variables of interest and evaluate the importance of other variables conditional on inclusion of the core set. As such the ensuing analysis of growth maximising results in this chapter mainly focuses on the link between financial development indicators, industrial output and economic growth.

11.6 Determining the Optimal Long-run Financial Development

The study is mainly concerned with the relationship between financial development and the respective economic growth components. The study therefore applied a bivariate model from Equation 5.14 to assess the optimal growth maximising behaviour of the financial development indicators as well as thresholds for Ghana. The estimated coefficient of the quadratic form in the estimated growth equation were found to be found to be statistically significant, implying that the results can be plotted on respective finance and growth scatter plot to determine the optimal level of each of the financial development indicators over the period of study. The plots assist in examining the maximising behaviour of the relationship between financial development indicators and the respective components of economic growth. Additionally, the analysis assists in determining the point (optimal threshold) beyond which financial development indicators negatively affect the respective growth components under examination. After this point has been reached, further increases in the respective ratios of financial development indicators start to have a negative effect on growth. The results from the respective estimations of the quadratic equations are plotted on the finance and growth scatter to examine the maximising behaviour and as well determine the tipping point beyond which additional finance can possibly affect growth. The plot from the econometric results (Equation 5.14) from the bivariate equations for economic growth and industrial output are shown in the Figures 11.2, 11.3 and 11.4.

11.6.1 Economic Growth and Optimal Financial Development

The chart in Figure 11.2 depicts a concave or an inverted U-shaped relationship between economic growth rates and the domestic credit to private sector-to-GDP and total credit-to-

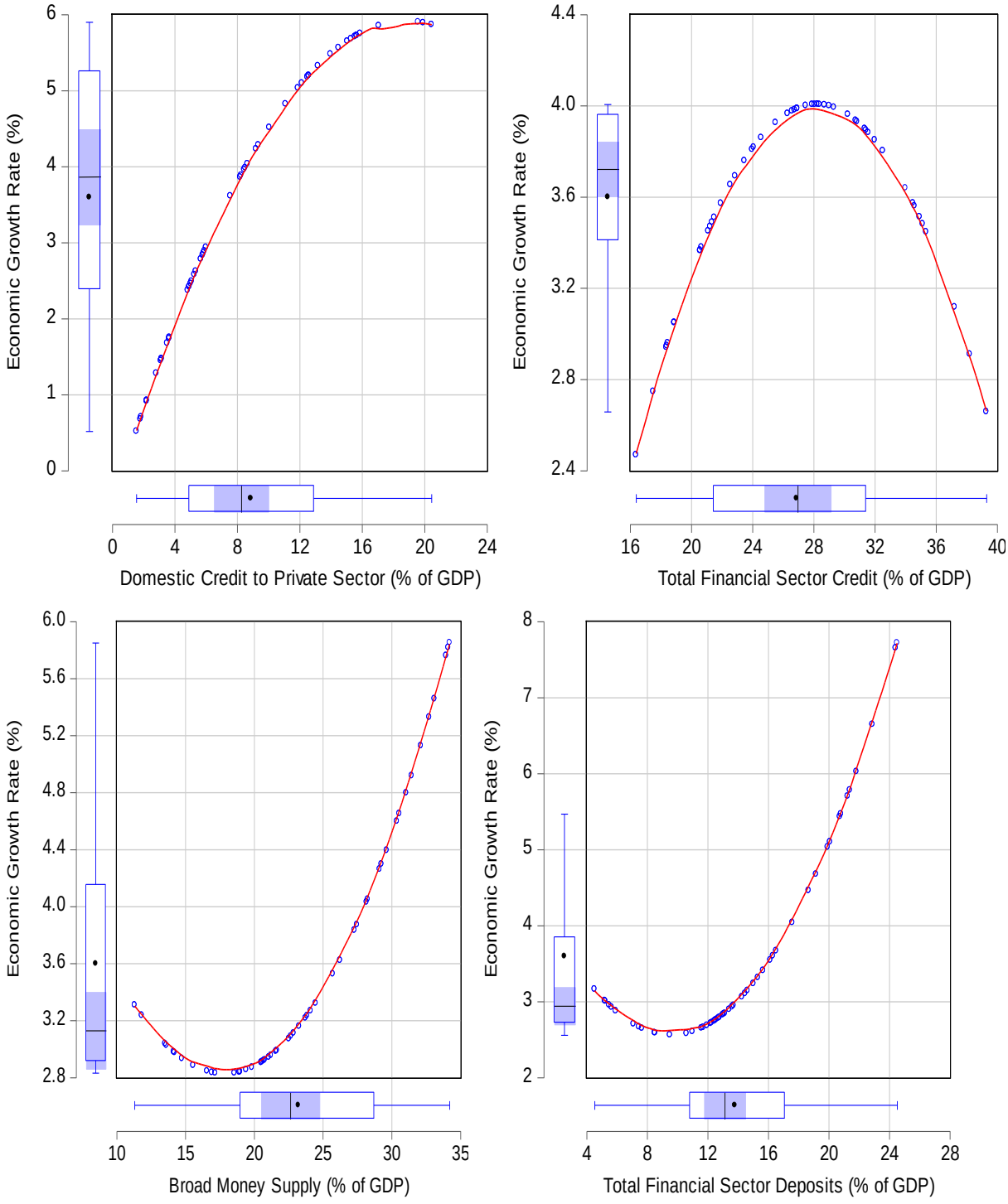
GDP ratios. Upon examination of the graphs and estimates, Ghana achieved higher growth rates when private credit-to-GDP ratio ranged between 16.00 per cent and 20.00 per cent. The chart however gives the indication of the existence of a convex relationship between economic growth and both broad money and financial sector deposits. The findings indicated that beyond 28.00 per cent total credit-to-GDP ratio, Ghana's economic growth rates record declines. This threshold point for total credit is consistent with the stabilising position for the total credit-to-GDP ratio. The results indicate that approximately 19.00 per cent and 10.00 per cent minimum thresholds for broad money supply and financial sector deposits. Beyond these thresholds, increases in the respective ratios resulted in higher economic growth. This estimated thresholds for private credit-to-GDP and total credit-to-GDP ratios are higher than the respective averages of 8.85 per cent and 26.87 per cent observed for the period 1965 to 2016. However, these rates are lower than the stabilising ratios of 34.00 per cent and 28.00 per cent estimated for the respective indicators. Since, private credit shows a comparatively, robust positive impact on growth, the economic implication is that there is the need for policy makers in Ghana to work towards improving credit to private sector businesses in the economy towards the stabilising ratio and on the other hand keep total credit within the limit of 28.00 per cent. It is relevant to constantly monitor and integrate financial stability management as part of the broader financial development process.

The U-shaped relationship between total credit and economic growth, as evident in Figure 11.2, is consistent the views of Cihak *et al.* (2012) that countries where banks' lending standards become very loose, with banks providing loans too easily, without proper risk management and loan monitoring. On the surface, one could observe the rapid growth as a sign of deepening and increased access to finance. The quite recent situation in Ghana, where a substantial number of banks have run into financial distress and the Bank of Ghana (BoG) have had to merge some of the banks to make them efficient, give credence, to the findings that financial systems in Ghana may be inefficient. The findings are, therefore, consistent with the developments in Ghana's financial sector as observed by the IMF (2011) that a moderate deterioration in asset quality of banks could lead to insolvency of several banks. According to the BoG and IMF, the ratio of non-performing loans on the balance sheet of banks in Ghana have been higher in recent times (Bank of Ghana, 2017, 2018; IMF, 2011). Also, seven banks

have collapsed in Ghana between March, 2017 and August, 2018 as a result engagement in the financing of either too risky and bad business projects or poor corporate governance (Bank of Ghana, 2018). The evidence of existence of financial thresholds are thus consistent with theories that postulate the existence of an optimal level of financial development given by the characteristics of an economy (Ductor & Grechyna, 2015).

The complete U-shaped relationship between total credit offered by the financial system and economic growth and the rising NPLs ratio imply that the expansion of the financial system in Ghana have positioned financial institutions to embark on competition and thus resulted the financing high risk or unproductive investments that have led to possible drains on growth. This conclusion is consistent with the observation of Cihak *et al.* (2012) and further supports the assertion by Kaminsky and Reinhart (1999); and Loayza and Ranciere (2005) that rapid credit growth could increase macro-economic volatility or lead to financial and banking crises which, in turn, may have a negative effect on growth. The findings are also consistent with the suggestion by Ductor and Grechyna (2015) that the effect of financial development on growth becomes negative, if there is rapid growth in private credit not accompanied by growth in real output.

Figure 11.2: Polynomials of Economic Growth and Optimal Finance thresholds



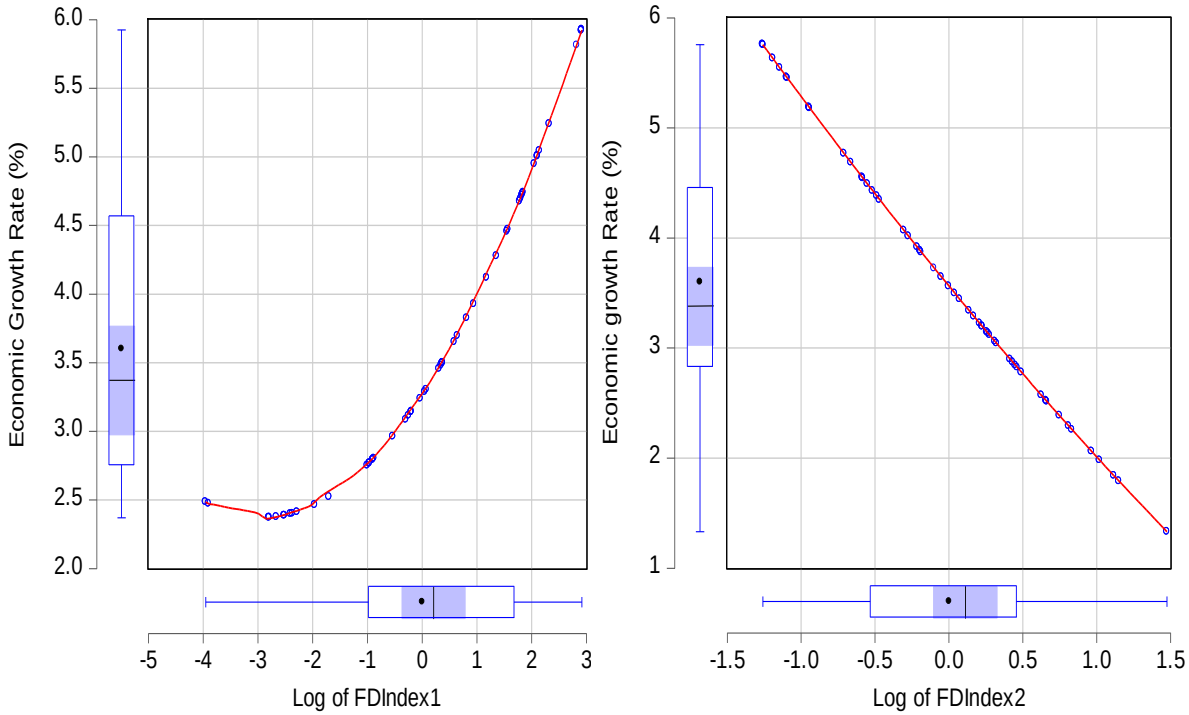
Source: Researcher's own computations.

With regards to broad money supply-to-GDP and financial sector deposit-to-GDP ratios, the respective averages of 23.19 per cent and 13.77 per cent for the period 1965-2015 are higher

than the minimum required thresholds of 19.00 per cent and 10.00 per cent, respectively. This implies that government has to work to stabilise the optimising minimum ratios of broad money supply and financial sector deposits observed in these estimations.

The findings were further checked with the financial development indices. FDIndex1 and FDIndex2 confirm that financial development can enhance growth and equally dampen growth at some levels. The two polynomial displays indicate tendencies for improved finance to harmfully affect economic growth and they exhibit both rising and declining trends in the optimal behaviour.

