UNIVERSITY OF CAPE COAST

STOCK MARKET PERFORMANCE AND ECONOMIC GROWTH IN GHANA

NANCY NAA ODUA LARYEA

2016

UNIVERSITY OF CAPE COAST

STOCK MARKET PERFORMANCE AND ECONOMIC GROWTH IN GHANA

BY

NANCY NAA ODUA LARYEA

Dissertation submitted to the Department of Finance of the School of Business, University of Cape Coast in partial fulfilment of the requirements for award of Master of Business Administration degree in Finance.

NOVEMBER 2016

DECLARATION

Candidate's Declaration

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

Candidate's Signature: …….. Date……

Candidate's Name: Nancy NaaOduaLaryea

Supervisor's Declaration

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

Supervisor's Signature: …… Date……..

Supervisor's Name: Dr. Daniel Agyapong

ABSTRACT

This study investigated the relationship between stock market performance and economic growth in Ghana for the period 1991–2014, using quarterly secondary data. The objective was to empirically analyse the relationship between stock market performance and economic growth using Auto regressive Distributed Lag (ARDL) approach.The study found acointegrating relationship between economic growth and its determinants. The regression results show that stock market performance is a very important determinant ofeconomic growth in Ghana since they exertedstatistically significant positive effects on economic growthboth in the short-run and long-run in Ghana.Additionally, consumer price index and interest rate also exerted negative and statistically significant effects on economic growth both in the short-run and long-run in Ghana. Further,real effective exchange rate,physical capital and labour force exerted positive and statistically significant effects on economic growthboth in the short-run and long-runin Ghana. It is therefore recommended that policymakersspecifically of Ghana Stock Exchange should put pragmatic measures to improve the performance of the stock market, increase physical capital, and labourforce,as well as maintaining low inflationary rate. Finally, Bank of Ghana should maintain a stable exchange rate while financial institutions are to reducetheir interest rate on lending.

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to my supervisor, Dr. Daniel Agyapong for his guidance during the entire period of my research work.I want to thank my dear mother, Madam Adelaide Vanderpuye, siblings and friends for their dependable support and advice which served as a great motivation for me.

To my dear husband, Mr. James Kofi Doe Jnr, I say thank you for being there for me always.A special thanks to the Dean of the School of Business, UCC, Prof. Edward Marfo-Yiadomfor being a source of encouragement.

I would also like to take this opportunity to render my heartfelt gratitude to my colleague Jonas Benadam of National Board for Professional and Technical Examination (NABPTEX) and Mr. Kofi Siabi-Mensah, former Registrar of the University of Health and Allied Sciences (UHAS) for their encouragement and contribution during my study period.

DEDICATION

To my lovely husband, Mr. James Kofi Doe Jnr. and my children; Deborah, Enoch and Adelaide for their patience and understanding during the period.

TABLE OF CONTENTS

CONTENT PAGE

LIST OF TABLES

TABLE PAGE

LIST OF FIGURES

FIGUREPAGE

LIST OF ABBREVIATIONS

ADF Augmented Dickey-Fuller

ARDL	Auto Regressive Distributed Lag
CPI	Consumer Price Index
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GSE	Ghana Stock Exchange
INTR	Interest Rate
L	Labour Force
PP	Philip Perron
REER	Real Effective Exchange Rate
SBC	Schwarz Bayesian Criteron
SMC	Stock Market Capitalisation
Y	Economic Growth

CHAPTER ONE

INTRODUCTION

The main purpose of this study was to determine the effect of stock market performance on economic growth in Ghana.This section presents the overview on the study which includes the background to the study, statement of the problem, purpose of the study, objectives of the study, hypotheses of the study, significance of the study, delimitations of the study, and organization of the study.

Background to the Study

Lack of long-term capital for investment is the major constraint to economic growth and development in developing countries (Ezeoha, Ogamba&Oyiuke, 2009) of which Ghana is not an exception. Stock markets are expected to increase economic growth by increasing the liquidity of financial assets, making international and global risk diversification possible for potential international and domestic investors. Levine (2005) observed that countries with better developed financial systems experienced faster economic growth than those without it. Economic literature, dating back to Schumpeter (1911) and Bahegot (1973) placed much importance on the positive contributions of financial systems to economic growth. Levine and Zervos (1996) found that stock market liquidity positively predicts aggregate economic growth whiles Rajan and Zingalese (1998) established that stock market size is related to growth of financial dependent firms.

Over the past decades, a major objective of developing economies across the world has been ways and means to accelerate economic growth, and the development of the stock market has become key as it has been established as being a major means of mobilizing medium and long term funds needed for economic growth and development. Past research works have established that a major constraint to economic growth and development in Sub-Saharan African is the lack of long term capital for investment. Absence of medium to long term investment capital has been a major hindrance to sustained economic growth and development not only in Ghana but throughout the sub region. This problem has been traced to the underdevelopment of capital markets such as stock and security markets and financial institutions that serve the capital markets. Another contributing factor to this condition is the banking sector inability to mobilize medium to long term funds to finance economic growth and developmental projects. This has necessitated the need for a better and more efficient financial market through which long term capital can be mobilized to finance development projects and expansion of companies' operations (Rajan&Zingalese, 1998).

Other researchers, such as Levine (1996) maintain that countries with well-developed banks (as measured by total bank loans to private enterprises as a share of GDP) tend to grow faster than countries with underdeveloped banks. They observed that countries with both liquid stock markets and well-developed banks grew much faster than countries with both illiquid markets and underdeveloped banks. Similarly, greater banking development implies faster growth no matter what the level of stock market liquidity. Thus, stock

market development and banking development, each on its own is a strong predictor of future economic growth, although it has been argued that stock markets and banks provide different types of financial services.

According to Demirguc-Kunt (2006), the financial system among others help to mobilize and pool savings, provide services that facilitate the exchange of goods and services as well as efficient allocation of capital to enhance economic growth. Financial systems comprise financial intermediaries such as banks and security markets (Garcia & Liu, 1999). The capital market plays an essential role in the growth of commerce and industry which ultimately affects the economy of the country to a large extent.

Stock market activities play a major role in determining the level of economic activities in both emerging and developed economies, by providing and efficiently allocating capital for investment, creating the enabling platform that will facilitate best corporate practices that will result in growing investment and further growth of the economy. The issue of whether there is a long run bidirectional causality between financial development and economic growth still remains sketchy. Another unresolved issue is the relationship between stock market indicators and the proxy for economic growth (real gross domestic product) in the emerging economies (Garcia & Liu, 1999).

It is widely held that stock exchanges are expected to increase economic growth by increasing the liquidity of financial assets and this makes diversification of international and global risk possible for potential domestic and international investors (Osei, 2005). Liquidity can be defined

as the ability of the market to absorb fairly, large volumes of stock trades without drastically affecting the price and can be calculated as a value of traded shares divided by gross domestic product (GDP), (Nowbutsing&Odit,2009). This realization resulted in attention being shifted from the banking sector to the establishment and development of the capital markets, hence the establishment of stock exchanges in the early 1980s.

Stock market may affect economic activity through the creation of liquidity. Many profitable investments require a long term commitment of capital but generally investors are not willing to invest for long periods. Liquid equity markets therefore provide the platform for less risky and more attractive investments by allowing investors to purchase equity and sell it quickly and cheaply if they need access to their savings or want to change their portfolio. Companies have permanent access to capital raised through equity issues, (Levine, 1996) by facilitating longer term, more profitable investments, liquid markets improve the allocation of capital and increases prospects for long term economic growth. Also by making investment more profitable and less risky, stocks market liquidity can also lead to more investment because people will naturally invest when they know they can leave if they are not satisfied with the services being rendered or returns from their investments.

The stock market affects Gross Domestic Product (GDP) primarily by influencing financial conditions and consumer confidence. When the stock markets are performing well it increases economic activities positively. High valuations allow companies to borrow more money at cheaper rates and this allows them to expand operations invest in new projects and hire more

workers, putting more money into the economy. All of these activities boost GDP. However, when stock prices are low, it negatively affects GDP by reversing the gains made in the economy through the same channels. Companies are forced to cut down costs and workers are laid off, reducing their purchasing power and their ability to save. Businesses find it difficult to find new sources of funding which makes them unlikely to invest in new projects. Many believe that large decrease in stock prices were reflective of future recessions whereas large increase in stock prices may reflect the expectations towards future economic growth, given the impact that the stock markets have on the economy.

The role of stock markets in economic development has been well acknowledged across the world in recent years (Ezeoha et al.,2009),however, divergent views have been expressed on the nature and direction of causality between stock market performance and economic growth. Some studies have found that economic activities in a country drives stock market development (El-Wassal, 2005;Demirguc-Kunt& Levine, 1996), whiles others observed that stock market growth rather leads to economic growth (Chinwuba& Amos, 2011;Yartey, 2008).

Similarly, evidences of positive effect of capital market development on economic growth have been reported by some researchers. Examples, Nazir, Nawaz and Gilani (2010), report that economic growth can be obtained by increasing the size of the stock market and market capitalization in an emerging market. Levine and Zervos (1996) show that stock market development is positively and robustly associated with economic growth and development. Many researchers have used different measures of stock

exchange development in assessing the performance of the stock markets. Some of the factors include liquidity, size, market capitalization and all shares/composite index. Among the stock market development indicators which had been used by different researchers are market capitalization ratio, which relates the size of the market to the whole economy; turnover ratio, which shows the liquidity of the market as well as volume of trade and value traded; market capitalization, which shows the performance of the market. The All Share Index is a measure of the general performance of the stock exchange.

Stock markets development therefore enables firms to acquire much needed capital quickly and reduces investment risk due to the ease with which equities are traded and facilitates capital allocation and investment. Stock market pools long term capital for firms and thus facilitate economic growth.

Statement of the Problem

The development of the capital market has been argued to enhance economic growth but evidence on this has been limited to advanced countries and therefore, there is the need for such a study to be conducted in a developing country context. Furthermore, most studies on financial market development and economic growth in Africa have concentrated on how banking development influences economic growth and thus, since there is an argument that the stock market performance (which can also be used as surrogate measure for financial market development) also influences economic growth, there is the need to establish this relationship in the context of a developing country.

This study is conducted to determine the short and long term relationship between the Ghana stock exchange and economic growth using market capitalization figures and the GDP per capita as the proxy for economic growth measurement.This is to help policy makers put measures in place to attract more companies to list on the exchange to address the problem of inadequate financial capital for economic growth in Ghana. It will further enable managers of the economy to put strategies in place to make the capital market impact positively on Ghana's economic growth.

Purpose of the Study

The many purpose of this study is to examine the effect of stock market performance on economic growth in Ghanausing quarterly time series over the period 1991Q1-2014Q4.

Research Objectives

Specifically, the study seeks to;

1. assess the long-run relationship between stock market performance and economic growth.
2. examine the short-run relationship between stock market performance and economic growth.

Hypotheses

This study seeks to test the following hypotheses based on research objectives

1. Ho: There is no long-run relationship between stock market performance and economic growth.

   H_1: There is long-run relationship between stock market performance and economic growth

2. Ho: There is no short-run relationship between stock market performance and economic growth.

   H_1: There is short-run relationship between stock marketperformanceand economic growth.

Significance of the Study

The main objective of this study is to determine the causal relationship between stock market performance using the market capitalization and the economic growth using the GDP per capita values, using data from 1991 to 2014. This study will contribute to the stock of knowledge on the existing debate on the causal relationship between the two variables and also verify existing theories on the link between stock exchange performance and economic growth. It is hoped that the findings of this study will provide managers of the economy and policy makers with insights to put the appropriate strategies and measures in place to boost the performance of the Ghana Stock Exchange for a sustained economic growth in Ghana.

Delimitation of the Study

This study is to determine the relationship between stock market performance using the market capitalization as a proxy and the economic growth using the GDP per capita as a proxy, as the main focus variables using data from 1991 to 2014. The study employs the following control variables based on the literature: physical capital, labour force, interest rate, exchange rate, and inflation rate.

Limitations of the Study

One major limitation of this study was the availability of daily, weekly, monthly or quarterly data on all variables from the Bank of Ghana and the World Bank. Thus, to produce highly reliable estimates especially with cointegration, variables that have their values already in quarters were needed. As a result, quarterly series were generated through interpolation for the purpose of the estimation. However, there is no gain in the power of these tests by switching from low frequency to high frequency data and merely increasing the number of observations over a short time period.

