EXAMINING THE RELATIONSHIP BETWEEN MACROECONOMIC VARIABLES AND STOCK PRICES. EVIDENCE FROM THE GHANA STOCK EXCHANGE

by

BAFFOUR, STEPHEN GYAU

A Thesis Submitted to the School of Graduate Studies, Kwame Nkrumah University of Science and Technology, Kumasi, in partial fulfilment of the requirements for the degree

of

MASTER OF BUSINESS ADMINISTRATION

FINANCE

College of Humanities and Social Sciences

July, 2015

DECLARATION

I hereby declare that this submission is the result of my own work towards the MBA Finance programme, and that to the best of my knowledge, this study contains no material neither previously published by another person nor submitted for the award of any other degree of the university, except where acknowledgement has been duly made in the text. Any opinion or view expressed and errors found in the work, however, entirely are my responsibility and do not necessarily represent the organizations or individuals who have been cited in this work.

Stephen Gyau Baffour	……..	…….
(PG 9620813)		
(Student's Name and ID)	Signature	Date

Certified by:

Mr. Kwasi Poku	……	……
(Supervisor's Name)	Signature	Date

Certified by:

K. O. Appiah (PhD)	……	……
(Head of Department)	Signature	Date

ABSTRACT

The growth and development of the capital market are very crucial for investment, economic growth and development. However, the market is affected by a number of factors out of which macroeconomic variables have attracted massive interest of research. A lot of such studies focused on the advanced economies. However, in recent years, huge amounts of funds are flowing into emerging economies as a result of liberalization and increased liquidity. Thus, conducting a study to examine the relationship between macroeconomic variables and stock prices of developing economies becomes more imperative. This study is conducted to examine the long run, short run and causal relationship between stock returns in Ghana and macroeconomic variables such as inflation, broad money supply, monetary policy rate and exchange rate. Secondary data is sourced for the study. Monthly data from January 1995 to December 2014 are analysed. Dickey Fuller Unit root test, Johansen cointegration test and Granger causality test are conducted to analyse the time series data. The results confirm the existence of a long-run relationship among the Ghana Stock Exchange Composite Index, inflation, exchange rate, monetary policy rate and broad money supply. The results further reveal that inflation and broad money supply have significant short run negative relationship with stock returns. Also, the results reveal that inflation and money supply granger cause stock return. The study recommends, among others that Bank of Ghana undertakes measures to control money supply.

ACKNOWLEDGMENTS

I first of all give thanks to the Almighty God for seeing me through this course successfully.

Also, I express my profound gratitude to my supervisor, Mr. Kwasi Poku, for his invaluable support in making this work complete. Mr. Michael Adusei also deserves a lot of commendation from me.

My profound appreciation goes to my lecturers in KNUST School of Business for the invaluable knowledge they deposited in me

Furthermore, I am highly indebted my wife, Mrs Agnes Baffour Gyau, and my children Benedict Nana Baffour Gyau and Eugene Ohene Gyau for their sacrifice and patience.

I am also indebted to Nana Baffour Gyau, my dad, Rose Bisi, my mum and all my family members for their encouragement and support.

Last but not least, I would like to thank my colleagues and mates who encouraged me throughout this course.

DEDICATION

I dedicate this work to Mrs Agnes Baffour Gyau, my lovely wife, and my children, Benedict Nana Baffour Gyau and Eugene Ohene Gyau.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ACRONYMS

ADF	–	Augmented Dickey-Fuller
CI	–	Composite Index
BOG	–	Bank of Ghana
EVIEWS	–	Econometric Views
FDI	–	Foreign Direct Investment
GDP	–	Gross Domestic Product
GSE	–	Ghana Stock Exchange
M1	–	Narrow Money supply
M2	–	Broad Money supply
MPR	–	Monetary Policy Rate
SAP	–	Structural Adjustment Programme.
VAR	–	Vector Autoregression
VAC	–	Vector Error Correction Model

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

How macroeconomic variables and share prices relate is very critical, not only for investors and industry players, but to macroeconomic policy makers as well. The critical importance of this relationship has attracted attention of policy makers, investment analyst, economist and academia. This has led to a plethora of studies on how macroeconomic variables and share prices relate and also the degree or extent of the relationship. (e.g., Maysami & Sims, 2002; Singh, Mehta, & Varsha, 2011; Samadi, Bayani, & Ghalandari, 2012). The increase attention on the subject is due to the fact that economic theory considers share prices to be a key measure of changes in economic activities.