Figure 11.3: Robustness Checks of Optimal Financial Development Behaviour

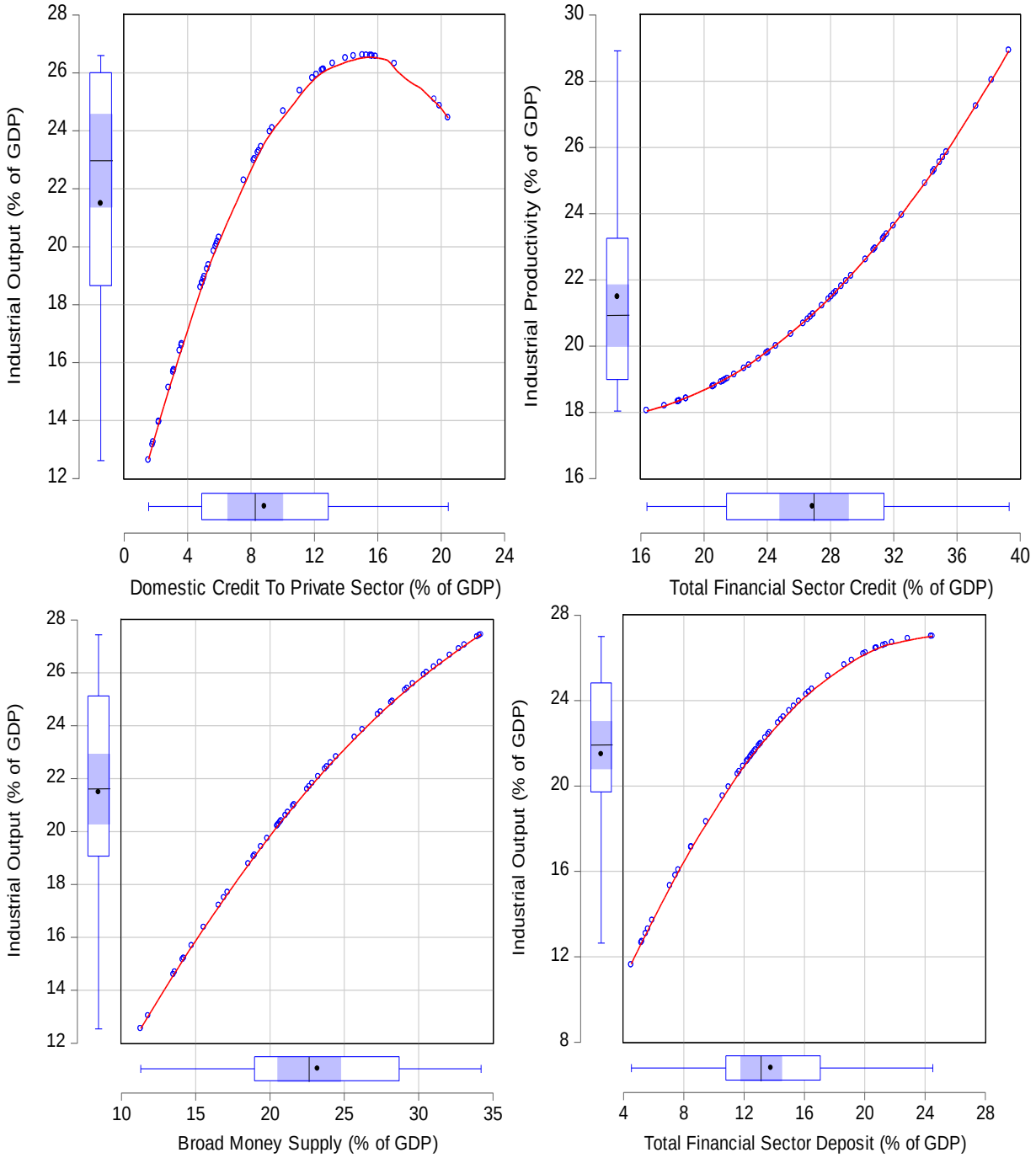


Source: Researcher's own computations.

11.6.2 Industrial Output and Optimal Financial Development

The chart in Figure 11.4 depicts a concave or an inverted U-shaped relationship between industrial output-to-GDP ratio and the domestic credit to private sector-to-GDP, broad money supply-to-GDP and total financial sector deposit-to-GDP ratios. Upon examination of the graphs and estimates, industrial output in Ghana experience declines beyond a private credit-to-GDP ratio of 15.00 per cent.

Figure 11.4: Polynomials of Industrial Output and Optimal Finance thresholds



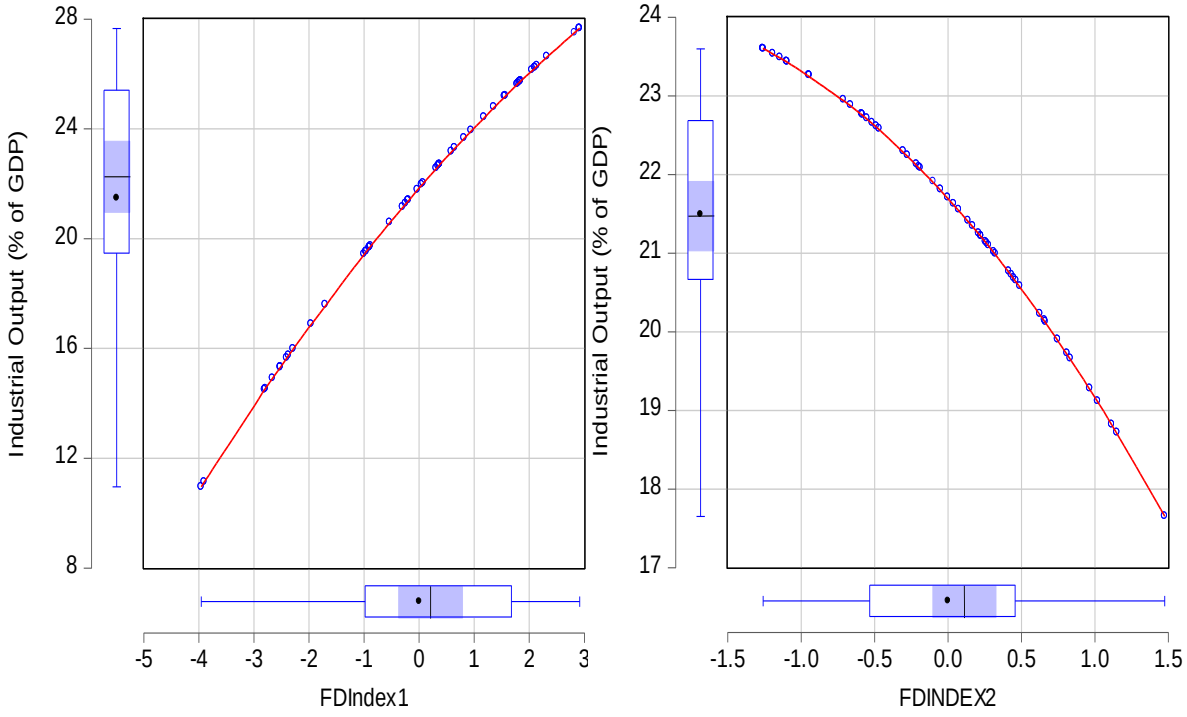
Source: Researcher's own computations.

The chart further shows that after respective thresholds of about 25.00 per cent and 16.00 per cent additional increases in broad money supply-to-GDP and financial sector deposit-to-GDP ratios cause the industrial sector to increase at diminishing rates. The results indicate approximately a 17.00 per cent minimum threshold for total credit-to-GDP ratio is necessary

for industrial sector growth. Beyond this threshold, additional increases in the total credit-to-GDP ratio results in higher industrial output growth. The charts give the indication that improvement in the financial system enhances industry growth, to a larger extent. The convex nature of the association between increasing total credit and industrial growth observed in Figure 11.4 gives the indication that the total credit provided by the financial institutions are resulting in sub-optimal productivities in industry. This observation may be consistent with developments in the industrial sector as its major component, manufacturing, has witnessed persistent declines amidst the rising size of financial system in Ghana.

The findings were further checked with the financial development indices. The polynomial plots of FDIndex1 and FDIndex2 confirm that financial development can boost industrial output growth and also diminish manufacturing at some levels.

Figure 11.5: Robustness Checks of Optimal Finance and Industrial Output



Source: Researcher's own computations.

11.1Results and Analysis of Economic Reaction

This section provides the results of the economic reaction function test together with the simulated financial development Ghana. The results are used to determine the probability that

financial development can result in growth of countries of the SSA in the medium to long-term.

11.2 Estimated Economic Reaction Function

The estimated economic reaction function only used the financial development indices created by the principal component analysis approach and estimated economic growth output gap using per capita GDP and omitted other determinants of growth. The other factors were omitted to avoid determining their out of sample trajectories required to simulate growth paths. All the variables are integrated of order 1 and the signs of the main explanatory variables are as expected.

Table 11.4: Economic Growth Reaction Function

Variables Dependent: Economic Growth	**Economic Growth Model**	**Capital Accumulation Model**	**Industrial Growth Model**
Constant	6.631*** [399.202]	2.681*** [49.735]	3.027*** [89.053]
Lagged FDIndex1	0.099*** [10.571]	0.186*** [6.113]	0.112*** [5.822]
Lagged FDIndex2	-0.058** [10.571]	-0.384*** [-4.934]	-0.155*** [-3.162]
Output Gap	0.050* [1.929]	0.067 [0.763]	0.028 [0.503]
Diagnostic Tests	R^2= 0.73 Adj. R^2= 0.71 F-Stat=43.27***	R^2= 0.58 Adj. R^2= 0.55 F-Stat=21.68***	R^2= 0.49 Adj. R^2= 0.46 F-Stat=15.31***

Source: Researcher's own computations, Note: ***, ** and * represent 1%, 5% and 10% levels of significance, respectively. Figures in brackets are t-values.

The results from Table 11.4 show that economic growth responds positively to increases in the financial development, suggesting that the inter-temporal condition exists amongst the two. The output gap has a positive sign and this indicates that economic growth responds positively to increases in the output gap. This positive association does not indicate a pro-cyclical economic policy. The results show that if the financial development improves by 1 per cent of GDP in year t, the economy would improve by 0.098 per cent of GDP in year $t + 1$. The significant positive coefficient of the output gap in the economic growth model suggests that Ghana's economy policy position has been counter-cyclical during the in the period under

investigation, from 1965 to 2016. On the other hand, although the financial developments indicate a significantly positive association with capital accumulation and industrial output growth, the positive but statistically insignificant coefficients of the output gap suggest that economic policies have not had meaningful impacts on the two components of growth. This result is in line with the observation by Clapham (1996) that Ghana has made sincere and consistent attempt to implement growth enhancing structural adjustment policies. Similarly, Burger *et al.* (2011) found a positive and statistically significant coefficient for South Africa indicating that the country follows a counter cyclical fiscal approach.

11.3 The Impact of Economic and Financial Reforms on Economic Growth in Ghana

Finally, the study examines and tests the impact of structural adjustment and financial reform programmes on economic growth in Ghana. The main objectives of economic reforms in Ghana have been to enhance the development of the real sectors and ultimately promote economic growth in Ghana. As observed by Moyo *et al.* (2014) that although financial reforms enhance growth of an economy by promoting innovation and efficiency, it may equally also increase the financial fragility of financial intermediaries such as banks. As indicated earlier, financial reforms in Ghana have primarily aimed at promoting economic growth through the removal of credit allocation controls, competitive interest rates and increased financial intermediation. These are supposed to promote growth through efficient credit allocations, increased access to credit and enlarged financial intermediation.

The results of the Chow test indicated that there is a structural break in the data. Accordingly, the study introduced a dummy variable in the estimation of the parsimonious equation in the earlier analysis in Chapters Six, Seven, Eight and Nine. The Chow test suggests that the presence of structural breaks imply that an estimation may well fit the data if separate models are developed for the before and after structural break scenarios (Chow, 1960). Accordingly, the study, additionally, captures the effect of financial reforms and economic reforms by splitting the data into two periods and re-estimates the models to observe the impact of the financial development on economic growth, capital accumulation and industrial output growth using equation 5.1. These estimations are only highlights the variables of interest in this study. The first period represents the pre-reform era beginning from 1965 to 1983 while the second period is from 1984 to 2016.

Accordingly, the study estimates two separate models, representing the stated periods, for each of the growth components as well as for economic growth. The growth indicators, namely; economic growth, capital accumulation and industrial output growth are treated as the dependent variables. The results presented here only indicate the financial development indicators even though the estimation includes other control variables as indicated in Equation 5.2 in Chapter Five. Some selected results from the models are presented in the annexes.

Table 11.6: Impact of Financial Developments on Growth Components in Ghana

Variable	Economic Growth		Capital Accumulation		Industrial Growth	
	1965-1983	**1984-2016**	**1965-1983**	**1984-2016**	**1965-1983**	**1984-2016**
DCPS	0.115**	0.272***	-0.029	0.014	0.158**	0.023
	[2.755]	[4.391]	[-0.147]	[0.094]	[2.816]	[0.324]
DCFS	0.237**	0.305***	-0.040	-0.537***	0.387***	0.171
	[2.232]	[3.234]	[-0.104]	[-5.670]	[3.354]	[1.067]
BMS	0.101	0.622***	0.009	0.312	0.103	0.010
	[1.357]	[6.22]	[0.024]	[0.849]	[0.794]	[0.049]
FSD	0.132*	0.374***	0.032	0.591***	0.194	-0.197
	[2.058]	[4.789]	[0.079]	[5.533]	[1.549]	[-1.086]
FDIndex1	0.032*	0.112***	-0.0006	-0.086	0.048*	0.025
	[2.195]	[8.140]	[-0.0087]	[-1.638]	[1.999]	[0.534]
FDIndex2	0.059	0.028	-0.026	-0.124***	0.153**	0.041
	[1.447]	[1.366]	[-0.163]	[-6.551]	[3.117]	[1.112]

Source: Researchers own computations.

The results in Table 11.6 show that financial development is a robust determinant of growth and have had positive impacts on the general economic growth of Ghana. As can be observed, the degree of impact on financial developments on economic growth in Ghana has greater in the post-economic and financial sector reform period. The comparative impacts of private credit, total credit, broad money and total financial sector deposits in the pre-reform period are

0.115, 0.237, 0.101 and 0.132 and these are relatively lower than their respective units of 0.272, 0.305, 0.622 and 0.374 in the post-reform period from 1984 to 2016. The results further show that the individual financial indicators and the combined impact of financial developments on economic growth in Ghana have been highly significant and higher in the post-reform era.

With regards to capital accumulation, the results indicate that private credit had a statistically insignificant negative impact on capital formation in the pre-reform era. However, the private credit has had a positive but statistically insignificant impact on capital formation in Ghana in the post-reform era. The finding suggests that the level of credit to the private sector is not leading to substantial capital formation or investment in Ghana in the post-reform period. The results further indicates that improvement in the level or size of total credit provided by the financial sector have dampen capital formation in Ghana in both the pre- and post-reform periods although the negative impact is highly significant in the later period. This gives an indication of the existence of high level of inefficiencies in the financial system and this is significantly affecting capital formation in Ghana. Additionally, the negative association indicates that increases in investments in Ghana are resulting in massive problems in the financial system. This situation may arise whereby there are careless or poor lending practices, bad investment decisions, and poor supervision within the financial sector. The financial sector deposits, however, show a highly robust positive association with capital formation and this emphasises that improvement in liquidity position of banks substantially enhances investments in the Ghana economy, especially in the post-reform period. On the whole, the results suggest that the combined effect of financial developments on capital formation in Ghana have been statistically significant in the post-reform era. This revelation is consistent with the results in variance decomposition in Chapter Ten which indicated that total credit provided by the financial system has a statistically significant negative persistence on capital accumulation in Ghana.