Organisation of the Study

The study is organized into five chapters; chapter one presents the Introduction and background to the study, the statement of the problem, purpose of the study, the research objectives, hypotheses of the study, significance of the study, delimitation, limitations of the study and organisation of the study. Chapter two reviews the literature of previous study comprising both theoretical and empirical review and chapter three looks at the research methods to carry out the study including research design, specification of the model, definition and measurement of variables, estimation techniques, sources of the data in the study, and tools for data analysis. Chapter four presents the results and discussions and chapter five presents summary, conclusions and policy recommendations.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Introduction

This chapter provides a review of theoretical and empirical literature for the study. It essentially consists of two parts; the first part indicates the overview of Ghana's growth experience as well as theoretical review underpinning the study while the second part provides a review of empirical studies conducted to evaluate the relationship that the stock market performance has on economic growth.

Ghana's Growth Experience

The trend of economic growth in Ghana has been characterized by a lot of ups and downs since independence. Given the high rates of economic growth the country experienced at the early stages of independence, one would have expected that these high rates of growth would have continued to spur the country into becoming a high-income country by the end of the twentieth century. However, Ghana's economy began to experience a slowdown in the growth of GDP by 1965. Aryeetey, Fosu, and Bawumia (2002) mentioned that, Ghana's economic growth was turbulent for much of the period after 1965 and only started stabilizing after 1983. In fact, the country experienced periods of negative economic growth rates between 1965 and 1984, where the lowest growth rate of (-12.4%) was recorded in 1975. This was attributed to the decline in the production of cocoa, minerals, and timber, which were the main foundation of the nation's exports, within that period. Cocoa exports, for

example, reduced from 382,000 metric tonnes in 1974 to 159,000 metric tonnes by 1983 (World Bank, 1987).

The poor performance of the economy called for the implementation of an Economic Reform Programme (ERP) and the Structural Adjustment Programme, with the aim of halting the downward trend in economic growth and stabilizing the macroeconomy. Aryeetey and Kanbur (2008) noted that, the economy responded positively to the economic reforms as it recovered from its negative growth rate of (5%) in 1983 to an immense positive economic growth rate of about (8%) in the following year. Ghana has since the implementation of the ERP and SAP seen consistent, stable, and positive economic growth, with annual growth rates averaging (5.4%) (World Bank, 2012).

Although the nation continues to enjoy high economic growth rates, average economic growth of (5.4%) is seen as woefully inadequate given that the country in 1993 set itself to become an upper middle income country by 2020 (Fosu&Aryeetey, 2008). For this target to be achieved, it was estimated using a Harrod-Domar model that the economy needed to grow, on average, at (8%) to achieve this goal (Institute of Economic Affairs, 1992). The economy did not show any capacity of achieving this target in five years after the targets were set. The economic and growth performance of the country had been characterized by the non-attainment of macroeconomic targets. Particularly, while GDP was expected to grow between (7.1%) and (8.3%) in the period 1996-2000, actual growth was between (4.2%) and (5.0%) (Fosu&Aryeetey, 2008). The situation of significant divergence between actual and targeted macroeconomic figures is best reflected by developments in 1999. For

example, in 1999, real GDP growth of (4.4%) was (1.1%) less than the targeted growth; end-of-period inflation was (4.3%) higher than targeted, and budget deficit was (3%) higher than what was targeted. This trend of non-attainment of macroeconomic targets persisted up to 2002 (Centre for Policy Analysis, 2003). Developments following the successful implementation of the Highly Indebted Poor Country (HIPC) initiative, which brought huge debt relief to the country and the discovery of oil in commercial quantities have seen the country making a lot of progress towards a becoming an upper middle income country. GDP growth accelerated from (4%) in 2001 to a (14.4%) in 2011 while *per capita* GDP growth has increased from U.S. $270.43 in 2001 to U.S. $1570.13 in 2011 (World Bank, 2012). Nonetheless, the country needs to put in more efforts to become an upper middle income by 2020, given that the average growth rate of the economy is still less than 8% and the fact that the economy is still hugely dependent on primary commodities as its major exports. Fosu and Aryeetey (2008) noted that, the inability of the Ghanaian economy to grow beyond an average of (6.0%) per annum is basically due to the absence of structural transformation of the economy.

This is influenced by the fact that macroeconomic policies have not been grounded in a comprehensive and reliable long-termdevelopment framework.

The Ghana Stock Exchange (GSE)

The Ghana Stock Exchange was incorporated in July 1989 as a private company limited by guarantee under Ghana's companies' code 1963. The Exchange, however, changed its status to a public company limited by

guarantee in April 1994. Trading on the floor of the Exchange commenced in November 1990. The GSE is not funded by government, it's a private sector initiative. The Exchange is governed by Council which sets its policies and functions which includes maintaining good order among members regarding the stock market, granting listing and preventing frauds and malpractices.

There are forty companies currently listed on the Exchange, all offering ordinary shares except Standard Chartered Bank which is offering both ordinary and preference shares. The listed companies represent a cross section of the economy ranging from agriculture/agro processing, manufacturing, pharmaceuticals, financial, and mining. Since its establishment the GSE has been performing very well, for instance in 1998, it was voted the best performer among all stock markets in Africa in terms of capital appreciation by Standard Chartered Bank London Limited.

The Ghana Stock Exchange is one of the world's best performing stock market. This is indicated by the performance of the equities listed on the market from 1991 to 2014. The GSE All-Share Index is a measure of the general performance of the stock exchange has increased consistently over the period and available market statistics show that the GSE is one of the best performing exchanges on the continent at the moment.

The table below indicates the consistent increase in the number of listed companies since the establishment of the Ghana Stock Exchange in 1989 and this can be attributed to the level at which it attained in raising equity capital for the listed firms.

Table 1A: Number of Listed Companies: 1990-2014

Year	Number of Listed Companies
1990	11
1991	13
1995	19
1996	22
2003	26
2005	29
2010	36
2014	40

Source: Ghana Stock Exchange Market Statistics from 1990 - 2014

The Ghana Stock Exchange (GSE) has attracted the attention of foreign investment and international institutions because of its high performance in terms of returns on investments. It has also promoted savings and investment habits of investors in the country (Ziorklui, 2001).

Market Capitalisation is the total market value of the shares outstanding of a publicly traded company. It is equal to the share price multiplied by the number of shares outstanding i.e. the market value of a company's outstanding shares. The market capitalization and its growth rate are indicators of market size and performance of the stock market in relation to the economy. The market size is measured by the market capitalization ratio. The importance of the market capitalization is that the size of the market should be positively related with the ability to mobilize capital and diversify risk in an economy.

The market capitalization figures shown in Table 1B below, makes GSE one of the best stock markets in the world and in Africa.

Table 1B: Market Capitalisation of GSE:1991 – 2014

Year	Amount $ (in millions)
1991	76.00
1992	84.00
1993	118.00
1994	1870.00
1995	1649.00
1996	1492.00
1997	1138.00
1998	1384.00
1999	915.82
2000	502.41
2001	527.57
2002	740.40
2003	1425.63
2004	2643.60
2005	1660.58
2006	3232.88
2007	2380.22
2008	3394.38
2009	2507.52
2010	3531.48
2011	3096.95
2012	3464.53
2013	4945.00
2014	5375.30

Source: Ghana Stock Exchange Market Statistics from 1990 - 2014

The upward trend in the figures shows that liquidity of GSE has improved significantly and serves as a platform on which long term equity capital can be raised and accumulated by firms in need of capital for investment and economic growth in Ghana. Stock market performance indicators are market capitalization, market capitalization ratio, trade value, turnover ratio, composite index among others. Market capitalization shows the performance of the market, the market capitalization ratio relates the size of the market to the whole economy; the turnover ratio indicates the liquidity of the market; as well as volume of trade and value traded.

The literature review indicates that most studies used market capitalization to measure stock market performance. Furthermore, the link between stock market performance and economic growth is not conclusive. While some studies found that economic growth leads to stock market development, others found that stock market development leads to economic growth. This study will, however, use the market capitalization figures and the GDP per capita values from the period 1990 - 2014 to determine the causal link between the stock markets and the growth of the economy in Ghana.

The choice of the two indictors is informed by the level of significance that each has in determining the performance of their respective sectors. The empirical review especially those conducted on Ghana reveal that no study has been done using only GDP per capita as a measure of economic growth against market capitalization. This study will therefore contribute to knowledge by using GDP per capita as the proxy for economic growth.

Theoretical Review

The link between stock markets and economic growth provided ambiguous result on a major aspect of finance-growth hypothesis (Schumpeter, 1932; McKinnon, 1973) with an explanation into how financial intermediation facilitates economic growth. Spears (1991) reported that in the early stages of development, financial intermediation stimulated economic growth in Sub-Saharan Africa. On the other hand Atje and Jovanic (1993) using cross-sectional regressions conclude that stock markets have long run impact on economic growth. A number of studies had been conducted into the relationship between economic growth and stock markets development, however, the causal link between stock market development and economic growth has been a debate among economists and finance experts across the world. The theoretical foundation linking financial development and economic growth remains a controversial subject amongst economists as well as policy makers.

Schumpeter (1911) states that the financial intermediation services offered by the financial sector encourage technological innovation which in turn boosts economic growth. Mackinnon (1973) similarly, indicate a positive relationship that flows from financial development to economic growth. Robinson (1952) was of the contrary view that financial development is only a by-product of economic growth. He further argues that the development of the financial sector is a direct result of a country's growth performance over time. Robison maintains that as per capita income rises with economic growth, it will improve the development of the financial sector by enhancing its ability to effectively mobilise financial intermediation services. This assertion is

however countered by Singh (1997) who purports that financial markets development may likely turn out to be an obstruction to economic growth when they cause volatility and subsequently scare away risk-averse investors from undertaking investment projects.

The Efficient Market Hypothesis Theory

The overriding function of financial market is to increase the financial resources available to the economy and to ensure a more efficient use of these resources, that is, to facilitate financial intermediation and its management in order to stimulate and accelerate the process of economic growth. Financial markets intermediate in both debt and risk capital finance. The Random Walk Theory postulates that current stock prices fully reflect available information which makes it impossible for anyone to outperform the market without assuming additional risk. The stock markets generate efficient information about the performance of firms, reflecting the fundamentals in the real sector and this guides the investor in choosing a particular investment vehicle to invest in the economy. In all three forms of the efficient market, stock prices fully reflect the available information and this boost investor confidence in the stock market. An active equity market is an important engine of economic growth.

The Stock Market and Economic Growth Theory

The stock market stimulates economic growth through savings mobilization from individuals, businesses, government and foreigners thus providing the avenue for business financing and efficient allocation of resources in the economy. One fundamental strategies of economic growth is to increase the proportion of national income saved. If savings can be raised then the rate of GDP growth can be increased (Todaro& Smith, 2009). The economic growth theory further advances that in the early stages of economic development, the financial sector grows substantially faster than economic growth. It is therefore very important to build financial institutions well ahead of demand for their services and the appropriate policies put in place to enable finance becomes a channel for real sector development (Acquah-Sam & Salami, 2014).

UNITAR/DFM (2005) observes that in recent years, the world and developing countries in particular have turned their attention to capital market development for two basic reasons: the collapse of the Soviet Union in the early 1990's; and the rapid growth of capital markets and their positive effect on developed nations of the world such as England and the USA. In most sun-Saharan African countries, the development of capital markets has been a deliberate national strategy to restructure their financial sectors and to privatized state owned enterprises that under perform in order to stimulate greater economic growth and creation of wealth. Capital markets accelerate growth by facilitating the ability to trade ownership of firms and allowing investors to hold diversified portfolios. Liquid capital markets enable investors to change their portfolios quickly and cheaply. It facilitates investments

projects and makes them less risky and as such helps in facilitating capital formation, allocation, investment and growth (Brasoveanu, Dragota, Catarama&Semenescu, 2008; Kolapo&Adaramola, 2012; Garcia & Liu, 1999).

Acquah-Sam and Salami (2014) concluded that capital market development has a positive and significant effect on long run economic growth in Ghana. They further stated that there was a positive bi-directional relationship between economic growth and capital market development, even though the stronger effect was from capital market development to economic growth.

A well organized and managed stock market generally generates investment opportunities in the country and ensures an efficient allocation of scarce economic resources to profitable investments. According to Saint-Paul(1992) and Alovsat (1998), stock exchanges contribute to economic growth through the global risk diversification opportunities they offer. Stock markets are expected to accelerate economic growth by providing a boost to domestic savings and increasing the quantity and quality of investments (Singh, 1997). The stock market stimulates economic growth through savings amongst individuals, providing avenue for business financing and efficient allocation of resources in the economy.