A number of factors affect securities' prices. Some of these factors are directly related to the company, while others are environmental in nature. The performance of share prices is observed to be dependent on factors such as macroeconomic, market expectation about the future growth, socio-political events, monetary and fiscal policies, international transaction and the like. Among the numerous factors that affect the share prices, the one that has attracted massive interest of researchers is macroeconomic variables.

A number of studies, both theoretical and empirical, have been undertaken to prove that macroeconomic variables and share prices relate significantly. For instance, Fama and Schwert (1977) affirmed that macroeconomic indicators influence stock return. Over the past few decades, there had been increase belief that activities in the real

economy have some impact on share prices. For instance, Chen, Roll and Ross (1986) established that changes in the macroeconomic variables have some impact on future dividend and also on discount rates, thereby affecting share prices.

Financial markets are inextricably linked to some of the political and macroeconomic decisions. These decisions such as weak macroeconomic environment, poor policymaking and implementation have the potential of affecting the capital market. For instance, in the past twenty years, as a result of weak macroeconomic fundamentals, emerging economies like Russia and Argentina, witnessed severe financial crises, culminating into higher market fluctuations and drastic fall in the stock market.

In modern economy, the capital market plays a very significant role. It is an important avenue for mobilizing resources from the general public and using those resources for productive ventures (Mohammad, Hussain, Anwar and Ali (2009). Also, in the view of Okoli (2012), capital markets contribute significantly in resource mobilization from individuals and issuing these resources to investors. Significant attention is being paid to the analysis of the stock market because stock markets are among the most critical segment of the economy. The nation's exposure to the external world is promptly felt at this section. The stock market mainly intervenes in the middle of savers and borrowers by activating reserve funds from countless savers and coordinating these resources into productive ventures. Likewise, the stock market plays a part in the redistribution of resources among organizations and sectors. The stock market makes funds available for local expansion and growth of credit.

The Ghanaian stock market has experienced rapid growth since its establishment in 1990. This is evidenced by the numerous companies that have listed on the stock exchange. However, despite this growth, the Ghana Stock Exchange (GSE) market capitalization is relatively small compared to developed markets. Also, the capital market is less explored. In view of this, the GSE response to economic variables may likely significantly differ from that of the developed market. This current study seeks to contribute to works done by Adam and Tweneboah (2008), Frimpong (2011) and Kyereboah-Coleman and Agyire-Tettey (2008) in assessing the capital market in Ghana.

This study aims among other things, to establish the relationship between macroeconomic indicators and share price movement of companies that are listed on the Ghana Stock Exchange. The main macroeconomic variables examined include Money Supply, Monetary policy rate, Exchange Rate and Inflation. The study employs information on month to month basis from January 1995 to December 2014 to examine the short run, long run and causal relationship between macroeconomic variables and stock prices utilizing Vector Error Correction Model (VAC), Johannsen cointegration and Granger causality test.

1.2 PROBLEM STATEMENT

The development and growth of the capital market is crucial for investment, economic growth and development. As a result, studies have been undertaken to assess the relationship between macroeconomic variables and share prices. A lot of such studies focused on advanced economies. However, in recent years, huge amount of funds are flowing into emerging markets as a result of liberalization and increased liquidity. Thus, conducting a study to ascertain the possible association between

macroeconomic factors and stock markets becomes more imperative. The current study seeks to contribute to the work of researchers such as Adam and Tweneboah (2008), Kyereboah-Coleman and Agyire-Tettey (2008) and Frimpong (2011) by employing time series analysis to examine how macroeconomic variables and share prices of listed companies on the GSE relate. The time series analyses or tests for this study include Augmented Dickey Fuller Unit root, Johansen cointegration and Granger causality.

1.3 GENERAL OBJECTIVE

Generally, this study focuses on the correlation and causal relationship, if any, between macroeconomic variables and share prices of companies that are listed on the Ghana Stock Exchange (GSE).

1.4 SPECIFIC OBJECTIVES

1. To examine the existence of long-run relationship between macroeconomic variables and share prices of companies that are listed on the GSE
2. To examine the existence of short-run relationship between macroeconomic variables and share prices of companies that are listed on the GSE
3. To explore causal relationship between macroeconomic variables and share prices of companies listed on the GSE.

