

UNIVERSITY OF CAPE COAST

**STOCK MARKET CAPITALIZATION AND ECONOMIC GROWTH
IN GHANA**

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BY

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**THESIS SUBMITTED TO THE DEPARTMENT OF ECONOMICS,
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DECLARATION

Candidate's Declaration

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

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

Name:.....

Supervisors' Declaration

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

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

Name:

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

Name:

ABSTRACT

This study examines the relationship between stock market capitalization and economic growth in Ghana using quarterly time series data from 1991 to 2006. The study employed Johansen multivariate cointegration technique and vector error correction model to investigate the long-run relationship and the short-run dynamics among the variables. Also, the standard Granger-causality test was conducted to determine the causal relationship between the variables.

The study finds 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. Economic growth is the most important factor explaining the development of the Ghana Stock Exchange. In contrast, the results show that the banking sector development has a significant negative relationship with the stock market development suggesting that they are substitutes in financing corporate investments in Ghana.

The results of the Granger-causality test indicate that economic growth leads to stock market capitalization (stock market development) without any feedback supporting “demand following” hypothesis.

The study concludes that although the Ghana Stock Exchange is new, illiquid and highly concentrated, it has a great potential to mobilize both domestic savings and foreign capital for financing future investments. Therefore, there is the need for government to initiate policies to promote economic growth, stock market liquidity and domestic investment so as to develop the Ghana Stock Exchange.

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DEDICATION

To my daughter, Esi Kwegyirba Quaidoo, my wife, Irene Quaidoo and
in memory of my late brother, Isaac Nkrumah Panyin.

TABLE OF CONTENTS

Content	Page
DECLARATION	ii
ABSTRACT	iii
ACKNOWLEDGEMENTS	iv
DEDICATION	v
TABLE OF CONTENTS	vi
LIST OF TABLES	x
LIST OF FIGURES	xi
LIST OF ACRONYMS	xii
CHAPTER ONE: INTRODUCTION	1
Background to the Study	1
Statement of the Problem	6
Objectives of the Study	7
Research Hypotheses	8
Justification of the Study	8
Organization of the Study	9
CHAPTER TWO: LITERATURE REVIEW	10
Introduction	10
Overview of the Ghanaian Economy	10
Structure and Performance of the Ghanaian Economy	10
Real GDP Growth Performance	12
Overview of the Ghana Stock Exchange	13
Historical Background	14
Trading Practices and Operations of the GSE	15

Trends in the Ghana Stock Exchange Performance	16
Trading Activities (GSE Market Indicators)	19
The Size of the Market	19
Market Liquidity	22
Primary Capital Issues	25
Theoretical and Empirical Literature on Stock Market	
Development and Economic Growth	27
Introduction	27
Theoretical Literature Review	28
The Relationship between Stock Market Development and	
Economic Growth	28
The Impact of Economic Growth on Stock Market Development	31
The Role of the Stock Market Development in Economic Growth	34
Determinants of Stock Market Development	37
Indicators of Stock Market Development	41
Stock Markets and Banks in Economic Growth	45
Empirical Literature Review	49
The Link between Stock Market Development and Economic Growth	49
Empirical Literature Review on Ghana	56
Summary and Conclusion	58
CHAPTER THREE: METHODOLOGY	61
Introduction	61
Specification of Theoretical Model	61
Specification of Empirical Model	63
Data Source and Measurement of Variables	64

Estimation Techniques	67
Stationarity Test	68
Cointegration Test	69
Error Correction Model	72
Granger-Causality Test	73
Summary and Conclusion	75
CHAPTER FOUR: RESULTS AND DISCUSSION	77
Introduction	77
Results of Stationarity Test	77
Long-Run Equilibrium Relationship	79
Short-Run Dynamic Relationship	84
Evidence from Causality Analysis	87
Summary and Conclusion	90
CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	91
Introduction	91
Summary	91
Conclusions	94
Recommendations	95
Limitations of the Study	96
Direction for Future Research	97
REFERENCES	98

APPENDICES	111
A. Types and Characteristics of Securities on the GSE	111
B. Trading History of the GSE (Volume and Value of Listed Securities from 1990– 2006)	112
C. Mode of Offer of New Equity Issues	113
D. Plot of Time Series Data	114
E. Results of the Johansen Cointegration Test	115
F. Primary Issues on the GSE	117

LIST OF TABLES

Table	Page
1. Sectoral Contributions to Real GDP – Period Averages (in %)	11
2. GSE All-Share Index (1991–2006)	17
3. Trading Activities-Market Indicators in Percentages (1991- 2006)	20
4. Primary Capital Issues (Capital Raised)	26
5. Results of the ADF Unit Root Tests	78
6. Results of the PP Unit Root Tests	79
7. Results of the Johansen ML Cointegration Test	80
8. Results of the Parsimonious Vector Error Correction Model	85
9. Results of the Pairwise Granger-Causality Test	88

LIST OF FIGURES

Figure	Page
1. Trend of the GSE All-Share Index between 1991 and 2006	18
2. The Size of the Ghana Stock Exchange (1991–2006)	21
3. The Liquidity of the Ghana Stock Exchange	23
4. Turnover Ratio of the Ghana Stock Exchange	24

LIST OF ACRONYMS

ABL	Accra Brewery Limited
ADF	Augmented Dickey-Fuller
AGA	AngloGold Ashanti
AGC	Ashanti Goldfields Company
AIC	Akaike Information Criterion
ALW	Aluworks Limited
ARDL	Autoregressive Distributed Lag
ASML	Accra Stock Market Limited
BOPP	Benso Oil Palm Plantation
CAL	Continental Acceptances
CGL	Camelot Ghana Limited
CLYD	Clydestone Ghana Limited
Co.	Company
CPC	Cocoa Processing Company
DMB	Deposit Money Banks
EBG	Ecobank Ghana
ECM	Error Correction Model
ERP	Economic Recovery Programme
ETI	Ecobank Transnational Incorporated
FDI	Foreign Direct Investment
FINSAP	Financial Sector Adjustment Programme
GCB	Ghana Commercial Bank
GDP	Gross Domestic Product
GGBL	Guinness Ghana Breweries Limited

GGL	Guinness Ghana Limited
GSE	Ghana Stock Exchange
GWEB	Golden Web Limited
HFC	Home Finance Company Bank Limited
IMF	International Monetary Fund
IPO	Initial Public Offering
ISSER	Institute of Statistical, Social and Economic Research
Ltd.	Limited
MCAP	Market Capitalization
MGL	Metalloplastic Ghana Limited
ML	Maximum Likelihood
MLC	Mechanical Lloyd Company Limited
NTHC	National Trust Holding Company
OFS	Offer for Sale
OLS	Ordinary Least Squares
OTC	Over the Counter
PAF	Pioneer Aluminum Factory Limited
PBC	Produce Buying Company
PP	Phillips-Perron
SAP	Structural Adjustment Programme
SBC	Schwarz Bayesian Criterion
SCB	Standard Chartered Bank
SEC	Securities and Exchange Commission
SMEs	Small and Medium Enterprises
SPPC	Super Paper Products Company

SSB	Social Security Bank
SWL	Sam Woode Limited
TBL	Trust Bank Limited
TRANSOLS	Transaction Solutions Limited
UNIL	Unilever
VAR	Vector Autoregressive
VECM	Vector Error Correction Model
2SLS	Two Stage Least Squares

CHAPTER ONE

INTRODUCTION

Background to the Study

Financial systems help to mobilize and pool savings, provide payments services that facilitate the exchange of goods and services as well as efficient allocation of capital among others which enhance long-term economic growth (Demirguc-kunt, 2006). The financial system, according to Garcia and Liu (1999), comprises financial intermediaries (banks, insurance companies and pension funds) and the securities markets.

The financial sector in Africa is dominated by the banking system and the capital markets are relatively new and generally underdeveloped (Jefferis, 1995; Aryeetey, 2003). The financial sector reform programmes implemented by African countries in the late 1980s and early 1990s led to the development of capital markets, especially, stock markets including the Ghana Stock Exchange (GSE) which are seen as crucial in raising savings and investment rates as well as attracting foreign investment (Kenny & Moss, 1998).

The importance of long-term capital in economic development of a country cannot be overemphasized. The capital market, indeed, has played significant role in national economic growth and development, especially in

developed and other emerging markets (Levine & Zervos, 1996; Ezeoha, Ogamba & Oyiuke, 2009). As economies grow, more funds will be needed to meet the rapid expansion and sustain economic growth. The capital market is expected to provide long-term funds for sustainable economic growth in developing countries, especially in Sub-Saharan Africa which, hitherto, have depended heavily on short-term funds provided by the banking sector (Popiel, 1991; Jefferis, 1995). According to Aryeetey (2003) the dominance of the commercial banks in the formal financial markets of Africa is attributed to the poor development of capital and money markets.

Until recently, the theoretical literature emphasized the role of the banking sector as the only organized capital market in most developing countries. It neglected the potential role of stock markets for efficient capital allocation and risk sharing in a liberalized financial market (Caporale, Howells & Soliman, 2004). In this regard, most of the earlier empirical research on the relationship between finance and economic growth focused on the traditional financial intermediary development, banking, both in developed and developing countries (King & Levine, 1993; Odedokun, 1996).

Most economic managers believe that a well-organized capital market is crucial in mobilizing both domestic and foreign capital in the form of equity and debt for investment (Osei, 1998). The stock market, which is the pivot of the capital market, is expected to play a major role in pooling domestic savings and foreign capital for investment to sustain economic growth, providing liquidity to investors and serving as an avenue for risk diversification. It is also expected to

encourage public participation in capital market in particular and deepen financial system in general which in the long run promote economic growth (Levine, 1991, 1997; Caporale et al, 2004).

Over the past two decades, the importance of stock market as a new financial intermediary in mobilization of domestic savings and foreign capital for investment has renewed research interest in the role of stock market development in promoting economic growth. Recent research, therefore, has begun to focus on the linkages between stock market development and economic growth using time series data (Hondroyannis, Lolos & Papapetrou, 2004).

However, there have been divergent views on the nature of the relationship existing between stock market development and economic growth on one hand, and the nature and direction of causal relationship between the two variables on the other hand. With regard to the first issue, the traditional growth theorists believe that there is no correlation between stock market development and economic growth because of the presence of level effects, and not the rate or growth effects as observed earlier by Pagano (1993) and Shahbaz, Amed and Ali (2008). In the case of the causal relationship, some researchers have argued that it is the economic activities in a country that constitute the key drivers of stock market development while others are of the view that it is rather growth in the stock market that leads to economic growth (Yartey, 2008; Filer, Hanousek & Campos, 1999). The whole controversy boils down to the paradox of “the egg and the hen, which is older?”

While most empirical studies have confirmed the positive relationship between stock market development and economic growth at cross-country studies and time-series approaches, the issue of causality is still not resolved (Hondroyannis et al, 2004; Ezeoha et al., 2009). Hondroyannis et al. (2004) observe that the differences in empirical findings of the causal relationship between stock market development and economic growth may be attributed to the variations in institutional characteristics and market sizes across countries.

While there have been extensive empirical studies on the linkages between stock market development in advanced and emerging markets in Asia and Latin America, little can be said of Africa, particularly, Sub-Saharan Africa. This may be attributed to the fact that stock market development, especially in Sub-Saharan Africa (excluding the older stock markets in South Africa and Zimbabwe), is new (Popiel, 1991).

In Africa, new stock markets have been established thereby raising the number from eight in 1989 to nineteen in 2006. Stock market development has been central to the domestic financial liberalization programmes of most African countries often with the encouragement of the World Bank and International Finance Corporation (Jefferis, 1995; Yartey & Adjasi, 2007). It is anticipated that the establishment of stock markets in Africa will boost domestic savings and increase the quantity and quality of investment. With the exception of South Africa for instance, most African stock markets doubled their market capitalization between 1992 and 2002. Total market capitalization for African markets increased from US\$ 113,423 million to US\$ 244,672 million between

1992 and 2002 as indicated in Yartey and Adjasi (2007). In the case of the Ghana Stock Exchange, the market capitalization rose immensely from GH¢ 4.38 million (about US\$ 84 million) in 1992 to GH¢ 618.38 (US\$ 328 million) in 2002.

The Ghana Stock Exchange was incorporated in July 1989 as a company limited by guarantee which commenced trading on 12th November, 1990. Initially, eleven securities were listed and that increased to thirty-two ordinary shares, one preference share and depository share by the end of 2006. There are also corporate and government bonds listed on the Ghana Stock Exchange. The listed companies represent a cross-section of the economy ranging from mining and manufacturing through pharmaceutical to financial and agriculture/agro-processing.

The Ghana Stock Exchange has attracted the attention of foreign investors and international institutions in recent time due to its sterling performance in terms of returns on investment to investors or capital appreciation since 1994. It has provided an avenue for raising long-term capital by both the listed companies and government for investment. The Ghana Stock Exchange has also promoted saving and investment habit of investors of the country (Ziorklui, 2001).

It is anticipated that as the economy improves and invariable real GDP grows in Africa and in Ghana, for that matter the stock market will play a key role in mobilizing domestic savings and foreign capital for investment to sustain economic growth and development. In principle, a well-functioning stock market is expected to accelerate economic growth by providing a boost to domestic savings and increasing the quantity and the quality of investment (Singh, 1997).

Statement of the Problem

The nature of the relationship between stock market development and economic growth, especially, in developing countries has often generated strong controversy among economists over the years. For instance, some economists are of the view that there is either no correlation or negative relationship between stock market development and economic growth (Shahbaz et al., 2008). On the other hand, other economists believe that there is positive relationship between stock market development and economic growth (Levine & Zervos, 1996, 1998). In contrast, the early empirical studies conducted in developed economies and emerging markets, mainly sampled from Latin America and Asia, showed that there is a positive relationship between stock market development and economic growth (Dimirguc-Kunt & Levine, 1996; Levine & Zervos, 1996, 1998).

In the case of Ghana, Osei (2005) investigated the causal relationship between stock market development and economic growth in Ghana between 1991 and 2003 using quarterly time series data on nominal market capitalization and real GDP. The main weakness associated with Osei's study is that since stock markets are "forward looking", market capitalization is affected by the price effect of stock markets. Therefore, the use of nominal stock market capitalization and market capitalization ratio may not be the appropriate indicators for the study because it may lead to spurious relationship or effects (Rousseau & Wachtel, 2000). Moreover, he did not examine the long-run and short-run relationships between stock market development and economic growth.

The issue of interest here is, is there any link between stock market development (market capitalization) and economic growth? Or has the gains in the stock market no relation with economic growth in the case of Ghana? In the light of this gap, this thesis sought to examine whether the positive relationship between stock market development and economic growth in developed and emerging economies of Latin America and Asia can be replicated in Ghana.

Objectives of the Study

The main objective of the study was to examine the relationship between stock market capitalization and economic growth in Ghana. The specific objectives were to:

1. investigate the long-run relationship between stock market capitalization and economic growth;
2. establish the direction of causality between stock market capitalization and economic growth;
3. find out whether stock market liquidity, domestic investment and banking sector development explain stock market capitalization in the long-run;
4. explore policy implications for the improvement of the Ghana Stock Exchange.

Research Hypotheses

The following hypotheses were formulated to guide the study.

1. H_0 : There is no significant relationship between stock market capitalization and economic growth.
2. H_0 : There is no causal relationship between stock market capitalization and economic growth.
3. H_0 : Stock market liquidity, domestic investment and banking sector development do not explain stock market capitalization.

Justification of the Study

Critics of the stock market development in developing countries including Ghana consider stock markets as “casinos” that have little positive impact and perhaps even negative effect on economic growth (Singh, 1997; Levine & Zervos, 1996). Although some studies have been done on the Ghana Stock Exchange by Osei (1998), Osei (2005), Yartey (2006) and others, they did not give much attention to verify whether the assertion made by the critics of the stock market development in developing countries holds in Ghana. Even though Osei (2005) investigated the causality between stock market development and economic growth in Ghana between 1991 to 2003, he did not consider the long-run equilibrium and short-run dynamic relationships. As an improvement on Osei’s (2005) work, this thesis examined the long-run and short-run relationships including the causal relationship between stock market development and

economic growth using real quarterly data on market capitalization from 1991:1 to 2006:4.

This study would therefore provide additional information on the nature of the relationship between stock market development (capitalization) and economic growth in Ghana. In addition, the use of more observations (i.e. quarterly data from 1991 to 2006) and real market capitalization which is considered a more appropriate proxy for stock market development for estimation would improve upon the efficiency of the estimates. Again, by employing cointegration technique and time-series data, the study would provide a more appropriate framework for analyzing the dynamic relationship between stock market development and economic growth.

Organization of the Study

The study is organized into five chapters. Chapter one focuses on the introduction which includes background to the study, research problem, the objectives, hypotheses, justification and organization of the study. Chapter two is devoted to the review of relevant literature on the Ghanaian economy, the Ghana Stock Exchange, stock market development and economic growth. Chapter three explains the methodology including model specification, data sources and measurement and estimation techniques. Chapter four discusses empirical results. The summary, conclusions, recommendations as well as the limitation of the study and direction for future research are presented in chapter five.

CHAPTER TWO

LITERATURE REVIEW

Introduction

This chapter is divided into two main parts. The first part focuses on the overview of the Ghanaian economy and the Ghana Stock Exchange. Part two is devoted to the review of the theoretical and empirical literature on stock market development and economic growth.

Overview of the Ghanaian Economy

This section looks at the structure and economic performance of the country from 1966 to 2006.