The development of the capital market and the stock market provides opportunities for greater funds mobilization, improved efficiency in resource allocation and provision of relevant information for appraisal (Inanga&Emenuga, 1997). Stock market contributes to economic growth through the specific services it performs either directly or indirectly.

Prominent among the functions of the stock markets are mobilization of savings, creation of liquidity, risk diversification, improved dissemination and the acquisition of information and enhanced incentive for corporate control. Improving the efficiency and effectiveness of these functions, through prompt delivery of their services can accelerate the rate of economic growth.

Todaro and Smith (2009) emphasised that if we can raise savings, we can increase the rate of GDP growth. According toSchumpeter (1911), financial intermediation plays a key role in economic growth by improving productivity and social change. Financial development impacts on economic growth through the raising and pooling of funds, the allocation of resources to their most productive uses, effective monitoring of the use of funds, the provision of instruments for mitigating risk (especially for small and medium enterprises), and reducing inequality. The stock market generates efficient information about the firms' performance which reflects the fundamentals in the real sector. Stock markets help investors to cope with liquidity risk by allowing those in need of cash to sell their shares to others who want to invest cash. The result is that capital is not prematurely removed from firms to meet short-term liquidity needs rather it assists in allocating capital to the corporate sector which will have a real effect on the economy growth. In so doing they provide an important source of investment capital at relatively low cost (Dailami&Atkin, 1990).

The debate for the positive relationship between economic growth and stock market development were supported by various empirical studies, such as Levine and Zervos (1993),AtjeandJovanovic (1993), Levine andZervos (1998), Rousseauand Wachtel (2000), and Beck Levine (2004). These studies

emphasize the importance of stock development in the growth process, however, they do not simultaneously examine banking sector development, stock market development and economic growth in a unified framework. Their findings, however, indicate a strong positive relationship between stock market development growth rates of real per capita. This is also consistent with the work of Levine and Zervos (1995) and Demirguc-kunt (1994) that stock markets and banking sector development can give a boost to economic development. More importantly, they found that stock market liquidity and banking development both predict the future growth rate of the economy when they both enter the growth regression. They concluded that stock market provide different services from those provided by banks.

Economic growth is accelerated by increasing liquidity of financial assets, making global risk diversification easier for investors, promoting sound investment decisions by saving-surplus units based on available information which are all facilitated by stock exchanges. Corporate managers are forced to work harder for shareholders interest and to channel more savings to corporations. The positive role of liquidity provided by stock exchanges on the size of new real asset investments through common stock financing is emphasized by Levine (1991), Benchivenga, Smith, and Starr (1996).

Stock markets contribute to the mobilization of domestic savings by enhancing the set of financial instruments available to savers to diversify their portfolios. They help investors to cope with liquidity risk by allowing those who are hit by a liquidity shock to sell their shares to others who do not suffer from a liquidity shock. The result is that capital is not prematurely removed from firms to meet short term liquidity needs. In principle, a well-developed

stock market should increase savings effectively, allocate capital to productive investments which leads to increase in the rate of economic growth.

Another important contribution that the stock exchanges make to economic growth is the opportunity they offer through diversification of global risk Saint-Paul (1992), Deveraux and Smith (1994) and Obstfeld (1994) observed that opportunities for risk reduction through global diversification may also increase the risk of investors and at the same time provide high return domestic and international projects viable and as a result allocate savings between investment opportunities more efficiently. Optimal investment decisions are made by investors with the help of publicly available information and stock prices determined in exchanges. Better investment decisions by investors lead to better allocation of funds among corporations resulting in a higher rate of economic growth. In efficient capital markets prices already reflects all available information and this reduces the cost and efforts made by investors to obtain additional information (Stiglitz, 1994). According to Schumpeter (1911), technological innovation is the force which underlies long-run economic growth and that the financial sector's ability to extend credit to the entrepreneur.

Theoretically, a growing literature argues that stock market development boost economic growth. Greenwood and Smith (1996) show that stock markets lower the cost of mobilizing savings, facilitating investments into the most productive technologies. Obstfeld (1994) indicated that international risk sharing through internationally integrated stocks markets improves resource allocation and accelerates growth. Levine (1991) and Bencivengaet al. (1996) have argued that stock market liquidity, the ability to

trade equity easily, play a key role in economic growth; although profitable investment require long run commitment to capital, savers prefer not to relinquish control of their savings for long periods. The role of stock markets in improving informational asymmetries has been questioned by Stiglitz (1985) who maintains that stock markets reveal information through price changes rapidly, thus reducing investor incentives to conduct costly search. Demirguc-KuntandLevine (1996) point out that increased liquidity may deter growth via three channels. First it may reduce saving rates through income and substitution effects; second, by reducing the uncertainty associated with investments, greater stock market liquidity may reduce saving rates because of the ambiguous effects of uncertainty on savings; third stock market liquidity encourages investor myopia, adversely affecting corporate governance and thereby reducing economic growth.

Edo (1995) asserts that security investment is a veritable medium of transforming savings into economic growth and development and that a notable feature in any developing economy is the expansion of the stock market thereby facilitating the trading in stocks and shares. Osinubi(1998) reported that one of the conditions of being developed pertains to having a large stock of capital per head, which must always be replaced and replenished when used up. In the absence of this the condition of being underdeveloped prevails.

Economists and finance experts across the world are yet to agree on the causal link between stock market development and economic growth. Azamiet al.(2005) examined the relationship between stock market development and economic growth in India during the pre and post liberalization periods from

1981 to 2001. They observed that there is no causal link between Indian stock market development (measured by stock index comprising market capitilisation ratio, total value traded ratio and turnover ratio) and economic growth (proxies by real per capita GDP) for the entire twenty year period. The authors also found a significant negative relationship between stock market development and economic growth for the post liberation period covering 1991 to 2001. The results, however, found evidence of positive relationship between stock market development and economic growth during the pre-liberalization sub-period between 1981 and 1990.

Endogenous Growth Theory

Endogenous growth theory explains that economic growth is mainly generated by factors like economies of scale, increasing returns or induced technological changes which are within the production process. Romer (1990), Grossman and Helpman (1991) developed growth models within the endogenous growth theory to explain the relationship between FDI and growth. These models assume that technological progress is the principal driving force of economic growth. Thus, the theories focus on the creation of technological knowledge and its transfer, and view innovation as major engines for growth. Therefore, these models place emphasis on human capital accumulation and externalities on growth. In these regard, growth rate of developing economies is seen to be reliant on the extent to which these countries can accept and utilize innovative technologies available in highly developed economies. They argue that FDI is the main channel for the process

of advanced technologies by developing countries. Developing countries generally are not able to innovate and generate new technologies. Therefore, they have to adopt technology that is produced from advanced countries through the channel of FDI.

Nevertheless, Dowling and Hiemenz (1982) and Lee and Rana (1986) concluded that, rapid economic growth also induces the FDI inflows. This is explained in the sense that high sustainable growth usually creates high levels of capital requirements in the recipient economy and as a result, the host country needs more FDI by creating the necessary macroeconomic climate to attract foreign investors. The speedy growth in the host nation also builds the self-assurance of foreign investors investing in the host country.

Empirical Review

The Calderon-Rossell Model considered economic growth and stock market liquidity as the main determinants of stock market development. The model used market capitalization as a proxy for stock market development. The study established that stock market liquidity and economic growth are important determinants of stock market growth (Yartey, 2008). Garcia and Liu (1999) reported on the determinants of capital market development. They used market capitalization as a proxy capital market development and concluded that real income level, saving rate, financial intermediaries' development and stock market liquidity are important predictors of stock market development while macroeconomic stability does not prove significant.

Divergent views have been expressed on the nature and direction of the causality between stock market performance and economic growth (Ezeohaet

al.,2009, Hondroyianniset al., 2004). Some studies observed that economic activities in a country drive stock market development (El Wassal, 2005, Demirguc-Kunt& Levine, 1996), others have also found that stock market growth rather leads to economic growth (Chinwuba& Amos, 2011;Yartey, 2008). There is also disagreement on the direction of causal relationship while some maintain that there is no causal link between stock market performance and economic growth (Sililo, 2010).

Aboudou (2009) examined the causal relationship between stock market development and economic growth for the West African Monetary Union economies by applying Granger causality test by Toda and Yamamoto (1995). He observed that both real market capitalization ratio and total value traded ratio Granger causes economic growth, which is significant at 5% and 1% respectively. The results therefore suggest that stock market development leads to economic growth in the West African Monetary Union. In contrast, Bahadur and Neupane (2006) found a bi-directional relationship between stock market development and economic growth. Bahadur and Neupane (2006) examined the causal relationship between the stock market development and economic growth in Nepal from 1988 to 2005, using Granger causality tests. The researchers measured stock market development by market capitalization ratio and a conglomerate index of market capitalization, total value traded and turn over ratios while economic growth was proxies by real GDP. The results showed bi-directional causality between the market capitalization ratio and real GDP at 5% level of significance.

Applying Granger non-causality test proposed by Toda and Yamamoto, Deb and Mukherjee (2008) on their part investigated the causal

relationship between stock market development and economic growth for Indian economy, using quarterly data for the period 1996 to 2007. The authors used real GDP growth rate as a proxy for economic growth and real market capitalization ratio, real total value traded ration and stock market volatility as stock market indicators. The results suggest bi-directional causation between real stock market capitalization ratio and economic growth at 1% significance level. The implication of both studies is that economic growth and stock market are mutually dependent.

Garcia and Liu (1999) showed the existence of a positive and significant long run relationship between capital market activities and gross fixed capital formation. Both Garcia and Liu (1999) and Yartey (2008) found support for a positive relationship between the banking sector development and stock market development. The capital market and the banking sector serve as intermediate savings towards investment projects and they can be both complements and substitutes for capital mobilization for economic growth (Demirguc-Kunt& Levine, 1996).

Enisan and Olufisayo (2009) investigated causal link between stock market development and economic growth for seven countries in Sub-Saharan Africa. Their results on the Granger causality test which is based on the vector error correction model (VECM) indicated that stock market development Granger causes economic growth in Egypt and South Africa. However, Granger causality in the context of VAR showed evidence of bi-directional relationship between stock market development and economic growth for Cote D'Ivoire, Kenya, Morocco and Zimbabwe. In Nigeria, the authors observed a weak evidence of growth led finance using market size as indicator of stock

market development. They came to the conclusion that stock market could help promote growth in Africa. They went further to state that to achieve this goal, however, African stock markets need to be further developed through appropriate regulatory and macroeconomic policies.

In Ghana, there are limited studies on the relationship between stock market performance and economic growth (Quaidoo, 2011; Osei, 2008) and the results on these studies are mixed. Osei (2005) used a vector autoregressive (VAR) technique developed by Sims (1972) based on Granger's (1969) definition of causality to examine the relationship between stock market development and economic growth in Ghana, using quarterly data for the period 1991 to 2003. The author's purpose was to establish the direction of causality between stock market development and economic growth in Ghana. He used nominal market capitalization and market capitalization ratio as measures of stock market development and real GDP as a proxy for economic growth. The results of the Granger causality test showed that stock market development Granger causes economic growth in Ghana at 5% level of significance.

The relationship between stock market capitalization and economic growth in Ghana was examined by Quaidoo (2011), using quarterly time series data from 1991 to 2006. He employed Johansen multivariate co-integration technique and vector error correction model to examine the long run relationship and short run dynamics among the variables. The researcher also conducted the Granger causality test to determine the causal relationship between the variables. The study further indicated that real economic growth, real stock market liquidity and real gross domestic investment have significant

positive impact on the development of the Ghana stock exchange. According to the author, economic growth is the most important factor explaining the development of the Ghana stock exchange. The results of the Granger causality test showed that economic growth leads to stock market capitalization without any feedback. The study concluded that although the Ghana stock exchange is new, it has a great potential to mobilise both domestic savings and foreign capital for financing future investments, illiquid and highly concentrated. It is therefore important for government to initiate policies to promote economic growth and the stock market.

Levine (1995; 2005) affirmed the fact that countries with better developed financial systems experienced faster economic growth than those without it because a well-developed financial system ensures the flow of funds from surplus spending units to deficit spending units in society. Carlin and Mayer (2003) found a strong relationship between the structure of financial systems operated by countries and economic growth. As a result, the rate of growth of an economy has a strong relationship with whether the economy is thriving on a bank based financial system or a market based financial system.

Demirguc-Kuntand Levine (1996) established that banks, other financial intermediaries and stock markets all grow and become more active and efficient as countries become richer. However, in higher income countries, stock markets become more active and efficient than banks.Mckinnon (1973) and Shaw (1973) are among those who concluded that capital market enhanced the mobilization of domestic and foreign resources and as such facilitated investments.