1.5 RESEARCH QUESTIONS

1. Are macroeconomic variables and share price index related in the long run?
2. Are macroeconomic variables and share price index related in the short run?

3. What is the causal relationship between share price index and macroeconomic variables?

1.6 SIGNIFICANCE OF THE STUDY

Upon the completion of the study, it will contribute more to the existing body of literature on the macroeconomic variables that affect share prices in emerging markets like Ghana. The research contributes to literature on how macroeconomic variables relate to share prices within the context of multivariate analysis in developing economies like Ghana. This study is among the few studies in Sub-Saharan Africa, to the best of the researcher's knowledge, using cointegration and causality analysis to examine the relationship between share prices and macroeconomic indicators.

The study will also increase the stock of information investors have about how share prices relate to macroeconomic variables among listed companies on the GSE. This will go a long way to inform them on their investment decision.

Also, since the stock market is among the most sensitive segment of the economy, the study will help shape macroeconomic policies of the government. For instance, the study will help inform the policy of the government towards improving macroeconomic variables that positively impact on the capital market.

1.7 BRIEF RESEARCH METHODOLOGY

Secondary data was sourced to examine the connection that exists between macroeconomic variables and share price. Time series analysis techniques such as unit root, correlation, cointegration and causality were applied to examine the long

term and short term connections as well as causality between the variables. EVIEWS statistical software was used to perform the analysis.

1.8 SCOPE OF THE STUDY

The study encompasses companies that are listed on the Ghana Stock Exchange from January 1995 to December 2014. Although several factors affect the stock market index, the study concentrates on macroeconomic variables. The macroeconomic indicators employed in the study include Inflation, Exchange rate (cedi/United State dollar rate), Money supply and monetary policy rate. The GSE Composite Index (GSE CI) is used to represent share price performance.

1.9 ORGANISATION OF THE STUDY

This research is organized into five main chapters. The first chapter introduces the study. This comprises the background of the study, the problem statement, the objectives, research questions, brief methodology, significance, organisation and limitation of the study. The second chapter reviews relevant literature, both theoretical and empirical, on how macroeconomic variables and share prices relate. Chapter three concentrates on the methodology used, made up of research design, research strategy, study population, sources of data, econometric models and analysis techniques, as well as the profile of the study area. Chapter four presents the results, their analyses, interpretation and discussion. Chapter Five summarizes the outcome and also provides the conclusion and recommendations made.

1.10 LIMITATIONS OF THE STUDY

Due to financial challenges, time constraints and challenges in accessing data, other relevant macroeconomic variables such as interest rate, balance of trade, GDP and the like are not employed in this study. These challenges, notwithstanding, do not underestimate this research in any way.

CHAPTER TWO

LITERATURE REVIEW

2.0 INTRODUCTION

The preceding chapter provided the background, problem statement and the objectives of the study. This chapter seeks to review theoretical and empirical literature on the subject under study. It begins with theoretical concepts linking the macroeconomic variables and share price return. The main theoretical concepts examined are the Present Value Model and the Arbitrage Pricing Theory. The chapter also examines various empirical literature on the connection that exists among macroeconomic variables and share price return in both the advanced and developing economies. Finally, the macroeconomic situation of Ghana since the year 2000 is critically examined.

2.1 THEORETICAL LITERATURE REVIEW

The current study aims at examining empirically the impact macroeconomic variables have on the Ghanaian stock market. This impact or link can be explained using the Present Value Model and the Arbitrage Pricing Theory. These models indicate that, the stock price or return may be influenced by basic macroeconomic factors like gross domestic product, inflation, exchange rate, , money supply and so on by the impact of expected dividends, the discount rate or both (Rahman, Abdul, Noor, and Fauziah, 2009). A simple discount model gives indication to the fact that present value of expected future dividends equates the fundamental value of business stock. The future dividends must in the end reflect actual economic activity. Stock prices could closely relate with expected future economic activity if all current pertinent and existing

information are taken into account. Hence, prices of shares are calculated by the expected rate of return and anticipated inflows (Gan, Lee, Yong, and Zhang, 2006; Humpe and Macmillan, 2007;). This suggests that the share price is influenced by economic activities that influence the expected cash inflows and required rate of return.

