KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI

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AN ANALYSIS OF STOCK MARKET PERFORMANCE AND GROSS DOMESTIC PRODUCT GROWTH IN GHANA

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DECLARATION

I hereby declare that this submission is my own work towards the Master of Science (Economics) and that, to the best of my knowledge, it contains no materials previously published by another person nor material which has been accepted for the award of any other degree of the university, except where due acknowledgement has been made in the text.

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ABSTRACT

There is a general assertion that a vibrant and representative stock market will reflect the economic growth of a country. This importance attached to the performance of stock markets has triggered curiosity and interest among investors, business owners, governments and policy makers regarding capital markets. This has generated a debate as to whether or not an exact relationship exists between the performance of stock markets and GDP growth. Therefore, an important question that must be answered is, does stock markets really contribute to growth in the GDP? A few researches have been conducted about the contributions of stock markets to the growth in the GDP but has produced varying results. This study employed the ARDL estimation techniques using the GSE Composite Index and the GDP to examine the relationship between the two variables. Results from the ARDL estimation techniques showed that, the stock market Composite Index used as a proxy for stock market performance has a positive relationship with GDP growth statistically only in the long run. Again, inflation has a positive relationship with GDP growth positively in the long run but negatively in the short run. Finally, labour impacts GDP growth positively in the long run but negatively in the short run. The study recommends that, regulators of the securities industry should meticulously ensure that, funds raised by companies on the market are managed and utilized efficiently, and also channelled to appropriate and productive ventures in order to contribute to Ghana's GDP growth. Secondly, policies that are geared towards improving human capital should be advanced to tap the positive impacts of labour on GDP growth. Finally, since there is a positive relationship between inflation and GDP growth, policy measures should be put in place such that, inflation rate will not exceed its desired level and hamper growth.

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LIST OF ABBREVIATIONS

1. ARDL…….. Auto Regressive Distributed Lag Model
2. CI……. Composite Index
3. FINSAP…… Financial Sector Adjustment Programme
4. GAX……. Ghana Alternative Market
5. GDP……. Gross Domestic Product
6. GSE……... Ghana Stock Exchange
7. OLS……... Ordinary Least Squares Regression
8. SAP…… Structural Adjustment Programme
9. WACMIC……... West African Capital Markets Integration Council

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

There is a general assertion that a vibrant and representative stock market will reflect the GDP growth of a country. A stock market refers to a collection of markets and exchanges, where the issuing and trading of shares of public corporations, bonds, and other types of financial assets take place. This allows businesses to raise funds for investments across various sectors of the economy, leading to business expansions, increased productivity, as well as increased employment.

The attainment of GDP growth and development is possible through the combination of factors including the quality and quantity of the country's resource stock, improvements in technology, education, political will, participation, transparency and accountability. According to Manu (2015), a key driver of economic growth is the level and degree of capital accumulation. This means that, the ability of a nation to accumulate capital over time is a major booster for sustained economic growth, as capital drives real investments and output in an economy. As Todaro (2016) opines, capital accumulation can be attained by saving and investing portions of current income in order to boost expected output. Yartey and Adjasi (2007) also reported that, stock markets are avenues for accumulation of funds and an excellent forecaster of output levels and GDP growth. In the light of this, some scholars have argued that there exists a relationship between the performance of stock markets and GDP growth of countries.

On account of the significance of the capital market to Ghana's GDP growth and development agenda, the Ghana Stock Exchange (GSE) was incorporated in July 1989 under the Financial Sector Adjustment Program (FINSAP) to facilitate the trading of securities between investors. The exchange currently lists a total of 38 companies, with 33 on the main bourse and 5 others on the Ghana Alternative Market (GAX). In addition to the equities, there are 97 listed government bonds and 9 corporate bonds. The importance attached to the performance of stock markets has triggered curiosity and interest among investors, business owners, governments and policy makers regarding capital markets. This has generated a debate as to whether or not an exact relationship exists between the performance of stock markets and GDP growth. For planning and policy making purposes, economists and investors alike try to provide answers to whether the stock market affects GDP growth, or whether the effect is in the opposite direction. It is worth noting that, there are dissenting views which contends that, Ghana's development would be best enhanced by improving the existing credit markets. For instance, Singh (1990) argued that, high economic development is not dependent on established stock markets.

The market capitalization of the Ghana stock market as at the end of December 2018 was approximately GH61.36 billion, equivalent to US$12.77 billion (31st December, 2018). According to the April 2018 edition of the provisional 2017 annual Gross Domestic Product (GDP) published by the Ghana Statistical Service, the GDP of Ghana at the end of 2017 stood at approximately GHS256 billion, equivalent to US$46.8 billion; this implies that, the market capitalization of the stock market is about 23 percent of Ghana's GDP. Therefore, an assessment of the values of the stock market's capitalization and the size of the GDP suggests that, an empirical investigation of the relationship between the two is a worthwhile academic exercise. Also, owing to the role of the Ghana stock exchange in facilitating capital accumulation, it can be inferred that the stock market has the prospect of promoting business access to capital, both in

Ghana and across the West African sub region. In the light of this background, this study is a step towards systematically examining the relationship between the performance of the stock market and Ghana's GDP growth.

1.2 Overview of the Ghana stock exchange

The Ghana Stock Exchange was set up in July 1989 as a private company limited by guarantee under the Companies Code of 1963 and subsequently changed its legal status to a public company limited by guarantee in April 1994. In October 1990, it obtained a license as an authorized Stock Exchange under the Stock Exchange Act of 1971 (Act 384). Its operations are regulated by the Securities and Exchange Commission (SEC). It was set up with the following objectives:

1. Provision of the framework and facilities to enable the public to engage in trading of various financial instruments;
2. To control the granting of quotations on the securities market in respect of bonds, shares and other securities of any company, corporation, government, municipality, local authority or other body corporate;
3. To regulate the dealings of members with their clients and other members; and
4. To co-ordinate members stock dealing activities and enhance information exchange regarding prices of listed securities.

1.3 Prospects of the Ghana Stock Market

Since its establishment, the Ghana stock market has undergone landmark transformations; from manual trading to fully automated trading and online transaction settlement. A platform for fixed

income trading has also been instituted, thus providing an avenue for increased liquidity. In order to make it easier for SMEs to raise funds on the capital market, the Ghana Alternative Market (GAX) was established with less stringent requirements. The West African Capital Markets Integration Council (WACMIC) was also established as the governing body for the harmonization of West African Capital Markets in 2013. Its objective is to develop an integrated and coordinated platform for cross-border listing and trading activities. (Ghana Stock Exchange). On the back of the foregoing, one can conclude that the importance of liquid stock markets to GDP growth cannot be overemphasized.

1.4 Research Problem

Given the shortage of financial resources faced by developing nations with Ghana inclusive, due partly to declining official development assistance, it is obvious that the failure of individual nation's commercial banks to provide adequate financial resources to investors has become the enemy of economic growth (Insah, 2013; Mijiyawa, 2013). Hence, the need to turn to developed nations and foreign organizations for financial resource assistance.

Again, the lack of substantial long-term investment capital has been a major drawback to Ghana's GDP growth. According to Osei (2004), this challenge is not experienced by Ghana alone, but is common throughout Sub-Saharan Africa, and has been attributed to the relatively less advanced capital and stock markets. This explains why in his study, Levine (1996) indicated that, there is the possibility that, developing countries are not having optimal benefits from their stock markets, compared to advanced economies. Therefore, an important question that must be answered is does stock markets in developing countries really contribute to their GDP growth?

According to Najeb (2013), researchers hold diverse opinions regarding the importance of stock markets playing a significant role in growth processes by performing the following functions: improving liquidity, aggregating and mobilizing capital, observing managers and exerting corporate control, and providing risk-pooling and sharing services.

Nsiah (2009) also indicated that, due to the unique structural and macroeconomic situations characteristic of advanced economies on one hand and developing economies on the other, findings and conclusions on studies related to advanced economies may not be necessarily deemed to be the case of emerging markets. These unique situations include information asymmetry, and market and institutional efficiency.

In the case of Ghana, few researches have been conducted about the contributions of the Ghana stock market to GDP growth, but have produced varying results. Darkoh (2006) and Ayesu et al. (2012) found a significant positive relationship between the two variables, employing the Ordinary Least Squares model. However, their findings may have been fraught with spurious regression, which is a regression that has non-stationary time series, which is possible in the ordinary least squares model. Moreover, they failed to test for the presence or not of unit root in the model; therefore, the conclusions from their study cannot be fully relied on.