Chapter Summary

From the above review, it is realized that several works have examined the sources of economic growth in both the developed and the developing countries including Ghana, most of these works concentrated on the interrelationship between GDP growth and its determinants without necessarily paying much attention to particular areas such as stock market capitalisation and economic growth linkages where most policies and strategies should be geared towards in order to achieve the desired rate of growth. This in effect has left some gaps in the economic growth-determinants literature. In the light of this and many others, this study attempts to examine the relationship between stock market capitalisation and economic growth in Ghana during the period 1991-2014. Consequently, it attempts to contribute to the limited existing literature by focusing mainly on which particular areas that most policy issues should be geared towards in the Ghanaian economy as far as economic growth is concerned.

CHAPTER THREE

RESEARCH METHODS

Introduction

This chapter presents the research methods employed in the study. Specifically, it gives a detailed description of the research design, specification of the model, definition and measurement of variables in the model, estimation technique, sources of data and tools for data analysis.

Research Design

The study followed the positivist paradigm within the framework of classical and neoclassical economics. The positivist philosophy favours the use of quantitative approach to research used in this study. Also, this philosophy is suitable for the development of mathematical models to measure relationship between quantitative measurements. Therefore, quantitative method was used in this study.This calls for a suitable model to be employed to examine the effect of stock market performance (using stock market capitalization as a proxy) on economic growth in Ghana. In this regard, this study adapted Solow growth model in a form of a Cobb-Douglas production function. This model is modified to include other variables to analyse the relationship between stock market performance and economic growth using time series quarterly data from 1991 to 2014 in Ghana. This is due to the fact that the study is a macro study and involves trends analysis.

Model Specification

The study adopts the Solow growth model in a form of a Cobb-Douglas production function to capture the relationship between stock market performance and economic growth as shown in equation (1).

$$Y_t = K_t^{\alpha}(A_t L_t)^{\beta}\ell^{\varepsilon} \quad (1)$$

For the purpose of the study and followingLevine (1995; 2005), Carlin and Mayer (2003), and Vieira et al. (2013), we define the total factor productivity (A) in equation (1) as;

$$A_t = f(SMC_t, CPI_t, INT_t, REER_t) = SMC_t^{\beta_1} CPI_t^{\beta_2} INT_t^{\beta_3} REER_t^{\beta_4} \quad (2)$$

Where Y_t= per capita GDP, SMC_t = Stock market capitalisation, CPI_t =Consumer Price Index, INT_t=Interest rate, $REER_t$=Real Effective Exchange Rate, L_t = Labour force and K_t = Gross Fixed Capital Formation.

Substituting equation (2) into (1) we get

$$Y_t = \eta K_t^{\alpha}(SMC_t^{\beta_1} CPI_t^{\beta_2} INT_t^{\beta_3} REER_t^{\beta_4} L_t^{\beta_5})\ell^{\varepsilon} \quad (3)$$

Taking logarithm of the variables, differencing per capita GDP we get:

$$\ln Y_t = \beta_0 + \beta_1 SMC_t + \beta_2 \ln CPI_t + \beta_3 \ln INT_t + \beta_4 \ln REER_t + \beta_5 \ln L_t + \alpha \ln K_t + \varepsilon_t \quad (4)$$

Where $\ln \eta = \beta_0$, $\ln \ell$ =1, ln = natural logarithm. Equation (4) is subsequently modeled with optimal lags of the variables to depict the ARDL representation.

Expected Sign of the Variables

The coefficients $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ and α in equation (4) are the various elasticities of the respective variables. β_0, t and ε are the drift component, time and error term. The a priori signs for the coefficient in equation (4) are $\beta_1 > 0, \beta_2 < 0, \beta_3 < 0, \beta_4 > 0, \beta_5 > 0$ and $\alpha > 0$. The choice of the variables included in the above model is based on the literature, economic theory, data availability and their significance in the model chosen for the study.

Definition and Measurement of Variables

For the purpose of this study, the following operational definitions and measurements will be used for the variables being examined.

Economic Growth (Y)

Economic Growthrefers to steady increases in the economy's real gross domestic product or national product overtime. Following standard practice, we use real GDP per capita growth as the measure for economic growth (Levine et al., 2000). Real GDP per capita is real gross domestic product divided by population.

Stock Market Capitalisation

Stock Market capitalization is the total market value of shares traded on the exchange. It is calculated by multiplying the total number of shares outstanding (for all listed companies) by the market price per share which represents the current value of a company. The study expects a positive relationship between stock market capitalisation and economic growth.

Consumer Price Index

CPI is the index of prices used to measure the change in the cost of basic goods and services in comparison with a fixed base period. The annual percentage change in the cost to the average consumer of acquiring a fixed basket of goods and services that may be fixed or changed at specified intervals, such as yearly is used to measure inflation. It is a reflection of macroeconomic instability. A high rate of inflation is generally unattractive to foreign investors because it raises the cost of borrowing and thus lowers the rate of capital investment. Inflation is therefore used as an indicator to capture macroeconomic instability, (Asiedu& Lien, 2004; Asiedu, 2006).

Interest Rate (INTR)

The interest rate used here is the difference between the domestic interest rate and the foreign interest rate. Thus, it is defined as the rate charged by financial institutions on borrowings (loans). Interest rates will be measured using the Bank of Ghana's prime rate. The prime rate is the annualized interest rate the central bank charges commercial and depository banks for loans advanced to them to meet temporary shortages of funds. The study expects a positive relationship between the country's interest rate and economic growth.

Exchange Rate (REER)

Real effective exchange rate (REER) is the weighted average of a country's currency relative to an index or basket of other major currencies adjusted for the effects of inflation. In this study, the real effective exchange rate used is based on 67 trading partners. Demand for crude oil is relatively inelastic; hence the increase in oil prices increases expenditure on imports by the oil importing country. This may result in an increase in the supply in the

local currency, thus weakening the currency relative to foreign currencies. The weakened currency will increase the burden of payments and lead to balance of payment problems and reduction in other imports, which will ultimately affect economic growth. Hence the inclusion of exchange rate in the model. This study uses real effective exchange rate as a measure of the exchange rate as was used by (Jiménez-Rodríguez & Sánchez, 2005). Exchange rate depreciation may lead to increase in the export of goods and services since goods produced in the economy become relatively cheap. This will have a positive impact on economic growth. Depreciation of the domestic currency may also result in the reduction of imports. However, the impact of exchange rate depreciation on the economy may depend on the balance of payment position of the country. Hence, we expect that a positive relationship.

Physical Capital (K)

The study also follows the work of Fosu and Aryeetey (2008) and uses Gross fixed capital formation as a proxy for capital stock in this study. Gross fixed capital formation is defined as the total value of additions to fixed assets by domestic enterprises, less disposalsof fixed assets during the year, Plusadditions to the value of non-produced assets such as discoveries of mineral deposits, plants, machinery, and equipment purchases; and the construction of infrastructure and commercial and industrial buildings (Baafi, 2010). Investment is included in the model because, fluctuations in crude oil prices lead to a rise in the level of uncertainty which subsequently results in the deferral of irreversible investment which in turn affect real GDP growth. It is expected that the coefficient of capital stock to be positive all other things being equal.

Labour Force (L)

Labour force consists of the proportion of the population that is economically active. In this study, the proportion of the total population aged between fifteen (15) years and sixty-five (65) years who are active and productive is used as a proxy for the labour force. Jayaraman and Singh (2007) argued that, there can be no growth without the involvement of labour. Solow (1956) and Swan (1956) also recommended that labour force should be incorporated in the growth model because of its impact on the work force, hence the inclusion of labour force in the study. All things being equal, the higher the labour force the higher the supply of labour and hence output. The study therefore expects the coefficient of labour to be positive.

Estimation Technique

This study first investigates the time series properties of the data using the Augmented Dickey-Fuller (ADF) and the Philip-Perron (PP) tests. The unit root test was used to check the stationarity properties of the data. The study then proceeded to test for the long-run and short-run relationships among the variables using the Autoregressive Distributed Lag (ARDL) approach.

Sources of Data

This study relied strongly on secondary data coming from the World Bank database, and the Bank of Ghana quarterly bulletins and annual reports. This study employed quarterly data on the chosen variables from the period 1991:Q1 – 2014:Q4. Ghana's exchange rate values against the U.S dollar were obtained from both the Bank of Ghana website and World Development

Indicators. Data on stock exchange performance indicator, market capitalization was obtained from the World Bank Group data base. Data on growth rates and other control variables were equally obtained from the World Development Indicators. Quarterly series of the control variables – trade openness, government expenditure, CPI, capital stock and labour force were generated from annual series using Gandolfo (1981) algorithm.

Unit Root Tests

Since macroeconomic time series data are usually non-stationary (Nelson &Plosser, 1982) it is very important to test for the stationarity properties of the data. This testing requires the test of the order of integration of the data set which is the unit root tests. A time series is stationary if its moments such as the mean, variance, and autocovariances are independent of time (Gujarati, 2012). A stationary series is said to be integrated of order (d) if it achieves stationarity after being differenced (d) times. Many studies have shown that models with non-stationary variables tend to produce spurious regressions and make the usual test statistics (t, F, DW, and R^2) unreliable (Al-Yousif, 2002). So, if the non-stationary variables are differenced properly, they become stationary. The appropriate number of differencing is called the order of integration. Therefore, if a time series, for example, Y becomes stationary after being differenced d times, Y is said to be integrated of order d, denoted by $Y \sim I(d)$.

In line with empirical literature, the study employed the ADF and PP tests to inspect the stationarity properties of the variables included in the model. These tests actually involve two separate steps. First, they test the model with constant but no linear time trend, and second, with both constant

and linear trend in order to determine the degree of integration of the data series. The main reason for conducting these two tests is to be sure that, the series enter the model to be estimated in non-explosive form and also to address the issue of tests with low power. The ADF and PP tests are similar except that they differ with regard to the way they correct for autocorrelation in the residuals. For instance, the PP (non-parametric) test generalizes the ADF procedure, allowing for less restrictive assumptions for the time series in questions. That is, it relates the assumptions pertaining to autocorrelation and heteroskedasticity. Both ADF and PP tests, test the null hypothesis that the variables under investigation have unit root against the alternative hypothesis of no unit root. Moreover, in each of these tests, the optimal lag length is chosen using the Swartz Information Criterion (SIC). Here, the sensitivity of the ADF test to lag selection renders the PP test an important and essential additional tool for making inferences about unit roots. The basic formulation of the ADF is given as:

$$\Delta Y_t = \mu + \delta_t + \rho Y_{t-1} + \sum_{i=1}^{p} \psi_i \Delta Y_{t-i} + \varepsilon_t \text{.....(7)}$$

Where Y_t denotes the series at time t, Δ is the difference operator, μ, δ, ρ, and ψ are the parameters to be estimated and ε is the stochastic disturbance term.

The hypothesis testing is given as:

$H_0 : \rho = 0$ (Series contain unit root- non stationary)

$H_1 : \rho \neq 0$ (Series contain no unit root - stationary)

From the hypothesis test, if the tau (τ) value or test statistic is more negative than the critical values, then, we reject the null hypothesis and conclude that

the series is stationary. However, if the tau (τ) value is less negative than the critical value, we fail to reject the null hypothesis and conclude that the series is non-stationary.

Cointegration Test

In the face of non-stationary series with unit roots, first differencing appears to provide the appropriate solution to the problems. However, first differencing tends to eliminate all the long- run information which economists are invariably interested in. Thus, such differencing may result in a loss of low frequency information or long-run characteristics of the series data. Nevertheless, Engle and Granger (1987) disclosed that, if there is an equilibrium relationship between such variables, then for this relationship to have any meaning, a linear combination of these variables, the disequilibrium error should fluctuate around zero (that is, it should be stationary). Thus, two time series integrated of the same order d are said to be co-integrated if one unique linear combination of these series exists which is integrated in an order inferior to (d-b) with ≥ 1. After establishing that variables are stationary, it is necessary to determine whether or not there is any long-run relationship between them, and this leads to co-integration testing.

The Bounds Testing/ARDL Procedure

In fact, a number of time series studies have used the Johansen's co-integration technique to determine the long-run relationship between variables of interest. This technique actually remains the choice for many researchers who argue that, this is the most accurate method to apply for I (1) variables.