The results again indicate that the impact of financial developments on the industrial sector was higher in the pre-reform period. The results show that credit to private sector, total credit and total deposits had statistically significant impact on industrial development in the pre-

reform period. These results are in line with the fact that the pre-reform period in Ghana witnessed specific economic and financial sector policies that aimed at promoting industrial growth and this involved the use of instruments such as credit allocation controls and interest rate ceilings. The policy thus influenced credit allocations with banks channelling substantial proportions of loanable funds into financing industrial sector projects. The liberalisation of the financial sector that occurred in the post-reform era seems to have reduced the impact of the financial system on industrial growth.

To a larger extent, the findings are similar to the observations made in the analysis of the impact of financial development on capital accumulation, industrial output growth and economic growth presented in Chapters Six, Seven and Nine. The study thus conclude that financial developments in Ghana have substantially contributed to economic growth in Ghana and policy interventions under the structural adjustment programmes as well as the financial sector reforms have had significant positive effect on the extent of impact of financial development on the economy.

11.4 Engine of Growth Test

Finally, following Cantore *et al.* (2014) the study performs the engine of growth tests using the Fagerberg-Verspagen (1999) technique to find out whether the industrial and manufacturing growth have been significant booster of economic growth in Ghana. In this regard, the study tests whether the coefficients of industrial and manufacturing growth, β, is positive and whether it is larger than the respective shares of industrial and manufacturing in GDP. The results are presented in Table 11.5. Thus, to accept the hypothesis that the industrial sector output and manufacturing productivity are the engines of growth for Ghana's economy then the coefficients must be positive, larger than their respective shares in GDP and as well be statistically significant.

Table 11.5: Engine of Growth Hypothesis Testing for Industrial Output

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-0.132	0.198	-0.667	0.5079
AR(1)	0.992***	0.032	30.789	0.0000
Industrial Productivity	0.065***	0.021	3.050	0.0037
R^2= 0.96, Adj. R^2 = 96, Durbin-Watson = 1.5, J-Stats. = 2.70, Prob. (J-Stats) = 0.09				

Source: Researcher's own Computations, Note: ***, ** and * represent 1%, 5% and 10% levels of significance.

The results from the Table 11.5 indicate that the coefficient of industrial output is not larger than the average share of industrial value-added in GDP. The results show that the difference is significant but not large enough to provide a strong basis for accepting the engine of growth hypothesis (not definitive). This implies that the impact of the industrial sector growth in Ghana is positive and significant but not robust enough to be classified as the main engine of economic growth in Ghana.

Table 11.6: Engine of Growth Hypothesis Testing for Manufacturing Productivity

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.224	0.383	0.586	0.5604
AR(1)	0.985***	0.045	21.889	0.0000
Industrial Productivity	-0.049	0.047	-1.059	0.2245
R^2= 0.96, Adj. R^2 = 95, Durbin-Watson = 1.06, J-Stats. = 4.79, Prob. (J-Stats) = 0.02				

Source: Researcher's own Computations, Note: ***, ** and * represent 1%, 5% and 10% levels of significance.

The results from the Table 11.6 indicate that the coefficient of manufacturing productivity growth is negative and provide no basis at all for considering the engine of growth hypothesis (not definitive). These results thus do not provide robust, even if not definitive support, for the

first Kaldor Law and the engine of growth hypothesis of manufacturing. This is consistent with the declining trends in manufacturing in Ghana.

The declining trend in the manufacturing productivity seems to be showing a negative persistence on industrial sector growth in Ghana. This position is consistent with the observation by Ackah *et al.* (2014) that the slowdown in the industrial sector growth is attributable to the negative growth of the manufacturing sub-sector in Ghana. The strong persistence coupled the fact that a substantial number of industrial projects in Ghana been initiated and financed by the government of Ghana may be responsible for the negative association between economic growth and industrial sector productivity. It is thus concluded that financial developments in Ghana have not robustly impacted on growth of the real sectors of the economy, especially manufacturing productivity.

11.5 Chapter Summary

This chapter analysed the optimal growth maximising financial development rate for Ghana by examining the relationship between financial development indicators and economic growth. The analysis was undertaken to examine the growth maximising behaviour as also determine the tipping point at which financial indicators have affected economic growth components in Ghana. The chapter contributes to the debate on the link between financial development and economic growth, and whether optimal financial development threshold exists in Ghana. The chapter tested the presence of a laffer-curve type relationship, where the contribution of financial development to growth is theorised to be positive at lower levels and show declining tendencies at higher levels. A quadratic econometric model was applied to fit a non-linear relationship between financial development indicators and economic growth. For robustness checks, the study further uses two financial development indices created from the principal component approach to plot polynomials as an additional means of confirming the maximising behaviour of financial development indicators.

The analysis begin by applying the autoregressive process determine the stability positions for each of the financial development indicators as well as the economic growth components. The study found that the stable positions for private credit, total credit, broad money supply and

financial sector deposits to be 34.00 per cent, 28.00 per cent, 28.00 per cent and 35.00 per cent, respectively. Economic growth stabilising rate was found to be 4.00 per cent while industrial value-added share in GDP recorded indicated a stable position of 23.00 per cent. The stabilising positions could form the basis for targeting of the respective growth enhancing indicators for the Ghanaian economy.

The coefficient for the financial development indicates that for every percentage point increase in the financial development index 1 the growth rate of per capita income rises by 0.085 per cent. The results confirm that positive impact of the financial developments in Ghana have been higher in the post-reform era of 1984-2016. But similarly, the findings also suggest that, at some point, increased finance can equally have adverse effects on growth. This is indicative of the fact that financial development index 2 showed a negative and statistically significant impact of 0.078 per cent on economic growth with a given unit rise in the index.

Private credit and total credit demonstrated a concave or an inverted U-shaped relationship with economic growth while broad money supply and financial sector deposits indicated patterns of convex associations. The results indicated 20.00 per cent and 28.00 per cent shares in GDP as optimal thresholds for private credit and total credit, respectively. The findings suggested that minimum ratios of 18.00 per cent and 10 per cent, for broad money supply and financial sector deposits are required to enhance economic growth.
Private credit, broad money supply and total deposits showed inverted U-shaped association with industrial output growth. Industrial output in Ghana experience declines beyond a private credit-to-GDP ratio of 15.00 per cent.

The results show that the study cannot conclude that the industrial sector and the manufacturing sub-sector in Ghana are not the engines of economic growth in Ghana. The industrial sector recorded a positive and statistically significant beta but not large enough to provide a strong basis for accepting the engine of growth hypothesis (not definitive). Manufacturing productivity recorded a negative beta suggesting that the manufacturing sub-sector is exerting a strong negative persistence on industrial growth in Ghana.

The significant positive coefficient of the output gap in the economic growth model suggests that Ghana's economy policy position has been counter-cyclical during the in the period under investigation, from 1965 to 2016. On the other hand, although the financial developments indicate a significantly positive association with capital accumulation and industrial output growth, the positive but statistically insignificant coefficients of the output gap suggest that economic policies have not had meaningful impacts on the two components of growth. This result is in line with the observation by Clapham (1996) that Ghana has made sincere and consistent attempt to implement growth enhancing structural adjustment policies.

The study thus concludes that the finance sector has been good for Ghana's economic growth, however, the extent of impact on industrial sector and particularly, manufacturing have been relatively lower. Although, financial development has had positive impact on investment, the findings suggest that inefficiencies in the expanding financial sector have, to some extent, adversely affected investment and economic growth in Ghana. The findings strongly point out that private sector credit is a robust determinant of economic growth in the Ghanaian economy. The findings further suggest that policy reforms in Ghana, although have led to expansion of the financial sector, seem to have hampered growth of industry, and negatively impacted on manufacturing output productivity.

CHAPTER TWELVE

SUMMARY, CONCLUSION AND POLICY RECOMMENDATION

12.1 Introduction

This chapter provides a summary of the issues discussed throughout this thesis, concluding remarks and policy recommendations. The results from the study are based on Ghana's financial and economic growth data obtained over a period spanning from 1965 to 2016. The study adopted statistical approaches and techniques to assess the impact of financial development on economic growth. As part of the investigation, the study also examined the effect of financial developments on the real sector and specifically evaluated impacts on capital accumulation and industrial output growth. Capital accumulation and industrial output growth are adapted as the sources by which finance enhance economic growth.

This study investigated the impact of financial developments on Ghana's economic growth. Ghana was adopted as a case study in view of the fact that the Country experienced major financial sector reforms after its financial system was characterised as financially repressed. As part of Ghana's strategy was a target to move its economy from a lower income country to a middle income country. If these were to be achieved, reform of the financial sector was deemed necessary by the IMF and the World Bank. Today, Ghana has achieved a status as a middle income country. The study therefore found Ghana, a perfect case study to investigate Ghana's economic growth within the context of financial developments that have occurred between 1965 and 2016. The sections below provide details of the various issues addressed by the study and the related major findings that evolved from the study.

12.2 Summary of the Study

The sub-sections below present the various issues that were considered in examining the impact of financial developments on Ghana's economic growth. Each sub-section addresses the key issues discussed in each of the chapters and deemed relevant in understating the study. The later sub-sections discuss the policy implications of the findings of this attained in the study as well as recommendations for future research.

12.2.1 Financial Developments in Ghana

This study performed a detailed analysis of the financial sector and financial developments that have occurred in Ghana over the period 1965—2016. Before the middle of the 1980s, Ghana's economy was characterised by policies that were described as interventionist and repressive; and this was deemed as consistent with the McKinnon-Shaw hypotheses. Central government controls and direct administrative manipulations in the financial sector resulted in an underdeveloped and inefficient financial system. Repressive financial policies in the form of interest rate ceilings retarded growth of private investment, discouraged savings culture and inhibited financial deepening and hence growth of the economy. After series of reforms initiated by the Financial Sector Adjustment Programme (FINSAP) in 1987, Ghana's financial sector transitioned from a financially shallow, repressed, interventionist-driven to a financially deepened and market oriented under a liberalised financial sector policy regime with some remarkable turnaround from what existed before a comprehensive chain of reforms were initiated in 1988.

Ghana's financial sector has for a long time been dominated by the banking sector and in recent times the financial sector has witnessed a sizeable increase in both banking and non-banking financial institutions (NBFIs). The financial sector development should imply efficient and effective financial resource mobilisation and allocation to prioritised real sector development. Financial sector reforms in Ghana became eminent as it was concluded that the financial system failed in effectively intermediating funds to growth enhancing real sectors of the economy such as agriculture, industrial (particularly, manufacturing).

12.2.2 Real Sector and Economic Growth in Ghana

This study undertook an analysis of the performance of the real sector of the economy of Ghana. The secondary review show that the initial industrial strategy policy of Ghana from the 1960s period was characterised by (i) emphasis on import substitution through high levels of effective protection, (ii) reliance on administrative controls rather than market mechanisms to determine incentives and resource allocation, and (iii) reliance on large scale, public sector investment as the lending edge in industrial development.

The policies adopted stimulated rapid growth of industrial output during the 1960s with manufacturing sub-sector accounting for a higher share in GDP. Total industrial output recorded steady increases but witnessed sharp declines beginning 1982 with manufacturing output also reducing impulsively for the same period. The declining trend in industrial output necessitated the development of sector specific policies intended to move the industrial sector from the downward trend towards a more robust sector.

Ghana's economy experienced lower and declining levels in industrial output especially in the early 1980s and this led to the introduction of the Economic Recovery Programme (ERP) in 1983. The programme, principally, sought to arrest and reverse over a decade of precipitous decline in all sectors of the economy, and to rehabilitate ruined productive and social infrastructure. These objectives were based on an industrial strategy that emphasises, *inter alia*, the introduction of measures that will attract entrepreneurs and investors, particularly, the private sector into all major sub-sectors with special emphasis on the development of appropriate technologies in the small and medium-scale manufacturing sector. These objectives and strategies were to be matched against the specific economic policy reforms initiated under the structural adjustment programme. The one of the major problems that confronted the manufacturing industries during the part of the year 1996 was identified as inadequate finance for working capital, rehabilitation, innovation and modernisation and high cost of credit resulting from tight monetary policies.

The performance of the industrial sector and all its sub-sectors showed improvements since 2005, albeit marginally, the manufacturing sub-sector has witnessed declining importance with mining and oil, and construction recording steady increases.

12.2.3 Literature Review

The reviewed show that financial development is measured by size, depth, access, efficiency and stability of a country's financial system (World Economic Forum, 2012). The extent of financial development of countries can be substantially influenced by factors such as institutions, openness policy, geography and technological innovations (Huang, 2010; Voghouei *et al.*, 2011). The conventional indicators that have been used as proxies for measuring financial development have been highlighted by (Huang, 2010) who observes that

there is no single measure for determining financial development. The review show that conventional measures of financial development include Liquid Liabilities (LL), Private Credit (PC), Commercial-Central Bank Ratio (CCBR), Overhead Cost (OC), Net Interest Margin (NIM), Stock Market Capitalisation (SMC), Total Value-Traded (TVT) and Turnover Ratio (TOR). Some studies use the principal component analysis (PCA) technique to produce new indices as measure of financial development.