Also, Dziwornu and Awunyo-Victor (2013) examined the causal link between the performance of the Ghana stock market and GDP growth using the Granger causality test and revealed that, at 5 and 10 percent significant levels, there is a unidirectional causality between the performance of the stock market and Ghana's GDP growth. Similarly, using the same Granger causality analysis, Osei (2005) in his study proved a causal link between the performance of the Ghana stock market and GDP growth when he used Granger causality test. However, their studies could not

examine the relationship between the variables, whether positive or negative, long-term or short term.

Adusie (2014) found a negative long-run relationship between the two variables using the Vector Error Correction model. In contrast, Osamwonyi et al. (2013) found out that, there exist no causal relationship between the stock markets of emerging markets (namely Ghana, Nigeria and Kenya) and GDP growth.

Also, an area of study involving the performance of the stock market and GDP growth which existing research have not explored, is a trend analysis providing an account of the movements of variables under study over a period of time. Trend analysis has become very vital in research works as it provides insights and understanding of how two or more variables move over a given time frame, and can also help in predicting and forecasting future movements. It also provides a pictorial explanation of events especially for people who do not understand rigorous econometric procedures. This therefore leaves a gap in the literature.

Therefore, due to the opposing research findings and gaps identified in the literature, further empirical studies must be conducted to examine the exact relationship between the two variables. Hence, this study seeks to examine the effect of stock market performance on GDP growth using the ARDL method and trend analysis.

1.5 Objectives of the Study

The purpose of the study is to assess the relationship between GDP growth and the performance of the Ghana stock market. Specifically, the study seeks to:

1. Examine the trends in stock market performance and GDP growth
2. Examine the effect of stock market performance on GDP growth

1.6 Research Hypotheses

To achieve the stated objectives, the study is supported by the following hypothesis:

Ho: There is no significant relationship between Ghana's GDP growth and the stock market's performance

H1: There is a significant relationship between Ghana's GDP growth and the stock market's performance

1.7 Significance of the Study

According to the African Journal of Business Management (December 2010), the capital market plays a pivotal role in the growth of businesses which eventually impacts economic growth. This implies that, a key driver of growth is an efficient capital market system that facilitates capital mobilization to support business operations and growth. As such, industrial bodies, securities industry regulators, government advisors and central banks follow stock market activities keenly. Unfortunately, economic managers have not been able to achieve targets set out in budgets and statements of economic policies over the years. A prominent building block needed to achieve growth targets in Ghana is the establishment and development of a well-regulated and efficient capital market. The significance of this study is reflected in helping to address the questions of the exact relationship between Ghana's stock market performance and GDP growth, and also providing recommendations on policy directions to improve the viability of the Ghana stock

market. Using the variables under study, the research will assist investment policy makers, investors, regulatory bodies, exchanges and governments to make well-informed, valid and empirical predictions on the stock market and the economy; thus, providing inputs for economic, industrial and business decision-making purposes.

1.8 Scope and Delimitation of the Study

The study shall cover the relationship between stock market performance and GDP growth in Ghana between 1990- 2017. The performance of the market shall be measured by the year-end GSE Composite Index, and the changes in the Gross Domestic Product (GDP) will be used as the proxy for GDP growth. This research shall not cover other indicators and parameters such as volatility and investor sentiments, which would have provided a deeper insight of the market.

1.9 Organization of the Study

The research is sectioned in five chapters. Chapter one entails the background to the study; the problem statement; objectives of the study; hypothesis and research questions; the relevance of the study; and the scope and delimitations of the study. Chapter two captures theoretical and empirical reviews of existing literature and definitions of some concepts relevant to the study. Chapter three focuses on the research methodology that was used to achieve the research objectives. This includes model specification; variable definitions; empirical identification; estimation strategy and sources of data. In Chapter four, the data is analyzed and the findings are discussed. The study ends with Chapter five which focuses on the summary of the findings together with conclusions and recommendations based on the results.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter covers theories underpinning the relationship between GDP growth and the performance of stock markets, together with empirical evidence of the link between capital markets in general, and growth. It gives definitions of key terms and concepts relevant to the study and provides an evaluation and interpretation of the empirical literature. The chapter also gives an account of the birth of Ghana's capital market.

2.1 Definitions of Terms and Concepts

2.1.1 Gross Domestic Product

Gross Domestic Product is the monetary measure of the market value of all the finished goods and services produced in an economy at a given period. It is a measurement of a nation's overall economic activity and includes all private and public consumption, government outlays, investments and additions to private inventories.

2.1.2 Economic growth

According to Kuznets (1971), economic growth is a long-term improvement in the capability of a country to supply increasingly wide-ranging economic goods to the population. The improved capability is driven by technological and institutional advancement as well as ideological changes. Todaro (1992) also defines economic growth as the gradual improvement in an economy's ability to produce over a period of time, which subsequently triggers an increase in

the national output and national income. For the purpose of this study, economic growth is defined as the increase in a country's Gross Domestic Product.

2.1.3 Year-To-Date Return of the Stock Market

The Year-To-Date Return is also known as the Year-To- Date Yield. It refers to the accrued return from the first trading day of the year up to the current date. For the purposes of this study, the Year-To-Date Return refers to the annual returns or yields of the stock market; thus, the end of year returns of the market.

2.1.4 Co-Movement

This is the correlated or similar movement of two or more variables. It refers to a strong correlation among two or more variables. Thus, it is the tendency of two or more variables to move in parallel.

2.1.5 GSE Composite Index and GSE Financial Index

The GSE Composite Index gives an indication of the performance of all the equities on the exchange. The GSE Financial Index on the other hand, specifically measures the performance of all the listed financial equities, which is made up of banking and insurance stocks.

2.1.6 Stock Market Capitalization

Market capitalization is the combined valuation of all listed companies based on their current share prices and the total number of outstanding shares. It is obtained by multiplying the total number of outstanding shares of each listed company by their prevailing prices and summing the individual capitalizations.

2.1.7 Technology

Kumar et.al (1999) explains that, technology comprises of the following: 1) physical element made up of processes, techniques, products, tools and equipment; and 2) information element which is made up of management knowledge, marketing knowledge, production knowledge, and expertise in other functional areas.

2.2 Theoretical Review

2.2.1 Endogenous Growth Theory

The endogenous growth theory argues that, the internal processes within an economic system triggers growth. According to this theory, the improvement of a nation's stock of capital (both human and physical) will lead to growth, through the development and application of new forms of technology, as well as efficient and effective means of production.

Aretis and Sawyer, (2003) outlined some features of the endogenous growth model as follows:

1. Various forms of capital such as public infrastructure, intellectual capital, physical capital, human capital and social capital combines to form overall capital;
2. There are constant returns to capital and overall increasing returns to capital and labour combined;
3. Households are driven to save based on their optimizing decisions which results in an equal amount of investment, with savings boosting capital formation; and

4. Profit maximizing motives drives investment in privately owned capital which responds to the rate of interest. Interest rate brings savings and investment into equality.

2.2.2 Criticisms of the Endogenous Growth Theory

Solow (1994) argues that, the assumption of constant returns to capital is restrictive with no adjustments for deviation. Lucas (1988) also contends that, the effect of diminishing returns, specifically human capital would significantly alter how the model behaves, making it incapable of generating permanent growth. Setterfield (1994) also adds that, it is not clear that the existence of increasing returns is a necessary condition for endogenous growth to occur in the endogenous growth theory. The theory begins at the level of the representative firm, and then aggregates. In view of this, Arestis and Sawyer (2013) have contended that, the model does not specify the appropriate level of aggregation, and raised the question as to whether the nation-state should be seen as the suitable aggregation unit. Further, the endogenous growth theory has been criticized as relying on neoclassical assumptions which are not characteristic of developing countries. For instance, it assumes that all sectors of the economy are symmetrical (Manu, 2015). More importantly, the model does not address factors that slow growth in developing countries such as: inefficient markets, corruption, lack of developmental ideologies, lack of political will, nepotism, poor economic structures, and relatively weaker institutions. On the back of the foregoing, Todaro and Smith (2011) contends that, the model is not adequately applicable in examining growth in developing countries.

2.2.3 The Romer model

One significant contributor to the endogenous growth theory is the Romer model, developed by Paul Romer in 1986. The Romer model focuses on the distinction between ideas and objects and specifies that, output requires knowledge and labour. It examines how capital stock (K) and labour (L) combine, employing a stock of knowledge (A). According to Romer, the processes of production are derived at the firm or industry level. The model assumes that the level of output at the industry level is positively influenced by the economy's capital stock (K), thus resulting in increasing returns at the industry level. The knowledge component of the capital stock ($\bar{K}$), is a public good and affects output at the industry level. Following from this, the increasing returns to scale on knowledge filters into the other firms by way of spill-overs which results in an economy-wide growth in output.