However, a series of studies by Peseran and Peseran (1997), Peseran and Shin (1999), and Peseran et al. (2001) have introduced an alternative co-integration technique known as the Autoregressive Distributed Lag (ARDL) bounds test. This technique has a number of advantages over the Johansen's co-integration technique. First, the ARDL Approach is the more statistically significant technique to determine the co-integration relations in small samples (Ghatak&Siddiki, 2001), while the Johansen's co-integration technique requires large data samples for validity. Second, while other techniques require all the regressors to be integrated of the same order, the ARDL approach can be applied whether the regressors are I (1) or I (0). This means that, the ARDL approach avoids the pre-testing problems associated with standard co-integration, which requires that the variables already be classified into I (1) or I (0) (Peseran et al., 2001). In addition, Tang, (2006) stated that, the ARDL approach is also applicable when the explanatory variables are endogenous and is sufficient to simultaneously correct for residual serial correlation.

Bahmani-Oskooee and Kandil (2007) explained that, the first step in any co-integration technique is to determine the degree of integration of each variable in the model but this depends on which unit root test one uses because different unit root tests could lead to contradictory results. For example, applying the conventional unit root tests such as the Augmented Dickey-Fuller and the Philips-Perron tests, one may incorrectly conclude that a unit root is present in a series that is actually stationary around one-time structural break (Perron, 1997). Thus, the ARDL approach is useful since it avoids all these problems. Another difficulty of the Johansen's co-integration technique which

the ARDL approach avoids concerns the large number of choices which must be made including decisions regarding the number of endogenous and exogenous variables to be included in the model, the treatment of deterministic elements, as well as the order of VAR and the optimal number of lags to be used. Finally, with the application of the ARDL approach, it is possible that different variables have different optimal number of lags, while in Johansen's technique, this is not permitted.

According to Peseran and Peseran (1997), the ARDL approach requires the following two steps. In the first step, the existence of any long-run relationship among the variables of interest is determined using an F-test. The second step of the analysis is to estimate the coefficients of the long-run relationship and determine their values, followed by the estimation of the short-run parameters of the variables with the error correction representation of the ARDL model. By applying the error correction model (ECM) version of ARDL, the speed of adjustment to equilibrium will be determined. In order to apply the bounds test procedure for co-integration, the following restricted (conditional) version of the ARDL models are estimated to test the long-run relationships between exchange rate volatility and economic growth. This framework is implemented by modeling equation (3) as a conditional ARDL as:

$$\Delta \mathrm{InY}_t = \alpha_0 + \sum_{i=1}^{p} \lambda_{1i} \Delta \mathrm{InY}_{t-i} + \sum_{i=1}^{p} \lambda_{2i} \Delta \ln SMC_{t-i} + \sum_{i=1}^{p} \lambda_{3i} \Delta \mathrm{InCPI}_{t-i} + \sum_{i=1}^{p} \lambda_{4i} \Delta \mathrm{InINT}_{t-i} +$$
$$\sum_{i=1}^{p} \lambda_{5i} \Delta \mathrm{InREER}_{t-i} + \sum_{i=1}^{p} \lambda_{6i} \Delta \mathrm{InL}_{t-i} + \sum_{i=1}^{p} \lambda_{7i} \Delta \mathrm{In}K_{t-i} + \eta_1 \mathrm{InY}_{t-i} + \eta_2 SMC_{t-i} +$$
$$\eta_3 \mathrm{InCPI}_{t-i} + \eta_4 \mathrm{InINT}_{t-i} + \eta_5 \mathrm{InREER}_{t-i} + \eta_6 \mathrm{In}L_{t-i} + \eta_7 \mathrm{In}K_{t-i} + \nu_t \text{.....(8)}$$

Where $\Delta's$ are the first difference operators, $\eta_1 \ldots\ldots\ldots\ldots \eta_7$ are the long run multipliers, $\lambda's$ are the short run coefficients to be estimated through the error correction framework in the ARDL models, α_0 is the constant term (drift) and v is the white noise error term.

The first step in the ARDL approach is to estimate equations (5) by applying OLS. The second step is to test the null hypothesis of no long run relationship among the variables in equation (5) against the alternative hypothesis of the presence of a long run relationship among the variables using F-test denoted by F_Y (Y|SMC, CPI, INT, REER, L, K)and it is given by:

$$H_0 : \eta_1 = \eta_2 = \eta_3 = \eta_4 = \eta_5 = \eta_6 = \eta_7 = 0$$

$$H_1 : \eta_1 \neq \eta_2 \neq \eta_3 \neq \eta_4 \neq \eta_5 \neq \eta_6 \neq \eta_7 \neq 0$$

Given that the asymptotic distribution of F-statistic is non-standard without considering the independent variables being I(0) or I(1), Peseran et al. (2001) generated and presented the appropriate critical values according to the number of independent variables I the models of presence or absence of constant term or time trend in the models. Therefore, the calculated F-statistic is compared with two sets of critical values developed on the basis that the independent variables are I(d)-where $0 \leq d \leq 1$.Here, the lower critical bound assumes that all variables are I (0) whereas the upper critical bound assumes that the variables are I(1). If the calculated F-statistic exceeds upper critical value, then the null hypothesis of no co-integration is rejected irrespective of whether the variables are I (0) or I (1). This signifies that, there are long-run relationships among the variables. On the other hand, if the F-statistic falls below the lower bound then the null hypothesis of no cointegration cannot be

rejected. Additionally, if the F-statistic lies within the lower critical and upper critical bounds, then, the test is inconclusive (Peseran&Peseran, 1997). However, when all the variables are integrated of order zero (i.e. I(0)), then the null hypothesis of no co-integration is rejected implying that there exist long-run relationships among the variables, otherwise they are not co-integrated.

For optimal lag length for each variable, the ARDL methodology estimates $(m+1)^{k+1}$ number of regressions, where m is the maximum number of lags and k is the number of variables in the equations. The orders of the lags of the ARDL models are chosen using one of the following information criteria:Schwarz-Bayesian Criterion(SBC), Alkaike Information Criterion (AIC), the $\overline{R}^2$ Criterion or the Hannan and Quinn (HQ) Criterion.

Long-run and Short-run Dynamics

Once co-integration is established, the next step is that, the following ARDL $(p, q_1, q_2, q_3, q_4, q_5, q_6)$ models are estimated in order to obtain the long run coefficients (estimates). These are given by:

$$\ln Y_t = \lambda_0 + \sum_{i=1}^{p} \eta_1 \ln Y_{t-i} + \sum_{i=0}^{q_1} \eta_2 SMC_{t-i} + \sum_{i=0}^{q_2} \eta_3 \text{InCPI}_{t-i} + \sum_{i=0}^{q_3} \eta_4 \text{InINT}_{t-i} +$$
$$\sum_{i=0}^{q_4} \eta_5 \text{InREER}_{t-i} + \sum_{i=0}^{q_5} \eta_6 \ln L_{t-i} + \sum_{i=0}^{q_6} \eta_7 \ln K_{t-i} + \mu_t \quad \text{.....(9)}$$

When there is a long run relationship among the variables, then the unrestricted ARDL error correction representations (short run) are estimated as:

$$\Delta \ln Y_t = \alpha_0 + \sum_{i=1}^{p} \lambda_{1i} \Delta \ln Y_{t-i} + \sum_{i=0}^{q_1} \lambda_{2i} \Delta SMC_{t-i} + \sum_{i=0}^{q_2} \lambda_{3i} \Delta \ln \mathrm{INT}_{t-i} + \sum_{i=0}^{q_3} \lambda_{4i} \Delta \ln GE_{t-i} +$$

$$\sum_{i=0}^{q_4} \lambda_{5i} \Delta \ln \mathrm{REER}_{t-i} + \sum_{i=0}^{q_5} \lambda_{6i} \Delta \ln L_{t-i} + \sum_{i=0}^{q_6} \lambda_{7i} \Delta \ln K_{t-i} + \phi ECT_{t-i} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots (10)$$

From equation (10) the $\lambda's$ are the coefficients relating to the short run dynamics of the convergence to equilibrium, ECT_{t-i} is the error correction term resulting from the estimated long run equilibrium relationship, and ϕ is the coefficient denoting the speed of adjustment to long run equilibrium when there is a shock in the system. Here, the residuals from the co-integration equation, lagged one (1) period is defined as:

$$ECT_t = \ln Y - \alpha_0 - \sum_{i=1}^{p} \phi_{1i} \Delta \ln Y_{t-i} - \sum_{i=0}^{q_1} \phi_{2i} \Delta SMC_{t-i} - \sum_{i=0}^{q_2} \phi_{3i} \Delta \ln \mathrm{CPI}_{t-i} -$$

$$\sum_{i=0}^{q_3} \phi_{4i} \Delta \ln \mathrm{INT}_{t-i} - \sum_{i=0}^{q_4} \phi_{5i} \Delta \ln \mathrm{REER}_{t-i} - \sum_{i=0}^{q_5} \phi_{6i} \Delta \ln L_{t-i} - \sum_{i=0}^{q_6} \phi_{7i} \Delta \ln K_{t-i} \ldots\ldots\ldots\ldots\ldots (11)$$

Engle and Granger(1987) explained that when variables are cointegrated, their dynamic relationship can be specified by an error correction representation in which an error correction term (ECT) computed from the long-run equations must be incorporated in order to capture both the short-run and long-run relationships. The error term indicates the speed of adjustment as stressed above to long-run equilibrium in the dynamic models. In other words, its magnitude shows how quick the variables converge to equilibrium when they are being disturbed. It is expected to be statistically significant with a negative sign. The negative sign indicates that any shock that occurs in the short-run will be corrected in the long-run. Therefore, the larger the coefficients of the error correction term in absolute terms, the faster the convergence to equilibrium.

To ensure the goodness of fit of the models, the diagnostic and stability tests are also conducted. The diagnostic test examines the serial correlation, functional form, normality, and heteroskedasticity associated with the selected models. Peseran and Peseran (1997) suggested that conducting stability test is of great importance. This technique is also known as cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ). The CUSUM and CUSUMSQ statistics are updated recursively and plotted against the breaks points. If the plots of CUSUM and CUSUMSQ statistics stay within the critical bounds of five percent level of significance, the null hypothesis of stable coefficients in the given regression cannot be rejected (Peseran and Peseran, 1997).

Chapter Summary

This chapter presented the methodological framework suitable for conducting the study. The study adopted the Solow growth model in a form of Cobb-Douglas production function to capture the relationship between stock market capitalisation and economic growth. The study followed the standard literature of Levine (1995; 2005), Carlin and Mayer (2003), Vieira et al. (2013) to specify the econometric model for economic growth. Quarterly time-series data on economic growth, stock market capitalisation, consumer price index, interest rate, CPI-rate of inflation, labour force, and capital from 1991 to 2014 were used for the study. Stationarity test was conducted using Augmented Dickey–Fuller (ADF) and Phillip-Perron (PP). Finally, Autoregressive Distributed Lag (ARDL) econometric methodology was used to examine the long-run and short-run dynamics among the variables.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This chapter presents and discusses the estimation results. The results of the descriptive statistics of the variables, both ADF and PP unit root tests, the ARDL approach to cointegration and Granger-causality test are presented and discussed in relation to the hypotheses of the study.

Descriptive Statistics

It can be shown in Table 2 that all the variables have positive average values (means). The minimal deviation of the variables from their means as shown by the standard deviation gives indication of slow growth rate (fluctuation) of these variables over the period. Most of the variables were positively skewed implying that the majority of the values are less than their means.

Table 2: Summary Statistics of the Variables

	lnRGDP	SMC	INT	lnREER	lnCPI	lnLF	lnK
Mean	0.813	3.170	5.320	5.233	0.924	3.977	5.359
Median	0.838	2.762	4.255	5.139	0.983	3.983	5.289
Maximum	1.270	1.912	16.939	6.537	1.568	4.708	6.652
Minimum	0.428	-5.798	1.664	4.025	0.343	2.912	4.109
Std. Dev.	0.173	0.908	3.278	0.290	0.327	0.161	0.288
Skewness	0.058	-3.125	1.475	1.175	-0.302	1.448	1.019
Kurtosis	2.807	19.313	4.988	11.312	1.985	28.517	11.731
Sum	74.81	-11.682	489.465	481.425	84.993	365.909	493.016
Sum Sq. Dev.	2.709	75.093	977.856	7.669	9.7188	2.364	7.587
Observations	96	96	96	96	96	96	96

Note: Std. Dev. represents Standard Deviation while Sum Sq. Dev. represents Sum of Squared Deviation.

Source: computed by the author using Eviews 9.0 Package

It is evident from the Table 2 that only variables, that is stock market capitalisation and consumer price index, are negatively skewed implying that majority of the values are greater than their means.