Structure and Performance of the Ghanaian Economy

The general consensus in Aryeetey and Kanbur (2008) is that sustained economic growth would normally be accompanied by a significant structural transformation of the economy. The structure of the Ghanaian economy followed almost the same pattern during the 1960s and 1970s. The real sector of Ghanaian economy has been grouped into three sectors comprising agriculture, industry and services.

Table 1 shows the trend in sectoral contributions to real GDP in averages from 1966 to 2006. The table indicates that agriculture is the leading contributor to real GDP followed by services and then industry. The share of agriculture to real GDP increased considerably from 43.5% to 57.1%, the highest level between the period 1976 to 1980. It later declined consistently in the subsequent periods to 36.2 % between 2001 to 2006.

Table 1: Sectoral Contributions to Real GDP- Period Averages (in %)

Year \ Sector	1965	1966-1970	1971-1975	1976-1980	1981-1985	1986-1990	1991-1995	1996-2000	2001-2006
Agriculture	43.5	43.5	47.7	57.1	52.9	48.4	40.8	36.7	36.2*
Industry	18.6	19.3	18.7	14.2	9.9	16.7	21.7	25.1	24.9*
Services	37.9	37.2	37.9	28.7	37.3	34.9	37.5	38.2	29.8*
Total	100	100	100	100	100	100	100	100	90.9*

Source: Adapted from Fosu and Aryeetey, 2008; ISSER, 2007.

* This does not include indirect taxes.

Both the share of industry and services to real GDP fluctuated over the entire period. The industrial share, for instance, declined sharply from 19.3% between the period 1966 and 1970 to 9.9 % being the lowest for the period 1981 to 1985. It then picked up from 16.7 % between 1986 and 1990 to 25.1% between

1996 and 2000 before dropping marginally to 24.9% for the last period. Similarly, the services sub-sector fell from 37.2% for 1966 to 1970 period to 28.7% between 1976 and 1980. It, however, increased to 37.3 % and above in the subsequent periods except the periods 1986 to 1990 and 2001 to 2006 where it averaged 34.9 and 29 %, respectively.

Table 1 also shows that there was a slight shift in dominance from agriculture towards industry and services between the late 1980s and 1990s suggesting a marginal change in the structure of the economy. In contrast, ISSER (2006), in the review of the state of the Ghanaian economy in 2005 admits that the historical structure of the Ghanaian economy shows hardly any change and that the industrial sector since 1993 has remained relatively stagnant.

Real GDP Growth Performance

The long-run real GDP growth record shows considerable fluctuations between the mid 1960s to early 1980s and particularly in the 1970s as depicted in Fosu and Aryeetey (2008). With reasonably high real GDP growth in the 1950s and early 1960s averaging 5%, the Ghanaian economy began to experience a slowdown in GDP growth in 1964 with a growth rate of 2.1%. The subsequent periods from 1966 to 1983 experienced several negative growth rates which resulted from changes in government and sometimes policy changes or reversals (Aryeetey & Kanbur, 2008). These periods are: 1967, 1972, 1975-6, 1979, 1981-1983. However, the period of turbulence also recorded positive growth rates, with the highest peak rate of about 7% in 1970 and 9% in 1978.

To reverse the economy from the poor performance and further decline, the government, with the support from the World Bank and IMF, launched the Economic Recovery Programm (ERP) and Structural Adjustment Programmes (SAPs) in the 1980s. The economy responded positively to the implementation of the ERP and subsequent reform programmes just after 1983. For instance, the economy recovered from its negative growth rates in 1981-1983 to a record level of about 9% in 1984. The favourable trend continued since then averaging about 5.2% between 1985 and 1989, but 4.3% over the period 1990 to 2000. Similarly, the economy maintained a relatively high average growth rate of 5.2 % from 2001 to 2006 (ISSER, 2007).

It is worth noting that, although the economy recorded positive GDP growth rates between 1990 and 2006, it was not reflected in the performance of the Ghana Stock Exchange particularly in 1991, 1992, 1995, 1996, 1999 and 2005. The poor performance of the Ghana Stock Exchange especially in 1995, 1996, 1999 and 2005 was attributed to high interest rates, high inflation and depreciation of the domestic currency (Ziorklui, 2001).

Overview of the Ghana Stock Exchange

This section explores the profile of and development in the Ghana Stock Exchange from 1991 to 2006. It also provides an assessment of the performance of the Ghana Stock Exchange.

Historical Background

The establishment of a stock market in Ghana has been on the drawing board of governments for the past four decades. Early attempts at establishing a stock market in Ghana dates back to 1968 when a government study concluded that the establishment of a stock market was crucial for the economic development of the country. This led to the promulgation of the Stock Market Act of 1971, which laid the foundation for the establishment of the Accra Stock Market Ltd. (ASML) in 1971. However, the idea of establishing a stock market did not work largely because of the unfavourable political and economic environment and the lack of government support (Yartey, 2006). In spite of these unsuccessful attempts, two stock brokerage firms, namely National Trust Holding Company Ltd. (NTHC) and National Stockbrokers Ltd., now Merban Stockbrokers Ltd. did over-the-counter (OTC) trading in shares of some foreign-owned companies prior to the establishment of the Ghana Stock Exchange.

As part of the Financial Sector Adjustment Programme (FINSAP) initiated by Ghana in 1988, the Ghana Stock Exchange was established in July, 1989 as a private company limited by guarantee under the country's Companies' Code of 1963 (Act 179). The company later changed its status to a public company limited by guarantee in April, 1994. The exchange was given recognition as an authorized stock market under the Stock Exchange Act of 1971 (Kenny & Moss, 1998; Ziorklui, 2001).

Trading Practices and Operations of the GSE

Trading currently takes place daily from Monday to Friday between 10:00 a.m. and 12:00 noon. Transactions are done in round lots of 100 shares with settlement of trades being done manually, but centralized on the floor of the Exchange at specified times. The GSE uses the continuous auction trading system for all shares of the listed companies on the floor of the Exchange, except AngloGold Ashanti Ltd.'s shares which can also be traded through the over-the-counter after GSE trading hours. The settlement period has been reduced from T+10 in 1996 to T+3 business days. There is a Central Securities Depository already in place for government securities while all the listed equities will be included in due time (GSE, 2007). Currently, the Ghana Stock Exchange has sixteen stockbrokerage firms licensed to trade on the Exchange.

Securities on the Ghana Stock Exchange can be purchased by any investor including non-resident Ghanaians and foreigners who are aged 18 years and above. Non-resident Ghanaians and foreigners can purchase up to 10% of any security approved for listing on the GSE. Furthermore, the total holdings of all external residents, non-resident foreigners, in one listed security shall not exceed 74%. The commission rate is fixed and regulated by the government. A minimum of 1.5% and a maximum of 2.4% are charged as commission on the value of shares traded. There is a 10% withholding tax on dividend income for both resident and non-resident investors while capital gains on listed securities are tax exempted until 2010 (Ziorklui, 2001).

Trends in the Ghana Stock Exchange Performance

Although the Ghana Stock Exchange is a new emerging market characterized by small size and low liquidity, it has been performing creditably in terms of return on investment. For example, in 1994 it was graded as the 6th best performing stock market index among all the emerging markets, gaining 124.3%, by Birinyi Associates, a Research Group based in the USA. It was also voted the best performer among all stock markets in Africa and the third best in emerging markets in 1998 in terms of capital appreciation by the Standard Chartered Bank London Limited (Economic Commission for Africa, 1999). The GSE was then again adjudged the world's best-performing market at the end of 2003 with a yearly return of about 154.7% (or 144 % in US dollar terms) compared with 30% return by Morgan Stanley Capital International Global Index as indicated in Yartey and Adjasi (2007).

The GSE All-Share Index, which is a statistical measure of the general performance of the Ghana Stock Exchange, has varied considerably over the past years. Table 2 and figure 1 show the trend of the GSE All-Share Index from 1991 to 2006. The All-Share Index rose sharply from 69.77 points in 1991 to 334.02 points in 1994 representing a gain of 124.34% but dipped in 1995, with a disappointing growth rate of 6.3% resulting mainly from high levels of inflation and interest rate before reaching a peak of 1,201.08 points in 1998. The Index then experienced a downward trend two years after and then rose steadily to reach a record high of 7,469.04 points in 2004 representing a gain of 91.33%, although much lower than the 2003 growth rate of 154.67% which is the highest yield. The

Table 2: GSE All-Share Index (1991 – 2006)

Year	High	Date	Low	Date	End of Year	% Change
1991	69.77	Jan-04	55.49	May-17	64.51	-7.95
1992	72.90	Oct-06	60.15	Jul-23	62.17	-3.63
1993	132.88	Dec-30	63.29	Jan-05	132.88	113.74
1994	334.02	May-17	132.91	Jan-04	298.1	124.34
1995	322.11	Oct-25	296.32	Mar-22	316.97	6.33
1996	385.80	Sept-13	307.42	Jan-12	360.76	13.82
1997	524.21	Dec-08	346.66	Jan-31	511.74	41.85
1998	1,201.08	May-06	511.66	Jan-07	868.35	69.69
1999	903.17	Feb-05	735.39	Dec-22	736.16	-15.22
2000	873.35	Sept-22	737.16	Jan-03	857.98	16.55
2001	1,025.78	Aug-01	856	Feb-07	955.95	11.42
2002	1,395.31	Dec-30	955.95	Jan-02	1,395.31	45.96
2003	3553.42	Dec-31	1,395.36	Jan-02	3,55.42	154.67
2004	7,469.04	Aug-25	3,55.96	Jan-02	6,798.59	91.33
2005	6,901.36	Jan-28	4,751.17	Dec-22	4,769.02	-29.85
2006	5,006.02	Dec-29	4,692.84	Jan-31	5,006.02	4.97

Source: GSE Market Statistics, December 2006.

good performance of the stock market in 1994, 1998 and 2003 was attributed partly to favourable macroeconomic indicators (inflation, interest rate) and mainly to the listing of the Ashanti Goldfields Company Limited in 1994. In 1998 in particular, there was high demand for equity shares on the market that led to a

remarkable increase in share prices on the market. The growth rate of -29.85% in 2005 was the worst since trading commenced on the Ghana Stock Exchange.

The worst performance of the Ghana Stock Exchange in 2005 was attributed to the rising oil prices, inflation and interest rates (ISSER, 2006; GSE, 2006).

Figure 1 also depicts a steady rise in the All-Share Index trend from 1991 to 2001, but a sharp rise from 2002 to its peak in 2004 and a fluctuation afterwards.

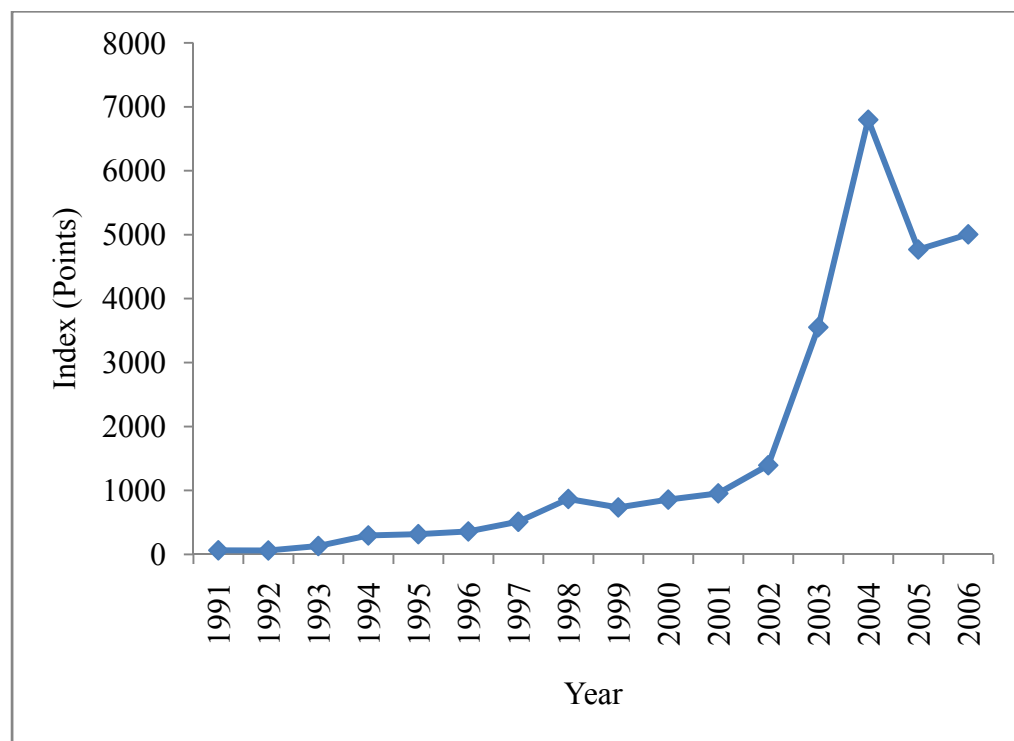


Figure 1: Trend of the GSE All-Share Index between 1991 and 2006

Source: GSE Market Statistics, December 2006.

Trading Activities (GSE Market Indicators)

The GSE market indicators which show the trading activities and performance of the Ghana Stock Exchange in terms of its size, liquidity and efficiency are presented in Table 3.

The Size of the Market

The size of the Ghana Stock Exchange is measured using the typical index of stock market capitalization to GDP ratio. This is defined as the value of domestic equities traded on the Stock Exchange divided by GDP. The magnitude of the market capitalization ratio indicates the ability to mobilize capital and consequently diversify risk (Osei, 1998). Information on the market indicators including the Gross Domestic Product (GDP) is shown in table 3. As indicated in table 3, the market capitalization, which measures the depth of the market, increased gradually from GH¢ 2.96 million in 1991 and jumped to GH¢ 196.84 in 1994. This was attributed mainly to the off-loading of the government shares in Ashanti Goldfields Company Limited in March, 1994. The market capitalization further increased steadily from GH¢ 239.9 in 1995 reaching a peak of GH¢ 11,249.6 million in December, 2006 although dropping in 1997, 1999 and 2005, respectively.

The market capitalization to GDP ratio increased from 1.15% in 1991 to a remarkable level of 37.82% in 1994, but dipped gradually in subsequent years before picking up in 2002. It reached a record high level of 122.2% in 2004 but fell to 94.44% before picking up marginally to 96.44% in 2006 as indicated in

Table 3: Trading Activities–Market Indicators in Percentages (1991 – 2006)

Year	Volume Traded (m)	Value Traded (GH¢m)	Mcap (GH¢m)	GDP (GH¢m)	Mcap/ GDP	Value Trade/ GDP	Value Trade/ Mcap
1991	1.83	0.0105	2.96	257.48	1.15	0.004	0.35
1992	2.04	0.0173	4.38	300.88	1.46	0.006	0.39
1993	37.95	0.32	9.65	387.25	2.49	0.082	3.29
1994	93.04	7.31	196.84	520.52	37.82	1.404	3.71
1995	55.84	2.71	239.90	775.26	30.94	0.349	1.13
1996	35.75	2.79	286.27	1,133.92	25.25	0.246	0.97
1997	125.63	9.34	255.28	1,411.34	18.09	0.661	3.66
1998	91.45	13.40	324.56	1,729.57	18.77	0.775	4.13
1999	49.57	6.96	320.54	2,057.98	15.58	0.338	2.17
2000	30.72	5.06	365.50	2,715.27	13.46	0.186	1.39
2001	55.30	9.23	390.40	3,807.07	10.25	0.242	2.36
2002	44.12	8.94	618.38	4,886.24	12.65	0.183	1.45
2003	96.33	38.93	1,261.68	6,615.77	19.07	0.487	3.09
2004	104.35	65.59	9,761.48	7,988.74	122.19	0.821	0.67
2005	81.40	46.44	9,185.73	9,726.06	94.44	0.477	0.51
2006	98.29	47.60	11,249.6	11,665.3	96.44	0.408	0.42

Source: GSE Market Statistics, December 2006, Ghana Statistical Service, 2007

and the author's computation.

table 3 and figure 2, respectively. According to the GSE (2005) report, the outstanding performance of the market capitalization in 2004 was attributed to the listing of AngloGold Ashanti Limited through a merger. The average market capitalization ratio for the Ghana Stock Exchange stood at 32.5% which is very close to the world's average of 38.2% in the 1990s and 1994 market capitalization ratio of 37.8%, but far above most of the ratios of the years preceding 2004. The market capitalization ratio of 122.2% recorded for 2004 is more than thrice the Ghana Stock Exchange average capitalization ratio and that of the world in the 1990s.

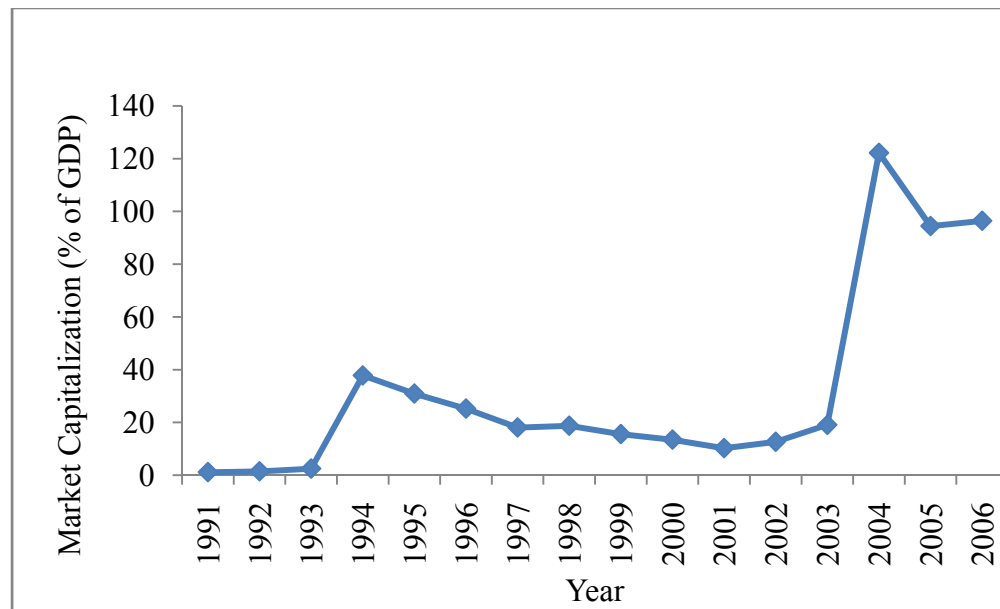


Figure 2: The Size of the Ghana Stock Exchange (1991–2006)

Source: GSE Market Statistics, December 2006.