Todaro and Smith (2006) indicated that, the model is relevant to the industrialization process of developing countries, as it adjusts for technological spill-overs on the back of improvements in the productivity of a firm, which have rippling effects on another firm or industry. The model promotes learning by investing. (Todaro and Smith, 2006). As such, the Romer model views the determinant of economic growth as investment in learning or knowledge.

The Romer model can be represented in a Cobb-Douglas aggregate production function as:

$$\mathbf{Y} = \boldsymbol{A}\mathbf{K}^{\alpha+\beta}\boldsymbol{L}^{1-\alpha}$$

Y represents output; ***A*** represents technology or knowledge; **K** is capital stock which is made up of both physical and human capital; **α** shows the elasticity of output with respect to capital; **β** represents the spill-over effects of knowledge; *and* ***L*** is labour. For a given degree of technology (A), the production function represents constant returns to scale in **K** and ***L,*** however, there will be increasing returns if ***A*** rises. If capital, labour, and the stock of technology all double, then output more than doubles.

According to Manu (2015), the implication of this model is that, the accumulation of physical capital, technological and knowledge improvement, and labour force increment are factors within the economic system which can contribute to high growth rate. An assessment of the Romer model shows that, the rate of GDP growth is affected by the stock of physical capital. Therefore, an efficient stock market which facilitates the generation and accumulation of physical capital to be invested in different sectors of the economy can significantly drive GDP growth. As Manu (2015) indicated, it is upon this foundation that Bencivenga and Smith (1991), Levine (1991) and King and Levine (1993), have sort to establish a link between the endogenous growth theory, stock markets and GDP growth rates.

2.3 Empirical Review

2.3.1 Empirical Link between GDP growth and stock markets

Several researches in economics literature have established an empirical link between GDP growth and stock market performance. However, it is worth noting that, while some research has established a significant relationship between the two, others have found no relationship. Also, there have been lack of consensus, as to whether the relationship (if there exist) is significant or insignificant, positive or negative. Some researchers employed cross-country analysis, while others have used time series regression analysis in studying the relationship between the two.

2.3.2 Cross-Country Methodology

A major research on the relationship between stock markets and GDP growth with the cross-country approach is the empirical work, done by King and Levine (1993), using data on eighty countries over the 1960-1989 periods. According to their cross-country findings, factors that

contribute to high levels of financial advancement include; real capita GDP growth, the physical capital accumulation rate, and efficiency in the application and use of physical capital. Studies done by Goldsmith (1969) and McKinnon (1973) also show links between financial and economic development for some economies. Findings of other cross-country research on stock markets and GDP growth such as Barro (1991) and Fry (1997) agrees with that of King and Levine (1993), and illustrated a positive impact of stock markets performance and development on GDP growth.

Despite its contributions to empirical studies, some researchers have raised concerns about the limitations of the cross-country approach. According to Evans (1995), the heterogeneity in slope estimates from country to country is a major drawback in cross-country analysis. Aretis et al. (2001) also contends that, even though the cross-country approach is useful in providing a generic view of the relationship between stock markets and GDP growth, unique situations driven by other related factors in different countries are not addressed. Also, Quah (1993) using data covering 118 countries revealed that, stable growth path assumption in cross-country analysis does not exist. Furthermore, in their study Lee et al. (1996) reported that, the presence of asymptotic bias in the coefficients of the estimators makes the convergence test results deceptive. On the back of the limitations of the cross-country approach, this research adapts time series analysis in accessing the relationship between the performance of the Ghana stock market and GDP growth. After pointing out the drawbacks of the cross-country analysis, Aretis et al. (2001) indicated that, time-series analysis helps to reveal the regression details not addressed in the cross-country framework. They also argue that, the time-series approach is less likely to suffer from cross-country limitations, and it is able to better address the issues of causality and endogeneity.

2.3.3 Time Series Analysis

In his study, Nyong (1997) established the relationship between the Nigeria stock market and the GDP growth with time series regression, covering 1970-1994. He employed the Ordinary Least Square (OLS) regression and Granger causality analysis. The OLS regression showed a significant and negative relationship, while the Granger causality analysis showed a bi-directional causality between the Nigeria stock market and the GDP growth.

In Kenya, Owiti (2012) employed time series analysis covering 1990-2010 and found a significant and positive relationship between the stock market performance and GDP per capita.

In Ghana, Dziwornu and Awunyo-Victor (2013) used annual time series data from 1990-2012 to examine the causality relationship between the stock market and GDP growth. The research showed a one-way causality link between the two with Granger causality analysis, but did not show the degree to which the stock market's performance affect GDP growth.

Darkoh (2006) also applied Ordinary Least Squares (OLS) regression analysis to study the relationship, with quarterly time series data covering 1993-2004. He used the GDP as the proxy of economic growth and the market capitalization to represent the performance of the stock market. Also, inflation, trade openness and government expenditure were used as the control variables. The result showed that, the performance of the stock market has a significant and positive effect on GDP growth.

Furthermore, using quarterly data from 2006-2013 with cointegration and Granger causality test based on a Vector Error Correction model (VECM), Adusie (2014) found a long-run relationship between the stock market and GDP. However, the results showed a significantly negative relationship between the two variables. On the back of the result, he indicated that, the stock market does not contribute to Ghana's GDP growth.

A similar result was obtained by Ofori-Abebrese, Kamasa & Pickson (2016), when they used the Autoregressive Distributed Lag Model (ARDL) to study the causality relationship between stock market capitalization and the GDP growth, with data from 1991-2011. The research produced a positive relationship between the market capitalization and the GDP in the short-run, but negative relationship between the two in the long-run. Despite the fact that results of both Adusie (2014) and Ofori-Abebrese, Kamasa & Pickson (2016) showed a negative long-run relationship between the two variables, they disagreed on the causality link between the two.

From the reviewed empirical literature, the relationship between stock market performance and GDP growth is much studied using the granger causality method. Much of the other techniques has been scarcely explored. Therefore, in studying the relationship between the stock market performance and GDP growth, this research will use the ARDL model to examine the link between the two variables.

2.4 The Birth of Ghana's Capital Market

The weaker-than-expected growth during the 1980s prompted the government to provide solutions to the challenges that slowed economic growth at the time. As a result, in the mid-1980s, the government adopted liberal economic policies under the guidance of the World Bank and the International Monetary Fund (IMF). This led to the introduction of the Structural Adjustment Programme (SAP), with the objective of addressing a number of structural challenges to ensure a sustained economic growth. (Alagidede et al. 2013). Consequently, Ghana implemented the Financial Sector Adjustment Program (FINSAP) under the SAP. It is worth noting that, Ghana's capital market was established under FINSAP to facilitate capital raising activities across various sectors of the economy in order to augment economic growth.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

Different methodologies have been used in literature to examine the relationship between stock market performance and other economic indicators especially economic growth rate, interest rates, inflation rate, and the level of foreign direct investments inflow. Some of the methodologies used include; time series, cross-sections, panel data and estimation techniques such as GLS and OLS. This chapter discusses the methodology and data used in the study. The discussion begins with how the empirical model is derived and also focuses on the estimation technique and diagnostic test conducted on the variables to ensure that the results are efficient, consistent and unbiased. The source of data is also presented.

3.1 Model Specification

This work will be based on a simple model where GDP growth will be expressed as a function of several economic variables over time. The most critical of the variables to be considered is the performance of the stock market. That is, the model will express GDP growth as a function of the composite index of the stock market with the aid of other control variables. The model that

will be used to investigate the relationship between GDP growth and the other variables is identical to the one used by Kabir (2008) and can be specified as follows:

$GDP = f(E)$ 3.1

where, E is the matrix of economic variables with the Composite Index of the stock market inclusive.

More precisely, the functional relationship between GDP growth and the other variables can be expressed in the form;

$Y = BX + U$ 3.2

where Y is a nx1 vector of dependent variables, X is a kx1 vector of explanatory variables, B is a kx1 coefficient vector and U is a nx1 error vector.