Unit Root Tests

Although the bounds test (ARDL) approach to cointegration does not necessitate the pretesting of the variables for unit roots, it is however vital to perform these tests to verify that the variables are not integrated of an order higher than one. The aim is to ascertain the absence or otherwise of $I(2)$ variables to extricate the result from spurious regression. Thus, in order to ensure that some variables are not integrated at higher order, there is the need to complement the estimated process with unit root tests.

As a result, before the adoption of Autoregressive Distributed Lag approach to cointegration and Granger-causality test, unit root tests were conducted in order to investigate the stationarity properties of the data. As a result, the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests were applied to all variables in levels and in first difference in order to formally establish their order of integration. In order to be sure of the order of integration of the variables, the test was conducted first with intercept and no time trend, and second with intercept and time trend in the model. The optimal number of lags included in the test was based on automatic selection by Schwarz-Bayesian Criterion (SBC). The study used the P-values in the parenthesis in Tables 3 and 4 to make the unit root decision, (that is, rejection

or acceptance of the null hypothesis that the series contain unit root) which arrived at similar conclusion with the critical values.

The results of ADF test and PP test for unit root with constant only in the model for all the variables are presented in Table 2and Table 3 respectively. The null hypothesis is that the series is non-stationary, or contains a unit root. The rejection of the null hypothesis for the test is based on the MacKinnon (1991) critical and probability values.

Table 3: Results of Unit Root Test with constant only: ADF Test

Levels			First Difference			
Variables	ADF-Statistic	Lag	Variables	ADF-Statistic	Lag	*I(0)*
lnRGDP	-3.163[0.256]	1	ΔlnRGDP	-5.001[0.000]***	0	*I*(1)
SMC	-1.877 [0.336]	0	ΔSMC	-4.102[0.000]***	2	*I*(1)
INT	-2.825 [0.588]	1	ΔINT	-6.452[0.000]***	0	*I*(1)
lnREER	-0.508 [0.986]	5	ΔlnREER	-4.592[0.000]***	1	*I*(1)
lnCPI	-2.776[0.658]	4	ΔlnCPI	-7.263[0.000]***	3	*I*(1)
lnLF	-3.251 [0.205]	5	ΔlnLF	-7.551[0.000]***	4	*I*(1)
lnK	-0.437 [0.983]	4	ΔlnK	-14.228[0.004]***	3	*I*(1)

Note: *** indicate the rejection of the null hypothesis of non-stationary at 1% level of significance, Δ denotes first difference, and *I(0)* is the order of integration. The values in parenthesis are the P-values.

Source: computed by the author using Eviews 9.0 Package.

Table 4: Results of Unit Root Test with constant only: PP Test

Levels			First Difference			
Variables	PP-Statistic	Bwd	Variables	PP-Statistic	Bwd	*I(0)*
lnRGDP	-2.542[0.109]	2	ΔlnRGDP	-5.010[0.000]***	1	*I*(1)
SMC	-1.192 [0.321]	1	ΔSMC	-4.093[0.005]***	2	*I*(1)
INT	-2.573[0.102]	4	ΔINT	-6.485[0.000]***	2	*I*(1)
lnREER	-2.444 [0.133]	5	ΔlnREER	-3.791[0.009]***	1	*I*(1)
lnCPI	-1.792 [0.382]	4	ΔlnCPI	-5.143[0.006]***	1	*I*(1)
lnLF	-1.658 [0.438]	1	ΔlnLF	-4.063[0.005]***	0	*I*(1)
lnK	-0.083 [0.957]	2	ΔlnK	-5.245[0.004]***	2	*I*(1)

Note: *** indicate the rejection of the null hypothesis of non stationary at 1% significance levels, Δ denotes first difference, Bwd is the Band Width, and *I(0)* is the order of integration. The values in parenthesis are the P-values.

Source: Computed by the author using Eviews 9.0 Package.

Table 5: Results of Unit Root Test with constant and trend: ADF Test

Levels			First Difference			
Variables	ADF-Statistic	Lag	Variables	ADF-Statistic	Lag	*I(0)*
lnRGDP	-2.322[0.137]	1	ΔlnRGDP	-6.144[0.000]***	0	*I*(1)
SMC	-2.869[0.178]	1	ΔSMC	-4.713[0.001]***	0	I(1)
INT	-2.529[0.313]	1	ΔINT	-6.589 [0.000]***	0	*I*(1)
lnREER	-1.752 [0.719]	1	ΔlnREER	-4.565 [0.002]***	0	*I*(1)
lnCPI	-1.905 [0.641]	5	ΔlnCPI	-7.133[0.000]***	3	*I*(1)
lnLF	-2.858 [0.181]	3	ΔlnLF	-4.083 [0.000]***	2	*I*(1)
lnK	-2.981 [0.143]	0	ΔlnK	-7.558[0.000]***	3	*I*(1)

Note: *** indicate the rejection of the null hypothesis of non-stationary at 1% significance level, Δ denotes first difference, and *I(0)* is the order of integration. The values in parenthesis are the P-values.

Source: computed by the author using Eviews 9.0 Package

From the unit root test results in Table 5, it can be seen that all the variables are non-stationary at levels. This is because the P-values of the ADF statistic are not statistically significant. However, when the variables are differenced for the first time they become stationary. This is because the null hypothesis of the presence of unit root (non-stationary) is rejected at 1 percent significant levels.Table 6 presents the unit root test results obtained for the PP test with both constant and trend in the model.

Table 6: Results of Unit Root Test with constant and trend: PP Test

Levels			First Difference			
Variables	ADF-Statistic	Lag	Variables	ADF-Statistic	Lag	*I(0)*
lnRGDP	-2.269 [0.243]	3	ΔlnRGDP	-6.129 [0.000]***	1	*I*(1)
SMC	-1.941 [0.624]	4	ΔSMC	-4.678 [0.002]***	2	*I*(1)
INT	-1.109 [0.921]	5	ΔINT	-6.471[0.000]***	2	*I*(1)
lnREER	-2.047 [0.568]	2	ΔlnREER	-3.156 [0.012]***	1	*I*(1)
lnCPI	-2.809 [0.198]	5	ΔlnCPI	-11.493[0.000]***	13	*I*(1)
lnLF	-2.692 [0.242]	6	ΔlnLF	-4.566 [0.002]***	2	*I*(1)
lnK	-2.364 [0.299]	4	ΔlnK	-6.687 [0.000]***	3	*I*(1)

Note: *** indicate the rejection of the null hypothesis of non-stationary at 1% significance level, Δ denotes first difference, and *I(0)* is the order of integration. The values in parenthesis are the P-values.

Source: computed by the author using Eviews 9.0 Package

Bounds Test for Cointegration

It is important to establish the existence of a long run relationship between the variables by employing the bounds testing approach to cointegration (Pesaran, Shin& Smith, 2001). Cointegration test helps to verify the long run and short-run relationships among the variables of interest. The results are presented in Table 7.

Table 7: Bounds Test for Cointegration

Critical value Bounds	90% Level		95% Level		99% Level	
Intercept with no trend	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
K=6	2.141	3.250	2.476	3.646	3.267	4.450
Dependent Variable lnRGDP						
$F_{\ln RGDP} = F_{\ln RGDP\|SMC,INT,\ln REER,\ln CPI,\ln LF,\ln K}$ F-Statistic 4.675						

K is the number of regressors. Note: Critical values were obtained from Pesaran and Pesaran (1997).
Source: Computed by Author using Microfit 4.1

As indicated in Table 7, the joint null hypothesis of lagged level variables (that is, variable addition test) of the coefficients being zero (no cointegration) is rejected at 1 percent significance level when the intercept without trend is included in the model. This rejection is necessitated by the fact that the calculated F-statistic value of 4.675 (i. e. $F_{\ln RGDP}(.) = 4.675$) exceeds the upper bound critical value of 4.450 at 99% level.

As a result of the existence of Cointegration among the variables in Table 7, the long run and short run estimates of the ARDL models were estimated to obtain the long and short run coefficients and their standard errors. The estimation was done using Schwarz Bayesian Criterion (SBC).

Long Run Relationship

This section presents the long-run estimation results which addressed the study's objective of a long-run relationship between stock market capitalisation or performance and economic growth in Ghana.

As shown in Table 8, all the estimated coefficients have their a priori expected signs. From the results,the coefficient of stock market capitalisation is statistically significant at 10 percent significance level implying that 1 percent increase in stock market capitalisation will increase economic growth by approximately 0.02 percent. This result confirms theoretical literature and most findings in most empirical literature such as (Ezeohaet al.,2009; Hondroyianniset al., 2004; Chinwuba& Amos, 2011; Yartey, 2008).

The coefficient of interest rate is statistically significant at 1 percent level, indicating that if Ghana were to increase her interest rate by 1 percent, economic growth will decrease by approximately 0.05 percent in the long run. This means that interest rate has the potential to influence economic growth over the period. This negative effect of interest rate on economic growth lends support to the argument that with an import inelastic country like Ghana interest rate hike is likely to hurt economic growth.This result is in line with the findings by Nicolae (2008), Barro (2003), and Salisu and Ogwumike (2010) in Sub-Saharan Africa.

In addition, the coefficient of real effective exchange rate is statistically significant at 10 percent level, indicating that if real effective exchangerate were to increase by 1 percent economic growth will increase by approximately 0.3 percent in the long run. This means thatreal effective

exchangerate positively affect economic growth in Ghana.This finding is in line with the findings ofOjo and Oshiokoya (1995).

Furthermore, the coefficient of consumer price index carried the expected negative sign and is statistically significant at 1 percent significance level. Thus, if the country's consumer price index increases by 1 percent, economic growth will reduce by approximately 0.04 percent in the long-run. That is, the rate of change in the consumer price index which captures macroeconomic instability has had a significant adverse effect on economic growth in Ghana. This result is in line with theory and empirical literature.

Finally, even though the coefficient of labour force had the expected positive sign,it is statistically significant at 1 percent. This means that if labour force increases by 1 percent, economic growth will also increase by 0.07 approximately in the long run in Ghana. The coefficient of capital had the expected positive sign and is statistically significant at 5 percent level. This means that capital positively affect economic growth in Ghana.This is in line with the findings by Nicolae (2008).

Having established the existence of long-run relationship between economic growth and the associated variables, the ARDL cointegration method is then used to estimate long-run parameters.

Table 8: Long-Run Coefficients Estimates using the ARDL Approach

ARDL(2, 0, 2, 2, 2, 0, 2) selected based on SBC			Dependent Variable: lnY	
Regressor	Coefficient	Standard Error	T-Ratio	P-values
Constant	-1.8835	0.7572	-2.4872**	[0.015]
SMC	0.0163	0.0083	1.9643*	[0.053]
INT	-0.0454	0.0154	-2.9480***	[0.000]
LnREER	0.2980	0.1541	1.9333*	[0.057]
lnCPI	-0.0442	0.0033	-13.314***	[0.000]
LnLF	0.0664	0.0355	1.8723*	[0.068]
LnK	0.3226	0.1561	2.0668**	[0.042]

Note: ***, ** and * denote significance levels at 1%, 5% and 10% respectively

Source: Computed by the author using Microfit 4.1

The long-run results indicate that any disequilibrium in the system as a result of a shock can be corrected in the long-run by the error correction term.Hence, the error correction termthat estimated the short-run adjustments to equilibrium is generated as follows:

ECM = lnRGDP -0.0163*SMC +0.0454*INT – 0.2980*lnREER + 0.0442*lnCPI – 0.0664*lnLF - 0.3226*lnK + 1.8835*C

Short Run Relationship

This section also presents the short-run estimation results which addressed the study's objective of a short-run relationship between stock market capitalisation or performance and economic growth in Ghana.

Once the long-run cointegrating model has been estimated, the next step is to model the short-run dynamic relationship among the variables within the ARDL framework. Thus, the lagged value of all level variables (a linear

combination is denoted by the error-correction term, ECM_{t-1} is retained in the ARDL model. Table 8 presents the results of the estimated error-correction model of economic growth for Ghana using the ARDL technique. The model is selected based on the Schwarz Bayesian Criterion.