Figure 2 depicts the trend in the market capitalization ratio between 1991 and 2006. The figure shows a sharp rise in market capitalization ratio between

1993 and 1994, dipping continuously in the subsequent years before rising very sharply again in 2003 to its peak in 2004. It can be observed that the Ghana Stock Exchange has been relatively small in the 1990s and early 2000s compared with the world average partly because it has not been in existence for long as suggested earlier by Yartey (2006).

Market Liquidity

The stock market liquidity generally refers to the ability to buy and sell securities easily (Demirguc-Kunt & Levine, 1996; Mala & White, 2006). Two main traditional stock market indicators used to gauge market liquidity are total value traded ratio and turnover ratio. Theoretically, it is believed that liquid markets will improve the mobilization of resources and efficiency of capital allocation which promote long-term economic growth (Levine, 1991; Bencivenga, Smith & Starr, 1996).

Total value traded ratio which equals total value of shares traded on the stock market divided by GDP is often used to gauge market liquidity because it measures trading relative to economic activity (Levine & Zervos, 1998). Table 3 shows that the trading activities have been relatively low. However, the volume and value traded of shares improved considerably in 1994, 1997 and 2004. The value of shares traded in particular rose substantially to the tune of about GH¢7.31 million in 1994 and GH¢ 65.59 million in 2004 due primarily to the listing of the Ashanti Goldfields Company Limited and AngloGold Ashanti Limited through a merger as noted earlier.

Table 3 and figure 3 show that the total value traded ratio, the liquidity relative to the economy as a whole, has been insignificant, especially, prior to 1994 before jumping to 1.4% in 1994. Since then the liquidity dropped significantly experiencing a downward trend in subsequent years and then picking up to about 0.8 % in 1998 and 2004. The average liquidity of 0.42% of the Ghana

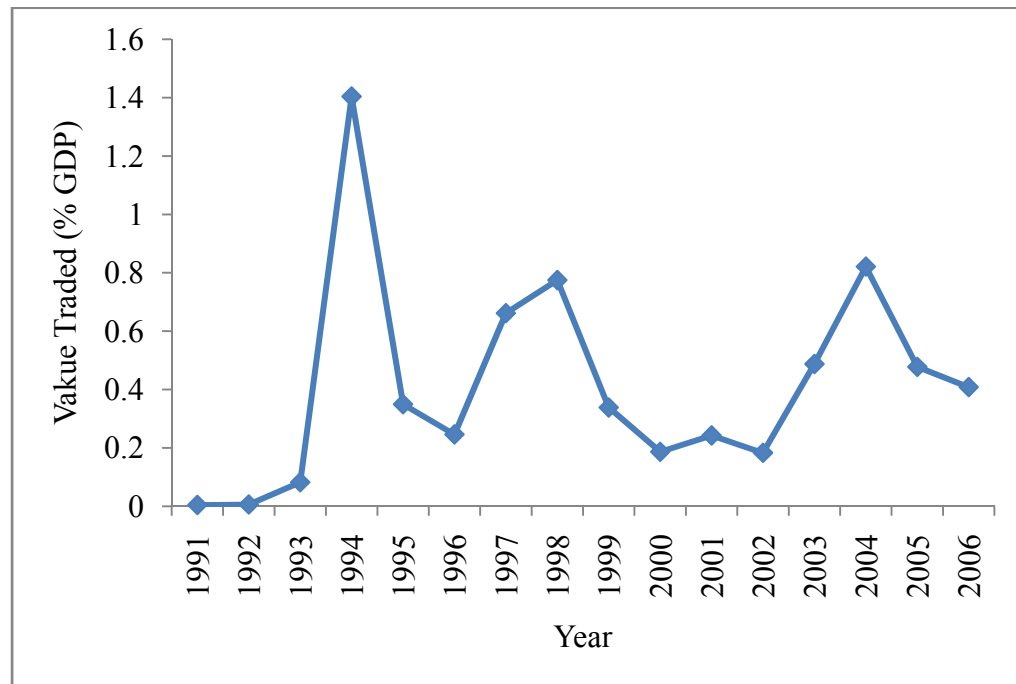


Figure 3: The Liquidity of the Ghana Stock Exchange

Source: GSE Market Statistics, December 2006.

Stock Exchange is far below the world's average of 31% in the 1990's which is indicative of the fact that the Ghana Stock Exchange is relatively illiquid as already indicated in Yartey (2006).

Turnover ratio is the total value of shares traded during the period divided by the average market capitalization for the period. It measures the activity of the stock market relative to its size. Turnover ratio is often used to capture the efficiency of the domestic stock market. High turnover ratio is used as an indicator of low transaction costs. An active or a liquid market will have a high turnover ratio, but a small market capitalization ratio (Demirguc-kunt & Levine, 1996). Table 3 and figure 4 show that turnover ratio rose from 0.35 % in 1991 to 3.71 % in 1994 and then fluctuated between 1995 and 2006. For instance, it reached a peak of 4.13%, the highest level in 1998 and then recorded a downward trend (except a marginal increase of about 2.4% in 2001 and an increase of about 3.1% in 2003) depicting a decrease in the efficiency of the Ghana Stock Exchange.

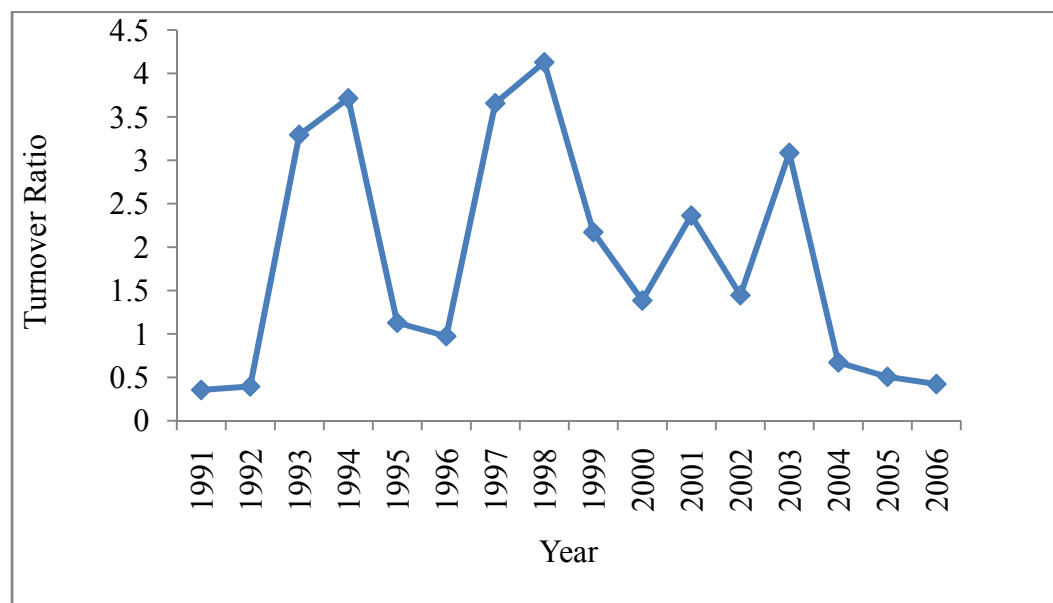


Figure 4: Turnover Ratio of the Ghana Stock Exchange

Source: GSE Market Statistics, December 2006.

The rise in the liquidity indicators, particularly, the turnover ratio in 1994, 1998 and 2003 was due to the listing of more companies which improved significantly the trading activity of the Stock Exchange. It can be observed that the turnover ratio improved remarkably in 1993 (about 3.3%), 1994, 1997 (about 3.7%), 1998 and 2003 as compared to the overall average of 1.8% on the Ghana Stock Exchange.

Primary Capital Issues

The establishment of the Ghana Stock Exchange has enhanced the mobilization of long-term capital by both corporate bodies and government through its link with the primary market. The primary market deals with the issue of new securities by government and corporate bodies. This section assesses the new capital raised by corporate bodies between 1991 and 2006.

Table 4 indicates that corporate bodies raised a total capital of GH¢ 88.67 million through the equity issues on the market. The bulk of the equity capital was raised by the listings of the Ashanti Goldfields Company Ltd (AngloGold Ashanti Ltd), Cocoa Processing Co. Ltd., CAL Bank Ltd., Benso Oil Palm Plantation Ltd., Ghana Breweries Ltd. and Ecobank Ghana Ltd. The 2004 issue of shares recorded the highest capital raised with two companies, BOPP and CAL bank, accounting for 54%. However, the single highest equity capital which was raised by the Cocoa Processing Company Ltd. in 2002 amounted to GH¢ 13.46 million (refer to appendix F). This suggests that the Ghana Stock Exchange is becoming robust in

Table 4: Primary Capital Issues (Capital Raised)

Year	Equity (GH¢ million)	Corporate Bond(in millions)
1991	-	-
1992	0.21	-
1993	-	-
1994	6.31	-
1995	2.61	-
1996	4.25	\$ 2.55
1997	0.20	\$ 2.25
1998	1.56	\$ 2.00
1999	0.29	\$ 2.70
2000	7.93	\$ 1.51
2001	-	£ 1.20
2002	13.66	\$ 3.03
2003	11.60	-
2004	24.46	\$ 2.5
2005	0.55	-
2006	15.05	GH ¢m 35.00
Total	88.67	\$ 16.54*

Source: Computed from GSE Market Statistics, December 2006.

* The total amount raised excludes the GH ¢m 35.00 and £1.20

offering the cheapest means of raising capital in order to reduce the dependence on the banking sector for financing. Out of the total equity capital raised, Initial Public Offerings (IPOs) alone accounted for about GH¢ 64.11 million representing 72.3% which is an indication of the public confidence and willingness to participate in the Ghana Stock Exchange through saving and investment of their resources. Right issue also accounted for GH¢ 23.86 million representing 26.9%. In particular, the two offers constituted about 99.2% of the total equity capital raised on the Ghana Stock Exchange. This also suggests that as the country attains middle income level status, the level of domestic savings and resource mobilization to funding viable investment projects will increase. Private

placement, on the other hand, was very low accounting for about GH¢ 0.46 million representing 0.52 %. This means that the institutional investment tends to be low. (See appendix F for details).

Corporate bond issued on the market was virtually non-existent in the first five years. The bond market became active from 1996, but not much has been raised. However, US\$16.54 million has been raised by Home Finance Company excluding the £1.20 million raised by the same company and the GH ¢ 35.00 million Standard Chartered Bank Medium Term Note.

Theoretical and Empirical Literature on Stock Market Development and Economic Growth

Introduction

This part reviews both the theoretical and empirical literature on the relationship between stock market development and economic growth. The theoretical literature review is organized into six sections. Sections one and two look at the relationship between stock market development and economic growth as well as the impact of economic growth on stock market development. The third and fourth sections deal with the role of stock market development in economic growth and the determinants of the stock market development while sections five and six focus on the indicators of stock market development, and relative roles of stock markets and banks in economic growth. The empirical literature review, on the other hand, is structured into two sections. The first section focuses solely on

the empirical work on the link between stock market development and economic growth. The second section also discusses the empirical literature on the Ghana Stock Exchange.

Theoretical Literature Review

The Relationship between Stock Market Development and Economic Growth

The relationship between financial development, and apparently stock market development, and economic growth involves a lot of theories. This review mainly looks at the nature of the relationship between stock market development and economic growth. There are two main opposing theories underpinning the relationship between stock market development and economic growth. These are the “supply-leading” and “demand-following” hypotheses as highlighted by Patrick (1966).

The proponents of the “demand-following” hypothesis such as Robinson (1952) and Lucas (1988) contend that financial system including stock market development plays a trivial role in economic development; financial development simply responds to economic growth and therefore it is overemphasized. For example, Lucas states that economists “badly over-stress” the role of the financial system in economic growth (p.6). Robinson earlier argues that “where enterprise leads finance follows” (p.86). From this perspective, economic growth creates demands for particular types of financial services to which the financial system responds. In other words, it is the growth of an economy which causes increased

demand for financial services which results in the development of financial institutions and markets. The basis for their argument is that financial development plays unimportant, if not little, role in economic development.

Moreover, other economists make a stronger case against the development of stock market as part of the capital markets. They argue that stock markets are likely to hurt economic growth due to their susceptibility to market failure, which often manifest in the volatile nature of stock markets in many developing countries (Singh & Weiss, 1998). In fact, some consider stock markets as “casinos” which have little impact and potentially negative effect on economic growth (Singh, 1997; Levine & Zervos, 1996). They are of the view that stock market development rather has a negative relationship with economic growth. Again, the traditional growth theorists believe that stock market development and economic growth are not correlated because of the level effects of the former (Pagano, 1993; Shahbaz et al., 2008).

On the contrary, the proponents of the “supply-leading” hypothesis which include Schumpeter (1912), Hicks (1969) and McKinnon (1973) maintain that financial development precedes economic growth. This hypothesis claims that the establishment of financial institutions and markets would increase the provision of financial services and thus lead to economic growth. Bagehot (1873) and Hicks (1969) in particular argue that financial system played a critical role in igniting industrialization in England by facilitating the mobilization of capital for “immense works”. This implies that good projects would not fail for lack of capital as noted by Levine (2005).

Similarly, Azarmi, Lazar and Jeyapaul (2005) argue that the stock market as an initial source of equity finance is necessary and has a strong positive supportive effect for the formation of entrepreneurial and small to medium size enterprises (SMEs). Levine and Zervos (1996, 1998) also support the view that stock markets promote economic growth. They observe that the development of stock markets is positively related with the level of economic development and accumulation of capital. Hence, stock markets are not “casinos”. This means that the development of stock markets matters a lot since they channel both domestic and foreign capital into productive investible projects as well as the provision of liquidity. The fact is that well-functioning stock markets, along with well-designed institutions and regulatory systems bring about economic growth.

Patrick (1966) and Montiel (1995) on the other hand, taking a neutral stand, emphasize that financial development and economic growth are positively interdependent which can be described as “feedback” hypothesis. According to this hypothesis, a country with well-developed financial system and for that matter well-developed stock markets could promote economic growth through technological and products innovation as pointed out earlier by Schumpeter (1912). This, in turn, will create high demand for the financial arrangements and services to which financial institutions respond to stimulate higher economic performance. Patrick (1966) asserts that the “supply-leading finance” (i.e. financial development) may not be a necessary condition or precondition for ensuring self-sustained economic development. Rather, it offers an opportunity to induce real growth by financial means. He concludes that financial development

plays a significant role in the early stages of economic development, but plays a passive role in the later stages.

Montiel (1995) in his contribution argues that growth and financial development/intermediation are mutually dependent on the grounds that the level of per capita income partially determines the level of financial development, while the level of financial development/intermediation can contribute to economic growth in the long-run. Similarly, Ezeoha et al. (2009) note that, “no matter the extent of causality that exists, the main essence of the stock market is to consolidate growth in the financial systems, and enhance the consequent impact of the latter on economic development” (p. 21).

Although the debate on the nature of relationship between stock market development and economic growth remains inconclusive, Levine and Zervos (1996) observe that a prominent line of research stresses the importance of stock market development in economic growth. It is equally important to emphasize that stock market development and economic growth are positively interdependent since the level of development of one affects the other.

The Impact of Economic Growth on Stock Market Development

The level of economic growth plays an important role in influencing the level of stock market development in an economy. According to Miller (1998), economic growth only occurs when there are annual increases in per capita GDP. Demircuc-Kunt and Levine (1996, 1999) also note that stock markets and other

financial intermediaries tend to become more developed and efficient as countries become richer.

The role of economic growth in stock market development is directly linked to the “demand-following” hypothesis. According to this hypothesis, the growth in stock market development is driven by the growth in real economic activities. They argue that the expansion of an economy will create new demand for certain financial services. Such increase in demand resulting from high economic growth will exert pressure to establish larger and more sophisticated financial institutions to create certain financial instruments and arrangements to satisfy the new demand for their services (El-Wassal, 2005). As economies grow or develop, more funds will be needed to meet the rapid expansion.

According to Nyong (1997) the financial structure of a firm (the mix of debt and equity financing) changes as economies grow or develop. The tilt is, however, more towards equity financing through the stock market. In another development, El-Wassal (2005) observes that the Asian economies grew almost twice as much as the developed economies over the period 1980 to 2000. He suggests that economic growth seems to have created a new demand for financial assets, including stocks traded in organized stock exchanges.

Furthermore, it has been argued that economic growth enlarges the stock ownership base in the economy through the rise in per capita income (ibid). When per capita income of a country increases, it creates the opportunity for the citizens to participate in the stock market by acquiring ownership of companies.

This tends to reduce poverty among the citizens because of their investment in such companies.