Equation 3.2 is transformed into its operational form as;

$$GDP_t = \beta_o + \beta_1 INF_t + \beta_2 GCF_t + \beta_3 RXR_t + \beta_4 OPN_t + \beta_5 CI_t + \beta_6 L_t + e_{it} \quad \text{---------- 3.3}$$

To interpret the results as elasticities, the operational form of Equations 3.3 is transformed into log linear form as;

$$\ln GDP_t = \beta_o + \beta_1 \ln INF_t + \beta_2 \ln GCF_t + \beta_3 \ln RXR_t + \beta_4 \ln OPN_t + \beta_5 \ln CI_t + \beta_6 \ln L_t + e_{it} \quad \text{---------- 3.4}$$

where,

GDP = Gross Domestic Product measured in local currency unit;

INF = Consumer Price Index representing annual inflation;

GCF = Measure of the Gross Capital Formation which is a proxy for total private investment per annum;

RXR = The Effective Exchange Rate of the Cedi against the Dollar

OPN = Measure of the Openness of the economy. This is obtained by adding exports and imports and dividing by the total output for the year;

CI = Composite Index of the stock market for each year used as a proxy for the performance of the stock market; and

L= Labour in the Ghanaian economy

The logarithmic transformation was done with three main objectives. Firstly, some of the estimates for the economic variables are larger values whiles others are in decimals, which sometimes makes working with the data quite difficult. Therefore, the logarithmic transformation is done to make analysis and data handling simpler. Secondly the logarithmic transformation will mean that, the coefficients are elasticities and thus, will provide a basis for comparison with other studies on the subject.

3.1.1 Apriori Expectations

Inflation (INF) which represents increase in general prices is expected to have a negative relationship with GDP growth. When the cost of services coupled with that of goods increase consistently in an economy, it leads to reduction in the living standards of the citizenry. Inflation affects income and wealth distribution. High inflation causes apathy towards investing in financial assets because, it erodes returns on investment. Low inflation on the other hand can increase the desire for investments. Inflation has a negative relationship with output volatility. This is because, inflation makes domestic goods relatively costly, as compared to other countries.

This therefore increases the demand for imported goods which subsequently creates balance of payment deficit. Also, the poor may not be able to meet their daily expenses due to high prices.

When Gross Capital Formation (GCF) increases, GDP growth improves. This is because, it will create employment opportunities and increase income levels, leading to increased economic growth. It also increases investment opportunities. The higher the rate of investment, the higher the growth rate of the economy, all things being equal. This is in line with both the neoclassical and endogenous growth predictions.

The relationship between exchange rate and GDP growth is an ambiguous one. According to Eichengreen (1998), expected depreciation of the local currency decreases the demand for domestic-currency deposits, making available more liquidity in the economy, thereby stabilizing the financial sector. Sustained exchange rate stability is expected to stabilize the currency's value and price level, reduce uncertainties, aid in effective planning and forecasting, and help achieve economic growth. On the other hand, depreciation of the local currency increases prices of imports, and so countries that import raw materials and semi-finished goods for production encounter high cost of production and hence import inflation into their economies. The end result will negatively affect growth.

Trade Openness (OPN) stimulates economic activity. More growth opportunities are created when trade is expanded. For example, an increase in trade will lead to increased employment opportunities, infrastructural expansion including roads, rail ways, electricity, enhanced revenue generation for government, among others. This is indicative that, trade openness is positively related to GDP growth.

The stock market is believed to be an avenue for accumulation of funds and hence trigger increased growth in the GDP. It is normally assumed that, huge declines in stock prices reflects recession in the future, and rising securities prices signals potential improvements in the GDP. Hence, the expected sign between stock market performance (CI) and GDP growth is positive.

Abundant labour will translate into cheap labour in the economy. This leads to low production costs, partly contributing to increase in national output and hence, enhanced GDP growth. There is therefore a positive relationship between labour and GDP growth.

3.2 Estimation Strategy

This is where the study estimates the parameters. To ensure reliability of the estimates of the parameters of equation 3.4 using the time series data, three (3) steps are followed. Firstly, each of the individual variables in the regression model are examined for presence (or not) of unit root to be sure that the estimated results of the model are not spurious. Secondly, the presence of co-integration among the variables in the models specified above is tested using the ARDL Bounds test method. Lastly, the long-run and short-run coefficients in the model under estimation are estimated using the ARDL framework.

3.2.1 Stationarity Test

In order to assess if the time series data are stationary or not, a unit root test is required. This is done to ensure that, the variables are stationary and that shocks that may occur are only temporal and will therefore dissipate and return to their long-run mean.

It is important to test for unit root of the variables to know the order of integration of each of the variables, as is required for the use of time series data for analysis. The number of tests available

for testing whether or not a series is stationary includes the following; the Dickey-Fuller (DF) test, Augmented Dickey-Fuller (ADF) test, the KPSS test, the Philips-Perron (PP) test, among others. This study applied the ADF Test to check for stationarity following Dickey and Fuller (1981) and Fuller (1996). The ADF test is based on the regression equation below.

$$\Delta \mathbf{y} = \mathbf{b_1} + \mathbf{b_2}\, \mathbf{t} + \mathbf{b_3}\, \mathbf{y_{t-1}} + \sum_{n=1}^{n} (\boldsymbol{B_i}\ \Delta \boldsymbol{y_{t-i}}) + \mathbf{u_t} \quad \text{.....3.5}$$

where,

Δ = the difference operator,

y= the natural log of the time series variable,

t= a trend variable,

b_1, b_2, b_3 are all parameters to be estimated,

B= vector of the estimated parameters of the lagged values of the differenced value of time series

Δy_{t-i}= the vector of the lagged value of the differenced value of the series and

U= the error term.

Decisions as to whether the variables are stationary or otherwise are based on the hypothesis below;

H_0: $b_1 = b_2 = b_3 = 0$

H_1: $b_1 \neq b_2 \neq b_3 \neq 0$

A rejection of the null hypothesis implies stationarity in the series. However, if the null hypothesis is accepted, the conclusion that there is unit root is drawn. The null hypothesis is rejected when the p-value is less than the 1% significance level or the 5% significance level

otherwise, the null hypothesis is accepted. So, the ADF test is run at level and at first difference with intercept only and with intercept and trend.

3.2.2 The ARDL Co-integration Test

This study employs the ARDL co-integration technique to test for the long-run and short-run relationships between GDP growth and the selected macroeconomic variables in this study. The study used the ARDL model for the following advantages; the ARDL model is a more statistically significant approach to determine the co-integration even when the sample size is small. Also, the ARDL approach does not need all of the variables to be integrated of the same order, unlike other co-integration techniques. Therefore, the ARDL technique can be applied whether the variables are *I(1)* and/or *I(0)*. In effect, the ARDL technique avoids the pre-testing problems connected to standard co-integration, which demands that, the variables be already categorized into *I(1)* or *I(0)* (Pesaran *et al.,* 2001). This model is even the more appropriate model for empirical work in a case where the stationarity properties of the data are uncertain. Bahmani-Oskooee (2004) observed that, in determining the degree of integration of each variable in the model, the result may differ depending on which test one uses, hence the results could contradict. For instance, when the Augmented Dickey Fuller technique is employed, it will be easy to incorrectly conclude that, a unit root is present in a series that actually has no unit root around a one-time structural break. The ARDL approach is therefore the best for this study because it avoids such problems.

In order to run the long run estimation, the ARDL Bounds test was first applied to check for long run relationship. The dynamic structure of the *ARDL* (*p,q*) model takes the following form;

$$\Delta X_t = a_0 + a_1 t + a_2 X_t + a_3 Z_t + \sum_{i=1}^{p} A_i X_{t-i} + \sum_{j=0}^{q} B_j Z_{t-j} + \mu_t \quad \text{.....3.6}$$

H_o: $a_2 = a_3 = 0$

H_1: $a_2 \neq a_3 \neq 0$

The hypotheses stated above can be determined through the use of the standard F-statistic. When the null hypothesis is rejected, it means there is co-integration among the variables; otherwise there is no co-integration among the variables. The null hypothesis is rejected when the p-value is less than the 1% significance level or the 5% significance level or the 10% significance level (or the calculated F- statistic is greater than the critical upper bound value) otherwise, the null hypothesis is accepted.

3.3 Diagnostic Tests

Diagnostic tests were performed to check if the linear regression models and data used do suffer from heteroscedasticity, serial correlation, normality of residual and multicollinearity. Various tests such as The Breusch-Pagan-Godfrey test for heteroscedasticity, Breusch-Godfrey Serial Correlation LM Test for serial correlation, the Jacque-Berra test for normality and also, the Ramsey RESET Test for stability were applied in the analysis of diagnostic and stability tests of the long-run coefficients together with the short-run dynamics. The purpose of these diagnostics is to check the robustness of the model.

3.4 Data Sources and Description

The study uses secondary data obtained from the World WDI database of the World Bank for the years 1990 up to 2017, and also from the Ghana stock exchange database. One stock market variable and five macroeconomic variables and were used for this study.