The literature on the link between finance and growth largely attributes the foundation of the association to the seminal work of Schumpeter (1911). The proposition of Schumpeter, largely, emphasises that a well-developed financial system has the potential to catalyse technological innovation and economic growth through the provision of financial services and resources to those entrepreneurs who have the highest probability of successfully producing innovative products and processes. The postulations emphasise that financial markets channel funds to the most efficient investors that foster entrepreneurial ingenuity for economic growth (Kagochi *et al.*, 2013). Relatively early works that supported the Schumpeter's proposition include, Gurley and Shaw (1955), Goldsmith (1969) and Hicks (1969) who advanced that the development of a financial system is essential in stimulating economic growth. The overriding premise of the finance and growth association that stands out is that financial development improves resource allocation and also provides strong basis for better monitoring, ensures fewer information asymmetries and these promote productivity thereby leading to long-run economic growth (Kim *et al.*, 2012; Shen & Lee, 2006). In this regard, the development of the financial systems lower income countries could improve opportunities for growth of their economies.

Much inferences have been drawn from the fundamental propositions and further emphases have placed in literature that the financial system affects the real economy either through increases in saving rates and investment or efficiency improvements in capital accumulation (Beck *et al.*, 2000; Goldsmith, 1969; King & Levine, 1993a, 1993b; McKinnon, 1973; Neusser & Kugler, 1998; Shaw, 1973). This approach of financial developments stimulating the components of growth is referred to as supply-leading growth hypothesis with causality running financial development to economic growth. Nyasha and Odhiambo (2014) re-echo the position of the supply-leading hypothesis and indicate that financial systems transfer

resources from non-growth sectors to high-growth sectors and exerts a positive influence on capital by efficiently allocating new investments among alternative uses.

Secondly, in opposing the finance-leading growth hypothesis, other authors indicate that causality rather runs from economic growth to financial development. This stance has been referred to as demand-following hypothesis and argues that the expansion of an economy increases demand for financial services which, in turn, generates the creation of financial intermediaries (Demetriades & Hussein, 1996; Greenwood & Smith, 1997; Gurley & Shaw, 1967; Harrison *et al.*, 1999; Jung, 1986; Kuznets, 1955; Robinson, 1952; among others). The demand-following hypothesis suggests that when the economy expanding demand for financial services becomes higher and this results in expansion of the financial sector (Chow & Fung, 2013; Robinson, 1952). Accordingly, in the absence of economic progress, financial systems become less effective (Laeven *et al.*, 2015), offer ineffective, non-standard amidst declines in the quality of service (Beck *et al.*, 2010).

Third, the feedback hypothesis brings the supply-leading and demand-following hypotheses together (Demetriades & Hussein, 1996; Gupta, 1984; Khalifa Al-Yousif, 2002; Shan *et al.*, 2001). This interaction could exist even during the same period, which indicates that financial development contributes to economic growth, and this, in turn, induces further financial deepening. This theoretical proposition thus suggests that there exist a bi-directional causality association between financial development and economic growth in a way that financial markets develop in response to economic growth, and financial markets, in turn, generate feedback effects that propel real growth. Moreover, the direction of causality may alter with respect to the general development level of the economy (Patrick, 1966; Thornton, 1996).

Finally, there is the fourth position dubbed the irrelevance hypothesis (Topcu & Çoban, 2017) which asserts that financial development and economic growth are almost independent from each other. Accordingly, financial development does not have a particular role in economic growth, or the impact can be ignored as argued by Lucas (1988) and Stern (1989), respectively. This view is consistent with neo-classical theory, which assumes zero transaction costs and perfect information (Blum *et al.*, 2002).

Yet others hold the view that the direction of causality between financial development and economic growth changes over the course of development (Patrick, 1966). Calderon and Liu (2003) assert that financial development induce capital formation in the early stages of economic development but gradually diminishes and eventually becomes responsive to economic growth. Nyasha and Odhiambo (2014) observe that the supply-leading pattern precedes the demand-following pattern in different stages of economic development.

Against the background of the growing arguments that favourable financial systems are important for economic growth McKinnon (1973) and Shaw (1973) put up an argument in support of more liberalised financial systems and strongly recommended against what they described as repressed financial sector. They pointed out that financial repression is a major source of weakening and collapsing financial sectors, which in turn hampers economic growth. These conclusions prompted the recommendations, especially from the IMF and World Bank, for the introduction of financial reforms in economies whose financial systems were deemed as repressed and weak. Repressive financial policies in the form of interest rate ceilings inhibited growth of private investment, discouraged savings culture and inhibited financial deepening and hence restricted growth of the economy (Antwi-Asare & Addison, 2000; Epstein & Heintz, 2006; Senbet & Otchere, 2005).

Many developing countries have made attempts to structure their economies through reforms and strategic policies to make the financial sector a revolving instrument for growth (Aryeetey *et al.*, 1997; Nissanke & Aryeetey, 1998). The overall impact on economic growth of the failed financial policies in the SSA region has been well documented (Aryeetey *et al.*, 2000; Bawumia, 2010). Real GDP growth rates within the SSA countries were relatively marginal between 1961 and 1980.

The literature also indicated that there is a growing debate about the right kind and level of financial development that is optimal for economic growth. Innovations and technological progress of the financial system can promote growth but there is the need to exercise caution as

too much innovation can have adverse consequences for the overall economy (Beck *et al.*, 2012).

12.2.4 Method of Investigation

This analysis of the impact of financial development on economic growth is based on time series data on financial sector development indicators and relevant macro-economic and economic growth variables on Ghana. The methodology derives from approaches taken by other studies (Adu *et al.*, 2013; Arcand *et al.*, 2012; Beck *et al.*, 2000; Ductor & Grechyna, 2015; Huang, 2010; King & Levine, 1993b, 1993a, Levine, 1997, 2004; Loayza & Ranciere, 2005; Naceur *et al.*, 2017; Ofori-Abebrese *et al.*, 2017; Quartey, 2005; UNCTAD & UNIDO, 2011). These approaches are useful in determining the finance-growth nexus and as such thus provide the necessary condition for examining the impact of financial development on real sectors of the economy. The analysis also assesses the link between industrial sector and financial development to determine the extent to which financial reforms in Ghana has affected economic growth. Fundamentally, the methodological approach is premised on the pioneering proposition of Schumpeter (1911), and subsequently McKinnon (1973) and Shaw (1973).

The thesis further follows a deductive approach, starting with a review of existing theoretical and empirical literature, mainly derived from the theory of endogenous growth model of Solow (1956).

The analysis starts with examining the theoretical and empirical foundations of financial development and growth in Ghana. The analyses in Chapters Six, Seven and Eight are undertaken to determine the major financial drivers of capital accumulation, industrial sector advancement, manufacturing productivity and economic growth. These factors are financial and macro-economic in nature. The analysis of the impact of the financial development on capital accumulation, industrial output growth, manufacturing productivity and economic growth are estimated using the two stage linear regression estimation techniques within the GMM estimation technique. The study examined the short-run and long-run impacts of financial development on economic growth indicators by employing the Vector Autoregressive Regression (VAR) within the Autoregressive Distributed Lag (ARDL) approach. The study

further assesses the direction of causality between financial development and economic growth indicators using the Engle-Granger causality testing approach with VAR models.

The maximising behaviour and optimal financial development thresholds were estimated from a joint analysis of the growth indicators and macro-economic variables that affect the depth of financial development and the reaction of economic policy to changes in financial sector. The unrestrictive VAR model is applied to examine the reaction of economic growth to variations in the financial development indicators and to assess the sensitivity of economic growth to financial development and macro-economic shocks. The analysis indicates the stimulation of an economic reaction function for Ghana. The results are expressed in terms of impulse response functions and variance decomposition. In view of the fact that economic decision is determined by monetary policy, the response of economic policy to changes in economic growth is also analysed. This is achieved by estimating the economic reaction function, with lagged financial development indicators and output gap as explanatory variables.

The reaction of economic growth and the real sector, particularly industrial and manufacturing, to shocks in financial sector development indicators and other macro-economic variables is also analysed using the Bayesian Vector Auto Regression (VAR) methodology. This analysis entails simulating economic and industrial value-added reaction function for Ghana. The results are expressed in terms of impulse response functions and variance decomposition.

12.2.5 Main Findings on Financial Developments and Capital Accumulation

The study showed that domestic credit to private sector has a positive association with capital formation in Ghana while total credit offered by the financial sector, broad money supply and financial sector deposits show negative relationships with capital accumulation. The results thus imply that, the nature and extent of association between financial development and capital accumulation is sensitive to the type of financial development indicator used in the estimation. These notwithstanding, the findings suggest that domestic credit provided to the private sector play a dominating role in influencing the extent of capital formation. The results point out that overall impact of financial development on capital accumulation in Ghana is positive and statistically significant at the 5.0 per cent level, both in the short- and long-runs. However, there is a strong indication that total credit offered by the financial sector significantly hampers

growth of investment in Ghana, with the adverse impact being relatively higher in the post-reform era.

With regards to the direction of causality, the results show that there exit a uni-directional causal relationship between financial development and capital formation. The causality runs from capital formation to financial development suggestion that it rather improvements in investment and for that matter capital formation that is resulting in growth of the financial sector in Ghana. As a source of growth, the results show that capital accumulation is causing economic growth in Ghana and not the other way round.

The study thus concludes that there is a uni-directional causal link between the financial development and capital accumulation in Ghana. However the causality is running from capital formation to financial development and not vice versa. The results proved that financial development positively influences capital formation significantly. The findings imply that, as a source of growth, capital accumulation contributes to economic growth in Ghana.

12.2.6 Main Findings on Financial Developments and Industrial Output Growth

The results showed that domestic credit to private sector and financial sector deposits have statistically significant positive associations with industrial productivity growth. This positive association between financial development and industrial output growth was confirmed by the financial development indices 1 and 2 as the FDIndex1 showed a statistically significant positive association. The results, however, showed that the impact of the financial development on industrial output within the context of the structural reforms has not been significant. The results further indicated that the impact of the financial sector reforms on industrial growth in Ghana has been negative although this effect was statistically insignificant. But within the context of structural reforms in Ghana, the results indicate that change in the structure of the economy has resulted in declines in industrial productivity. With regards to the other control variables, trade openness and government spending proved to have statistically significant positive associations with industrial sector growth under the GMM estimation technique.

The cointegration results showed that in both the short- and the long-run, financial development demonstrate a positive association with industrial sector growth. The results

however suggested that financial development beyond a certain point can lead negative growth of the industrial sector. The results also confirmed that the level of trade openness and government spending are positively associated with industrial sector growth in Ghana.

The Engle-Granger causality test indicated that there exist a bi-directional causal relationship between financial development and industrial sector growth in Ghana. The study thus concluded that there exists a causal link between financial development and industrial sector growth in Ghana and the two sectors promote the growth of each other.

The study, accordingly, concluded that financial development positively influences industrial sector growth in Ghana significantly and that financial developments in Ghana at some point resulted in adverse impacts on industry sector growth. The findings imply that, as a source of growth, the industrial sector enhances economic growth in Ghana.

12.2.7 Main Findings on Financial Developments and Manufacturing Productivity Growth

The study showed that that domestic credit to private sector, broad money supply and financial sector deposits have statistically insignificant positive associations with manufacturing productivity growth within the perspective of financial sector reforms. However, domestic credit to private sector showed positive statistical significance in the structural break period within the context of the structural reforms. The statistically insignificant positive association between financial development and manufacturing productivity was confirmed by the financial development index 1 which also indicated a statistically insignificant positive relationship. On the other hand, total domestic credit provided by the financial sector also showed a statistically insignificant negative association with manufacturing productivity growth. The negative impact of total credit manifested in the financial development index two as the FDIndex2 showed a statistically significant negative association both under financial and structural reforms assessments. The results thus give the indication that though domestic credit to private sector significantly contribute positively to manufacturing productivity, the adverse effect of the overall credit provided by the financial sector dampen manufacturing productivity growth in Ghana substantially. The results suggested that the impact of financial sector reforms on manufacturing productivity growth in Ghana has been negative. With regards to the other

control variables, trade openness and government spending proved to have statistically significant positive associations with manufacturing productivity growth. The results showed further that increases in the monetary policy rate strongly inversely affect manufacturing production.

The cointegration results showed that in both the short- and the long-run, financial development confirmed the positive but statically insignificant association with manufacturing productivity growth. The results, however, suggested that inefficiencies in the financial sector cause financial development dampen manufacturing productivity at certain point. The results also confirmed that the level of trade openness and government spending are positively associated with manufacturing growth in Ghana.

The study also showed that there is a uni-directional causal relationship between financial development and manufacturing productivity growth in Ghana, with manufacturing productivity improvements causing growth of the financial sector. The study therefore rejected the hypothesis that there exists no causal link between financial development and manufacturing productivity growth.

The study concluded that financial developments positively influence manufacturing productivity growth in Ghana although the impact is not significant. The findings imply that, as a source of growth, the manufacturing sub-sector inadequately enhances economic growth in Ghana.

12.2.8 Main Findings on Financial Developments and Economic Growth in Ghana

The results show that there are all the financial development indicators within the individual regression framework show statistically significant positive associations with economic growth in Ghana. The positive impact of financial development in Ghana has been stronger in the post-reform era period of 1984 to 2016.

The results further indicated that gross fixed capital formation, industrial value-added and the monetary policy rate had negative association with economic growth. The impact of gross capital formation in the post-reform era is however positive though statistically insignificant.

The negative impact of industrial growth on economic growth is far lower in the 1984-2016 period. The extent of trade openness showed positive but statistically insignificant association with economic growth within the 1965 to 2016 period. The results however indicated that from 1984 to 2016, the extent of trade openness has had a statistically significant negative impact on Ghana's economic growth. Government expenditure showed a consistent statistically significant positive association with economic growth.

The study showed that there is causal association running from domestic private credit to economic growth. Similarly, the results showed that there is a causal relationship running from economic growth to total credit and broad money supply. These findings suggest uni-directional causal associations between the three financial development indicators and economic growth. Financial sector deposits and economic growth suggested the existence of a bi-directional association between them. The findings further indicated the presence of a uni-directional association between both investment and industrial output with growth running from the two sources of growth to economic growth.