Table 9: Estimated Short-Run Error Correction Model using the ARDL Approach

ARDL(2, 0, 2, 2, 2, 0, 2) selected based on SBC			Dependent Variable: ΔlnY	
Regressor	Coefficient	Standard Error	T-Ratio	P-values
Constant	-0.5830	0.26166	-2.2283**	[0.029]
ΔlnRGDP(-1)	0.8117	0.0604	13.4315***	[0.000]
ΔSMC	0.0431	0.0010	4.3100***	[0.000]
ΔINT	-0.0357	0.0025	-0.0502***	[0.000]
ΔlnREER	0.3037	0.0501	6.0531***	[0.000]
ΔlnCPI	-1.4307	0.1254	-11.404***	[0.000]
ΔlnLF	0.2939	0.0685	4.2915***	[0.000]
ΔlnK	0.0554	0.0258	2.1497**	[0.035]
ECM(-1)	-0.1718	0.0289	-5.9432***	[0.000]
R-Squared	0. 7248	R-Bar-Squared	0.6309	
S.E. of Regression	0.13835	F-stat. F(8, 79)	8.1242	[0.000]***
Mean of Dep. Variable	0.0337	S.D. of Dep. Variable	0.1767	
Residual Sum of Squares	1.7473	Equation Log-likelihood	55.0684	
Akaike Info. Criterion	44.068	Schwarz Bayesian Criterion	30.4430	
DW-statistic	2.0072			

Note: ***, **, and * denote significance level at 1%, 5% and 10% respectively

Source: Computed by the author using Microfit 4.1

The results from the ARDL model as displayed in Table 9 suggest that the ultimate effect of previous period value of economic growth on current

values of economic growth in the short-run is positive and statistically significant at 1 percent significance level.The implication is that current values of economic growth are affected by previous quarters' values of economic growth in Ghana. This is expected in that previous growth and expansion in the economy serves as an indication of prosperity and may attract more investment leading to more growth. This result is in line with findings in the empirical studies by Levine et al.(2000) as well as Vieira et al. (2013).

The results also showed the expected negative sign of error correction term lagged one period ($ECM_{t-1)}$and it is highly significant at 1 percent significance level. This confirms the existence of the cointegration relationship among the variables in the model yet again. The ECM stands for the rate of adjustment to restore equilibrium in the dynamic model following a disturbance. The coefficient of the error correction term (ECM) is around –0.1718. In other words, the significant error correction term suggests that a deviation from the long-run equilibrium subsequent to a short-run shock is corrected by about 17% at the end of each quarter in a year. The rule of thumb is that, the larger the error correction coefficient in absolute terms, the faster the variables equilibrate in the long-run when shocked.

Consistent with the long-run results, the coefficient of stock market capitalisation or performance has the theorized positive impact on economic growth in the short-run. From the results, a 1 percent increase in stock market capitalisation will increase economic growth by approximately 0.04 percent in the short-run. We realise that stock market capitalisation has higher impact in the short run than in the long run. The results are in line with findings by

Enisan and Olufisayo (2009) for seven countries in Sub-Saharan Africa and Quaidoo (2011).

Moreover, the coefficient of interest rate has a negative impact on economic growth in the short-run. The coefficient is statistically significant at 1 percent significance level. The resultsshow that a 1 percent increase in interest rate will reduce economic growth by approximately 0.04 percent in the short-run. This confirms the results in the long run model.This result is still in line with the findings by Nicolae (2008), Barro (2003), and Salisu and Ogwumike (2010) Sub-Saharan Africa.

In addition, the coefficient of real effective exchange rate is statistically significant at 1 percent level, indicating that if the country's exchange rate were to increase by 1 percent, economic growth will increase by approximately 0.3 percent in the short run. This also corroborates the long run model results.This finding is in line with the findings ofOjo and Oshikoya (1995).

Again, the coefficient of consumer price index also maintained its negative sign and is statistically significance at 1 percent significance level which is consistent with the long-run results. The result therefore suggests that if the rate of change in the consumer price index goes up by 1 percent, economic growth will decrease by approximately 1.4 percent in the short-run. Thus, the short-run and long-run results indicate that the rate of change in the CPI has been a discouragement for economic growth in Ghana. The negative effect of inflation on economic growth seems more severe in short-run (-1.4) than in the long-run (-0.04). The results indicate how important it is to control inflation in the Ghanaian economy by putting in the appropriate policies. Its

impact in both the short and long run appears to be debilitating as inflation generally proxy macroeconomic instability. This result is consistent with in the empirical literature.

Finally, consistent with the long-run estimate, the coefficient of labour force maintained its positive sign and statistically significant at 1 percent significance level. The results indicate that a 1 percentage point increase in labour force will increase economic growth by about 0.3 percentage points in the short run. The results suggest that labour force is important for economic growth in short-run than in the long-run. The coefficient of capital had it expected positive sign and is statistically significant at 5 percent level. This means that capital positively affect economic growth both in the short and long run in Ghana.

The R-Square shows that around 72 percent of the variations in economic growth are explained by the regressors in the model. It can be seen that the R-Square value 0.72 is less than the Durbin DW-statistic value of 2.007 indicating that the results are not spurious.

Model Diagnostics and Stability Tests

In order to check for the estimated ARDL model, the significance of the variables and other diagnostic tests such as serial correlation, functional form, normality, heteroskedasticity and structural stability of the model are considered. As shown in Table 10, the model generally passes all diagnostic tests in the first stage. The diagnostic test shows that there is no evidence of autocorrelation and the model passes the normality test indicating that the error is normally distributed. Additionally, the model passes the white test for

heteroskedasticity as well as the RESET test for correct specification of the functional formbased on the probability values in parentheses.

Table 10: Model diagnostics

Diagnostics	LM-Version	F-Version
Serial correlation	$\chi^2_{Auto}(4)$2.597 [0.627]	F(4, 68)=1.624[.178]
Functional Form	$\chi^2_{RESET}(1)$ 0.547 [0.459]	F(1,71) =7.019[0.207]
Normality	$\chi^2_{Norm}(2)$ 0. 536[0.765]	Not Applicable
Heteroskedasticity	$\chi^2_{White}(1)$ 2.500[.114]	F(1,88)= 2.514[.116]

Source: Computed by Author using Microfit 4.1

Finally, when analyzing the stability of the coefficients, the Cumulative Sum (*CUSUM*) and Cumulative Sum of Squares (*CUSUMQ*) are applied. Following Pesaran and Pesaran 1997, the stability of the regression coefficients is evaluated by stability tests and they can show whether or not the parameter estimates are stable over time. This stability test is appropriate in time series data, especially when one is uncertain about when structural change might have taken place. The result for *CUSUM*and*CUSUMQ* are shown in Figures 1 and Figure 2.The null hypothesis is that the coefficient vector is the same in every period and the alternative is that it is not (Bahmani-Oskooee, 2004). The *CUSUM* and *CUSUMQ* statistics are plotted against the critical bound of 5 percent significance level.According to Bahmani-Oskooee (2004), if the plot of these statistics remains within the critical bound of the 5 percent significance level, the null hypothesis that all coefficients are stable cannot be rejected.

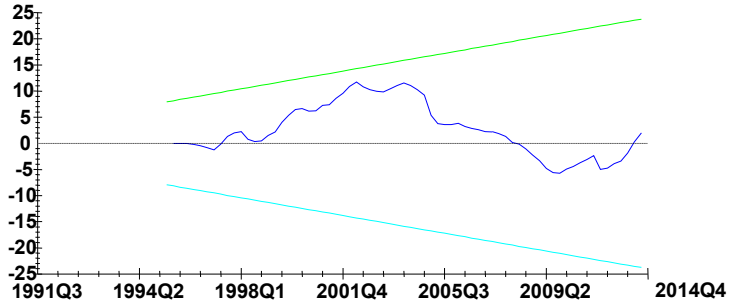

Figure 1: Plot of Cumulative Sum of Recursive Residuals

Note: The variable on the vertical axis is residuals whiles the variable on the horizontal axis is years in quarters.

Source: Generated by the author using Microfit 4.1

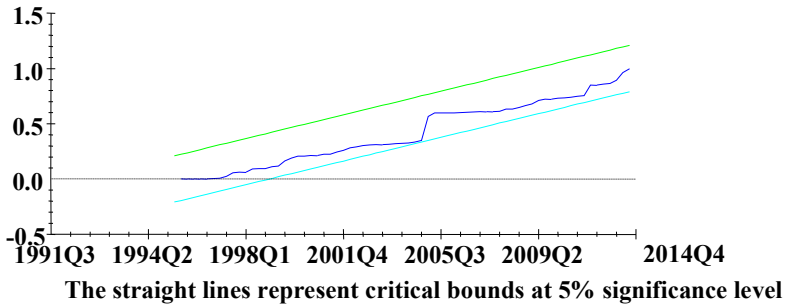

Figure 2:Plot of Cumulative Sum of Squares of Recursive Residuals

Note: The variable on the vertical axis is the square of the residuals whiles the variable on the horizontal axis is years in quarters.

Source: Generated by the author using Microfit 4.1

As shown in Figures 1 and 2, the plot of both the *CUSUM* and *CUSUMSQ* residuals are within the 5 percent critical bound (boundaries). That

is to say that the stability of the parameters has remained within its critical bounds of parameter stability. It is clear from both graphs in Figures 1 and 2 that both *CUSUM* and *CUSUMQ* tests confirm the stability of the coefficients.

Granger Causality Test

After establishing cointegration among the variables, Granger causality test was then applied to measure the linear causation between economic growth and exchange rate volatility. The results of the test are presented in Table 10.

Table 11: Results of Bivariate Granger causality test

Null Hypothesis:	F-Statistic	Prob.
SMC does not Granger Cause lnRGDP	5.71985	0.0447**
lnRGDP does not Granger Cause SMC	1.95333	0.1481

Note: **, and * denote significance level at 1%, 5% and 10% respectively

Source: Estimated by the author using E-views 9.0

The bivariate Granger causality test results in Table 11 reject the null hypothesis that the stock market capitalization does not Granger cause real GDP at 5 per cent level. The rejection of the null hypothesis indicates that stock market capitalization causes growth in real GDP. However, the null hypothesis that real GDP does not Granger cause the stock market capitalisation cannot be rejected even at the conventional level. The results of Granger causality tests confirm causation from stock market capitalisation to economic growth.

Chapter Summary

This chapter has examined the time series properties of the data used for estimation, presented and discussed the results. Unit root test employing both the ADF and the PP techniques essentially showed that all the series had to be differenced once to achieve stationarity. This implied that all the series are integrated of order one, *I*(1). The presence of non-stationary variables implied the possibility of the presence of a long-run relationship among the variables, which the study verified using ARDL bounds test.

The results of the ARDL (2, 0, 2, 2, 2, 0, 2) model selected based on SBC show the presence of long-run and short-run relationship between economic growth and stock market capitalisation or performance while controlling for interest rate, real effective exchange rate, consumer price, labour force and capital. Whereas interest rate and inflation exerted negative and statistically significant impact on economic growth, a positive effect from stock market capitalisation, exchange rate,labour force and capital to economic growth was found. The major finding of the study is that stock market performanceincreases economic growth of Ghana. Therefore policy must be targeted at increasing stock market performance in the country.

Also, the results of the ARDL (2, 0, 2, 2, 2, 0, 2) model selected based on SBC show that the error correction term (ECM_{t-1}) for economic growth carried the expected negative sign. The significant error correction term suggests that a deviation from the long-run equilibrium subsequent to a short-run shock is corrected by about 17% at the end of each quarter in a year.

The diagnostic and parameter stability tests revealed that the model passes the tests of serial correlation, functional form for misspecification, non

normal errors and heteroskedasticity at conventional levels of significance and the graphs of the CUSUM and CUSUMSQ indicate the absence of any instability of the coefficients because the plots of these graphs are confined within the 5 percent critical bounds of parameter stability suggesting that all the coefficients of the estimated ARDL model are stable over the study period. The Granger causality test results revealed a unidirectional causality from stock market capitalisation to economic growth.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

The purpose of this chapter is to present the summary, conclusions and recommendations. The summary presented a brief overview of the research problem, objective, methods and findings. The conclusions captured the overall outcomes regarding the findings of the study in light of the hypotheses. Recommendations also presented specific policies to be implemented by financial policy makers. The chapter also presented the limitations of the study and make suggestions for future research.

Summary

Lack of long term investment capital is the major constraint to economic growth and development in Ghana, The stock markets have been found to influence growth through savings mobilization, liquidity, risk diversification and corporate governance. This study specified an empirical model of economic growth for Ghana with specific focus on the role of stock market performance. Specifically, the study investigated the long run, short run and the causal relationship between economic growth and stock market performance while controlling for other growth determinants using quarterly time series data from 1991Q1 to 2014Q4.

In order to investigate the long and short run relationship between stock market performance and economic growth, the Autoregressive Distributed Lag (ARDL) approach to cointegration and error correction was preferred to other techniques because of its several advantages over other alternatives.

Granger-causality test was employed to examine the direction of causality between stock market performance and economic growth. The results of the Granger-causality test suggest that there is a unidirectional relationship between economic growth and stock market capitalisation or performance with causality running from stock market capitalisation to economic growth.