3.4.1 Gross Domestic Product

Gross Domestic Product is the monetary measure of the market value of all the final goods and services produced in a country at a given period. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus product taxes, minus subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current local currency (Ghanaian Cedi). This investigation utilizes the GDP growth as a dependent variable. Different researchers have also utilized it in their studies as a dependent factor (Anaman, 2006, Khan and Bashar, 2007, Frimpong and Abayie, 2006).

3.4.2 The Inflation Rate

Inflation refers to the consistent increment in the general price level of products and ventures over some stretch of time. It is a quantitative measure of the rate at which the average price level of a basket of selected goods and services in a country rises within a period. Furthermore, inflation is the persistent increase in the general level of prices, where a unit of currency purchases less than it did in previous periods. Therefore, it indicates a decrease in the purchasing power of an economy's currency. The research utilizes the Consumer Price Index (CPI) as a proxy for price increase.

3.4.3 The Effective Exchange Rate

Exchange rate is one of the important economic policy tools. When the exchange rate depreciates (Ghana operates the floating exchange rate system), a trader requires more units of the Cedi to buy foreign currency, thus increasing the cost of imported goods. The trader passes this cost to the consumer, which increases the prices of consumer goods.

The comparative engaging quality of native products relative to outside merchandise depends essentially on their relative costs. We can think about this relative cost as the quantity of household merchandise, that must be offered up to procure one outside entity. This comparative cost is recognized as the 'actual conversion rates.' This actual conversion rates could be communicated in both reciprocal and multilateral (or compelling) terms. The multilateral genuine conversion scale (the two terms are identical and are both in similar usage) is developed from reciprocal genuine trade rates. It is the geometrically weighted normal of the applicable arrangement of respective genuine trade rates.

3.4.4 Gross Capital Formation

Gross fixed capital formation (formerly gross domestic fixed investment) includes: land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Data are in current local currency.

3.4.5 Openness to Foreign Trade

Trade involves the transfer of ownership of goods and services from one person to another, in exchange for other goods and services or for money. International trade is often argued to be a contributor of GDP growth. With regards to an open economy, the total volume of trade which is the total number of exports and the total number of imports as a percentage of real GDP, is a variable, that contributes to the Gross Domestic Product which in turn leads to economic growth. International trade leads to specialization and exchange, which broadens the productivity base of a nation. Thus, an increase in the productivity base of a country tends to boost GDP growth.

3.4.6 Labour

Labor comprises groups with ages 15 and above who are able to work for the production of goods and services during a specified period. It includes people who are currently employed and people who are unemployed but seeking to work, as well as first-time job-seekers. However, not everyone who works is included; unpaid workers, family workers, and students are often omitted, and some countries do not count members of the armed forces. Labor force size tends to vary during the year as seasonal workers enter and leave.

3.4.7 Stock Market Composite Index

The stock market composite index is used as a proxy for the performance of the stock market in this study. It is an indication of the performance of all the equities on the exchange market. A composite index is a collection of many equities, other securities, or other indexes that are averaged together to represent overall market or sector performance. Typically, the elements of a

composite index are combined in a standardized way to present large amounts of data easily. Indexes are statistical tools, which can provide a useful measure of securities' relative performance over time.

Composite indexes are created to conduct investment analysis, measure economic trends, and forecast market activity. They are used as tools for tracking securities' price changes relative to an entire stock market or sector. Therefore, they provide a useful benchmark against which to measure an investor's portfolio. The goal of a well-diversified portfolio is usually to outperform the main composite indexes. Three of the most-followed indexes in the world are the Nasdaq Composite Index, Dow Jones Industrial Average (DJIA, the Dow), and the Standard & Poor's 500 Index (S&P 500). This study employs the Ghana Stock Exchange Composite Index (GSE CI).

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF FINDINGS

4.0 Introduction

In this section, the empirical and statistical findings of the study are analyzed. The results of the diagnostic tests are also discussed, the descriptive analysis of the various variables used in the study is presented and the estimation results are also interpreted. All analysis was carried out with EVIEWS 9 package.

4.1 Descriptive Analysis

The statistics presented include mean, standard deviation, and the maximum and minimum values of all the variables used in the study. The statistics represents the summary of the values of the variables reported only in the study period (1990-2017). The table below shows the descriptive statistics of the variables.

Table 4.1: Descriptive statistics of variables

Variable	Mean	Std. Deviation	Minimum	Maximum
lnGDP	22.759	2.272	19.073	26.271
lnINF	2.861	0.514	1.964	4.085
lnGCF	21.185	2.342	17.139	24.807
lnRXR	4.647	0.232	4.225	5.085
lnOPN	4.293	0.264	3.749	4.754
lnCI	6.966	1.438	4.146	9.253
lnL	16.038	0.244	15.641	16.428
No. of observations	28	28	28	28

Source: Author's computation with EVIEWS 9 package

From the table, Ghana has registered an average (mean) GDP of 22.759 within the period under study (1990 -2017). This necessitates the implementation of expansionary pragmatic policies in order to boost the rate of GDP growth. Average inflation recorded within the period was 2.861. Also, gross capital formation recorded an average of 21.185. This is higher than the average exchange rate of 4.647 recorded during the period under study. The table also indicates that, openness (which is measured by the addition of both total exports and total imports divided by total Gross domestic product) averaged 4.293. Therefore, export promotion must be at the core of Ghana's developmental agenda in order to spur higher growth rates. The standard deviation is a measure of how the variables are spread out around their various means. The difference between the minimum and the maximum values of the variables give the range of the variables used in the study. The range is an indicator of the level of fluctuations in the variables; the larger the range values, the higher the level of fluctuations in a variable. Labour had the lowest fluctuation among the variables and gross capital formation had the highest within the study period. Labour recorded an average of 16.038 within the period. The GSE composite index which measures the performance of the stock market recorded an average reading of 6.966. The

size of Ghana's stock market is relatively smaller compared to other stock exchanges like Kenya, Nigeria, South Africa and Morocco. It is therefore imperative for the government through the Ministry of Finance, the Securities and Exchange Commission and the Ghana Stock Exchange to put in place measures that will encourage and attract more businesses to list.

4.2 Trend Analysis of Stock Market Performance and GDP Growth

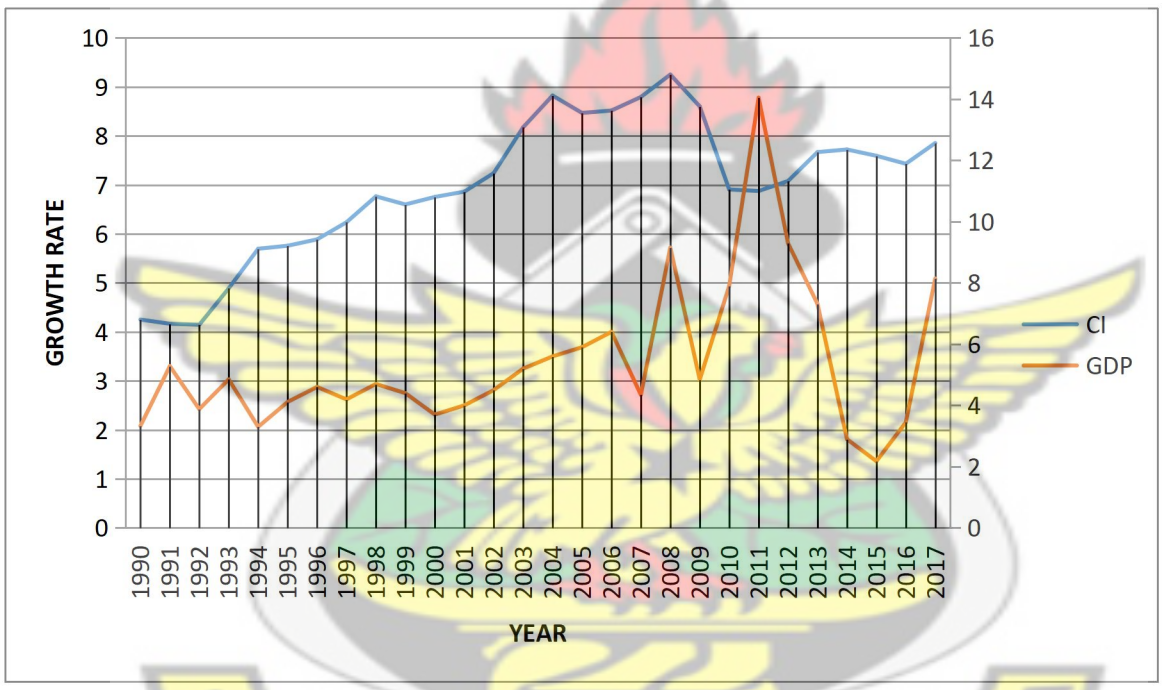


Fig 4.1 Trend of the GSE Composite Index and the GDP Growth Rate

The figure 4.1 shows that, the performance of the stock market and the GDP growth rate positively trended, with similar movements generally. The two variables moved in the same direction for most parts of the years under study. In all, 16 out of 27 years (1991-2017) saw similar movements and trend between the stock market's performance and Ghana's GDP growth.