The major policy implication from the analysis is the need continue to monitor and sustain development of the financial sector policies and improve the efficiency and allocation of credit to the private sector businesses since the results show that the financial development indicators as positively associated with Ghana's economic growth. In terms of monetary policy, the GoG should work to minimise the monetary policy rate since it is negatively associated with economic growth.

12.2.9 Main Findings on Reaction of Economic Growth to Financial Development Dynamics in Ghana

The results from the impulse response function showed that in the initial to medium term, shocks to domestic credit to private sector, broad money supply and financial sector deposits increase the economic growth in Ghana. As a source of growth, the shocks to industrial output increases economic growth while in the initial to medium term, capital accumulation decreases economic growth. The results from the impulse response function further showed that in the initial to medium term, shocks to domestic credit to private sector and financial sector deposits decrease capital accumulation in Ghana. Shocks to industrial output substantially increase

capital accumulation in the initial to medium term. The results from the impulse response function also indicate that in the initial to medium term, shocks to domestic credit to private sector increase industrial output productivity while in the initial to medium term, shocks in financial sector deposits, total credit and broad money supply decrease industrial output. Shocks to capital accumulation substantially decreases industrial output in the initial to medium term.

The results from the variance decomposition of economic growth show that approximately 18.00 per cent, 4.30 per cent, 6.53 per cent and 7.55 per cent of the variance in economic growth is explained by the respective changes in the ratios of domestic credit to the private sector, total credit, broad money supply and financial sector deposits. Industrial sector growth also makes a comparatively greater contribution to the variations in economic growth. The results from the variance decomposition of economic growth further showed that the relative contribution of the financial development indicators to capital formation minimal as compared to that of industrial output and trade openness. Private credit, total credit, broad money supply respectively contribute 2.84 per cent, 2.27 per cent, 5.24 per cent and 3.13 per cent to the variation in capital formation. Industrial output and trade openness respectively contribute 27.00 per cent and 20.00 per cent to the variations in capital accumulation. Regarding industrial output changes, private credit, total credit, broad money supply respectively contribute 2.28 per cent, 1.90 per cent, 1.25 per cent and 7.13 per cent to the variation in industrial output. The decompositions analysis exposed that inflation seems to account for a greater variation in the variations in the industrial sector output.

The major policy implication from the analysis is that private sector credit shows stronger stimulation in impacting economic growth as well as the sources of growth indicators. There is therefore the need for the Government of Ghana to work to improve accessibility to credit to businesses in Ghana. Also, the results showed that the industrial sector is a greater contributor and cause of substantial variation in the economic growth of Ghana and accordingly there is the need for government to create the enabling business environment for firms to succeed.

12.2.10 Main Findings on Optimal Financial Development in Ghana

The results depict a concave or an inverted U-shaped relationship between economic growth rates and the domestic credit to private sector-to-GDP and total credit-to-GDP ratios. The results further give the indication of the existence of a convex relationship between economic growth and both broad money and financial sector deposits. The findings indicated that beyond 28.00 per cent total credit-to-GDP ratio, Ghana's economic growth rates record declines. This threshold point for total credit is consistent with the stabilising position for the total credit-to-GDP ratio. The results indicate that approximately 19.00 per cent and 10.00 per cent minimum thresholds for broad money supply and financial sector deposits. Beyond these thresholds, increases in the respective ratios resulted in higher economic growth. This estimated thresholds for private credit-to-GDP and total credit-to-GDP ratios are higher than the respective averages of 8.85 per cent and 26.87 per cent observed for the period 1965 to 2016. However, these rates are lower than the stabilising ratios of 34.00 per cent and 28.00 per cent estimated for the respective indicators. Since, private credit shows a comparatively, robust positive impact on growth, the economic implication is that there is the need for policy makers in Ghana to work towards improving credit to private sector businesses in the economy towards the stabilising ratio and on the other hand keep total credit within the limit of 28.00 per cent. It is relevant to constantly monitor and integrate financial stability management as part of the broader financial development process.

The U-shaped relationship between total credit and economic growth is consistent the views of Cihak *et al.* (2012) that countries where banks' lending standards become very loose, with banks providing loans too easily, without proper risk management and loan monitoring. Chihak et. al. (2012) argue that on the surface, one could observe the rapid growth as a sign of deepening and increased access to finance. The quite recent situation in Ghana (June, 2018), where a substantial number of banks have experienced financial distress and the Bank of Ghana (BoG) have had to merge some of the banks with the objective to make them efficient, give credence to the findings that financial systems in Ghana may be inefficient. The findings are, therefore, consistent with the developments in Ghana's financial sector. According to the BoG, the ratio of non-performing loans on the balance sheet of banks in Ghana have been higher in recent times (Bank of Ghana, 2017, 2018). Also, seven banks have collapsed in

Ghana between March, 2017 and August, 2018 as a result engagement in the financing of either too risky and bad business projects or poor corporate governance (Bank of Ghana, 2018).

The complete U-shaped relationship between total credit offered by the financial system and economic growth and the rising NPLs ratio imply that the expansion of the financial system in Ghana have positioned financial institutions to embark on competition and thus resulted the financing high risk or unproductive investments that have led to possible drains on growth. This conclusion is consistent with the observation of Cihak *et al.* (2012) and further supports the assertion by Kaminsky and Reinhart (1999) that rapid credit growth could increase macro-economic volatility or lead to financial and banking crises which, in turn, may have a negative effect on growth.

12.3 Conclusions

The sub-sections below present the conclusions drawn from the findings on the various issues that were considered in examining the impact of financial development on economic growth in Ghana. The conclusions are based on the findings of the study and have been categorised under general and specific sub-sections.

12.3.1 General Conclusions

The findings show that there are all the financial development indicators as measured by private credit to GDP; total credit offered by the financial sector to GDP; broad money supply to GDP and financial sector deposits to GDP, show statistically significant positive associations with economic growth in Ghana. The overall impact of the financial development on economic growth indicates a statistically significant positive association.

The results show that there is both short- and long-run strong statistically significant positive relationship between domestic credit to private sector and economic growth in Ghana. The results further indicate that there exists a statistically insignificant association between total credit offered by the financial sector and economic growth in Ghana. However, the findings show that broad money supply and financial sector deposits both indicate statistically insignificant negative association with Ghana's economic growth. The positive relationship

between domestic to private sector and economic growth leads to the conclusion that Ghana's economy can growth substantially with increased credit to the private sector. The growth in the size of the financial sector credit offered in the economy does not guarantee significant economic growth but channelling financial resources to the private business and entrepreneurs will potentially grow Ghana's economy. Private credit benefits the economy both in the short and long-terms and managers of the economy should consider ways of ensuring efficient transfer of financial resources towards private businesses and projects.

The results show that there is a long-run statistically significant positive relationship between capital accumulation (investment) and economic growth in Ghana. The long-run results gives the indication that both the negative and positive but statistically insignificant relationship between capital accumulation and economic growth are only temporary and a short-run phenomenon. The results from the variance decomposition of economic growth further showed that the relative contribution of the financial development indicators to capital formation minimal as compared to that of industrial output and trade openness.

The results show a statistically significant negative association between industrial sector productivity and economic growth in Ghana. The findings imply that industrial sector growth is a drag on the Ghanaian economy. It is concluded that the various failed attempts by Ghana to industrialise its economy has dampened economic growth. The persistent statistically significant negative impact of industrial sector growth on economic growth is not only a short-run phenomena and the declining trend in Ghana's industrial sector has the potential to draw economic growth. The results from the variance decomposition of economic growth further showed that the relative contribution of the financial development indicators to industrial development is minimal as compared to that of trade openness even though the industrial sector growth makes a comparatively greater contribution to the variations in economic growth.

The results show a statistically significant negative association between trade openness and long-run economic growth though trade positively contributes to growth in short-run in Ghana. The findings imply that though trade liberalisation may be important for growth in the short-

term, growth instigated by high rate of importation weaken the prospects and foundations of economic growth in the long-term. Ghana's economy is highly dependent on importation coupled with relatively lower levels of exports. As evident from the variance decomposition of economic growth, the relative contribution of the financial development indicators to trade is higher as compared to that of capital formation and industrial sector. This implies that improvements in the financial sector may also be enhancing trade. It is thus concluded that Ghana risks registering lower growth, high unemployment and unstable growth if the economy continues to register lower manufacturing productivity. Government expenditure showed a consistent statistically significant positive association with economic growth. This implies that if government increases its expenditure within the local economy it may substantially promote growth in Ghana.

Growth in broad money and financial sector deposits were found to be negatively associated with economic growth in the short- and long-runs. The negative association gives the indication that though financial developments are good for growth, at some point, to much or inefficient financial intermediation can dampen economic growth.

The study showed that there is causal association running from domestic private credit to economic growth. Similarly, the results showed that there is a causal relationship running from economic growth to total credit and broad money supply. These findings suggest uni-directional causal associations between the three financial development indicators and economic growth. Financial sector deposits and economic growth suggested the existence of a bi-directional association between financial development and growth in Ghana. The findings further indicated the presence of a uni-directional association between both investment and industrial output with growth running from the two sources of growth to economic growth.

The findings of the study point to a need for the Government of Ghana and enterprises to take advantage of the improving financial development indicators as a means of facilitating growth of the real sector. The concave or inverted U-shaped relationship between domestic credit and growth suggests that government must monitor the development trends between finance and growth of the economy as well as the responsiveness of the real sector to financial

development shocks in order to ensure sustained economic growth rates in the medium to long-term. The study also highlights the need for counter-cyclical macro-economic policies and keep the monetary policy and inflation rates emanating from frequent changes in the business cycle, and to minimise their negative impacts on real sector growth as well as economic growth. Generally, the findings from this study can assist in informing the policies to improve the impact of financial developments on real sector growth in Ghana to greatly enhance sustainable economic growth.

12.3.2 Specific Conclusions

This section comprises of specific conclusion reached by the study in view of the objectives the study sought to achieve.

The study showed that financial development has a positive effect on the economic growth and with regards to the finance-growth association in Ghana, there is a bi-directional causal link. The study rejects the null hypothesis that financial development does not positively impact on economic growth in Ghana. It can thus be concluded that the development of the financial sector of Ghana has contributed to the economic growth and similarly expansion in the economy has also contributed to the financial development in Ghana. The study thus rejects the null hypothesis that there is no causal relationship between financial development and economic growth and vice versa, and concludes that there exists a bi-directional causal association between finance and economic growth in Ghana. Improvements in financial intermediation through increased financial depth and access to credit has contributed significantly to economic growth in Ghana. The study further found that there is a long-run relationship between finance and economic growth in Ghana. The study does rejects the null hypothesis, accepts the alternative and concludes that there is a long-run relationship between financial development and economic growth in Ghana.

The study found that financial reforms had a significant effect on economic growth. This realisation leads to the conclusion that financial liberalisation policies including the removal of restrictions had a substantial effect on financial development and consequently economic growth. The study however found that structural reforms that shifted the focus of Ghana's

development from the implementation of industrialisation-driven policies resulted in declining growth of the economy and the impact of the structural reforms showed to be negative. The study thus concludes that the structural reforms that saw the withdrawal of credit controls adversely affected the manufacturing sector and this ultimately dampened economic growth in Ghana.

The findings on the relationship between financial development and capital accumulation revealed a positive association between the two. The study thus rejects the null hypothesis that financial development does not positively impact on capital accumulation in Ghana. The study further showed a strong uni-directional causal association between financial development and capital accumulation with growth running from increased investment (capital accumulation) to finance. It is thus concluded that improvements in capital formation of investment in Ghana is rather enhancing the development of the financial sector in Ghana. The study thus rejects the null hypothesis that there is no causal relationship between financial development and capital accumulation in Ghana, and concludes that there is uni-directional causal association between finance and capital accumulation. It can be concluded from this finding that the financial intermediation in Ghana is not significantly influencing investments and there is the need to increase financial services in terms of access to credit to the private sector. It can be inferred that financial liberalisation policies including the removal of credit restrictions and interest rate controls may not have had substantial effect capital accumulation in Ghana. The study further found that there is a long-run relationship between finance and capital accumulation in Ghana. The study does reject the null hypothesis, accepts the alternative and concludes that there is a long-run relationship between capital accumulation and financial development in Ghana.

The study found that structural and financial reforms had a significant positive impact on capital formation in Ghana. The finding implies that improve financial intermediation in Ghana is substantially facilitating investment projects through enhanced financial service provision. The study further concludes that the structural reforms in Ghana that saw the opening up of Ghana’s economy has led to increased investment in Ghana.

Regarding the relationship between financial development and industrial productivity growth, the findings show positive association in the finance-industry growth nexus. The study thus rejects the null hypothesis that financial development does not positively impact on industrial sector growth in Ghana. The study further showed a strong bi-directional causal association between financial development and industrial productivity growth. It can thus be concluded that the development of the financial sector of Ghana has contributed to the industrial productivity growth and in the same way the progress in the industrial sector has also contributed to the financial development in Ghana. The study thus rejects the null hypothesis that there is no causal relationship between financial development and industrial productivity growth in Ghana, and concludes that there is bi-directional causal association between finance and industry growth. It can be concluded from this finding that the financial intermediation in Ghana has enhanced economic activities in the industrial sector and relevant to ensure efficiency in the financial sector in order to promote growth of industries in Ghana through there is the need to increase access to financial services to the sector and further facilitate resourceful allocation of credit to the private sector. It can be inferred that financial liberalisation policies including the removal of credit restrictions and interest rate controls have had much effect industrial growth in Ghana. Likewise, the expansion in the industrial sector growth particularly, the mining and oil sub-sector has also caused growth of the financial sector in Ghana. The study further found that there is a long-run relationship between finance and industrial growth in Ghana. The study does accept the alternative hypothesis and concludes that there is a long-run relationship between financial development and industrial productivity growth in Ghana.