Moreover, Calderon-Rossell (1991) (as cited in El-Wassal, 2005) made a serious attempt by applying a partial structural model to demonstrate how economic growth (measured by the GNP per capita growth rate) affects stock market growth (proxied by stock market capitalization). He identified two main channels through which economic growth affects market capitalization. In the first place, economic growth provides investors with more resources resulting from potential increase in income. These additional resources, in turn, increase the demand for shares. This, to some extent, explains why stock markets are well-developed in developed and emerging economies as compared to African stock markets, especially those in Sub-Saharan Africa (Jefferis, 1995; Durham, 2002).

The second one is what is termed the “value of companies” channel. In this case, economic growth has a direct impact on the value of companies. The increasing income stream of revenues and profits of listed companies raises stock prices. Consequently, increases in stock prices induce companies to issue additional shares. Therefore, economic growth positively affects the size of the stock markets. This implies that economic growth affects both the demand for and supply of shares through prices. This is also evidenced in global recessions and credit crunch where the decline in economic growth negatively affects share prices and the size of stock markets. That is, the economic growth and invariably increase in income should impact the size of the stock market and share prices.

On the other hand, the decline in economic growth due to global recession or any other external shocks should negatively impact the stock market size and share prices, hence, the value of the listed companies.

The Role of the Stock Market Development in Economic Growth

The stock markets perform important financial functions which ensure efficiency in capital allocation to induce economic growth. Levine and Zervos (1996) observe that stock markets influence economic growth through savings mobilization, provision of liquidity, risk diversification, information acquisition about firms and corporate control. However, the critics cast doubts on the contributions of the stock markets to long-run economic growth.

The stock markets are expected to promote economic growth through encouraging both domestic savings and foreign capital inflow by providing opportunities for investors with financial instruments that may better meet their risk preferences and liquidity needs. It also provides an avenue for firms to raise capital through equity issues at lower cost for financing their businesses (Feldman & Kumar, 1995; Rousseau & Wachtel, 2000). Greenwood and Smith (1996) in particular, show that stock markets lower the costs of mobilizing savings thereby facilitating investment into the most productive technologies. In contrast, Mayer (1988) and Stiglitz (1989) dispute the importance of the stock markets in raising capital. They argue that new equity issues account for a very small fraction of funds required for corporate investment.

Moreover, the stock markets may influence economic growth through their liquidity which ensures that investment in firms is not disrupted. Since high-return projects require a commitment of long-term capital, liquid equity markets help investors who cannot cope with liquidity risk and are therefore reluctant to commit their savings for long periods to easily and quickly sell their shares to those who are not suffering from liquidity shock. In this case, capital is not prematurely removed from firms to satisfy short-run liquidity needs (Levine, 1991; Levine & Zervos, 1996). It is important to point out, however, that theory is unclear about the exact effects of greater stock market liquidity on economic growth. Some models show that increased stock market liquidity can hurt economic growth (Levine, 1997). For example, Bencivenga and Smith (1991) demonstrate that by reducing uncertainty, greater liquidity may reduce savings rates which will have adverse effect on the rate of economic growth.

Furthermore, the stock market development can serve as an important vehicle for risk diversification through internationally integrated stock markets. Devereux and Smith (1994), and Obstfeld (1994) show that stock market development could influence economic growth through risk diversification in the internationally integrated stock markets. Their models also show that greater risk diversification can influence growth by shifting investment into higher-return projects, thereby improving resource allocation and accelerating economic growth. On the contrary, theory suggests that greater risk sharing can slow economic growth. In line with this view, Devereux and Smith (1994), and Obstfeld (1994) again demonstrate that reduced risk through internationally

integrated stock markets can lower savings rates, slow growth, and reduce economic welfare.

The stock markets can also promote economic growth by aggregating information about firms' prospects, thereby directing capital to investment with higher returns (Holmstrom & Tirole, 1993). The efficient stock markets, by reducing the costs of acquiring information and providing better information about firms, will enable investors to acquire information about investment opportunities and monitor firms. This will improve resource allocation and result in a higher rate of economic growth (Levine & Zervos, 1996). Stiglitz (1985), on the other hand, casts doubts on the role of stock markets in stimulating information acquisition and hence improving informational asymmetries. He argues that well-developed stock markets quickly reveal information through price changes, creating a free-rider problem that reduces investor incentives to conduct costly search for information. Again, in spite of the fact that the efficient stock markets may reflect all available information, that information has little effect on resource allocation (Stiglitz, 1989).

The stock market development is expected to foster corporate governance by ensuring that resources are used efficiently (Jensen & Meckling, 1976). As in Jensen and Murphy (1990), well-functioning stock markets help mitigate the principal-agent problem as they will help align the interests of managers to owners, thereby spurring efficient resource allocation and economic growth. This will be effective when it is easier to tie the managers' compensation to stock performance. Moreover, the threat of a takeover will induce managers to

maximize firm's value, since it has the ability to help align managerial incentives with those of the owners (Scharfstein, 1988). In contrast, Shleifer and Vishny (1986) and Bhidé (1993) argue that well-functioning stock markets will not improve corporate governance; instead, more liquid stock markets may adversely influence corporate control and ultimately impede effective resource allocation and productivity growth. They maintain that greater stock market liquidity encourages investor myopia and this adversely affects corporate governance. Thus, with more liquid stock markets, dissatisfied investors can quickly and easily sell their shares in a company, weakening their long-term commitment with firms, incentive to monitor managers and incentive to exert corporate control.

From the foregoing discussion, it is evident that the stock markets, although, have their limitations they provide several financial services that promote long-run economic growth.

Determinants of Stock Market Development

The theoretical literature emphasizes that a well-functioning stock market plays important role in resource mobilization and allocation of funds into high-return investible projects through various mechanisms as well as deepening the financial system which in the long run promote economic growth (Pardy, 1992; Levine & Zervos, 1996; 1998). A well-developed stock market, however, is underpinned by a combination of factors which include sound macroeconomic/fiscal policies, institutional development, appropriate legal and regulatory framework and availability of professional financial intermediary institutions such

as brokerage firms and investment banks or underwriters (Popiel, 1991; Paddy, 1992).

Writing on the development of financial markets in Sub-Saharan Africa, Popiel (1991) identifies three broad factors that are critical to the development of successful capital markets including the stock markets. These are:

- the existence of a sufficient number of market intermediaries such as brokers, dealers and underwriters;
- reasonably well developed accounting, auditing and disclosure standards, so that all needed financial information may be available, transparent, and accurate;
- establishment and vigorous enforcement of rational and comprehensive legal and regulatory frameworks, so that abuses are prevented and investors protected.

Paddy (1992) who shares a similar view identifies two basic building blocks necessary for a thriving securities market. The first block concerns a macroeconomic and fiscal environment conducive to the supply of good quality securities and sufficient demand for them. The second one relates to a market infrastructure capable of supporting efficient operation of the securities market. The market infrastructure, according to Paddy, comprises institutional, regulatory and legal infrastructures.

Popiel (1991) considers the legal and regulatory frameworks to be critical for maintaining the integrity of the capital markets and sustaining investor confidence. Aryeetey (2003) supports the view that investor protection should be

paramount in capital market regulation. He concludes that small investors should be properly protected through strict enforcement of securities laws and regulations. In a similar vein, Pagano (1993) argues that the existence of transparency and regulations increases investor confidence and has a greater impact on the development of financial markets. It is believed that tightening the regulatory environment by increasing disclosure requirements for new stock listings, reduction in taxes and fees on transactions will encourage the development of securities markets (Feldman & Kumar, 1995). This points to the fact that the development of a successful stock market will depend to a larger extent on the enforcement of securities laws and regulations which seek to safeguard the interest of the investors so as to attract both domestic and foreign capital.

Moreover, macroeconomic factors such as income, interest rate, investment, stock market liquidity and inflation play important role in the development of capital markets (Garcia & Liu, 1999). A stable and favourable macroeconomic and political environment provide conducive and harmonious atmosphere necessary to attract savings and investments for a sustained economic growth. Demirguc-Kunt (2006) observes that well functioning financial systems do not only require a stable political system, but also fiscal discipline and stable macroeconomic policies on the part of the government. Popiel (1991), on the other hand, notes that because investors are very sensitive to political or economic uncertainty, a combination of macroeconomic and sector policies aimed at the maintenance of political stability, steady economic growth and low inflation

should be pursued to provide conducive environment for thriving capital markets. This suggests that political or macroeconomic uncertainty can scare away both the actual and potential investors which may have adverse effects on resource mobilization in particular and economic growth in general.

The development of good quality institutions can also affect the attractiveness of equity investment and hence the development of stock market (Feldman & Kumar, 1995). According to Billmeier and Massa (2007), institutions can be interpreted as the set of rules and norms that shape the social, political and economic interactions among the members of a society. It can also be described as organizational institutions such as political, economic, social, and educational bodies. Institutional factors include property rights, clearance and settlement issues, transparency and the inside information problems, taxation issues and accounting standards (Garcia & Liu, 1999). Paddy (1992), on the other hand, indicates that institutional infrastructure relates to intermediaries that provide important financial services which include trading, investment management and advisory services; market and market-related service providers for stock exchanges, over-the-counter markets and providers of ancillary services such as accounting and auditing, and legal advice.

Billmeier and Massa (2007) identify two ways by which institutions may affect stock market development. Firstly, better institutions which are marked by more transparency, less corruption, and better protection of property rights foster investor confidence, thus leading to a high demand for securities and larger stock markets. Secondly, better institutions promote economic growth in general and

enhance market fundamentals that lead to highly developed stock markets. In addition, Popiel (1991) observes that “a sound and rational development of capital markets requires, therefore, not only favourable policies, but also the establishment of the legal and institutional infrastructure to support the operation of such markets” (p. 208). This therefore calls for institutional reforms which seek to enhance transparency, minimize corruption and insider trading, improve legal protection of private property and law enforcement, and any form of impropriety so as to win investor confidence to attract more savings and foreign capital, especially, in Africa in their quest to develop their capital markets.

Indicators of Stock Market Development

The appropriate choice of the stock market development indicators is critical in guiding empirical research. As observed by Levine and Zervos (1996), the stock market development is a multi-dimensional concept. The theoretical literature, however, does not provide any unique indicators or measures of stock market development; it does suggest that stock market size, liquidity, volatility, concentration, integration with world capital markets and the legal rule or institutional development (regulation and supervision in the market) may affect economic growth (Demirguc-Kunt & Levine, 1996). It is also worth mentioning that no single indicator captures all aspects of the stock market development; each indicator has its own statistical and conceptual shortcomings.

In line with the purposes of studies based on the underlying theoretical arguments, some researchers use composite index of stock market development

indicators while others prefer using a combination of stock market indicators or only one indicator. Since a bulk of the theoretical and empirical studies conducted on the linkage between stock market development and economic growth employed the two main traditional indicators (measures of stock market size and liquidity), the following review focuses mainly on the indicators of stock market size and liquidity which will be linked to the methodology.

The size of the stock market development is measured by the ratio of market capitalization to GDP (i.e. market capitalization ratio). Market capitalization on the other hand, equals the total value of all listed shares. The assumption underlying the use of this measure is that the stock market size is positively correlated with the ability to mobilize capital and diversify risk (Demirguc-Kunt & Levine, 1996). On the other hand, theory does not suggest that the mere listing of shares will influence resource allocation and growth (Beck & Levine, 2004). Levine and Zervos (1998) and Rousseau and Wachtel (2000), on the other hand, argue that since the stock markets are “forward looking”, stock prices will rise if the markets anticipate large corporate profits thereby raising the market capitalization while there is no corresponding increase in the number of transactions. This, they say, is the main potential pitfall of the market capitalization ratio as an indicator of the stock market development.

Liquidity of the stock market is measured by total value traded ratio and turnover ratio. The total value traded ratio equals the total value of shares traded on the stock market divided by GDP and it is often used to gauge market liquidity. This indicator measures the value of equity transactions relative to the size of the

economy or as a share of national output and therefore it should positively reflect liquidity on an economy as whole. The total value traded ratio, therefore, provides more information about the aggregate provision of liquidity than the turnover ratio (Levine & Zervos, 1998). The main pitfall of the total value traded ratio as noted by Rousseau and Wachtel (2000) among others is that, it is also affected by the price effect of stock markets. Since it is a product of both market prices and the number of shares traded, the rise in share prices would increase the value of stock transactions and therefore raise the total value traded ratio. Henceforth, this liquidity indicator would erroneously rise without a corresponding increase in the number of transactions or a fall in transaction costs.

The turnover ratio equals the value of total shares traded divided by the market capitalization. It is often used to gauge the efficiency of the domestic stock market. High turnover is often used as an indicator of low transactions costs. However, the turnover ratio is not a direct measure of efficiency or trading costs. It rather reflects trading frictions and information that induce transactions. A small, liquid market may have small market capitalization and total value traded ratios, but high turnover ratio. In other words, a large but inactive market will have a large market capitalization ratio but a small turnover ratio (Demirguc-Kunt & Levine, 1996). The theoretical literature indicates that the turnover ratio does not suffer from the effect of forward looking nature of stock prices since both numerator and denominator contain the price (Levine & Zervos, 1998; Filer et al., 1999). Both the total value traded ratio and turnover ratio complement the market capitalization ratio.

With regard to the choice of appropriate measures of stock market development, Garcia and Liu (1999) and Arestis, Demeriades and Luintel (2001) favour the use of market capitalization ratio as a measure of stock market development. Garcia and Liu (1999) explain that the use of the market capitalization indicator is a better and less arbitrary proxy for general development of the stock market than other individual measures or constructing a composite index of stock market development. Arestis et al. (2001) on their part, argue convincingly that in the case of time series analysis, market capitalization indicator is preferable to other market liquidity indicators used mainly in cross-country studies since it is a stock rather than a flow variable that makes comparison with bank-based indicator, a stock variable, more meaningful. They, further, explain that market capitalization indicator as a stock variable is likely to have time series properties that make it suitable for cointegration analysis.

Moreover, given that both market capitalization and total value traded ratios are affected by the price effects they can be used together. Levine and Zervos (1998) suggest that since price effect of stock markets affects both market capitalization ratio and total value traded ratio, one way to gauge the influence of the price effect is to use both indicators together. In contrast, Rousseau and Wachtel (2000) point out that since total value traded ratio contains components of both market liquidity and size, it is a better measure of stock market development than market capitalization. Their conclusion, however, indicates that the price effect can be addressed by deflating both market capitalization and total value traded indicators with the local share price indices or deflators.

Demirguc-Kunt and Levine (1996), and Levine and Zervos (1998) also use assortment of stock market indicators comprising measures of stock market liquidity, size, volatility, and integration with world capital markets for their cross-country studies. Levine and Zervos (1996), on the other hand, use a single composite index of stock market development that combines information on stock market size, liquidity and integration with world capital market to provide an empirical assessment of whether overall stock market development is strongly linked to long-run economic growth.

The foregoing literature on measurement of stock market development does not clearly prescribe any particular indicators for research. However, it is certain that both indicators of market size and liquidity (total value traded ratio) have their shortcomings. Any or a combination of the two indicators as well as a composite index can be used for empirical studies.

Stock Markets and Banks in Economic Growth

In the modern economy banks and stock markets constitute a major part of the financial system. It has been argued that although banks and stock markets may perform different roles in the process of long-run economic growth, their uniqueness is hardly emphasized within the theoretical frameworks of economic growth (Caporale et al, 2003). There are theoretical arguments about the comparative importance of the bank-based and market-based financial systems in the process of economic growth. The theory provides conflicting predictions about whether stock markets and banks are complements or substitutes

(Rousseau & Wachtel, 2000; Levine, 2002; 2005). This section reviews the four competing theoretical views on the bank-based and market-based financial systems in economic growth. This will help to appreciate the unique services provided by the stock markets and banks in inducing economic growth and the need to create the right environment for overall development of the financial system.

The arguments on the relative importance of the bank-based and market-based financial systems on economic growth centre on the critiques of both financial systems in performing financial functions rather than the growth-enhancing roles of banks and markets (Levine, 2005). These functions include information acquisition, risk management, liquidity and corporate control. The proponents of the bank-based financial system contend that due to certain fundamental reasons, well-developed stock markets will not be able to provide better financial functions involving information acquisition about firms, monitoring managers and exerting corporate governance. Stiglitz (1985) and Boyd and Prescott (1986) for example, argue that banking sector development can play an important role in promoting economic growth, as banks are better than stock markets with regard to resource allocation. They conclude that the above pitfalls will adversely affect resource allocation and economic performance. Therefore, banks will do a correspondingly better job at researching firms, overseeing managers and financing industrial growth since they do not suffer from the same fundamental shortfalls as the stock markets (Levine, 2005).

The proponents of the market-based financial system on the other hand, focus on the limitations of the bank-based system and argue accordingly in favour of the stock markets. They question for instance, the role of banks in aggregating information about firms and exerting corporate control more effectively. It has been argued that the development of stock markets is necessary to achieve full efficiency in allocation of capital in a liberalized financial system because of the shortcoming of debt finance in the presence of asymmetric information. They also claim that while banks conveniently finance only well-established, less risky firms, stock markets can finance risky, productive and innovative investment projects (Caporale et al, 2004; Levine, 2005). They conclude that although bank-based systems may provide inexpensive, basic risk management services for standardized situations, market-based systems provide a richer set of risk management tools that permit greater customization of risk ameliorating instruments.