From 1990 to 1991, GDP grew from 3.32% to 5.28%, whilst the GSE composite index fell from 4.25% to 4.15% in 1992. While the GSE composite index after falling in 1992 turned to rise positively from 1992 to 2004 at 8.82%, GDP also kept a positive trend with annual fluctuations till 2011, where Ghana's GDP grew at its highest peak at a rate of 14.05%. In 1986, the Structural Adjustment Programme (SAP) was introduced to correct a number of structural imbalances to ensure a sustained healthy economic growth. The response of the economy to the paradigm shift of economic management from state control to a liberalized one, was the positive trend of GDP growth in the 1990s to the 2000s. Consequently, Ghana implemented the Financial Sector Adjustment Program (FINSAP) under the SAP. It is worth noting that, Ghana's capital market was established under FINSAP to facilitate capital raising activities across various sectors of the economy, in order to augment GDP growth and economic growth. It is therefore not surprising that, both stock performance and GDP growth was positively trending within this period.

In 2005, the GSE composite index fell to 8.47% and started rising again in 2006 until 2008 where the index peaked at 9.25%. In the same year, the economy recorded a GDP growth rate of 9.15%.

Owing to a GDP rebasement and the commencement of commercial oil production in 2010, in 2011 Ghana became one of the six fastest-growing economies in the world. After 2011, the GDP took a downward trend up till 2016 where it recorded its lowest rate of 3.7% and then rose again to 8.4% in 2017, with the GSE composite index trending higher within that period.

The declined performance of GDP growth after 2011 was partly as a result of the slump in commodity prices and the adverse effects of energy shortages between 2012 and 2013. The service and industry sectors have borne the brunt of the productivity loss, caused by the energy

shortages. Job losses in both the service and industry sectors largely because of the energy crisis in 2012 also contributed.

In 2014, the prices of Ghana's major exports; gold and crude oil declined. Export revenues had fallen and had contributed to the depreciation pressures on the Cedi. Coupled with a plunge in oil prices, this led to an economic crisis that forced the government to negotiate a $920 million extended credit facility from the IMF in April 2015. All these consequently led to the slump in GDP growth between 2012 and 2016.

Figure 4.1 shows a disparity in the movements of the two variables in some years especially from 2011-2014. This is partly due to the replacement of the GSE all share index in 2010 with the GSE composite index when it closed 2010 at 7,369.21 points, and was subsequently rebased to a lower reading of 1,000 points in the same year. Another reason for the disparity could be attributed to the commencement of oil production in commercial quantities during the period, which saw a significant growth in the GDP especially in 2011.

Unfavorable macroeconomic conditions in Ghana have sometimes resulted in a situation where stock market investors react in ways that have had negative ripples on the bourse. For instance, the effects of the energy challenges in 2012 and 2013 had a number of implications on economic activity and growth from 2013 to 2015. This resulted in a chain of issues including; high operating expenses of businesses, reduced profits across various sectors, high borrowing costs, weakened capacity of businesses to repay loans, and high loan default rates which resulted in high Non-Performing Loans ratios (NPL) in the banking sector. Consequently, the combined effects of these challenges resulted in a decline in Ghana's GDP growth rate. (i.e. from 9.3% in 2012 to 7.3% in 2013, to 4% in 2014 and 3.8% in 2015 respectively). As a result of these challenges, listed companies reported unimpressive financial performance, and the stock market

also became relatively unattractive, as risk appetite was mostly dampened. Subsequently, most stocks lost significant values which saw the stock market record subdued year-to-date returns from 73% in 2013 to 5% in 2014 and -12% in 2015 respectively.

Having started with the manual trading system/call over trading system which was time consuming with a number of inefficiencies, the GSE now has a fully automated trading system called the Capizar Ez Trade, which was developed in 2015. It supports efficient trading in multiple asset classes including equity, fixed income/debt instruments and derivatives. In 2015, the Ghana Fixed Income Market, an organization operating under the GSE launched the e-bond trading system, which facilitates trading in government bonds. This allows investors to trade in bonds without waiting for it to mature in the long term, thus improving liquidity on the market. Further, on account of the difficulty faced by entrepreneurs in raising funds to start and expand their businesses, the Ghana Alternative Market (GAX) was established in 2013. It acts as an avenue where SMEs can raise long term capital with relatively less stringent requirements.

The stock market closed 2017 at a Year-To-Date return of 55.73% from -15.33% in 2016. Also, the GDP growth accelerated to 8.4% in 2017, partly driven by the mining and oil sectors, making Ghana the second-fastest growing African economy, after Ethiopia. In addition to the impact of the oil sector, gold output was high, while cocoa production levels remained stable.

4.3 Results of Unit Root Test

A unit root test is undertaken on all the variables to examine their stationary conditions. Non-stationary data, as a rule, are unpredictable and cannot be forecasted since using non-stationary

time series may be spurious. Therefore, to receive consistent and reliable results, the non-stationary data needs to be transformed into stationary data. The results of the unit root tests on all the variables are presented in the table below. As indicated in Table 4.2, some of the series according to the ADF test are non-stationary in their levels but all the series are stationary in their first difference.

From the table, the null hypothesis of unit root was rejected for only lnINF and lnL at the levels for constant and trend. This means that inflation and labour are stationary at the levels. This could be as a result of the regulation of some agric products in the country and the fact that labour in the agricultural sector especially, which happens to be the larger sector in terms of employment have almost the same labour charges across the country. Since all the series were not stationary at the levels, the study further tested for unit root at first difference. From the results below, the null hypothesis is rejected for lnRXR, lnGDP, lnGCF, lnCI and lnOPN, indicating the absence of unit root in all the variables at the 1% critical values, hence stationarity at first difference. Since some variables are stationary at levels and others at first difference, it can be concluded that some variables are integrated of order zero *I (0)* and others of order one or *I (1)*.

As a result, statistically, the data has the potential of producing spurious relationships when VAR, ordinary least squares or VEC methods are applied on the data since not all the variables are integrated of the same order. Therefore, the ARDL method of estimation is applied.

Table 4.2: ADF Test for Stationarity

	LEVEL	FIRST DIFFERENCE

VARIABLE	CONSTANT	CONSTANT & TREND	CONSTANT	CONSTANT & TREND
lnCI	-2.301	-2.179	-4.171***	-4.669***
lnINF	-3.023**	-3.450*		
lnRXR	-1.756	-2.839	-4.775***	-4.718***
lnGCF	-0.909	-2.802	-4.959***	-4.911***
lnGDP	-0.636	-2.677	-5.103***	-5.070***
lnL	0.493	-4.283**	-2.869*	
lnOPN	-2.402	-2.053	-4.998***	-5.288***

Note: ***, ** and * represent significance at 1%, 5% and 10% respectively.

Source: Author's computation

4.4 Estimation results and Discussion

The ARDL results are broken into three stages: Firstly, finding cointegration. Secondly, testing for the long run and thirdly, estimating for short run and the error correction model. The results are presented in sections 4.4.1, 4.4.2 and 4.4.3 as follows;

4.4.1 Results and Analysis of the Co-integration

The ARDL Bound test was used to estimate for the presence of cointegration. The study used a maximum number of lags automatically selected by the Akaike Information Criterion (AIC).

When the F-statistic is greater than the critical value bounds, reject the null hypothesis that there is no long run relationship or co-integration, otherwise do not reject. From table 4.3, the F-statistic (8.192) is greater than the 1% upper critical value bound. Therefore, the null hypothesis is rejected implying that, there is a long run relationship between GDP growth and stock market

composite index, inflation, gross capital formation, trade openness, exchange rate and labour. Having established the long run relationship between the variables, the ARDL method is applied in the estimation of the parameters of the long run and short run.

Table: 4.3 ARDL Bounds Test Results for Co-integration Relationship.

F statistics	Level of Significance	Lower bound	Upper Bound
8.192***	1%	3.15	4.43
	5%	2.45	3.61
	10%	2.12	3.23

Note: *** represent significance at 1%.

4.4.2 Results of the Long-run Relationship

The study used a maximum number of lags automatically selected by the Akaike Information Criterion (AIC). Table 4.4 shows results of the long-run estimate.

The regression results of the equation estimating the relationship between the performance of the stock market and GDP growth is presented in table 4.4 below, using the ARDL as the estimation technique. The coefficients of the variables are their respective elasticities.