The study found that reforms in the financial sector, that was primarily in the form of financial liberalisation and removal of credit controls and interest rate restrictions, did not significantly affect industrial growth in Ghana. Rather the financial reforms negatively impacted on the industrial sector, to a larger extent. It is concluded that the removal of credit controls and interest rate restrictions, among other financial liberalisation policies, led to a slowdown in the industrial productivity growth. Similarly, structural reforms that sought to limit the state's involvement in the industrial development agenda seem to have negatively impacted industrial growth in Ghana, substantially.

The findings on the effect of finance on manufacturing lead to the conclusion that domestic credit has a positive significant effect on manufacturing output growth. The general trend, however, indicate that financial development has a statistically significant negative impact on manufacturing growth in Ghana. The study thus fails to reject the null hypothesis that financial development does not positively impact on manufacturing output growth in Ghana. The results show that there is a causal link between financial development and manufacturing output with growth running from manufacturing to private sector credit. On the other hand, the results showed that another causal link between finance and manufacturing output with growth running from broad money supply to manufacturing sector growth. The study does conclude that there is a bi-directional causal association between financial development and manufacturing output growth in Ghana. The study thus rejects the null hypothesis that there is no causal relationship between financial development and manufacturing productivity growth in Ghana. It can thus be concluded that the development of the financial sector of Ghana has contributed to the manufacturing growth particularly, as a result of growth in private credit. Total credit offered in the Ghanaian economy is dampening growth of the manufacturing sector although the impact is not statistically significant. It can be concluded from this finding that the financial intermediation in Ghana has the potential to boost manufacturing sector growth and there is the need to facilitate processes and policies that ensure guaranteed access to credit by manufacturing industries in order to promote growth. The study further found that there is a long-run relationship between finance and manufacturing growth in Ghana. The study does accept the alternative hypothesis and concludes that there is a long-run relationship between financial development and manufacturing productivity growth in Ghana.

The findings show robustly that financial sector reforms in Ghana strongly affected the manufacturing sector negatively. It is thus concluded that the liberalisation policies that in the form of financial liberalisation that saw the removal of credit controls and interest rate restrictions, adversely affected growth of the manufacturing sector in Ghana. The results showed that structural reforms that have occurred in have not have significantly affected the manufacturing sector. These reforms sought to limit the state's involvement in the manufacturing productivity by drawing in the private sector investment.

It can be inferred that financial liberalisation policies including the removal of credit restrictions and interest rate controls have had much effect industrial growth in Ghana. Likewise, the expansion in the industrial sector growth particularly, the mining and oil sub-sector has also caused growth of the financial sector in Ghana.

12.4 Policy Recommendations

(i) Ensuring the efficiency in total credit offered by the financial system

The results indicated that total credit offered by the financial sector is significantly hampering capital accumulation in Ghana. The negative association may result from inefficiencies in the financial system or may be a reflection of bad investment projects. The further found that the inverse association between the total size of credit offered in the economy and capital accumulation has the potential to dampen the overall impact of financial development on investment. The study recommends that the government of Ghana takes steps to address inefficiencies in the financial system by examining and ensuring efficiency in the credit allocation offered by the financial system. Additionally, attention must be paid the provide financing by the financial sector institutions. The evidence of high non-performing loans (NPLs) is an indication of the existence of inefficiencies in the financial system and/or bad investment projects within the economy.

Ghana's bank is asymptotic of small banks taking big risks due to perhaps rising NPLs in the banking sector. As noted earlier, the size of banks affects their capability for risk diversification. Small banks with very limited assets cannot afford to make large loans; bear costs of effective monitoring or in offering post-credit support services; otherwise they would have to bear much higher risk resulting from concentrated investments. Thus small banks can only make small loans and manage relatively smaller business portfolios. Large banks have more capability to make large loans while achieving better risk diversification. Since the transaction cost for making a loan is, at least to some degree, independent of loan size, large banks understandably prefer making loans to large firms rather than small ones for transaction cost consideration.

(ii) Tighter Risk Management Practices

The findings show that financial development is both positively and negatively affecting productivity growth in Ghana significantly as observed by IMF (2011). The results give indication that while total financial sector deposits significantly promote capital accumulation positively, total credit offered by the financial sector rather negatively affects investment significantly. The development implies that the existence of inefficiencies in the financial system of Ghana is hampering investment. The study recommends effective regulation for proper credit allocation management in the financial sector. The study further recommends that financial intermediary institutions be encouraged to provide tighter risk management practices as well as post-credit allocation monitoring services, particularly, in the financing of medium to long-term investment projects in Ghana.

(iii) Facilitation of Credit and Financing of Industrial Projects

The findings indicate the financial development is positively influencing industrial sector growth in Ghana. The findings further show that credit to the private sector and the total financial sector deposits positively impact on industrial productivity growth in Ghana significantly. The study, however, found that there is a consistent decline in the contribution of the manufacturing sub-sector of industry amidst increasing importance of the oil and gas component. This revelation implies that improvement in the financial sector may be facilitating growth of the oil and gas sub-sector while financial development is not significantly influencing manufacturing industry growth in Ghana. The development further implies that financial development is not largely promoting growth that is induced by manufacturing sub-sector which is noted to cause substantial employment. The study recommends that the government of Ghana encourages and facilitates the allocation of credit to industrial companies and financing of industrial projects through an industrial sector-specific financing policy.

(iv) Credit Extension and Post-Credit Management Services for Manufacturing Industries

The findings indicate that though financial development is positive for manufacturing output growth, the impact is not significant. The findings, however, give indication that financial development in Ghana is significantly impacting on manufacturing productivity growth

negatively. Domestic credit to the private sector shows strong positive effect on manufacturing growth but the inefficiencies in the financial system and trends in the overall credit offered by the financial sector are hampering manufacturing growth. The study recommends that more credit be allocated manufacturing industries through specific policies that influence the extension of credit to manufacturing industries as well as the introduction of post-credit management services.

(v) Efficient Credit Allocation

The findings indicate that financial development indicators are strongly contributing to Ghana's economic growth positively. The study shows that private credit, total credit, broad money supply and total financial sector deposits have positively impacted on economic growth in Ghana. The study, however, shows that credit to private sector shows stronger positive persistence in the long-term growth of the Ghanaian economy. These findings imply that the government of Ghana needs to continue to monitor and sustain development of the financial sector policies and improve the efficiency and allocation of credit to the private sector businesses since the results show that the financial development indicators as positively associated with Ghana's economic growth.

Also, the findings suggest the existence of inefficiencies in the financial system in Ghana. This may be as a result of the financing of high risk or poor investments within the economy by the financial system. The study recommends the introduction of effective regulatory, supervision and monitoring systems to ensure efficiencies of the financial sector of Ghana. To this end, the study recommends that economic mangers undertake continuous review of existing regulator, promote efficient corporate governance, supervisory and monitoring policies that are proving ineffective and causing inefficiencies in the financial system of Ghana.

(vi) Promotion of Investment

The findings indicate that capital accumulation shows strong positive effect on economic growth in Ghana. The results show that improved investment in Ghanaian economy has contributed to the economic growth the Ghana significantly. The study thus recommends that GoG should continue to implement policies that attract investment or capital flow to Ghana.

There is the need for Ghana to promote access to credit by the private sector in order to increase the rate of investments and expand the productive capacities of industries to allow for improved production and growth. The study recommends that more credit is offered to the private sector through well-conceived deliberate schemes, albeit within a tight regulatory and supervisory framework. It may be relevant for the Ghana government to work to improve capital inflow from the international markets in order to boost credit allocation and promote investment.

12.5 Limitations of the Study

The current study analysed the impact of financial developments on economic growth using national data on Ghana and did not consider the situation in other countries in the SSA region. It is worth noting that other countries of the SSA region equally implemented financial and structural reforms and a broad examination of the other countries may provide clearer understanding of the impact of finance on growth.

The study used aggregate data in estimating the models and as a result has broad implications and may likely omit firm specific associations with regards to the effects of financial intermediation on their growth.

12.6 Areas for Future Research

The current study focused on the impact financial development on real sector indicators (capital accumulation and industrial growth) as well as economic growth in Ghana. Ghana and other countries of the SSA region have over the last four decades implemented near common structural and financial policy reforms. It may be important for future research to extent the study of examining the impact of financial development on the real sectors of the economies of other countries of the SSA region.

Secondly, the study used aggregate national values in examining the association between financial development and the components of economic growth. This data and estimation approach omits the effects of financial development on specific firms. Future research can thus

focus on measuring the impact of finance on growth of the real sector using firm level data from Ghana or any other country of the SSA region.

In terms of the impact on finance on real sector growth, this study used capital accumulation (proxied by gross capital formation to GDP ratio) and industrial productivity growth (also proxied by industry value-added to GDP ratio) in the estimations. Other studies can use other real sector indicators.

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ANNEXURES

Annexure 1: Banking System Balance Sheet (1993-2012)

Table A1: Banking System Balance Sheet (1993-2012)

Year	Loans/Total Assets	T-Bills /Total Assets	Demand Dep./Total Deposits	Savings Dep./Total Deposits	Time Dep./Total Deposits	Total Assets /GDP
1993	0.16	0.38	0.48	0.40	0.12	0.31
1994	0.17	0.32	0.57	0.31	0.12	0.33
1995	0.18	0.40	0.63	0.21	0.16	0.25
1996	0.23	0.27	0.65	0.19	0.16	0.25
1997	0.29	0.31	0.61	0.24	0.15	0.26
1998	0.33	0.35	0.59	0.22	0.19	0.27
1999	0.36	0.31	0.61	0.21	0.18	0.35
2000	0.40	0.24	0.67	0.18	0.16	0.44
2001	0.38	0.28	0.62	0.20	0.18	0.38
2002	0.30	0.32	0.64	0.22	0.13	0.40
2003	0.35	0.28	0.61	0.21	0.16	0.41
2004	0.36	0.28	0.61	0.21	0.14	0.39
2005	0.43	0.27	0.61	0.22	0.17	0.38
2006	0.45	0.23	0.59	0.22	0.19	0.45
2007	0.50	0.18	0.57	0.18	0.25	0.56
2008	0.52	0.14	0.58	0.15	0.56	0.66

Source: Bank of Ghana.

Annexure 2: Selected Regression Estimation Results

Annexure 2.1: Impact of Domestic Private Credit on Economic Growth, 1965-1983.

Dependent Variable: LNGDPGC
Method: Generalised Method of Moments
Date: 01/09/18 Time: 11:26
Sample: 1965 -1983
Included observations: 19
Linear estimation with 1 weight update
Estimation weighting matrix: HAC (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)
Standard errors & covariance computed using estimation weighting matrix
Instrument specification: C LNDCPS LNGCF LNIDVA LNTOPEN LNGE LNMPR LNINF LNPGR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.840584	0.571227	10.22463	0.0000
LNDCPS	**0.115155**	0.041792	2.755422	**0.0203**
LNGCF	0.036414	0.067775	0.537281	0.6028
LNIDVA	-0.550520	0.188212	-2.924999	0.0152
LNTOPEN	0.389489	0.141526	2.752063	0.0204
LNGE	0.162354	0.135357	1.199451	0.2580
LNMPR	0.091182	0.124323	0.733433	0.4801
LNINF	0.010578	0.021311	0.496350	0.6304
LNPGR	0.103944	0.076062	1.366560	0.2017

R-squared	0.909222	Mean dependent var	6.575204
Adjusted R-squared	0.836600	S.D. dependent var	0.125017
S.E. of regression	0.050535	Sum squared resid	0.025538
Durbin-Watson stat	2.068236	J-statistic	0.000000
Instrument rank	9		

Annexure 2.2: Impact of Domestic Private Credit on Economic Growth, 1984-2016.

Dependent Variable: LNGDPGC
Method: Generalised Method of Moments
Date: 01/09/18 Time: 11:33
Sample: 1984 - 2016
Included observations: 33
Linear estimation with 1 weight update
Estimation weighting matrix: HAC (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)
Standard errors & covariance computed using estimation weighting matrix
Instrument specification: C LNDCPS LNGCF LNIDVA LNTOPEN LNGE LNMPR LNINF LNPGR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.032463	0.623123	12.89065	0.0000
LNDCPS	**0.272083**	0.061960	4.391280	**0.0002**
LNGCF	0.010553	0.090032	0.117211	0.9077
LNIDVA	-0.061912	0.112113	-0.552232	0.5859
LNTOPEN	-0.296252	0.098261	-3.014933	0.0060
LNGE	0.390636	0.074803	5.222183	0.0000
LNMPR	-0.168984	0.050040	-3.376949	0.0025
LNINF	0.060438	0.019893	3.038208	0.0057
LNPGR	-1.236766	0.367886	-3.361822	0.0026

R-squared	0.953462	Mean dependent var	6.655349
Adjusted R-squared	0.937950	S.D. dependent var	0.257967
S.E. of regression	0.064259	Sum squared resid	0.099102
Durbin-Watson stat	1.435108	J-statistic	1.78E-40
Instrument rank	9		

Annexure 2.3: Impact of Financial Development (FDindex1) on Economic Growth, 1965-1983.