In addition to the debates on the bank-based and market-based financial systems, Levine and Zervos (1998) among others, argue along the types of financial services provided by both financial systems in financing firms, mobilizing savings, exerting corporate control and providing avenues for risk management. The “financial services” view stresses that the primary issue is not about the type of the financial structure, but rather the creation of a conducive environment to ensure the availability and quality of financial services (Levine, 2002; 2005).

Again, some analysts consider stock markets as providing either complementary or substitutional role to bank finance. In line with these conflicting views, Garcia and Liu (1999) note that since both the banking sector and stock markets intermediate savings towards investment projects, they can be either complements or substitutes. Claessens, Klingebiel and Schmukler (2002), on the other hand, suggest that banks and stock markets may behave as complements rather than as substitutes. On the contrary, Arestis et al. (2001) argue that stock markets are substitute sources for corporate finance because as a firm issues new equity its borrowing needs from the banking system declines. They note further that it is possible for stock market development to hinder economic growth if it happens at the expense of banking development. Other analysts are of the view that the substitutes or complements issue could be country specific due to special incentives to obtain debt or equity financing.

Finally, the effectiveness of the bank-based and market-based financial systems in providing financial services depends, to a large extent, on the quality of the legal system on which they operate. La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997; 2000) hold the view that finance is a set of contract, and argue accordingly that a well-functioning legal system (legal rights and enforcement) is very crucial in facilitating the financial functions of both the financial intermediaries and markets. Beck, Demirguc-kunt, Levine and Maksimovic (2000) also contend that the financial structure is not an analytically useful way to distinguish the financial systems. The legal system, therefore, is the primary

determinant of the effectiveness of the financial system in facilitating innovation and growth (La Porta et al, 2000).

The most important issue here is that banks and stock markets provide different services and sources of finance in the form of debt and equity. Since both forms of finance are needed for private sector development and the growth of an economy in general, there is the need to formulate and implement well-functioning legal systems that promote the functioning of both financial systems to ensure that both sources of finance are readily available.

Empirical Literature Review

This review looks at the empirical evidence on the relationship between stock market development and economic growth on cross-country and country-specific studies with emphasis on emerging equity markets. It concludes with the empirical evidence on the stock market development in Ghana.

The Link between Stock Market Development and Economic Growth

The first comprehensive study on the relationship between stock market development and economic growth was conducted by Levine and Zervos (1996, 1998), Demirguc-Kunt and Levine (1996) among other scholars. Levine and Zervos (1996), for instance, evaluate the relationship between the stock market development and long-run growth using data on forty-one (41) countries over the period 1976 to 1993. The purpose of their work was to empirically assess the strength of the independent partial correlation between stock market development

and economic growth. They measured the stock market development by a composite index that combines information on stock market size, liquidity and integration with world capital market. Using instrumental variables procedure, the authors find that overall stock market development is positively correlated with long-run economic growth at 5% of significance after controlling for a large set of macroeconomic and political variables such as the initial real per capita GDP, initial investment in human capital, political instability and government expenditure.

In addition, Levine and Zervos (1998), applying ordinary least squares method (OLS) investigate the relationship between various measures of stock market development (the size, liquidity, volatility and integration with world capital market) and economic growth, capital accumulation, and productivity growth in a sample of forty-nine (49) countries spanning 1976 and 1993. The study focuses on whether the liquidity services provided by a country's stock market are strongly linked with the national performance. They find that measures of stock market liquidity are significantly correlated with future rates of economic growth, capital accumulation and productivity growth at 5% level of significance even after controlling for economic and political factors including banking sector development. The study also finds that the measure of stock market size is not robustly correlated with growth, capital accumulation and productivity improvement.

Beck and Levine (2004) also examine whether measures of stock market and bank development independently have a positive relationship with economic

growth using a panel data set, averaged over five-year periods, for forty (40) countries between 1976 and 1998. They use the system panel estimator to mitigate potential biases associated with the difference estimator. The results indicate that stock market liquidity (turnover ratio) and banking development (measured as bank claims on the private sector by deposit money banks divided by GDP) have strong positive relationship with economic growth.

In contrast, other studies show that economic growth plays significant role in stock market development. For instance, Calderon-Rossell (1991) (as cited in El-Wassal, 2005) developed behavioural structural model to analyze the determinants of the stock market growth using annual data from forty-two (42) countries from the main active stock markets in the world from 1980 to 1987. The model considered economic growth and additional stock market liquidity as the major determinants of stock market growth. The results show that economic growth and stock market liquidity are important determinants of stock market growth.

Furthermore, El-Wassal (2005) investigates the relationship between stock market growth (measured by market capitalization ratio) and economic growth (measured by GNP per capita growth rate), financial liberalization, foreign portfolio investment and political risk in forty (40) emerging markets between 1980 and 2000 by applying two stage least squares (2SLS) with fixed effect technique. The results show that economic growth, financial liberalization policies and foreign portfolio investments were the leading factors of the emerging stock markets growth. He concludes that the results seem to provide

some support for the “demand-following” hypothesis. That is, emerging stock markets size and liquidity growth are likely to be driven by contemporaneous rates of economic growth.

It can be inferred from the above cross-country studies that stock market development and economic growth are positively related. It is also clear that stock market liquidity does not hurt economic growth as argued by some analysts. However, empirical studies at country-specific levels provide mixed results. While studies in some countries established negative relationship between stock market development and economic growth, other studies confirm the positive relationship between the two variables.

Studies by Nyong (1997) and Azarmi et al. (2005) show a negative relationship between stock market development and economic growth. For instance, Nyong develops an aggregate index of stock market development comprising market capitalization ratio, total value traded ratio, turnover ratio and the number of listed companies to determine its relationship with long-run economic growth in Nigeria. The study employs time series data from 1970 to 1994. A measure of financial market depth (which is the ratio of broad money supply to GDP) was also included as a control variable. The result of the study indicates that stock market development is negatively and significantly correlated with long-run growth in Nigeria.

Azarmi et al. (2005) also examine the relationship between stock market development and economic growth in India during the pre- and post-liberalization periods between 1981 to 2001. They report that there is no relationship between

Indian Stock Market development (measured by stock index comprising market capitalization ratio, total value traded ratio and turnover ratio) and economic growth (proxied by real per capita GDP) for the entire twenty-year period. They also find a significant negative relationship between stock market development and economic growth for the post-liberalization period covering 1991 to 2001. The results, however, find evidence of positive relationship between stock market development and economic growth during the pre-liberalization sub-period between 1981 and 1990. They conclude that their results are consistent with the suggestion that the Indian Stock Market is a “casino” for the sub-period of post liberalization and for the entire twenty-year study period.

On the other hand, Hondroyiannis et al. (2004), and Shahbaz et al. (2008) report of a positive relationship between stock market development and economic growth in Greece and Pakistan, respectively. Hondroyiannis et al (2004) utilize monthly data to investigate the relationship between economic growth and the development of the stock market and the banking system in Greece over the period 1986 to 1999. Using VAR, their results show a positive long-run relationship among real output, stock market development (measured by market capitalization ratio) and banking system development (proxied by bank credit to the private sector divided by GDP) significant at 5%.

Shahbaz et al (2008) also investigate whether there is a relationship between stock market development and economic growth in Pakistan by using annual time series data from 1971-2006. They applied autoregressive distributed lag (ARDL) and Juselius-Johansen co-integration testing techniques to estimate

the long-run relationship between the two variables. The results reveal a very strong, positive long-run relationship between stock market development measured by market capitalization ratio and economic growth proxied by real per capita income significant at 5% level.

With regard to the causal relationship between stock market development and economic growth, some researchers find evidence in support of “demand-following” hypothesis while other studies support “supply-leading” hypothesis. Others also report of bi-directional causality between the two variables. For example, Vazakidis and Adamopoulos (2009) examine the causal relationship between stock market development and economic growth for France for the period 1965 to 2007 using Granger-causality tests based on vector error correction model (VECM). The results indicate that economic growth brings about stock market development in France. This suggests that economic growth has a positive effect on stock market development and that stock market growth is driven by economic growth.

Aboudou (2009), on the other hand, examines the causal relationship between stock market development and economic growth for the West African Monetary Union economy by applying Granger non-causality test proposed by Toda and Yamamoto (1995). He finds that both real market capitalization ratio and total value traded ratio Granger-cause economic growth, which are significant at 5% and 1%, respectively. The results suggest that stock market development leads to economic growth in the West African Monetary Union.

In contrast, Bahadur and Neupane (2006), and Deb and Mukherjee (2008) find a bi-directional relationship between stock market development and economic growth. Bahadur and Neupane (2006), for instance, examine the causal relationship between the stock market development and economic growth in Nepal from 1988 to 2005 using Granger causality tests. They measured stock market development by market capitalization ratio and a conglomerate index of market capitalization, total value traded and turnover ratios while economic growth was proxied by real GDP. The results show a bi-directional causality between the market capitalization ratio and real GDP at 5% level of significance.

Deb and Mukherjee (2008) on their part investigate the causal relationship between stock market development and economic growth for the Indian economy using quarterly data for the period 1996 to 2007. They use real GDP growth rate as a proxy for economic growth and real market capitalization ratio, real total value traded ratio and stock market volatility as stock market indicators. Applying Granger non-causality test proposed by Toda and Yamamoto (1995) to determine the direction of causality, the results suggest a 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 development are mutually dependent. Moreover, both studies find that economic growth leads to stock market development measured by stock index and value traded ratio at 5% level of significance in Pakistan and India, respectively.

Empirical Literature Review on Ghana

The Ghana Stock Exchange is considered to play important role in raising savings and investment rates as well as attracting foreign investment (Kenny & Moss, 1998). Few studies have been conducted on the Ghana Stock Exchange. These include Osei (1998), Osei (2005) and Yartey (2006).

Osei (1998) analyses the institutional factors affecting the development of the Ghana Stock Exchange. These institutional factors include legal and regulatory framework, information disclosure requirements, transparency of transactions and barrier to entry and exit. He also conducts efficiency tests on daily and weekly returns for the Ghana Stock Exchange before and after the listing of the AGC for the period 1993-1995 and came out with revealing results. The study establishes that the institutional factors particularly the legal and regulatory frameworks that ensure the protection and security of investors are strongly enforced. In instances where some brokerage firms failed to comply with the rules governing the operations of the GSE, they were fined and suspended. The results also show that there is mandatory disclosure of information on the part of the listed companies to the general public and that the call-over system of transaction is very satisfactory.

Furthermore, the random walk tests suggest that the GSE is inefficient, that is, “weak-form” inefficient. This implies that investors can profit from trading by predicting the market prices of shares using past or historical prices because of the serial dependency between the past and future prices. The study further finds that the listing of the Ashanti Goldfields Company impacted

tremendously on the GSE in many ways including improvement in the market liquidity and turnover.

Osei (2005), on the other hand, employs a VAR technique developed by Sims (1972) based on Granger's (1969) definition of causality to investigate the relationship between the stock market development and economic growth using quarterly data for the period 1991 to 2003. The purpose of the paper was to establish the direction of causality between stock market development and economic growth in Ghana. He utilizes quarterly data on 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 indicate that stock market development Granger causes economic growth in Ghana at 5% level of significance. However, since nominal market capitalization is affected by the price effect of stock markets, the use of nominal stock market capitalization and market capitalization ratio may not be the appropriate indicators for this study because it may lead to spurious relationship (Rousseau & Wachtel, 2000). Hence, the need to use real market capitalization and real market capitalization ratio for the study.

On the other hand, Yartey (2006) examines the financing practices of all non-financial listed firms based on their balance sheets between 1995 and 2005. He reports that the average listed Ghanaian firms financed about 12 per cent of growth of total assets from internal sources. External debt, however, financed 48 per cent of the growth of total assets while new issues of equity financed 41 per cent of the growth in total assets. He also finds that the new equity issues

compares favourably with those of the developed and even advanced countries like Germany, the Netherlands, Ireland, and Japan. Yartey (2006), further, notes that the stock market is the most important source of long-term finance for listed Ghanaian firms. He, therefore, concludes that the stock market has played a great role in financing the growth of large Ghanaian corporations and that stock market development in Ghana has been important.

Summary and Conclusion

The review of the Ghanaian economy revealed that the historical structure of the Ghanaian economy shows hardly any change. The implementation of economic reform programmes such as the ERP, SAPs since 1983 has improved the real sector growth and real GDP growth rates.

The review on the Ghana Stock Exchange showed that the GSE although is new, illiquid and has been in existence for barely seventeen years, it has contributed to the development of the capital market in the country. It has provided an avenue for firms and the government to mobilize both domestic and foreign capital for investment. It has also provided an opportunity for the public to participate in the capital market. The Ghana Stock Exchange has grown relatively over the years with improvement in All-Share Index and market capitalization including liquidity as depicted by the market indicators. However, the bond market is not active as compared with the equity market.

The theoretical literature on stock market development and economic growth focused specifically on the review of the relationship between stock

market development and economic growth, the impact of economic growth on stock market development, the role of stock market development on economic growth, the determinants and indicators of stock market development. It concluded with the comparative roles of banks and stock markets in the process of economic growth. The review of the relationship between stock market development and economic revealed that there are two main opposing theories, “supply-leading and demand following” hypotheses, underpinning the causal relationship between financial development in general and stock market development in particular and economic growth. The bulk of the theoretical literature maintains that stock market development plays a key role in economic growth. It is clear that both of them are mutually dependent in the process of economic growth.

The review also showed that economic growth influences the demand for and supply of shares of listed companies on stock markets. It therefore drives stock market development in an economy. Moreover, the literature review indicated that stock markets induce economic growth through the provision of financial functions such as savings mobilization, liquidity, risk diversification, information acquisition about firms and corporate control.

Furthermore, it has been established that efficient capital market and apparently stock market development thrives on the quality and enforcement of the legal and regulatory framework, sound macroeconomic, fiscal and institutional factors. With regard to the choice of the stock market indicators, the theoretical literature does not provide any unique measures of stock market

development. However, researchers can use a composite index, a combination of indicators or a single indicator based on the purpose of the study underpinned by the theoretical arguments. The theoretical literature also maintains that banks and stock markets provide different financial services in the process of economic growth. They may be considered as either substitute or complementary in financing corporate enterprises.

The empirical literature, on the other hand, reviewed the link between stock market development and economic growth in both developed and emerging market economies. The empirical evidence on the cross-country demonstrates beyond doubts that there is a positive relationship between stock market development and economic growth. The country-specific studies, however, show both positive and negative relationship between stock market development and economic growth. The country-specific studies also find evidence in support of both “supply-leading” and “demand-following” hypotheses in different countries. Other studies reveal a bi-directional causality between stock market development and economic growth particularly for low-income countries or emerging stock markets economies.

The empirical literature review on Ghana shows that although the Ghana Stock Exchange is inefficient and faces some challenges, it has the potential to mobilize domestic savings and foreign capital for long-term investments to sustain growth in Ghana since it has a positive relationship with economic growth.

CHAPTER THREE

METHODOLOGY

Introduction

This chapter focuses on the explanation of the methodology employed for the study and it is structured into four sections. Sections one and two consider the theoretical and empirical specifications of models while sections three and four deal with the data source, measurement and estimation techniques.

Specification of Theoretical Model

The literature review showed that stock market development has a positive relationship with economic growth. For instance, El-Wassal (2005) and others demonstrate that economic growth plays important role in influencing stock market development. Moreover, Garcia and Liu (1999), and Yartey (2008) have shown that macroeconomic factors such as gross domestic investment, stock market liquidity and banking sector development are important macroeconomic variables explaining stock market development. This calls for a suitable model to be employed to examine the relationship between stock market development and economic growth in Ghana. In this regard, this study adapted Calderon-Rossell's (1991) behavioural structural model of stock market development (as indicated in

El-Wassal, 2005). He developed this behavioural structural model to analyze the determinants of the stock market growth using annual data from forty-two (42) countries from the main active stock markets in the world from 1980 to 1987. In the model, economic growth and stock market liquidity are considered the main determinants of the stock market development proxied by market capitalization.

The market capitalization is defined as follows:

$$M \equiv PV \tag{1}$$

Where:

M is the market capitalization in local currency;

P is the number of listed companies (i.e. the quantity of listed equities) in the stock market; and

V is the local currency average price of listed companies.

The model can be presented formally as follows:

$$M \equiv PV = M(G, T) \tag{2}$$

$$\text{But } V = V(G, P) \text{ and } P = P(T, V) \tag{3}$$

$$V = G^{\alpha_1} T^{\alpha_2} \text{ and } P = G^{\beta_1} T^{\beta_2} \tag{4}$$

The exogenous variables G, represents per capita GNP in local currency and T, represents the turnover ratio. The endogenous variables are M, P and V.

The component of the reduced form model is expressed as follows:

$$\text{Log}V = \alpha_1 \text{Log}G + \alpha_2 \text{Log}T \tag{5}$$

$$\text{Log}P = \beta_1 \text{Log}G + \beta_2 \text{Log}T \tag{6}$$

Equation (1) can be written as:

$$\text{Log}M = \text{Log}(PV) = \alpha_1 \text{log}G + \alpha_2 \text{log}T + \beta_1 \text{log}G + \beta_2 \text{log}T \tag{7}$$

Factorizing equation (7) we have:

$$\text{LogM} = (\alpha_1 + \beta_1) \log G + (\alpha_2 + \beta_2) \log T \quad (8)$$

$$\text{LogM} = \theta_1 \text{LogG} + \theta_2 \text{LogT} \quad (9)$$

Where:

$$\theta_1 = \alpha_1 + \beta_1 \quad (10)$$

and

$$\theta_2 = \alpha_2 + \beta_2 \quad (11)$$

The equation (9) shows the impact of economic growth, G and stock market liquidity, T on the stock market development, M. The model shows that the stock market development is determined by the combined effects of economic growth and stock market liquidity (turnover ratio) on both stock prices, V and the number of listings, P.