The diagnostic tests results show that the model passes the test of serial correlation, functional form misspecification, non-normal errors and heteroscedasticity at conventional levels of significance. The graphs of the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) show that there is stability of the parameters.

Conclusions

The following conclusions are made from the study.

First, the study in line with the empirical literature has shown that there exist a long-run and short-run relationship between stock market performance and economic growth with stock market performance positively influencing economic growth.

Again, the results presented in this study imply that interest rate, real effective exchange rate, consumer price index, labourforce, and physical capital are statistically important determinants of economic growth.

Moreover, the study found a unidirectional causality between stock market performance and economic growth. This means that stock market capitalisation or performance leads to economic growth in Ghana.

Despite all the challenges faced by the Ghana Stock Exchange, it still has a positive influence on the Ghanaian economy; there is therefore the need to put measures in place to reduce the bottlenecks encountered by firms desiring to get listed on the exchange.

Recommendations

Taking into consideration the findings from the study, the following recommendations are proposed.

Ghana Stock Exchange needs to put pragmatic measures in place to improve the performance of the stock market. This can be done by strengthening the laws and regulations governing the operations of the stock market to protect the interest of buyers and sellers on the market. This will increase the confidence of investors, boost domestic investment and broaden stock ownership base in the economy. Also, measures designed to check excessive fluctuations in stock prices may help stabilize the macro economy.

Moreover, financial institutions in Ghana need to also consider reducing their interest rate to attract borrowing from the private sector so as to boost development in the financial sector leading to more growth in the economy.

Bank of Ghana needs to ensure astable exchange rate in order to stimulate economic growth in Ghana. Thus, the Bank of Ghana needs to put measures such as exchange rate targeting or stabilisation policies in place to ensure a stable exchange rate for a long time. Thus, the Government must pursue domestic currency appreciation policies in the country.

Also, the findings that labour force positively impact on economic growth shows how important it is to increase labour force rate in the Ghanaian economy. The Government can achieve this by creating more job opportunities for the youth which will lead to high economic growth in the country, the Government needs to first ensure that there is growth in the labour force.

Another policy implication of the study is that the Government of Ghana needs to encourage savings and investments by putting appropriate policies in place to enhance capital formation and investments and consequently increase the living standards of the people through increased economic growth.

Suggestions for Future Research

Since stock market performance is a high frequency phenomenon apart from the measurement used in the study, a different measurement can be used by future research to investigate its effects on economic growth. Finally, the possible determinants of economic growth range from macroeconomic factors, legal and institutional factors, geographical factors, monetary and fiscal policy factors to others. This therefore means that future researchers could explore the other determinants of economic growth other than those considered in this study.

REFERENCES

Aboudou, M. T. (2009). Causality tests between stock market development and economicgrowth in West African Monetary Union.*Economia SeriaManagement,*10(12), 14-25.

Acquah-Sam, E. (2016). Determinants of capital market development in Ghana. *European Scientific Journal,* Kacani 12(1).

Acquah-Sam, E.,& Salami, K. (2014).Effect of capital market development on Economic Growth in Ghana.*European Scientific Journal,* 10(7)

Adjasi, K. D., &Biekepe, N. B.(2006). *Stock exchange and economic growth: the case of selectedAfrican Countries*, University of Stellenbosch, Business School, Cape Town, South Africa.

Aryeetey, E.,Fosu, A. K., &Bawumia, M. (2002).*Economic growth in Ghana.* Draft chapter at African Economic Research Consortium (AERC) Growth Project Workshop, Cambridge.

Aryeetey, E.,&Kanbur, R. (2008). The economy of Ghana, analytical perspective: Growth and poverty.

Asiedu, E.,& Lien, D. D. (2004). Capital controls and foreign direct Investment. *World Development* Vol. 32 Issue 3, 479 – 495.

Atje, R., &Jovanic, B. (1993). Stock market and economic development. *European EconomicReview* 37, 632-640.

Azarmi, T., Lazar, D., &Jayapaul, J. (2005). Is the Indian stock market a Casino? *Journal ofBusiness and Economic Research,*3(4), 63-72.

Baafi, A. (2010). Ghana's economic growth in perspective: a time series approach to convergence and growth determinants.

Bahadur, S.,&Neupane, S. (2006). Stock market and economic development: A causality Test. *The Journal of Nepalese Business Studies*, 3(1), 36-44.

Bahegot, W. (1973). A description of the money market, E. P. Dutton and Company.

Bahmani-Oskooee, M. (2001). How stable is M2 money demand function in Japan? *Japan and the World Economy*, 13(4), 455-461.

Barro, R. J. (2003). The determinants of economic growth in a panel of countries.

Bencivenga, V., Smith, B.,& Starr, R. (1996). Equity markets, transaction costs and capital accumulation. *The World Bank Economic Review* 10(2), 241 – 265.

Carlin, W.,& Mayer, C. (2003). Finance, investment and growth. *Journal of Financial Economics*, 69(7), 191 – 226.

Chinwuba, O., & Amos O. A. (2011).Stimulating economic development through the Capital Market: The Nigerian Experience.*Jorind,* 9 (2).

Deb, S. G., & Mukherjee, J. (2008). Does stock market development cause economic growth? A Time series analysis for Indian economy, *International Research Journal of Finance and economics,* 21(1), 143-148.

Demirguc-Kunt, A. (2006). Finance and economic development: Policy Choices for developing countries. *Policy Research Working Paper* No. WPS 3955, Washington D.C., the World Bank.

Demirgut-Kunt, A., & Levine, R. (1996). Stock Exchange Development and Financial Inter-Mediaries: Stylised Facts. *World Bank Economic*

Review 10, 291-332.

Dickey, D. A., & Fuller, W. A. (1979).Distribution of estimators for autoregressive time series with unit root.*Journal of the American Statistical Association*, 74,427-431.

Dziwornu, R. K., &Awunyotor-Vitor, D. (2013). Stock exchange economic Performance and economic growth in Ghana. Is there a causal link *Asian Journal of Empirical Research*, 1152-1162.

El-Wassal, A. K. (2005).Understanding the growth in emerging stock markets. *Journal of Emerging Market Finance,* 4(3), 227-261.

Engle, R. F., & Granger, C. J. (1987).Cointegration and error-correction representation, estimation and testing.*Econometrica*, 55(2), 251-278.

Enisan, A. A. &Olufisayo, A. O. (2009). Stock market development and economic growth:Evidence from seven Sub-Saharan African countries. *Journal of Economics andBusiness*, 61(2), 167-171.

Ezeoha, A., Ogamba, E. &Oyiuke, O. N. (2009).Stock Market Development and PrivateInvestment Growth in Nigeria.*Journal of Sustainable Development in Africa*, 11(2), 20-35.

Fosu, A. K.,&Aryeetey, E. (2008). Ghana's post-independence economic growth:1960– 2000.

Gandolfo, G. (1981). Qualitative analysis and econometric estimation of Continuous time dynamic models.

Garcia, V., & Liu, L. (1999).Macroeconomics determinants of stock market development.*Journalof Applied Economics Argentina*, 2(1),2959.

Granger, C. W. J. (1969). Investigating causal relationships by econometric models and cross spectral methods. *Econometrica,* Vol. 17, 424-438.

Grossman, G., &Helpman, E. (1991). .*Innovation and growth in the global economy.*Cambridge: MIT Press.

Hodroyiannis, G. (2004). Estimating private savings behavior in Greece. *Journal of Economics Studies,*31(5), 457 - 476

Kemboi, K. J., &Tarus, K. D. (2012). Macroeconomic determinants of stock market development in emerging markets: Evidence from Kenya. *Research Journalof Finance and Accounting,* ISSN 2222-1697 (Paper), 3(5).

Levine, R. (2005). Finance and growth: theory and evidence.

Levine, R., &Zervos, S., (1996). Stock markets, banks and economic growth. *American Economic Review,* 88, 337-558.

Levine, R., &Zervos, S. (1999). Stock market development and long run Growth.*The World Bank Economic Review,* 10(2), 323-339.

Mckinnon, R. I. (1973). *Money and capital in economic development*. Washington, DC:The Brooking Institution.

Mensah, M., Awunyo-Vitor, D., &Sey, E. (2012).Challenges and prospects o of the Ghana stock exchange, *developing country studies,*10(2), Paper I ISSN 2225-0565.

Nazir, S. M., Nawaz, M. M.,& Gilani, J. U. (2010). Relationship between Economic growth and stock market development. *African Journal of Business Management,*4(16), 3473 – 3479.

Nowbutsing, B. M.,&Odit, M. P. (2009). Stock market development and Economic growth: the case of Mauritius.

Ojo, O.,&Oshikoya, T. (1995). Determinants of long term growth: some African Results. *Journal of African Economics,*4(2), 163-191.

Olweny, T. O., &Kimani, D. (2011). Stock markets performance and economic growth:Empirical evidence from Kenya using causality test *Approach Advances in Management & Applied Economics,* 1(3), *153-196.*

Osei, V. (2005). Does the stock market matter in Ghana? A Granger Causality Analysis.*Bank of Ghana, WP/BOG 05/13.*

Osinubi, T. S. (1998). Stock market development in long run growth in Nigeria.

Owusu, L. E., &Odhiambo, M. N. (2014). Stock market development and economicgrowth in Ghana: An ARDL-bounds Testing Approach. *Applied EconomicsLetters,* 21(4), 229-234.

Owusu, L. E., &Odhiambo, M. N. (2013). Financial liberalization and economic growth in Ivory Coast: An empirical investigations.

Patterson, K. (2000). *An introduction to applied econometrics*: A time series approach.

Pesaran, M. H., &Peseran, R. (1997).Estimating long-run relationships from dynamic heterogeneous panels.*Journal of Econometrics*, No. 68(5), 79-113.

Pesaran, M. H., & Shin, Y. (2001). Bounds testing approaches to the analysis level relationships. *Journal of Applied Econometrics,* 16(3), 28–326.

Phillips, P. C. B., &Perron, P. (1988).Testing for a Unit Root in Time Series Regression.*Biometrika*,Vol. 75, 335-446.

Quaidoo, C., (2011). *Stock market capitalisation and economic growth in Ghana.*A Dissertation submitted to the Department of Economics, A Master's Thesis, University of Cape Coast.

Rajan, R. G. &Zingales, L. (1998). Financial dependence and growth. *American Economic Review*, 88(3), 559–586.

Robinson, J. (1952). The generalization of the general theory: the rate of interestand other essays.

Romer, P. M. (1990).Endogenous technical change. *Journal of Political Economy,* 98(2),871-897.

Rousseau, P. L., &Watchtel, P. (2000). Equity markets and growth: Gross country evidence on timing and outcomes, 1980-1995, *Journal of Business and Finance,* Vol.24,1933-1957.

Schumpeter, J. A. (1911).Farsighted visions on economic development. *The American Journal of Economics and Sociology*, 61(2), 387– 403.

Schumpeter, J. A. (1932). *The theory of economic development*. Cambridge: Harvard University Press, MA.

Shabaz, M., Ahmed, N., & Ali, L. (2008). Stock market development and economic growth,ADRL causality in Pakistan. *International Research Journal of Finance and Economics,* Issue 14, 182-195.

Sims, C. A. (1972). Money, income and causality.*American Economic Review*Vol.62, 540-552.

Solow, R. M. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics* Vol. 70, 65–94.

Spears, A. (1991). Financial development and economic growth; causality tests. *Atlantic Economic Journal,*66-74.

Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information.*American Economic Review,* Vol. 71, 393-410.

Sudharshan, R. P., &Rakesh, G. (2011). An Empirical analysis of stock market performance and economic growth: Evidence from India. *International Research Journal of Finance and Economics,* Vol. 21, 133-149.

Thornton, J. (1995). Financial deepening and economic growth in developing countries,*EconomiaInternazionale*, 48(3), 423-430.

Toda, H. Y., & Yamamoto, T. (1995).Statistical inference in vector autoregressions with possibly integrated processes.*Journal of Econometrics,* 66(2), 225-250.

Todaro, M. P., & Smith C. S. (2009).*Economic development.10th Ed.* England, PearsonEducation Limited.

Yartey, C. A. (2008). Determinants of stock market development in emerging economies:Is South Africa Different?*IMF Working Paper-WP/08/32 Washington,* International Monetary Fund.

Ziorklui, Q. S., Abayo, A. G., Senbet, L. W., Nyagetera, B., Rustasitara, L., Musonda, F. &Kitua G. D. (2001). Capital market development and growth in Africa: Sub-Saharan:Thecase of Tanzania.*African Economic Policy,* DP 79.