Dependent Variable: LNGDPGC
Method: Generalised Method of Moments
Date: 01/09/18 Time: 11:39
Sample: 1965 -1983
Included observations: 19
Linear estimation with 1 weight update
Estimation weighting matrix: HAC (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)
Standard errors & covariance computed using estimation weighting matrix
Instrument specification: C FDINDEX1 LNGCF LNIDVA LNTOPEN LNGE LNMPR LNINF LNPGR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.183601	0.688320	8.983609	0.0000
FDINDEX1	**0.032648**	0.014872	2.195186	**0.0529**
LNGCF	0.034210	0.084612	0.404320	0.6945
LNIDVA	-0.558632	0.176171	-3.170964	0.0100
LNTOPEN	0.398786	0.119776	3.329423	0.0076
LNGE	0.179427	0.122622	1.463260	0.1741
LNMPR	0.015060	0.123328	0.122109	0.9052
LNINF	-0.001887	0.020477	-0.092126	0.9284
LNPGR	0.155792	0.085814	1.815473	0.0995

R-squared	0.902609	Mean dependent var	6.575204
Adjusted R-squared	0.824696	S.D. dependent var	0.125017
S.E. of regression	0.052344	Sum squared resid	0.027399
Durbin-Watson stat	2.176253	J-statistic	1.32E-40
Instrument rank	9		

Annexure 2.4: Impact of Financial Development (FDindex1) on Economic Growth, 1984-2016.

Dependent Variable: LNGDPGC
Method: Generalised Method of Moments
Date: 01/09/18 Time: 11:38
Sample: 1984- 2016
Included observations: 33
Linear estimation with 1 weight update
Estimation weighting matrix: HAC (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)
Standard errors & covariance computed using estimation weighting matrix
Instrument specification: C FDINDEX1 LNGCF LNIDVA LNTOPEN LNGE LNMPR LNINF LNPGR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.17207	0.579242	17.56101	0.0000
FDINDEX1	**0.112054**	0.013765	8.140610	**0.0000**
LNGCF	0.066939	0.047825	1.399661	0.1744
LNIDVA	-0.065438	0.096658	-0.677004	0.5049
LNTOPEN	-0.511362	0.086499	-5.911739	0.0000
LNGE	0.284541	0.062713	4.537198	0.0001
LNMPR	-0.220928	0.031450	-7.024851	0.0000
LNINF	0.084395	0.014516	5.813995	0.0000
LNPGR	-1.738705	0.289836	-5.998928	0.0000

R-squared	0.977222	Mean dependent var	6.655349
Adjusted R-squared	0.969629	S.D. dependent var	0.257967
S.E. of regression	0.044957	Sum squared resid	0.048506
Durbin-Watson stat	2.230290	J-statistic	1.23E-40
Instrument rank	9		

Annexure 2.5: Impact of Total Credit by Financial Sector on Capital Accumulation, 1965-1983.

Dependent Variable: LNGCF
Method: Generalised Method of Moments
Date: 01/09/18 Time: 12:11
Sample: 1965 -1983
Included observations: 19
Linear estimation with 1 weight update
Estimation weighting matrix: HAC (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)
Standard errors & covariance computed using estimation weighting matrix
Instrument specification: C LNDCFS LNGDPGC LNIDVA LNTOPEN LNGE LNMPR LNINF LNPGR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.995082	5.253361	0.189418	0.8536
LNDCFS	**-0.040823**	0.389326	-0.104855	**0.9186**
LNGDPGC	0.477793	1.088020	0.439140	0.6699
LNIDVA	-0.174210	0.853649	-0.204077	0.8424
LNTOPEN	0.351173	0.548399	0.640360	0.5363
LNGE	0.002722	0.603746	0.004508	0.9965
LNMPR	-1.019517	0.335819	-3.035907	0.0125
LNINF	0.097313	0.060044	1.620698	0.1361
LNPGR	-0.307586	0.558929	-0.550312	0.5942

R-squared	0.915994	Mean dependent var	2.165776
Adjusted R-squared	0.848789	S.D. dependent var	0.486132
S.E. of regression	0.189037	Sum squared resid	0.357348
Durbin-Watson stat	2.011093	J-statistic	1.33E-38
Instrument rank	9		

Annexure 2.6: Impact of Total Credit by Financial Sector on Capital Accumulation, 1984-2016.

Dependent Variable: LNGCF
Method: Generalised Method of Moments
Date: 01/09/18 Time: 12:15
Sample: 1984- 2016
Included observations: 33
Linear estimation with 1 weight update
Estimation weighting matrix: HAC (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)
Standard errors & covariance computed using estimation weighting matrix
Instrument specification: C LNDCFS LNGDPGC LNIDVA LNTOPEN LNGE LNMPR LNINF LNPGR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.418265	2.537861	-1.346908	0.1906
LNDCFS	**-0.537441**	0.094775	-5.670718	**0.0000**
LNGDPGC	0.529688	0.296965	1.783673	0.0871
LNIDVA	0.635290	0.209622	3.030649	0.0058
LNTOPEN	0.618716	0.138879	4.455067	0.0002
LNGE	-0.092795	0.185662	-0.499809	0.6218
LNMPR	-0.067536	0.136013	-0.496538	0.6240
LNINF	-0.026277	0.051294	-0.512273	0.6131
LNPGR	0.573802	0.643039	0.892328	0.3811

R-squared	0.939182	Mean dependent var	2.966217
Adjusted R-squared	0.918910	S.D. dependent var	0.381434
S.E. of regression	0.108619	Sum squared resid	0.283152
Durbin-Watson stat	1.908654	J-statistic	0.000000
Instrument rank	9		

Annexure 2.7: Impact of Financial Development (FDindex2) on Capital Accumulation, 1965-1983.

Dependent Variable: LNGCF
Method: Generalised Method of Moments
Date: 01/09/18 Time: 12:18
Sample: 1965 - 1983
Included observations: 19
Linear estimation with 1 weight update
Estimation weighting matrix: HAC (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)
Standard errors & covariance computed using estimation weighting matrix
Instrument specification: C FDINDEX2 LNGDPGC LNIDVA LNTOPEN LNGE LNMPR LNINF LNPGR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.875197	5.968101	0.146646	0.8863
FDINDEX2	**-0.026934**	0.164826	-0.163409	**0.8735**
LNGDPGC	0.473434	1.001203	0.472866	0.6465
LNIDVA	-0.136070	0.916629	-0.148446	0.8849
LNTOPEN	0.323237	0.546149	0.591849	0.5671
LNGE	-0.003929	0.603426	-0.006511	0.9949
LNMPR	-0.997791	0.446310	-2.235647	0.0494
LNINF	0.093438	0.058429	1.599185	0.1409
LNPGR	-0.328782	0.473660	-0.694131	0.5034

R-squared	0.916065	Mean dependent var	2.165776
Adjusted R-squared	0.848916	S.D. dependent var	0.486132
S.E. of regression	0.188957	Sum squared resid	0.357048
Durbin-Watson stat	1.999798	J-statistic	1.80E-40
Instrument rank	9		

Annexure 2.8: Impact of Financial Development (FDindex2) on Capital Accumulation, 1984-2016.

Dependent Variable: LNGCF
Method: Generalised Method of Moments
Date: 01/09/18 Time: 12:19
Sample: 1984- 2016
Included observations: 33
Linear estimation with 1 weight update
Estimation weighting matrix: HAC (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)
Standard errors & covariance computed using estimation weighting matrix
Instrument specification: C FDINDEX2 LNGDPGC LNIDVA LNTOPEN LNGE LNMPR LNINF LNPGR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.833243	2.161218	-0.848245	0.4047
FDINDEX2	**-0.124083**	0.018938	-6.551986	**0.0000**
LNGDPGC	0.191469	0.233623	0.819562	0.4205
LNIDVA	0.623958	0.201762	3.092548	0.0050
LNTOPEN	0.429862	0.130327	3.298344	0.0030
LNGE	-0.003627	0.154644	-0.023456	0.9815
LNMPR	-0.128875	0.127878	-1.007798	0.3236
LNINF	0.010230	0.052171	0.196079	0.8462
LNPGR	0.136637	0.569483	0.239932	0.8124

R-squared	0.943162	Mean dependent var	2.966217
Adjusted R-squared	0.924216	S.D. dependent var	0.381434
S.E. of regression	0.105005	Sum squared resid	0.264624
Durbin-Watson stat	1.989714	J-statistic	0.000000
Instrument rank	9		

Annexure 2.9: Impact of Domestic Private Credit on Industrial Growth, 1965-1983.

Dependent Variable: LNIDVA
Method: Generalised Method of Moments
Date: 01/09/18 Time: 12:32
Sample: 1965 1983
Included observations: 19
Linear estimation with 1 weight update
Estimation weighting matrix: HAC (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)
Standard errors & covariance computed using estimation weighting matrix
Instrument specification: C LNDCPS LNGDPGC LNGCF LNTOPEN LNGE LNMPR LNINF LNPGR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.118191	0.844775	7.242387	0.0000
LNDCPS	**0.158466**	0.056263	2.816492	**0.0183**
LNGDPGC	-0.930975	0.180629	-5.154081	0.0004
LNGCF	-0.021044	0.093338	-0.225455	0.8262
LNTOPEN	0.648249	0.078032	8.307436	0.0000
LNGE	0.133132	0.148610	0.895845	0.3914
LNMPR	-0.011170	0.183562	-0.060852	0.9527
LNINF	0.042364	0.030668	1.381390	0.1972
LNPGR	0.070895	0.119235	0.594579	0.5653

R-squared	0.981524	Mean dependent var	2.828014
Adjusted R-squared	0.966743	S.D. dependent var	0.360359
S.E. of regression	0.065717	Sum squared resid	0.043187
Durbin-Watson stat	1.966323	J-statistic	1.78E-39
Instrument rank	9		

Annexure 2.10: Impact of Domestic Private Credit on Industrial Growth, 1984-2016.

Dependent Variable: LNIDVA
Method: Generalised Method of Moments
Date: 01/09/18 Time: 12:45
Sample: 1984 2016
Included observations: 33
Linear estimation with 1 weight update
Estimation weighting matrix: HAC (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)
Standard errors & covariance computed using estimation weighting matrix
Instrument specification: C LNDCPS LNGDPGC LNGCF LNTOPEN LNGE LNMPR LNINF LNPGR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.541508	2.125743	-0.254738	0.8011
LNDCPS	**0.023454**	0.072343	0.324204	**0.7486**
LNGDPGC	-0.112657	0.214918	-0.524186	0.6050
LNGCF	0.252481	0.115160	2.192438	0.0383
LNTOPEN	0.360033	0.148290	2.427892	0.0231
LNGE	0.300431	0.105328	2.852327	0.0088
LNMPR	0.269439	0.095177	2.830908	0.0092
LNINF	-0.075668	0.083640	-0.904695	0.3746
LNPGR	0.779871	0.609802	1.278892	0.2132

R-squared	0.910509	Mean dependent var	3.133076
Adjusted R-squared	0.880678	S.D. dependent var	0.250938
S.E. of regression	0.086681	Sum squared resid	0.180328
Durbin-Watson stat	1.634553	J-statistic	0.000000
Instrument rank	9		

Annexure 2.11: Impact of Financial Development (FDindex2) on Industrial Growth, 1965-1984.

Dependent Variable: LNIDVA
Method: Generalised Method of Moments
Date: 01/09/18 Time: 12:42
Sample: 1965 1983
Included observations: 19
Linear estimation with 1 weight update
Estimation weighting matrix: HAC (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)
Standard errors & covariance computed using estimation weighting matrix
Instrument specification: C FDINDEX2 LNGDPGC LNGCF LNTOPEN LNGE LNMPR LNINF LNPGR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.105913	1.567124	2.620031	0.0256
FDINDEX2	**0.153795**	0.049328	3.117788	**0.0109**
LNGDPGC	-0.559800	0.297524	-1.881530	0.0893
LNGCF	-0.011018	0.076489	-0.144041	0.8883
LNTOPEN	0.669221	0.063812	10.48741	0.0000
LNGE	0.157469	0.139310	1.130344	0.2847
LNMPR	-0.242027	0.130060	-1.860885	0.0924
LNINF	0.051094	0.023396	2.183901	0.0539
LNPGR	0.273311	0.103361	2.644229	0.0246

R-squared	0.987632	Mean dependent var	2.828014
Adjusted R-squared	0.977737	S.D. dependent var	0.360359
S.E. of regression	0.053768	Sum squared resid	0.028910
Durbin-Watson stat	2.736866	J-statistic	2.62E-39
Instrument rank	9		

Annexure 2.12: Impact of Financial Development (FDindex2) on Industrial Growth, 1984-2016.

Dependent Variable: LNIDVA
Method: Generalised Method of Moments
Date: 01/09/18 Time: 12:44
Sample: 1984 2016
Included observations: 33
Linear estimation with 1 weight update
Estimation weighting matrix: HAC (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)
Standard errors & covariance computed using estimation weighting matrix
Instrument specification: C FDINDEX2 LNGDPGC LNGCF LNTOPEN LNGE LNMPR LNINF LNPGR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.166982	1.840185	-0.090742	0.9285
FDINDEX2	**0.041161**	0.036996	1.112568	**0.2769**
LNGDPGC	-0.112695	0.160605	-0.701689	0.4896
LNGCF	0.390351	0.209841	1.860226	0.0752
LNTOPEN	0.258716	0.181109	1.428508	0.1660
LNGE	0.262718	0.102127	2.572471	0.0167
LNMPR	0.259728	0.088822	2.924155	0.0074
LNINF	-0.073958	0.074445	-0.993465	0.3304
LNPGR	0.590907	0.591294	0.999346	0.3276

R-squared	0.917842	Mean dependent var	3.133076
Adjusted R-squared	0.890457	S.D. dependent var	0.250938
S.E. of regression	0.083054	Sum squared resid	0.165550
Durbin-Watson stat	1.750052	J-statistic	0.000000
Instrument rank	9		

Annexure 3: VAR Models, Impulse Response, Variance Decomposition

Annexure 3.1: Derivation of the Generalised VAR Model

The generalised VAR model is derived from Pesaran and Shin (1998) and given by:

$$X_t = \sum_{k=1}^{p} \delta_k X_{t-1} + \in_t \quad (1)$$

Where $X_t = (x_{it}, x_{2t}, \dots, x_{mt})$ denote a vector of endogenous proxies for period t volatility or changes in m district financial or macro-economic indicators. δ_k represents the coefficient matrices and $\in_t = (\in_{it}, \in_{2t}, \dots, \in_{mt})$ is a vector of mean-zero error terms. The derivation assumes that $\in_t$ has a multivariate normal distribution, with $\in_t$ independent for $\in_s$ for $s \neq t$ and with nonsingular covariance matrix $E_{t-1}(\in_t \in_t') = \sum_t = (\sigma_{ij})$ for $i, j = 1,2 \dots, m$.