Specification of Empirical Model

Since the main objective of this study was to examine the relationship between stock market capitalization and economic growth in Ghana, we modified the Calderon-Rossell's model and incorporated banking sector development and gross domestic investment. LDIN_t is the log of real gross investment-GDP ratio and U_t is the error term. The domestic credit to the private sector and investment were introduced into the model to evaluate their effects on the stock market development. In particular, we examined the nature of relationship between the stock market development and banking sector development as to whether they are complements or substitutes for financing corporate investment in Ghana.

Although the literature does not provide a unique measure of the stock market development, it does suggest that stock market size, liquidity and integration with the world capital markets may affect economic growth (Demirguc-Kunt & Levine, 1996). According to Garcia and Liu (1999), market capitalization is a better and less arbitrary proxy for general development of the stock market than other individual measures or a composite index of stock market development. Moreover, in the case of time series analysis, market capitalization indicator is preferable to other market liquidity indicators since it is a stock rather than a flow variable that makes comparison with bank-based indicator, a stock variable, more meaningful (Arestis et al., 2001). Therefore, market capitalization ratio is used as a measure of the stock market development.

From equation (9), we estimated the following long-run regression:

$$LMC_t = \alpha_1 + \beta_1 LRGDP_t + \beta_2 LTV_t + \beta_3 LDC_t + \beta_4 LDIN_t + U_t \quad (12)$$

where LMC_t is the log of real market capitalization ratio, $LRGDP_t$ is the log of real GDP, LTV_t is the log of real total value traded ratio, LDC_t is the log of real domestic credit to private sector, $LDIN_t$ is the log of real gross investment-GDP ratio and U_t is the error term.

Data Source and Measurement of Variables

All the series are in real terms (measured in 1997 constant price). Due to lack of quarterly data on the GDP and investment, the annual real GDP and gross investment series were interpolated into quarterly series using non-linear interpolation method-Prachowny (1969) algorithm. The data was obtained from

Bank of Ghana Quarterly Economic Bulletins, Ghana Statistical Service, Ghana Stock Exchange Market Statistics and IMF's International Financial Statistics.

The variables for the study are measured as follows. The stock market development is measured by market capitalization ratio. Market capitalization ratio equals the value of listed shares divided by real GDP. It gives a measure of the size of the stock market relative to the size of the economy. The assumption behind this measure is that overall market size is positively correlated with the ability to mobilize capital and diversify risk in the economy as a whole (Demirguc-Kunt & Levine, 1996).

Economic growth indicator used for the study was the real gross domestic product (GDP). From the literature, economic growth and stock market development are positively correlated. Therefore, we expected real GDP to be positively correlated with stock market capitalization.

Total value of shares traded ratio equals total value of shares traded on the stock market divided by real GDP. The total value traded ratio measures the organized trading of firm equity as a share of national output and therefore it should positively reflect liquidity on an economy as a whole. Liquidity in the stock market reduces the disincentive to investment as it provides more efficient resource allocation and hence economic development. The literature shows that total value traded ratio is a better measure of stock market liquidity as compared with the turnover ratio since it provides more information about the aggregate provision of liquidity than the turnover ratio (Levine & Zervos, 1998; Garcia & Liu, 1999). It was expected to have a positive coefficient.

The banking sector development, domestic credit to private sector, is measured by real bank claims on the private sector by deposit money banks divided by real GDP. It may be taken as a measure of overall banking sector development of a country's commercial banking system. Many studies of finance and growth use the ratio of M3 to GDP as a proxy of financial depth. King and Levine (1993) note, however, that this measure does not tell us whether the liabilities are those of the central bank, commercial banks or other depository institutions. In contrast, the domestic credit to the private sector captures the amount of external resources channeled through the banking sector to the firms. It excludes credits by development banks and loans to the government and public enterprises. Since the banking sector in Ghana is dominated by the commercial banks and deposit money bank's credit to private sector is dominant, the ratio of deposit money banks credit to private sector to real GDP ratio is used as a measure of banking development in this study (Gockel & Akoena, 2002). We expected the coefficient of domestic credit to the private sector to have either a positive or negative relationship with stock market capitalization.

Following the argument by Rousseau and Wachtel (2000) that market capitalization and total value traded are affected by the price effects of stock markets, the two indicators including the bank credit were deflated using consumer price index (1997 as a base year).

The variable "LDIN" is calculated as gross domestic investment divided by real GDP. The literature indicates that increased savings tend to be channeled into investment. The gross domestic investment is also important in influencing

the stock market development. The empirical literature also indicates that domestic investment is a better predictor of the stock market development than domestic savings. We expected real gross domestic investment to be important determinant of the stock market development. It is expected to have a positive sign.

Estimation Techniques

Available literature suggests that majority of the time series macroeconomic data are non-stationary or have a unit root (Nelson & Plosser, 1982). A non-stationary series according to Harvey (1990) is one where the moments (mean, variance and covariance) of the distribution from which series observations were drawn are time-variant; they depend on the point in time at which the observations were realized. A combination of variables that is non-stationary may lead to spurious regression results. Therefore, it was important to test for the stationarity of the variables to be employed for the study. This was followed by a cointegration test to establish the long-run relationship. Error correction model was also performed to track the short-run dynamics of the variables under consideration. Finally, causality test was conducted to determine the direction of causation between the stock market development and economic growth.

Stationarity Test

Stationarity test is expected to be the first step in the time series regression analysis. This is due to the fact that there is the need to distinguish between stationary and non-stationary variables in order to come up with statistically reliable results. Granger and Newbold (1974) and Stock and Watson (1988) have shown that running regression on non-stationary data using OLS estimation produces spurious results. One way to remedy non-stationarity is by differencing the variables to reverse them to stationary variables in order to obtain consistent parameter estimates, though this may lead to a loss of long-run properties of the data (Gujarati, 2001). Various tests have been developed to test for the stationarity of macroeconomic time series data. These include the Dickey–Fuller (1979) test, Augmented Dickey–Fuller (1981) test and Phillips–Perron (1988) test. The Augmented Dickey–Fuller (ADF) test which is widely used due to its simplicity and thoroughness was employed to test for the presence of unit roots in all the variables. To check for the robustness of the ADF unit root test, Phillips–Perron (PP) test was also carried out.

ADF test is conducted on condition that errors must have constant variance and be identically and independently distributed. In the following equation, the null hypothesis of $\beta = 0$ is tested against the alternative hypothesis of $\beta < 0$:

$$\Delta y_t = \alpha + \gamma T + \beta y_{t-1} + \sum_{i=1}^K \lambda_i \Delta y_{t-1} + \varepsilon_t \quad (13)$$

where Δ denotes the first difference operator, y_t is the variable in question, T is a time trend, ε_t is a random variable and k is the number of lags which are added to

the model to make ε_t white noise. Akaike Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC) are used to determine the optimal lag length k . If β (ADF test statistic) is significantly negative and greater than the MacKinnon critical value then the null hypothesis that the variable y has a unit root can be rejected. Non-rejection of the null hypothesis implies that the series is non-stationary; whereas the rejection of the null indicates the time series is stationary.

Cointegration Test

The purpose of cointegration estimation is to determine whether a stationary linear combination of two (or more) non-stationary variables exists (Haley, 1995). This involves testing for the existence of a stable or long-term equilibrium relationship between the variables. The underlying premise of cointegration analysis is that while time series may be non-stationary, a linear combination of the variables may be stationary (Haley, 1993). Non-stationary macroeconomic series are said to be cointegrated if they can be transformed into a single series that exhibits stationarity (Engle & Granger, 1987). Cointegration analysis proceeds by first determining whether the variables under consideration are individually integrated of order one, i.e. $I(1)$. This will be differenced once to become stationary. If it is determined that the variables are $I(1)$, then cointegration test can be performed to know whether a linear combination of the variables will be stationary, i.e. $I(0)$. Cointegration exists if a linear combination of non-stationary variables is stationary. This implies that it is possible for two or more

variables to be I(1) and yet for certain linear combinations of those variables to be I(0).

As noted by Shahbaz et al (2008) cointegration tests can be conducted by using the Engle-Granger (1987) two-stage procedure, autoregressive distributed lag (ARDL) approach proposed by Pesaran et al (2001) or the Johansen maximum likelihood approach (Johansen 1988; Johansen & Juselius, 1992). In particular, Johansen (1988) and Johansen and Juselius (1992) developed multivariate methods that explicitly use the vector autoregressive method (VAR) for the testing and estimation of cointegration (or ‘long-run’) relationships among nonstationary data. The VAR provides a useful framework for the investigation of both long-run (cointegration) relationships and short-run dynamics (via an equilibrium correction model, the ECM) of the variables in the system. The Johansen-Juselius estimation method is based on the error-correction representation of the VAR model with Gaussian errors (Hondroyiannis, et al 2004). Therefore, Johansen (1988) and Johansen–Juselius (1992) technique will be used to test for the cointegration among the variables since the study is a multivariate one. The Johansen-Juselius vector error correction (VCEM) representation of a VAR(p) model, of lag length p , can be written as:

$$\Delta X_t = \Pi X_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta X_{t-1} + \Psi + D_t + \varepsilon_t \quad (14)$$

where X_t is a ($nx1$) vector composed of non-stationary variables, Π and Γ_i are (nxn) matrices of coefficients, D_t is a vector of deterministic variables such as constant, trend and dummy variables, ε_t is a ($nx1$) vector of normally and

independently distributed error terms with zero mean and non-diagonal covariance matrix, Σ . The rank of the matrix (Π) gives the dimension of the cointegrating vector.

Provided that the variables are (at most) integrated of order one $\{I(1)\}$ and cointegrated, the equation (14) will be reparameterized. If the rank of the matrix, r is ($0 < r < n$), then Π can be decomposed into $\Pi = \alpha\beta'$ where α , β are ($n \times r$) matrices containing the adjustment coefficients and the cointegrating vectors respectively. Hence the equation (14) reduces to:

$$\Delta X_t = \alpha\beta'X_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta X_{t-i} + \Psi + D_t + \varepsilon_t \quad (15)$$

This implies that $\alpha\beta'X_{t-1}$ contains all the long-run information on the process of X_t . Therefore, emphasis will be on the ($n \times r$) matrix of cointegrating vectors, β , that quantify the ‘long-run’ relationships between the variables in the system and the ($n \times r$) matrix of equilibrium correction coefficients, α , elements which load deviations from this equilibrium (i.e. $\beta'X_{t-1}$) into ΔX_t for correction. Specifically, the rows of β are interpreted as the distinct cointegrating vectors and the rows of α are loading factors which indicate the speed of adjustment of the dependent variables towards the long-run equilibrium state. The Γ_i coefficients in (15) estimate the short-run effect of shocks on ΔX_t , and thereby allow the short- and long-run responses to differ. Appropriate lag length (p) is determined using standard model selection criteria (AIC and SBC) to whiten the errors.

Error Correction Model

The second step of the cointegration estimation is the error correction model. The tight link between cointegration and error correction models stems from the Granger representation theorem. According to this theorem, a set of integrated time series that are cointegrated have an error correction representation, and a set of time series that are error correcting are cointegrated (Engle & Granger 1987). This implies that when integrated series are cointegrated the appropriate procedure for estimation is the error correction model. The short run error correction model is captured by differencing the dependent and independent variables once and including the lagged value of the long-run relationship.

The error correction model (ECM) for the VAR can be specified as follows:

$$\Delta y_t = \sum_{i=1}^k \gamma_i \Delta y_{t-i} + \sum_{i=0}^k \beta_i X_{t-i} + \alpha \text{ECM}_{t-1} + \eta_t \quad (16)$$

where y_t and x_t represent the series of cointegrated variables, ECM_{t-1} is a lagged value of the estimated error term from the cointegrated equation(s) and the parameter, α of the error term shows how changes in Δy_t react to deviation from the long-run equilibrium. The error correction model works with stationary data. If the variables are cointegrated the error term(s) from the cointegrating regression (\square_t) can be used as the error correction mechanism. Akaike Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC) is to determine the optimal lag length, k .

Granger-Causality Test

Since the existence of relationship between variables does not necessarily indicate the direction of causation Granger-causality test was conducted to examine the causal relationship between the stock market development and economic growth. This analysis was extended to the causal relationship between the stock market development and other macroeconomic variables under consideration. The traditional Granger causality test developed by Granger (1969) will be employed to examine the direction of causality between the economic series. The Granger-causality test works on the assumption that the series are stationary. The series will have to be differenced once to achieve stationarity if it happens that they are non-stationary before applying the Granger-causality test (Gujarati, 2001).

The traditional pairwise Granger-causality test states that if the inclusion of the past values of a variable, y significantly contributes to forecast the future value of another variable, x (in a regression of x on its own past values) then y is said to Granger cause x . Conversely, if past values of x statistically improve the prediction of y , then we can conclude that x Granger causes y . The test involves the estimation of the following pair of regressions:

$$LMC_t = \sum_{i=1}^n \alpha_i LRGDP_{t-i} + \sum_{j=1}^n \beta_j LMC_{t-j} + u_t \quad (17)$$

$$LRGDP_t = \sum_{i=1}^n \lambda_i LRGDP_{t-i} + \sum_{j=1}^n \delta_j LMC_{t-j} + v_t \quad (18)$$

where LMC and LRGDP are assumed to be stationary time series, and u_t and v_t are mutually uncorrelated error terms. The n is the optimal lag order while the subscripts t and $t-i$ denote the current and lagged values. The null hypothesis of $\alpha_i = 0$ and $\delta_j = 0$ is tested against the alternative hypothesis of $\alpha_i \neq 0$ and $\delta_j \neq 0$.

Equation (17) postulates that current LMC is related to its own past values as well as that of LRGDP. Equation (18) posits a similar behaviour for LRGDP. There are four possible outcomes regarding the causal relationship between the variables as noted by Gujarati (2001). Firstly, unidirectional causality from LRGDP to LMC is indicated if the estimated coefficients of the lagged LRGDP in (17) are statistically different from zero (i.e. $\Sigma\alpha_i \neq 0$) and the set of estimated coefficients of the lagged LMC in (18) is not statistically different from zero (i.e. $\Sigma\delta_j = 0$). In other words, economic growth Granger causes the stock market development without feedback. Conversely, unidirectional causality runs from LMC to LRGDP if the set of lagged LRGDP coefficients in (17) is not statistically different from zero (i.e. $\Sigma\alpha_i = 0$) and the set of lagged LMC coefficients in (18) is statistically different from zero (i.e. $\Sigma\delta_j \neq 0$). Thirdly, there could be feedback or bidirectional causality in which case the sets of LMC and LRGDP coefficients are statistically significantly different from zero in both regressions. Finally, independence is suggested when the sets of LRGDP and LMC coefficients are not statistically significant in both regressions.

The restricted F-test was employed to test the hypotheses. The restricted F test is expressed below:

$$F = [(RSSR - RSSUR)/m] / [RSSUR/(n-k)] \quad (19)$$

where m is number of lagged terms, n is the sample size and k is the number of parameters and $RSSR$ and $RSSUR$ are residual sum of squares of restricted and unrestricted models, respectively. The calculated F-statistic compared with the F-critical value will be used to decide on either the rejection or non-rejection of the null hypotheses. That is, the null hypothesis is rejected if the calculated F-statistic exceeds the critical F-value at the chosen level of significance. The appropriate lag length is established by Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC).

Summary and Conclusion

The chapter which looked at the methodology explains the model, the data set and estimation techniques employed for the study. The thesis adapted a structural model developed by Calderon-Rossell (1991) to examine the relationship between the stock market development and economic growth. Quarterly time-series data on real stock market capitalization, real total value traded ratio, real GDP, real domestic credit to the private sector and real gross domestic investment from 1991 to 2006 were used for the study.

This chapter also touched on the estimation techniques employed for the study. ADF and PP tests were applied to test for the stationarity of the series. Moreover, Johansen-Juselius (1992) multivariate cointegration test and VECM

were used to examine the long-run equilibrium relationship and short-run dynamics among the variables. It concluded with the Granger-causality tests conducted determine the causal relationship between the stock market development and other macroeconomic variables.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This section is devoted to the estimation, interpretation and discussion of the empirical results of the relationship between stock market development and economic growth. It is structured into four sections. Section one begins with the stationarity test of the variables followed by the cointegration test. The third and fourth sections focused on the vector error correction model and Granger-causality tests. All the tests and estimations were conducted using E-Views (version 3.1) and PcGive (version 10) econometric packages.

Results of Stationarity Test

The time series plot which gives some idea about the nature of the stationarity of the series has been shown in appendix D. It can be observed that all the variables in their log-levels show trend overtime and none seems to be stationary. However, all the series in their first log differenced levels show no trend and this suggests stationarity. Notwithstanding the graphical examination, a more formal stationarity test was carried out and the results are reported in tables

5 and 6, respectively. The results of the ADF test reported in table 5 indicate that all the series are non-stationary in their respective levels. After first differencing the variables, the null hypothesis of a unit root in the ADF tests was rejected at 1% significance level for all the series. This implies that all the series are integrated of order one, i.e. I (1). That is, they become stationary after first differencing. To confirm the robustness of the ADF unit root tests, PP tests were conducted on all the series with three lags and the results are presented in table 6.