The table indicates that variables such as Gross Capital formation, Openness to Foreign Trade and the Exchange Rate have insignificant impact on Ghana's GDP growth. Other variables such as Inflation, the GSE Composite Index used as a proxy for stock market performance and Labour were found to be significant at various levels of significance.

Table: 4.4 Estimated ARDL long run coefficients.

Variable	Coefficient	Std Error	T- Statistic
lnCI	0.124*	0.057	2.199
lnGCF	-0.123	0.166	-0.738
lnINF	0.258**	0.084	3.077
lnRXR	0.296	0.399	0.740
lnL	10.171***	1.159	8.779
lnOPN	-0.033	0.093	-0.356
Constant	-139.394***	14.638	-9.523

***, ** and * represents statistical significance at 1%, 5% and 10% respectively

Source: Author's computation

The study aimed at analyzing the impact of stock market performance on the level of Ghana's GDP growth for the years 1990 to 2017. Table 4.4 above indicates that, there exists a positive relationship between GDP growth and the performance of the stock market. The results of the study indicate that, the GDP growth rate increases as the performance of the stock market improves. It also shows that, a 1% increase in the level of the GSE Composite Index causes the GDP to increase by 0.124%. The coefficient is statistically significant at 10% significance level. This result agrees with economic theory. This implies that, stock market performance has an impact on GDP growth. It is therefore surprising that Obeid, Patrick and Njau, (2015) claimed that, in Ghana, the stock market as a capital market has not yet fully played its role in capital mobilization, though if properly organized it could be a source of the much-needed capital necessary for GDP growth. The stock market is believed to be an avenue for accumulation of

funds and hence trigger increased growth in the GDP. It is normally assumed that, huge declines in stock prices reflects recession in the future, and rising securities prices signals potential improvements in the GDP. This finding is in agreement with that of Darkoh (2006) who applied Ordinary Least Squares (OLS) regression analysis to study the relationship between the two with quarterly time series data covering 1993-2004. His results showed that, the performance of the stock market has a significant and positive effect on GDP growth. The same can be said about the study conducted by Owiti (2012), who found a significant and positive relationship between the stock market performance and GDP per capita. A research done by Dziwornu and Awunyo-Victor (2013) showed a one-way causality link between the two, with Granger causality analysis but did not show the degree to which the stock market's performance affects growth. Also, the findings of this study are in tandem with Adusie (2014) in terms of the significance and sign. However, the finding is in disagreement with Singh (1990), who argued that, high GDP growth and economic development is not dependent on established stock markets.

Another variable which was found to insignificantly affect the level of GDP growth in Ghana is trade openness. According to the results, a 1% increase in openness to trade will lead to 0.033% decrease in GDP growth.

Again, inflation has a positive relationship with GDP growth and statistically significant at the 5% significance level. From Table 4.4, the coefficient of inflation is 0.258. This implies that, when prices of goods and services increases by 1%, GDP growth will increase by 0.258%. This is contrary to economic theory which predicts a negative relationship between inflation and GDP growth. However, this could be true because, a certain amount of inflation is natural and desired for GDP growth. When general prices of goods increase due to increased demand for goods, production of such goods increase, thereby increasing national output and hence GDP growth.

With respect to exchange rate, it has a positive relationship with GDP growth. However, the coefficient is statistically not significant. The positive coefficient implies that a 1% appreciation of the local currency will result in a 0.296% rise in economic growth.

From the results, labour impacts on GDP growth positively. A 1% increase in labour will cause GDP growth to increase by 10.171%. Economic activity is the act of the labor force, therefore, when the country's workforce is gainfully employed in productive sectors of the economy, they are able to meet their consumption needs and the multiplier effect leads to increased GDP growth. The coefficient of labour is also statistically significant at 1% significance level. The results support the findings of Seraphin and Yinguo (2015).

4.4.3 Results of the Short Run ARDL Model

The last step is to investigate the short run effects, having estimated the long run co-integration model. Estimation results based on the Akaike Information Criterion are presented in table 4.5.

The error correction ECM coefficient presents how quickly variables converge to equilibrium and it should have a statistically significant coefficient with a negative sign. The coefficient of ECM_{t-1} is -0.692, and significant at 1%. This implies that, the deviation from the long-term GDP is corrected by 69.2% in the model by the coming year. This finding shows that, the speed of adjustment is high in the model.

In the short run, all the variables maintained their signs and significance level, as in the long run except for Labour, Exchange Rate and the Gross Capital Formation.

Table 4.5: Estimated Short-Run Error Correction Model using the ARDL Approach

Variable	Coefficient	Std Error	T- Statistic
D(lnCI)	0.082*	0.036	2.256
D(lnCI(-1))	-0.118***	0.025	-4.633
D(lnGCF)	0.135*	0.070	1.938
D(lnINF)	0.057	0.043	1.294
D(lnRXR)	-0.081	0.166	-0.488
D(lnRXR(-1))	-0.376*	0.175	-2.154
D(lnL)	-20.243	15.534	-1.303
D(lnOPN)	-0.492***	0.103	-4.789
ECM_{t-1}	-0.692***	0.187	-3.712

***, ** and * represents statistical significance at 1%, 5% and 10% respectively

Source: Author's computation

Interestingly, inflation maintains its sign in the short as in the long run. The coefficient for stock market performance in the short run is also significant at 10% significance level and has a positive relationship with GDP growth as in the long run. The coefficient is 0.082, meaning that, when the stock market performs well by increasing by 1%, GDP growth will increase by 0.082%. However, previous year's stock market performance has a negative relationship with GDP growth by a coefficient of -0.118 and statistically significant at 1% significance level in the short run.

Openness to foreign trade was also found to significantly affect the level of GDP growth at 1% significance level in the country in the short run by -0.492%. According to the results, a 1% increase in openness to trade will lead to a 0.0492% fall in GDP growth.

Gross capital formation significantly affects GDP growth at 10% significance level and has a coefficient of 0.135 in the short run unlike in the long run. The coefficient implies that, when gross capital formation increases by 1%, GDP growth will respond by increasing by 0.135%. This result means that, gross capital formation is a key determinant of GDP growth in the short run.

Furthermore, exchange rate has a negative relationship with GDP growth but statistically not significant in the short run with a coefficient of -0.081. However, previous year's depreciation has a negative effect on GDP growth with a coefficient of -0.376. The coefficient is also significant at 10% significance level.

Surprisingly, labour has a negative effect on GDP growth in the short run with a coefficient of -20.243. This result means that, a 1% increase in labour force shrinks GDP growth by 20.243% in the short run. This could be indicative that, many people included in the labour force are not productive and therefore, do not contribute positively to GDP growth.

4.5 Model Diagnostics and Stability Tests

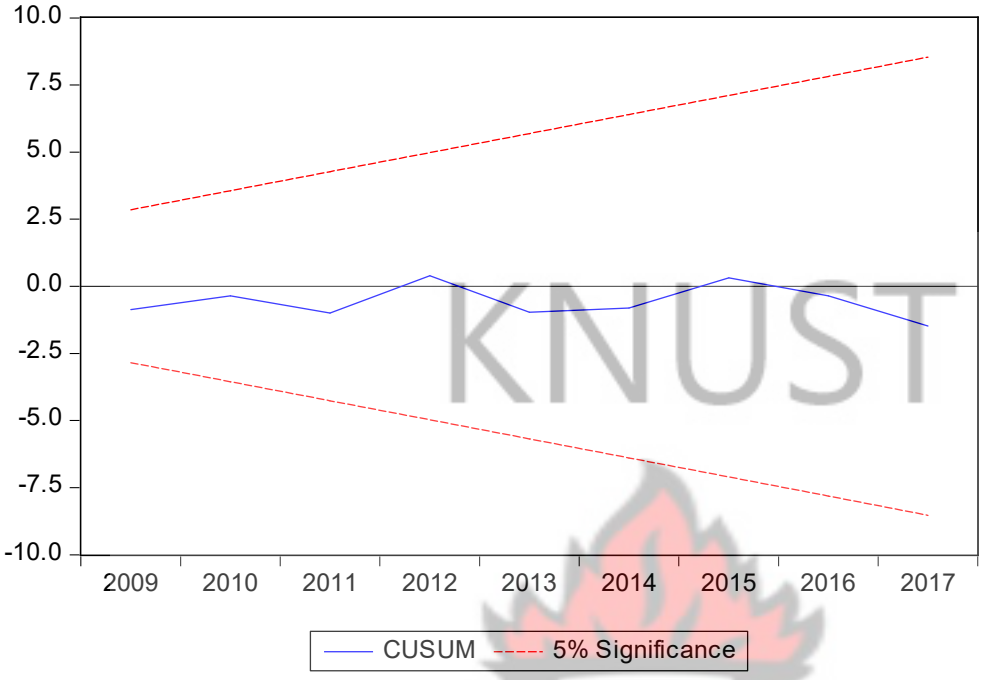
Diagnostic tests are conducted to ensure the robustness of the developed model. They are done to determine whether the estimates are consistent, reliable and unbiased among others. According to the results in Table 4.6, the model passed all the diagnostic tests which included the normality test, serial correlation test, stability test and the heteroscedasticity tests. As seen in Table 4.6, none of the test was significant at the 5% significance level. The p-values were all greater than the 5% significance level. Based on these findings, the above regression model is considered good for both analysis and policy implications.