Annexure 3.2: Generalised Impulse Response Function (GIRF)

The generalised impulse response function is derived following Morris and Shin (1998) and defined by:

$$\varphi_n = E_t(x_{t+n} | \in_t = \delta,\ \Omega_{t-1}) - E_t(x_{t+n} | \Omega_{t-1}) = A_n \delta \quad (2)$$

Where (2) is a function of the forecast period $n = 0.1 \dots$, and the period- t shock δ, but its value is invariant to past observations Ω_{t-1}. To consider the system-wide impact of a shock to the jt? element of $\in_t$, $set\ \in_t = \delta$ and $\in_t = 0\ for\ all\ i \neq j$, according to Duncan and Kabundi (2011). Given the assumed distributional properties of $\in_t$, we have the following conditional expectations.

$$E_{t-1}(\in_t | \in_{jt} = \delta) = (\sigma_{1j}, \sigma_{2j,} \dots, \sigma_{jj}, \dots, \sigma_{mj})' \sigma_{jj}^{-1} \delta_j = \frac{\sum_t e_j \delta_j}{\sigma_{jj}} \quad (3)$$

Where $\in_t$ denotes the jt? Column of I_m. Subsequently, the $n-$ period ahead GI of X_t conditional is given by:

$$\varphi_{j,n} = E_t(x_{t+n} | \in_{jt} = \delta_j, \Omega_{t-1}) - E_t(x_{t+n} | \Omega_{t-1}) = \frac{A_n \sum_t e_j \delta_j}{\sigma_{jj}}$$

Letting δ_j equal $\sqrt{\sigma_{jj}}$, results in

$$\varphi_{j,n} = \frac{A_n \sum_t e_j \delta_j}{\sqrt{\sigma_{jj}}} \qquad \text{for any } j = 1,2 \ldots, m. \tag{4}$$

Equation (4) measures the expected impact on x_{t+n} of 1 standard deviation error shock to variable j. Predicting the $i - j$[?] Element to X_t with a forecast horizon of n, the expected cumulative impact on $x_{i,t+n}$a period t shock δ_j equal $\sqrt{\sigma_{jj}}$ is

$$\varphi_{ji,n} = \sum_{t=0}^{n} e_i' \, \varphi_{j,l}. \tag{5}$$

Annexure 3.3: Generalised Forecast Variance Decomposition (GFVD)

The total *n*-step ahead forecast-error and forecast covariance for *i* is given as

$$\xi_{i,n} = \sum_{t=0}^{n} e_i' \, A_l \in_{t+n-1}$$
$$cov(\xi_{i,n}) = \sum_{t=0}^{n} e_i' \, A_l \sum_l A_l' \, e_i \tag{6}$$

Using equations 4, 5 and 7 the *n*-step ahead generalised forecast-error variance decompositions (GFVD) for variable *i* can be defined. Specifically, the contribution of innovations in variables *j* to the total forecast-error variance *i* is given by:

$$\theta_{i,j,n}) = \frac{\sigma_{jj}^{-1} \sum_{t=0}^{n} (e_i' A_l \sum_l e_j)^2}{\sum_{t=0}^{n} e_i' A_l \sum_l A_l' e_j} = \frac{\sigma_{jj}}{\sigma_{ii}} \left[\frac{cov(\varphi_{ji,t}}{cov(\xi_{i,n})} \right] \tag{7}$$

Note that the values in the estimations are uniquely determined and thus, invariant to the ordering of variables in the VAR. This is a special property of impulse response and forecasting analysis. The generalised impulse responses coincide with orthogonalised impulses obtained through Cholesky factorisation only if *j* is the first variable included in the VAR (Pesaran & Shin, 1998).

Annexure 4: Data Description

Year	GDPGR	GDPGC	IDVA	MVA	GCF	DCPS	DCFS	BMS	FSD	TOPEN	GE	INF	MPR
1965	1.37	792.86	21.36	11.19	17.87	8.52	20.66	20.5	12.19	43.86	14.46	26.44	7
1966	-4.26	741.74	20.35	11.31	12.85	8.45	26.75	20.77	13.12	34.26	13.04	13.23	9
1967	3.08	748.76	22.93	13.33	10.31	7.57	31.99	21.22	12.99	37.37	14.96	8.42	9
1968	0.37	736.57	22.97	14.21	11.12	8.66	31.57	20.69	12.69	41.18	16.76	7.89	9
1969	6.01	764.41	21.79	14.11	11.79	9.21	28.07	19.41	11.70	40.08	14.24	7.31	9
1970	9.72	819.26	21.13	13.23	14.17	8.25	26.29	18.91	11.59	44.05	12.84	3.03	9
1971	5.22	839.51	20.78	12.51	14.12	12.58	29.32	18.99	12.42	36	12.96	9.55	9
1972	-2.49	795.52	19.86	12.18	7.1	10.06	29.01	23.72	13.61	35.91	12.61	10.06	12
1973	2.88	795.14	20.22	12.7	9.03	5.34	24.07	22.67	13.71	37.85	10.91	17.68	10
1974	6.85	827.14	19.92	11.83	13.05	5.68	26.9	21.57	12.48	40.13	12.21	18.13	10
1975	-12.43	707.58	23.41	15.54	12.72	5.78	30.24	26.24	14.47	37.8	13.02	29.82	12.5
1976	-3.53	669.52	21.42	14.66	8.89	5.9	37.21	29.11	16.52	31.75	12.24	56.08	12.5
1977	2.27	673.57	17.17	11.69	11.06	5.02	34.5	27.28	16.13	22.05	12.62	116.45	12.5
1978	8.48	719.04	12.89	9.26	5.38	3.52	30.75	24.46	10.99	18.05	11.3	73.09	19
1979	-2.51	687.92	12.98	9.17	6.54	2.82	26.58	21.05	10.59	22.39	10.29	54.44	19
1980	0.47	675.09	12.31	8.1	5.62	2.19	22.55	18.55	8.52	17.62	11.16	50.07	19
1981	-3.5	632.95	9.54	6.22	4.57	1.85	21.49	16.57	7.66	10.08	8.79	116.5	19
1982	-6.92	570.12	6.47	3.73	3.38	1.8	21.93	17.16	7.10	6.32	6.48	22.291	19
1983	-4.56	525.49	11.3	6.9	3.75	1.54	18.46	11.3	5.92	11.54	5.86	122.87	19
1984	8.65	551.64	11.15	6.74	6.88	2.21	18.87	11.81	4.52	18.81	7.26	39.66	21.17
1985	5.09	561.26	17.99	12.44	9.57	3.11	23.47	13.62	5.24	24.24	9.4	10.3	21.17
1986	5.2	572.95	17.24	11.21	9.36	3.63	23.97	13.51	5.20	36.71	11.07	24.56	20
1987	4.79	583.63	16.35	9.9	10.43	3.15	28.24	14.21	5.49	45.85	10.63	39.81	25.5
1988	5.63	599.89	16.6	9.58	11.3	3.14	20.58	14.75	5.64	42.25	9.71	31.35	25.58
1989	5.09	613.58	16.88	10.1	13.21	5.84	21.23	16.92	7.46	41.09	9.84	25.22	30.3
1990	3.33	616.91	16.86	9.81	14.44	4.93	17.51	14.14	8.50	42.73	9.31	37.25	30
1991	5.28	631.74	16.98	9.28	15.88	3.66	16.38	15.56	9.50	42.49	9.48	18.03	20
1992	3.88	638.24	17.45	9.37	12.8	4.94	20.57	20.53	11.95	45.99	12.11	10.05	30
1993	4.85	650.98	27.8	10.51	22.21	4.84	21.35	19.84	12.57	56.67	14.45	24.95	35
1994	3.3	654.6	27.66	10.12	23.96	5.25	18.4	22.51	12.78	62.02	13.72	24.87	33
1995	4.11	664.03	26.74	10.27	20.02	5.07	18.89	21.64	13.06	57.42	12.07	59.46	45
1996	4.6	677.4	26.56	9.73	21.2	6.01	18.36	20.6	12.26	72.2	12.04	46.56	45
1997	4.2	688.87	28.73	10.13	24.81	8.2	25.51	23.84	14.63	85.4	12.36	27.88	45
1998	4.7	704.14	28.23	10.04	23.11	9.36	24.57	22.86	15.66	80.6	10.32	14.62	37
1999	4.4	717.58	28.36	10.07	21	12.56	32.52	24.09	15.02	81.71	10.84	12.4	27
2000	3.7	726.01	28.39	10.08	24	13.97	39.3	28.17	14.27	116.05	10.17	25.19	27
2001	4	736.28	28.14	10.05	26.6	11.88	35.13	31.45	15.32	110.05	9.72	32.9	27
2002	4.5	749.99	28.2	10.07	19.7	12.15	34.59	34.11	17.59	97.49	9.87	14.81	24.5
2003	5.2	768.84	27.76	9.88	22.94	12.49	26.92	31.05	19.15	97.29	11.53	26.67	21.5
2004	5.6	791.01	27.06	9.57	28.38	13.17	31.43	32.72	19.93	99.67	12.17	12.62	18.5
2005	5.9	816.08	27.46	9.46	29	15.54	30.84	32.11	20.07	98.17	15.31	15.11	15.5
2006	6.4	845.87	21.29	10.48	21.64	11.09	21.1	23.26	13.42	65.92	11.3	10.91	12.5
2007	4.35	859.82	21.24	9.37	20.11	14.49	22.86	25.72	16.31	65.35	11.56	10.73	13.5
2008	9.15	914.39	20.93	8.14	21.45	15.88	27.9	27.46	18.66	69.51	11.24	16.52	17
2009	4.85	934.43	19.66	7.19	20.67	15.66	28.7	28.25	20.80	71.59	11.73	19.25	18
2010	7.9	983.22	19.81	7.02	26	15.29	28.37	29.62	20.73	75.38	10.36	10.7	13.5
2011	14.05	1094.11	26.24	7.06	26.44	15.05	27.48	30.55	21.24	86.3	16.64	8.72	12.5
2012	9.29	1167.38	28.94	6.04	31.78	15.64	31.34	30.36	21.82	93.17	20.89	9.16	15
2013	7.31	1223.59	28.74	5.49	27.73	17.07	34.92	29.25	21.39	81.65	19.92	11.6	16
2014	3.99	1243.27	27.68	5.14	27.14	19.91	38.21	33.1	22.87	88.45	17.98	15.49	21
2015	3.92	1262.91	27.6	5.33	24.63	20.44	35.35	33.95	24.41	99.25	19.16	17.14	26
2016	3.58	1279.14	28.16	5.63	22.84	19.59	34	34.2	24.51	88.6	17.68	17.47	25.5

GDPGR	Annual GDP Growth Rate
GDPGC	Growth in Real GDP per capita
IDVA	Industry Value-added to GDP ratio
MVA	Manufacturing Value-added to GDP ratio
GCF	Gross Capital Formation to GDP ratio
DCPS	Domestic Credit to Private Sector to GDP ratio
DCFS	Domestic Credit provided by the financial sector to GDP ratio
BMS	Broad Money Supply to GDP ratio
FSD	Financial Sector Deposits to GDP ratio
TOPEN	Trade openness
GE	Government Spending
MPR	Monetary Policy Rate
INF	Consumer Price Index (Inflation)

Annexure 5: Summary of Results of the Hypotheses Tests

ID	Hypotheses	Decision
1	(i) H_0: There is no long-run relationship between financial development and capital accumulation in Ghana. H_1: There is a long-run relationship between financial development and capital accumulation growth in Ghana.	H_0: Rejected H_1: Accepted
2	(ii) H_0: There is no long-run relationship between financial development and industrial growth in Ghana. H_1: There is a long-run relationship between financial development and industrial growth in Ghana.	H_0: Rejected H_1: Accepted
3	(iii) H_0: There is no long-run relationship between financial development and economic growth in Ghana. H_1: There is a long-run relationship between financial development and economic growth in Ghana.	H_0: Rejected H_1: Accepted
4	(iv) H_0: Financial development does not positively impact on capital accumulation in Ghana. H_1: Financial development positively impact on capital accumulation in Ghana.	H_0: Rejected H_1: Accepted
5	(v) H_0: Financial development does not positively impact on the Industrial Sector Growth in Ghana. H_1: Financial development positively impact on the Industrial Sector Growth in Ghana.	H_0: Rejected H_1: Accepted
6	(vi) H_0: Financial Development does not positively impact on the Economic Growth in Ghana. H_1: Financial Development positively impact on the Economic Growth in Ghana.	H_0: Rejected H_1: Accepted
7	(vii) H_0: The Industrial Sector is not the engine of growth in Ghana. H_1: The Industrial Sector is the engine of growth in Ghana.	H_0: Not Rejected H_1: Rejected
8	(viii) H_0: The Manufacturing Sector is not the engine of growth in Ghana. H_1: The Manufacturing Sector is the engine of growth in Ghana.	H_0: Not Rejected H_1: Rejected
9	(ix) H_0: Financial development does not positively impact on the manufacturing Sector Growth in Ghana. H_1: Financial development positively impact on the manufacturing Sector Growth in Ghana.	H_0: Not Rejected H_1: Rejected