Table 5: Results of the ADF Unit Root Tests

Variables	Levels I (1) ADF Value	1 st Difference I (0) ADF Value	Lags	Integration Order I(d)
LRGDP	0.191	-10.650***	1	1
LMC	-1.735	-4.957***	1	1
LTV	-2.709	-6.628***	1	1
LDC	-0.793	-6.20***	1	1
LDIN	-0.727	-5.593***	1	1

Note: *, ** and *** indicate rejection of null hypothesis of a unit root at 10%, 5% and 1% respectively. MacKinnon critical values for the ADF test are -2.5919 (10%), -2.9092 (5%) and -3.5398 (1%).

Source: Computed by the author using EViews econometric software.

Similar to the ADF test results, the PP test results show that all the series are non-stationary in their respective levels. They become stationary at 1% significance level after first differencing, suggesting that they are integrated of order one, i.e. I (1).

Table 6: Results of the PP Unit Root Tests

Variables	Levels I(1) PP Value	1 st Difference I (0) PP Value	Lags	Integration Order I(d)
LRGDP	1.041	-20.818***	3	1
LMC	-1.543	-6.269***	3	1
LTV	-2.773	-11.010***	3	1
LDC	-0.592	-7.240***	3	1
LDIN	-0.544	-6.422***	3	1

Note: *, ** and *** indicate rejection of null hypothesis of a unit root at 10%, 5% and 1%, respectively. MacKinnon critical values for the PP tests are -2.5915 (10%), -2.9084 (5%) and -3.5380 (1%).

Source: Computed by the author using EViews econometric software.

Long-Run Equilibrium Relationship

Given that all the variables are integrated of order one, I(1), the long-run relationship between the stock market development and economic growth including the other variables was established using the Johansen maximum likelihood (ML) cointegration test. The results of the cointegration test for the

equation including the eigenevalues and log likelihood statistics are reported in table 7. (See appendix E for the detailed results of the cointegration test). The null hypothesis of no cointegrating vector is tested against the alternative hypothesis of one cointegrating vector. The likelihood ratio test statistic suggests that the cointegration rank of the system is equal to one. The null hypothesis of no cointegration is rejected at 5% significance level, whereas the null that the rank of the cointegration space is equal to one is not rejected.

Table 7: Results of the Johansen ML Cointegration Test

Rank under the Null	Alternative Hypothesis	Eigenevalue	LogLikelihood Statistics
r=0	r=1	0.469138	80.46172**
r=1	r=2	0.318298	41.83323
r=2	r=3	0.164095	18.46028
r=3	r=4	0.107813	7.526649

Note: L.R. test indicates 1 cointegrating equation(s) at 5% significance level. *, ** and *** indicate rejection of null hypothesis at 10%, 5% and 1% respectively.

Source: Computed by the author using EViews econometric software.

The existence of one cointegrating vector in the equation implies that there is a stable long-run relationship among the variables. That is, the stock market development and economic growth including the other macroeconomic variables

have long-term relationship. The estimated long-run equilibrium relationship for real market capitalization function derived from the normalized vectors, with the t-statistics in parenthesis, reported in appendix E is presented as follows:

$$\text{LMC} = -84.1 + 10.1317\text{LRGDP} + 0.5621\text{LTV} - 6.2702\text{LDC} + 5.3424\text{LDIN} \quad (20)$$

$$(6.2116) \quad (7.8927) \quad (-7.1406) \quad (5.0067)$$

From equation (20) all the estimated coefficients have the expected signs. With the exception of the real domestic credit to private sector, real economic growth, real total value traded ratio and real domestic investment have a positive and significant impact on the stock market development.

The positive long-run relationship between the stock market development and real GDP is consistent with the results reported by El-Wassal (2005), Levine and Zervos (1996) and Yartey (2008). The results show that out of the four variables, the real GDP has the strongest significant linkage with the real market capitalization. For instance, a 1% increase in real GDP will result in about 10.13% increase in real stock market capitalization in the long-run. The result is also consistent with the “demand-following” hypothesis and that stock market development is largely driven by economic growth. This means that the level of economic growth and for that matter real income level has greater influence in propelling the stock market development in Ghana. Thus, a rise in the level of real income resulting from the real economic growth will boost public participation in the stock market activity which in turn enhances mobilization of funds into investible projects through the stock market.

The results also show that real total value traded ratio has a positive long-run relationship with the stock market capitalization which suggests that the liquidity of the Ghana Stock Exchange plays important role in explaining the stock market development. This confirms the results obtained by Garcia and Liu (1999), El-Wassal (2005) and Yartey (2008). In particular, a 1% increase in real total value traded ratio increases real stock market capitalization ratio by 0.56%. This suggests that an improvement in the market liquidity will promote the development of the Ghana Stock Exchange since liquidity induces additional listings.

The estimated equation also reveals a significant and negative relationship between real market capitalization ratio and real domestic credit to private sector to GDP ratio. For example, a 1% increase in real domestic credit to private sector leads to about 6.3% decrease in real market capitalization ratio. This seems to suggest that the stock market and the banking sector are substitute sources for corporate finance as they compete with each other as vehicles for financing private investment. In other words, corporate bodies substitute debt for equity and vice versa depending on the cost of borrowing. This confirms the findings of Nagaishi (1999) which show that domestic credit to private sector is negatively correlated with indicators of stock market development in India in the 1980s. It is also consistent with the theoretical argument by Arestis et al (2001) that stock markets are substitute sources for corporate finance since a firm's borrowing from banks declines with the issuance of new equity. However, it is inconsistent with the empirical evidence documented by Garcia and Liu (1999) and Yartey (2008)

who find a positive and significant relationship between the bank and stock market development indicating that they play complementary roles as sources for corporate finance.

The negative relationship between stock market development and domestic credit to private sector may partly be attributed to the unfavourable fiscal and monetary policies of the country especially in the early and late 1990s. This was the period of high government borrowing (over 60%) from the banks to finance its expenditure thereby crowding out private investment. Aryeetey and Fosu (2002) observe that, “the financial system is characterized by high rates of interest and shrinkage of commercial lending by banks, in favour of bank holdings of government securities” (p. 62). In contrast, the result does not necessarily imply that the financial services provided by the deposit money banks or the commercial banks negatively affect the development of the Ghana Stock Exchange since the shares of listed companies are purchased through banks during initial public offerings (IPOs). In addition, dividends of the shareholders are paid through their banks. Therefore, the relationship between them should be interpreted with caution given that the study spanned just sixteen (16) years.

The results also show a significant positive long-run relationship between real gross domestic investment to GDP ratio and real market capitalization ratio suggesting that gross domestic investment is a good predictor of the stock market development. In particular, 1% increase in real domestic investment increases the real market capitalization ratio by about 5.3%. This indicates that more funds can be channeled through the stock market for long-term development. This is in

agreement with the findings by Garcia and Liu (1999) and Yartey (2008) who reported a positive relationship between domestic investment to GDP ratio and market capitalization ratio.

Short-Run Dynamic Relationship

The fact that the variables are cointegrated suggests that a VECM can be estimated to assess the linkages between the variables. The error correction term was computed from the long-run equation, (20), and used for the dynamic modelling. An over-parameterized model, which incorporated all the differenced variables with a lag length of five determined by AIC and SBC and a lagged error correction term, was reduced to a more parsimonious model. Those variables that were found to be insignificant were deleted using t-ratios and p-values to arrive at the final estimated dynamic equation which is presented in table 8. The insignificant variables were not reported. All the results and the diagnostic tests were obtained using PcGive 10.0.

The results for the short-run dynamic error correction model indicate that growth in real GDP is the most significant variable explaining growth in real market capitalization ratio. The rate of change of the real GDP in the first quarter has a significant negative effect but it improves market capitalization in the subsequent periods. For instance, while a 1% increase in real GDP growth in the first quarter reduces the growth in real market capitalization ratio by about 38%, a 1% increase in the third and fifth quarters increases growth in real market capitali-

Table 8: Results of the Parsimonious Vector Error-Correction Model

Variable	Coefficient	Std Error	t-value	p-value
DLMC_1	0.2020	0.08628	2.34	0.024
DLRDGP_1	-0.379827	9.953	-3.82	0.000
DLRDGP_3	6.4067	1.550	4.13	0.000
DLRGDP_5	36.3757	10.76	3.38	0.002
DLTV	0.1510	0.03187	4.74	0.000
DLTV_2	-0.0664	0.03127	-2.12	0.040
DLTV_5	0.1201	0.03202	3.75	0.001
DLDC_3	1.7871	0.5298	3.37	0.002
DLDC_4	0.7234	0.4277	1.69	0.098
DLDC_5	-1.6558	0.4535	-3.65	0.001
DLDIN	1.4895	0.4422	3.37	0.002
DLDIN_2	-1.5472	0.4962	-3.12	0.003
DLDIN_5	-1.5154	0.4472	-3.39	0.002
ECM_1	-0.2940	0.05390	-5.45	0.000

Vector Diagnostic Test Results

Autocorrelation test	$F(4,39) = 0.69082$ [0.6028]
Arch test	$F(4,35) = 0.41657$ [0.7955]
Normality test	$\text{Chi}^2(2) = 0.11762$ [0.9429]
hetero test	$F(28,14) = 0.83781$ [0.6674]
RESET test	$F(1,42) = 1.6678$ [0.2031]

zation ratio by about 6.4% and 36.4%, respectively. The response of the growth in real market capitalization ratio to growth in real GDP is significant at 1% in all cases. The results for the third and fifth quarters reinforce the positive long-run relationship between economic growth and the stock market development.

Moreover, the growth in real market capitalization ratio for the previous quarter has a positive feedback effect on the stock market development. For instance, a 1% increase in real market capitalization growth for the previous quarter will cause an increase in growth in the current real market capitalization ratio by about 0.2% which is significant at 5%. The results also show that the growth in real total value traded ratio has contemporaneous and lagged effects on the real market capitalization. For instance, a percentage increase in the growth rates of the real total traded ratio increases the market capitalization by about 0.2% for the immediate effect and about 0.1% for the fifth quarter both significant at 1%. However, the rate of change in the real total value traded for the second quarter reduces the real market capitalization by about 0.1% at 5% significance level.

In addition, the rate of growth in real domestic credit to private sector has both positive and negative lagged effects on the real market capitalization ratio. The response of growth in real market capitalization ratio to growth in real domestic credit to private sector is positive in the third and fourth quarters, but deteriorates in the fifth quarter. That is, 1% increase in the real domestic credit improves growth in market capitalization by about 1.8% and 0.7% for the first two quarters, but reduces it by about 1.7% in the last quarter. On the other hand,

the real domestic investment has positive contemporaneous and negative lagged effects on the real market capitalization ratio. A 1% increase in growth of real domestic credit improves growth in real market capitalization ratio by about 1.5%, but reduces it by almost the same proportion at 1% significant level for the subsequent periods.

The error correction term is negative as expected and significant at 1%. The significance of the error correction term justifies the validity of an equilibrium relationship among the variables used for the cointegration test. The adjustment coefficient indicates that about 29% of disequilibrium is corrected every quarter. That is, it shows a 29% convergence of the short-run shock existing last quarter towards its long-run path in the current quarter. The magnitude of the coefficient, -0.29 also implies that it will adjust quickly to long-run equilibrium when it is shocked. Moreover, the dynamic model passed all the diagnostic tests on the residuals.

Evidence from Causality Analysis

The existence of equilibrium relationship among the variables does not give any indication about the nature and direction of causality between the variables. Pairwise Granger-causality test was carried out to determine the causal relationship between the real market capitalization ratio and economic growth including the other variables. The pairwise Granger-causality test was conducted on null hypothesis that the dependent variable does not Granger-cause the independent variable. The variables to be used in the Granger-causality test are

assumed to be stationary. In the case of this study, test statistics for unit root have already been reported in tables 5 and 6, with the conclusion that the time series are I(1). The time series were made stationary by taking their first differences. The F-ratios and p-values were used to decide on the rejection of the null hypothesis. The results of the Granger-causality tests are reported in table 9.

Table 9: Results of the Pairwise Granger-Causality Test

Null Hypothesis (Ho):	Obs.	F-Statistics	P-Values	Lags
LMC does not Granger-cause LRGDP	58	0.3021	0.9092	5
LRGDP does not Granger-cause LMC		3.7036***	0.0066	
LMC does not Granger-cause LTV	58	2.3642*	0.0540	5
LTV does not Granger-cause LMC		4.3353***	0.0025	
LMC does not Granger-cause LDC	60	2.1888	0.1002	3
LDC does not Granger-cause LMC		0.6308	0.5984	
LMC does not Granger-cause LDIN	58	0.0982	0.9920	5
LDIN does not Granger-cause LMC		2.7593**	0.0290	

Note: *, ** and *** denote rejection of null hypothesis at 10%, 5% and 1% level of significance. Obs. denotes observations.

Source: Computed by the author using EViews econometric software.

The results show that real GDP Granger-causes real stock market capitalization ratio without feedback. This means that real economic growth predicts real market capitalization ratio at 1% significance level. This suggests that stock market development in Ghana is driven by economic growth which is

in line with “demand-following” hypothesis”. The results validate the long-run positive relationship between stock market development and economic growth. This finding is consistent with Vazakidis and Adamopoulos’s (2009) results for France, but inconsistent with Osei’s (2005) results. Osei in particular finds a uni-directional causality from stock market development (measured by nominal market capitalization and market capitalization ratio) to real economic growth in Ghana. This may be partly attributed to the fact that Ghana is still an agrarian economy and just a few agricultural related institutions are captured by the Ghana Stock Exchange.

Similarly, the results indicate a uni-directional causality from real gross domestic investment to real market capitalization ratio at 5% significant level, implying that domestic investment predicts the performance of the Ghana Stock Exchange. This finding confirms the long-run relationship between the stock market development and domestic investment.

The results of the Granger-causality test also show a bi-directional causality between the real total value traded and market capitalization ratios significant at 1% and 5%, respectively. The feedback from the liquidity to the real market capitalization ratio is very strong hence improvement in the stock market liquidity predicts stock market development. However, there was no evidence of causality between real market capitalization ratio and real credit to private sector. The Granger-causality test results seem to confirm the positive long-run relationship among the variables except the banking sector development.

Summary and Conclusion

This chapter examined the time series characteristics of the data used for estimation and discussed the estimated results. Stationarity tests were conducted on all the variables in their log-levels and log-differenced forms to determine the order of integration using ADF and PP tests. The results of the ADF and PP tests showed that all the series are integrated of order one, i.e. $I(1)$. The long-run equilibrium was established using Johansen Maximum Likelihood cointegration test.

The results indicated that there is a long-term relationship among real market capitalization ratio, real economic growth, real stock market liquidity, real domestic credit to private sector and real gross investment. All the variables except domestic credit to private sector have positive relationship with stock market development.

The results of the VECM showed that all the variables except the change in market capitalization ratio for the first quarter have both positive and negative short-run relationship with the stock market development. Growth in real GDP tends to be the most significant factor in explaining growth in real market capitalization ratio.

The results of the Granger-causality test suggested that real economic growth and real gross domestic investment leads to stock market development. The results also showed a bi-directional causality between real total traded and market capitalization ratios. Finally, there was no evidence of causality between real market capitalization ratio and real domestic credit to private sector.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter focuses on the summary of findings, conclusions and recommendations derived from the empirical results. It also touches on the limitation of the study and direction for future research.

Summary

The purpose of the study was to examine the relationship between stock market capitalization and economic growth. It also sought to identify other factors which explain the development of the Ghana Stock Exchange using quarterly data over the period 1991 to 2006. The study employed Johansen (1988) cointegration technique and VECM to examine the long-run equilibrium and short-run dynamics among the variables used for estimation. It also examined the causal relationship between stock market capitalization and economic growth including the other macroeconomic variables using the traditional pairwise Granger-causality test. All tests and estimations were conducted using E-views (version 3.1) and PcGive (version 10.0) econometric packages.

The review of the Ghanaian economy revealed that the historical structure of the Ghanaian economy shows hardly any change. Since 1983, various economic reforms such as the ERP and SAPs have been implemented to ensure sustainable economic growth. The descriptive analysis of the performance of the Ghana Stock Exchange contained in chapter two showed that it has performed creditably over the years. The GSE All-Share Index which measures the general performance of the Ghana Stock Exchange revealed a very remarkable improvement especially in 1994, 1998 and 2003, respectively making it one of the best performing markets in Africa in particular and the world as a whole. The market capitalization has also improved significantly since 1994 which is indicative of the ability of the Ghana Stock Exchange to mobilize both domestic savings and foreign capital for investment and diversify risk in the economy. The GSE was found to be relatively illiquid.

The empirical literature review showed that stock market development and economic growth are positively correlated with regard to cross-country studies. However, in the case of country-specific studies some researchers report of a positive relationship while other findings suggest a negative relationship between stock market development and economic growth. Again, the results indicated that stock market development and economic growth are mutually dependent.

The estimated results, on the other hand, showed a long-run relationship among the real market capitalization ratio, real GDP, real total traded ratio, real domestic credit to private sector and real gross domestic investment. All the variables except domestic credit to private sector have positive relationship with

the stock market development. The results also showed that real economic growth is the most important variable explaining market capitalization ratio and therefore a very good predictor of the stock market development in Ghana. The real total value traded ratio and gross domestic investment were also found to be significant in explaining stock market development. The latter was a better predictor of stock market development than the former. The results also indicated a negative and significant relationship between domestic credit to private sector and market capitalization ratio suggesting that banking sector development and stock market development are substitutes rather than complements in financing corporate investment in Ghana.

The results of the VECM showed that all the variables except the change in market capitalization ratio for the first quarter have both positive and negative short-run relationship with the stock market development. Growth in real GDP was found to be the most significant factor in explaining growth in real market capitalization ratio.