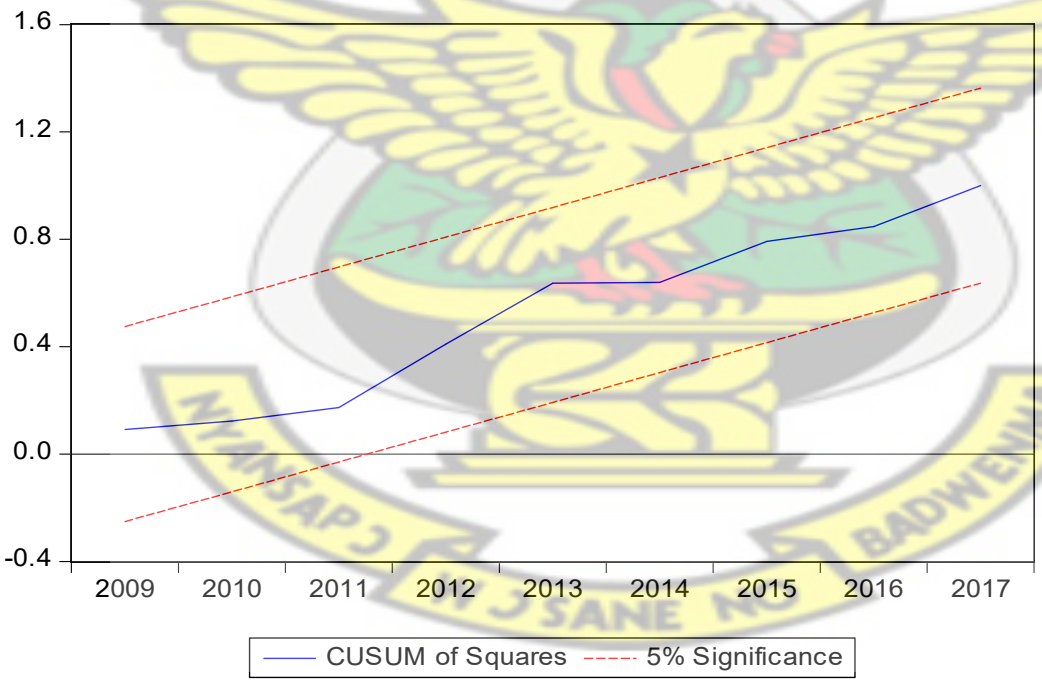
Table: 4.6 Results of the model diagnostics test

Test Statistics	LM Version	F Version
Serial Correlation	CHSQ (1) = 9.104[0.003]	F (1, 8) = 4.311[0.072]
Functional Form	Not Applicable	F (2, 7) = 2.327[0.168]
Normality	CHSQ (2) = 0.611[0.737]	Not applicable
Heteroscedasticity	CHSQ (16) = 17.812 [0.335]	F (16, 9) = 1.224[0.391]

Finally, when analyzing the stability of the long run coefficients together with the short run dynamics, the Cumulative Sum (CUSUM) and Cumulative Sum of Squares (CUSUM of Squares) are employed. The stability of the regression coefficients is appropriate in time series data, especially when we are uncertain about when structural change might have taken place. The null hypothesis for both the CUSM and CUSUM of square is that, the coefficient of vector is the same in every period and are plotted against the critical bound of the 5% significant level (i.e. all coefficients in the error correction model are stable). As shown in Fig 4.2 and 4.3, the plot of both the CUSUM and CUSUM of square residuals are within the boundaries. This implies that, the stability of the parameters has remained within its critical bounds of parameter stability, confirming the stability of the long run coefficients of both models.

Fig 4.3 Plots of CUSUM and CUSUM of Squares


10.0
7.5
5.0
2.5
0.0
-2.5
-5.0
-7.5
-10.0
2009
2010
2011
2012
2013
2014
2015
2016
2017
CUSUM
5% Significance


1.6
1.2
0.8
0.4
0.0
-0.4
2009
2010
2011
2012
2013
2014
2015
2016
2017
CUSUM of Squares
5% Significance

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter discusses the summary and conclusion of the study. The policy implications and recommendations that are relevant to policy makers in developing Ghana's stock market, in order to contribute to GDP growth, as well as directions for future studies are also discussed.

5.1 Summary of findings

The study sort to examine the linkage between the performance of the stock market, measured by the GSE Composite Index and Ghana's GDP growth, as well as the trend analysis of the two variables. The study employed the ARDL estimation techniques to estimate the relationship between the two variables, using data from the World Bank database and the Ghana stock exchange from 1990 to 2017.

From the trend graph, it is seen that both GDP growth and stock market performance are positively trended generally.

The ADF test for unit root showed that, all the variables were stationary at first difference. Given that all the variables are stationary, the ARDL Bounds test for long run relationship was carried out and it confirmed the affirmative.

The error correction method with a coefficient of -0.692 implies that, the deviation from the long-term GDP growth is corrected by 69.2% in the model by the coming year.

The result showed that, the Stock Market Composite Index which is the key variable of interest has a positive effect on GDP growth statistically, both in the long run and the short run. Also, previous year's stock market performance has a negative effect on GDP growth in the short run.

Gross Capital Formation significantly affects GDP growth only in the short run. The result of the study suggests that, in making policy decisions regarding improvement in GDP growth, Gross Capital Formation should be considered as a critical building bloc, as it has proven to significantly influence GDP growth in the short run.

Again, inflation has a positive relationship with GDP growth statistically only in the long run.

With respect to exchange rate, depreciation of previous year's local currency shrinks GDP growth in the short run.

Furthermore, Openness to Foreign Trade was also found to significantly affect the level of Ghana's GDP growth in the short run negatively.

Finally, labour impacts on GDP growth positively in the long run but negatively in the short run.

5.2 Conclusion

The importance of the stock market to Ghana's economy cannot be overemphasized. Its establishment has spurred activity in many regards. For instance, banks that raised capital from the stock market through initial public offerings and rights issues of shares have supported the

operations, expansion and growth of several businesses in different sectors of the economy, thus contributing immensely to Ghana's GDP growth over the years. Therefore, the prospects of the market remain positive.

5.3 Policy implication and recommendations

Based on the findings of this study, the following recommendations are made to stimulate and boost the financial system and the stock market in particular, in order to contribute to Ghana's GDP growth:

Firstly, since there is a significant relationship between stock market performance and GDP growth, it is recommended that, the regulators of the securities industry should ensure that, funds raised by companies on the stock market are managed and utilized efficiently and also channeled to appropriate and productive ventures, in order to contribute significantly to Ghana's GDP growth.

Secondly, the positive impact of labour on GDP growth in the long run means that, it is very important to pay increased attention to the overall role and the quality of human capital. Therefore, policies that are geared towards improving human capital should be advanced.

Thirdly, since there is a positive relationship between inflation and GDP growth, policy measures should be put in place such that, inflation will not exceed its desired level and hamper growth.

Fourthly, the industrial base of developing economies is not strong when compared to that of industrialized countries. Measures should be taken to keep the real exchange rate at a level that benefits domestic production and export activities of developing economies.

5.4 Directions for further studies

Further studies on the Ghana stock exchange and GDP growth could examine the relationship between the performance of the individual listed companies (severally) and GDP growth. Existing literature have mostly focused on the year-to-date returns of the market as a whole (which is a price weighted market capitalization index), against the GDP growth rate, without considering the returns of individual companies which subsequently affects the annual Year-To-Date return of the entire market. The limitation of using the performance of the whole market, as calculated by the price weighted market capitalization index without considering the returns of the individual equities is that, the study may not produce an accurate picture of the relationship between individual equities' performance and the GDP growth rate, since the impact of poor performing equities on the index can be more-than outweighed by high performing companies.

Additionally, other indicators and parameters such as volatility, investor sentiments, liquidity and individual company capitalization can also be explored in order to provide a deeper insight of the market.

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