The Granger-causality test results showed that real economic growth and real gross domestic investment lead to stock market development. The results also indicated a bi-directional causality between the real total traded and market capitalization ratios. On the other hand, there was no evidence of causality between real market capitalization ratio and real domestic credit to private sector.

Conclusions

Based on the results of the study, the following conclusions were drawn.

The empirical evidence showed that there is a positive relationship between stock market capitalization and economic growth. The study also found a unidirectional causality from economic growth to stock market capitalization which reinforces the positive link between the two variables. The result of the Granger-causality test supports the “demand following” hypothesis. This suggests that real economic growth is the key driver of stock market development in Ghana.

Moreover, real gross domestic investment and real stock market liquidity were found to be significant in explaining stock market development. This is consistent with the studies by Garcia and Liu (1999) and Yartey (2008).

The results also showed a negative relationship between stock market development and banking sector development suggesting that they are substitute sources for corporate finance as they compete with each other as vehicles for financing private investment. This is inconsistent with the findings by Garcia and Liu (1999) and Yartey (2008) but confirms the study by Nagaishi (1999). This may partly be explained by high interest rates resulting from government borrowing crowding out private investment and unfavourable monetary policy that existed in the early and late 1990s. This was a period of high interest rates and shrinkage in commercial lending by banks in favour of banks holdings in government securities. However, the result should be interpreted with caution since the study spanned sixteen (16) years and more data is needed to establish the exact relationship between them.

Although the Ghana Stock Exchange is relatively new, illiquid and highly concentrated, it has a bright future and therefore the ability to mobilize resources for financing corporate investments as evidenced by the continuous listing of new equities and the automation of the trading floor to improve the efficiency and liquidity of the market.

Recommendations

Based on the findings of the study, the following recommendations were made to improve the activities of the Ghana Stock Exchange.

The study revealed a positive relationship between stock market capitalization ratio and real GDP which is an indication that economic growth plays an important role in driving the stock market development. In respect of this, the government should initiate prudent economic policies to foster economic growth to ensure increase in the level of income of the people to boost domestic investor participation and enlarge stock ownership base in the economy. This can be achieved by developing the real side of the economy through improvement in investment, human capital and infrastructure. Again, there is the need for the government to promote policies that would enhance private investment by creating an enabling environment for the private sector to flourish to ensure accelerated economic growth.

The stock market liquidity has a positive effect on the stock market capitalization. There is the need for the government to encourage other private companies to be listed on the stock exchange so as to improve upon the liquidity

of the market. This can be achieved through provision of tax incentives for companies to be listed on the Ghana Stock Exchange. In addition, government divestiture programme should be channeled through the Ghana Stock Exchange.

Moreover, the results showed that stock market development (real market capitalization) and banking sector development (real credit to private sector) were substitute sources of capital for financing corporate investment in Ghana. Therefore, policy makers should formulate and implement good institutional, legal and regulatory frameworks to enable both the stock market and banks to thrive in providing equity and debt financing for corporate investment in Ghana. There is also the need for government to reduce borrowing from the commercial banks so that more funds would be channeled through the banks to finance corporate investment.

Limitations of the Study

The main limitation of the study had to do with lack of quarterly data on real GDP and gross domestic investment. The system of computation of quarterly GDP series is not yet developed in Ghana and this necessitated the interpolation of the series into quarterly data which is methodologically problematic. However, this did not have any significant influence in determining the outcome of the results. Because other authors including Osei (2005) have used similar approach and arrived at consistent and reliable results.

Moreover, evidence from the study showed that domestic investment played important role in influencing stock market development in Ghana. However, the study failed to consider how domestic savings affect stock market development in Ghana since savings are channeled into investment.

Direction for future research

Future research should examine the impact of the foreign direct investment (FDI) on the development of the Ghana Stock Exchange given the level of the FDI inflows into the Ghanaian economy and the capital market in particular as evidenced by the listing of the Ashanti Goldfields Ltd. (now AngloGold Ashanti).

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APPENDICES

APPENDIX A

Types and Characteristics of Securities on the GSE

Year	Government Stock	Corporate Stock	Equity Stock	Total number of securities
1990	1		11	12
1991	1		13	14
1992	1		15	16
1993	1		15	16
1994	1		17	18
1995	1		19	20
1996	-	1	21	22
1997	-	2	21	23
1998	-	3	21	24
1999	-	4	22	26
2000	-	5	22	27
2001	17	5	22	44
2002	22	5	24	51
2003	24	4	26	54
2004	8	3	30	41
2005	3	3	29	35
2006	81	2	32	115

Source: GSE Market Statistics (Various issues).

APPENDIX B

Trading History of the GSE (Volume and Value of Listed Securities from 1990– 2006)

Period	Volume Traded (in m)	Value Traded (GH¢ m)	Market Capitalization (GH¢ m)	Government Bonds (GH¢ m)	Corporate Bonds (US\$ m)
1990	0.22	0.0064	3.05	0.50	-
1991	1.83	0.0105	2.96	0.50	-
1992	2.04	0.0173	4.36	0.50	-
1993	37.95	0.32	9.65	0.50	-
1994	93.04	7.31	196.84	0.50	-
1995	55.84	2.71	239.90	-	-
1996	35.75	2.79	286.27	-	2.55
1997	125.63	9.34	255.28	-	4.80
1998	91.45	13.40	324.56	-	6.80
1999	49.57	6.96	320.54	-	9.50
2000	30.72	5.06	365.50	-	11.01
2001	55.30	9.23	390.40	100.37	10.20
2002	44.12	8.94	618.38	132.69	10.98
2003	96.33	38.93	1,261.68	144.24	8.98
2004	104.35	65.59	9,761.48	51.63	6.28
2005	81.40	46.44	9,185.73	22.50	8.78
2006	98.29	47.60	11,249.60	326.15	2.50

Source: GSE Market Statistics (Various issues).

APPENDIX C

Mode of Offer of New Equity Issues

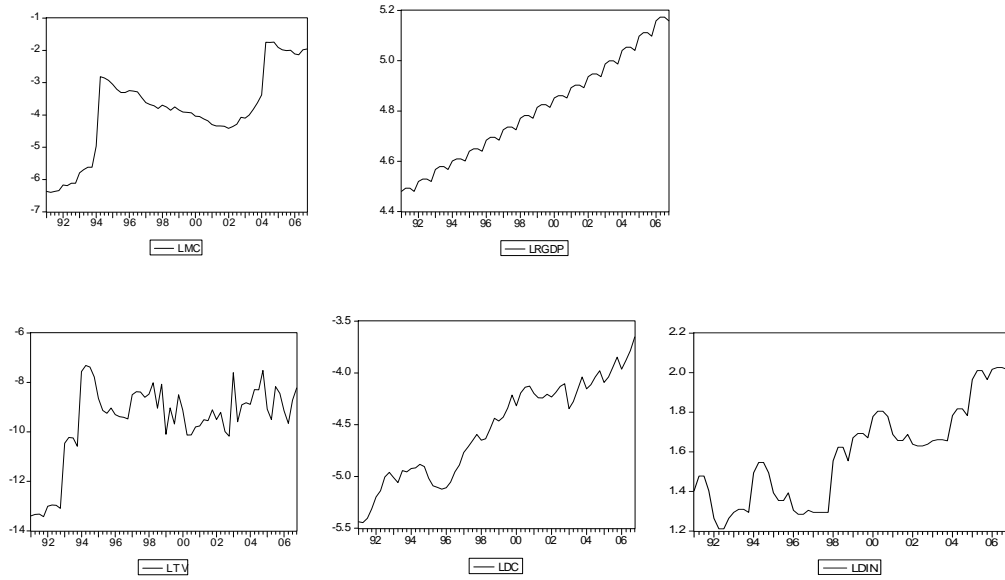
Mode of Offer	Number	Total Amount (GH¢)	Amount in %
Initial Public Offer	19	64.12	72.3
Rights Issue	12	23.86	26.9
Private Placement	2	0.46	0.52
OFS	1	0.24	0.3
Total	34	88.67	100

Source: Computed from GSE Market Statistics, December, 2006.

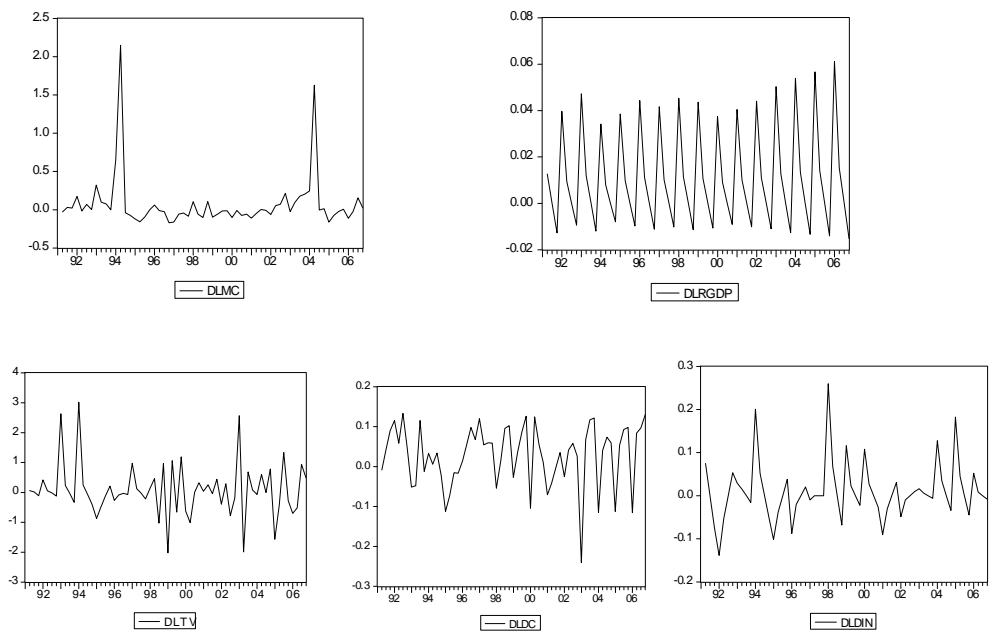
APPENDIX D

Plot of Time Series Data

(a) Plot of Series on Log-Levels



(b) Plot of Series on First Log Differenced Levels



APPENDIX E

Results of the Johansen Cointegration Test

Sample: 1991:1 to 2006:4

Included observations: 61

Test assumption: Linear deterministic trend in data

Series: LMC LRGDP LTV LDC LDIN

Lags interval: 1 to 2

Eigenvalue	Likelihood Ratio	5% Critical Value	1% Critical Value	Hypothesized No. of CE(s)
0.469138	80.46172	68.52	76.07	None *
0.318298	41.83323	47.21	54.46	At most 1
0.164095	18.46028	29.68	35.65	At most 2
0.107813	7.526649	15.41	20.04	At most 3
0.009265	0.567822	3.76	6.65	At most 4

*(**) denotes rejection of the hypothesis at 5% (1%) significance level. L.R. test indicates 1 cointegrating equation at 5% significance level.

Unnormalized Cointegrating Coefficients:

LMC	LRGDP	LTV	LDC	LDI
-0.228449	2.314575	0.128421	-1.432427	1.220472
0.079115	0.661388	-0.148901	-0.027210	-0.599337
0.189731	-2.257667	-0.097596	0.432534	0.739702
-0.108614	-1.177481	0.029348	0.445851	0.273709
0.028109	-0.492938	0.031938	-0.052641	-0.213485

Normalized Cointegrating Coefficient:

LMC	LRGDP	LTV	LDC	LDIN	C
1.000000	- 10.13168	-0.562142	6.270222	-5.342422	84.09412
	(1.63110)	(0.07122)	(0.87811)	(1.06706)	
Log likelihood	282.2174				

APPENDIX F

Primary Issues on the GSE

1. Equities

Company	Description	Offer Period	Issue Price GH¢ m	No. of shares offered (m)	Amount raised (GH¢ m)
SPPC	IPO	Dec.1991- Feb., 1992	0.02	8.00	0.06
MLC	IPO	Dec.1993- Feb., 1994	0.01	11.00	0.05
AGC.	IPO	March- April, 1994	1.87	2.80	5.98
AGC	IPO	May-June, 1994	1.87	1.20	0.28
HFC	Placement	Jan., 995	0.01	11.35	0.13
PAF	IPO	May-July, 1995	0.01	6.40	0.08
SSB	IPO	Sept.-Dec., 1995	0.08	21.36	1.20
ABL	Rights Issue	June-Aug, 1992	0.01	12.00	0.14

ALW	OFS	Sept.-Nov., 1996	0.14	5.00	0.33
UTC	Rights Issue	Oct.1994- March,1995	0.01	24.00	0.24
PZ	Rights Issue	Sept.-Oct., 1995	0.04	24.00	0.96
GCB.	IPO	Feb.-March, 1996	0.05	49.50	3.42
GGL	Rights Issue	May-June, 1996	0.02	23.50	0.49
MLC	Rights Issue	Oct.-Nov., 1997	0.01	13.36	0.20
HFC	Rights Issue	Oct.-Nov., 1998	0.06	9.50	0.57
ABL	Rights Issue	November, 1998	0.05	19.89	0.99
MGL	Rights Issue	Jan18- Feb19, 2003	0.02	12.00	0.22
CGL	IPO	Aug.,9 – 20, 1999	0.04	1.75	0.07
PBC	IPO	Dec. 1999 – March 2000	0.05	384.00	5.92

ABL	Rights Issue		0.06	23.86	2.01
SWL	IPO	March1– April, 2002	0.03	8.00	0.20
TBL	Introduction		0.41	30.00	-
CPC	IPO	Sept. – Nov. 2002	0.06	215.37	13.46
CFAO	Rights Issue	Jan – Feb. 2003	0.01	168.00	1.01
GBL	Rights Issue	4 – 27 June, 2003	0.05	230.34	10.60
ABL	Rights Issue	Jan 26 – Feb16, 2004	0.05	83.15	4.16
CLYD	IPO	March19– April16, '04	0.05	10.60	0.83
BOPP.	IPO	June16,– July23, 04	0.50	13.92	6.96
M CL	Rights Issue	June17,– July16, '04	0.25	10.02	2.50
CAL	IPO	Sept.2 – Oct 1, 2004	0.20	27.00	6.30

SPL	IPO	Oct. 29 – Nov 26, '04	0.05	30.00	3.70
GWEB	IPO	June7– Aug. 8 2005	0.06	17.00	0.55
EBG	IPO	May15- June 2, 2006	1.10	8.28	9.11
E TI	Introduction		2.24	611.00	
AYRTN	IPO	June7- July 7, 2006	0.09	43.20	3.67
TRAN-	IPO	Oct31 – Nov 30, '06	0.10	20.00	2.27
SOL					

2. Bonds

Title of Bond	Issuer	Offer Period	Securities Offered	Maturity	Amount raised
GSE Commemora- tive Registered Stock, 1995	Gov't of Ghana.	Oct.–Nov., 1990	□5.0 bn	5yrs, to 11/11/95	GH □0.5 m.

HFC Series A	HFC	Sept.–	US\$2m as	5yrs,	to US
7% Coupon	Bank Ltd.	Oct., 1996	series A of	mature on	\$2.55m
Bond due in			a US \$35	01/11/01	
2001			million		
(HFC–As701)			aggregate		
			offering		
HFC Series B	HFC	Sept.–	US \$2m as	5 yrs,	to US
7% Coupon	Bank Ltd.	Oct., 1997	series B of	mature on	\$2.25m
Bond due in			a US\$35 m	01/11/02	
2002			aggregate		
(HFC–B7s02)			offering		
HFC Series C	HFC	Nov., 1998	US \$2m as	5yrs,	to US
8.25%	Bank Ltd.		series C of	mature on	\$2.00m
Coupon Bond			a US\$35 m	01/11/03	
due in 2003			aggregate		
(HFC–			offering		
C8.25s03)					
HFC Series D	HFC	July29 –	US\$ 2m as	5yrs,	to US
8.25%	Bank Ltd.	Aug.19,	series D of	mature on	\$2.70m
Coupon Bond		1999	a US \$35	01/09/04	
due in 2004			million		
(HFC–			aggregate		
D8.25s04)			offering		

HFC Series E	HFC	Oct.23–	US\$1.5m	5yrs,	to US
8% Coupon	Bank Ltd.	30, 2000	as series E	mature on	\$1.51m
Bond due in			of a US	01/11/05	
2005			\$35 m agg.		
(HFC–E8s05)			offering		
HFC Series F	HFC	July 16 –	£1.2m as	5 yrs,	to £1.20m
6% Coupon	Bank Ltd.	August 13,	series F of	mature on	
Bond due in		2001	a US\$35 m	13/0806	
2006			aggregate		
(HFC– F8s06)			offering		
HFC Series G	HFC	Dec.15, 02	US 3m as	5yrs,	to US
8% Coupon	Bank Ltd.	–Jan.1, 02	series G of	mature on	\$3.03m
Bond due in			US \$35	Nov, 2006	
2006			million		
(HFC–G8s06)			aggregate		
			offering		
HFC Series H	HFC	Oct. 27 –	US \$3m as	5yrs,	to US
5% Coupon	Bank Ltd.	Dec.2, '04	Series G of	mature on	\$ 2.5m
Bond due in			a US\$35 m	Dec, 2009	
2009			aggregate		
(HFC–H5s09)			offering		

SCB	Medium	Standard	Dec. 2006	GH¢35m	5 yrs, to	GH¢35
Term Note 01	Chartered			Medium	mature on	million
	Bank Ltd.			Term	Dec. 2006	
				Notes		

Source: GSE Market Statistics, 2007.