Ahmed (2008) looked at the relationships from two different perspectives. First, the stock market as the most major benchmark of economic activity and second, how the stock market possibly impact on the total demand through the total expenditure and savings.

2.2 RELATIONSHIP BETWEEN MACROECONOMIC INDICATORS AND STOCK RETURN

This section examines the connection among key macroeconomic indicators like Inflation, exchange rate, Money Supply and monetary policy rate and stock market return.

2.2.1 Inflation Rate and Stock Return

One macroeconomic variable that is widely employed in the literature is inflation. For instance, studies such as Fama, 1981, Mukherjee and Naka, 1995 and Pal and Mittal, 2011 have used inflation in their studies. These studies found out that inflation and sock returns are relate negatively. The negative relationship is based on the proxy effect theory introduced by Fama (1981). According to the author, though actual economic activity and the stock return relate positively, the stock return inversely relate with inflation through the money demand theory. As such, inflation will inversely affect stock return. Also, the Dividend Discount theory has also explained how inflation and stock return apparently relate inversely. As stock performance is

regarded as the discounted value of future dividend or cash flow, an appreciation in prices causes the risk free rate to rise resulting in the fall in value of prices of shares.

Also, increased inflation rate brings about increased cost of living and as such, more resources are spent on consumption leading to less resource for investment. This therefore results in the fall in the quantity of stock demanded and traded. In addition, the increased cost of living reduces corporate profits, which in turn causes reduction in dividends. This will trigger for lower demand and disposal of stock because of the signal effect. As a result, an expected decrease return of stocks causes the stock's value to depreciate.

However, studies such as Ratanapakorn and Sharma (2007) have established that stock return and inflation are positively related, arguing that stock serves as a protection against inflation.

Chandra (2004) provided an explanation to how inflation impacts on stock market and established a bi-directional impact. He argues that while some businesses or corporations may benefit from inflation, the reverse will be true for others.

2.2.2 Money Supply and Stock Return

Supply of money has also been found to affect the stock prices of companies. Central monetary authorities are particularly concerned about money supply since it affects the economic activities of a nation (Osamwonyi 2003). Kevin (2000) sees money supply as a leading indicator of stock return and categorizes the supply of money into narrow money supply (M1) and broad money supply (M2). M1 refers to circulating money and money in accounts; while M2 is M1 plus savings account and deposits.

For the purposes of this study, however, M2 is used in the analysis. A lot of studies conducted in developed countries have established that money growth has a negative effect on stock return (Rozeff 1994). The reason for this trend, according to the researchers is that money supply, mostly unaccompanied by increased productivity, unleashes cycle of rising prices on the economy, which eventually reduces stock prices. Consequently, rational investors will diversify from holing financial assets such as stocks/shares to real or tangible assets.

Despite these explanations, the connection that exists between stock price and money supply remains uncertain. According to the portfolio theory, when money supply increases, portfolio changes from money assets that do not bear interest to financial assets like stocks. Also, Mukherjee and Naka (1995) used economic stimulus to explain how money supply and share prices relate. According to them, if the supply of money boosts commercial activities, then the associated business income results in a rise in the stock prices. However, if the increased supply of money causes a rise in inflation, then the discount rate will increase and subsequently reduces the prices of stock. Studies such as Mukherjee and Naka (1995) and Maysami et al. (2004) showed that money supply and stock prices are positively connected whiles Rahman et al. (2009) proved the reverse.

2.2.3 Monetary Policy Rate and Stock Return

Most studies have also included monetary policy rate as having some form of relationship with share prices. The monetary policy rate of the central bank directly influences interest rate. According to Chandra (2004), default risk, inflation rate, time, among others may change interest rate. The changes in interest rate encourage stock

market to be substituted with money market instruments and speculative activities. He argued that as interest rate rises, business profits are affected negatively. High interest rate also results in a rise in the rate of discount applied to equity investors. Both consequently adversely impact on stock prices, and vice-visa. As such, an increase the rate of interest is supposed to have a reverse consequence on the performance of the organization. In the view of Kevin (2000), in the formal sector like the financial sector, interest rates are regulated within acceptable range through monetary policies. On the other hand, in the case of the informal financial sector, because the rates are unregulated, they may vary drastically depending upon the forces of demand and supply of funds. Any individual who is interested to invest in an economy has to consider how the extent and fluctuating pattern of interest rate affect the various segments of the economy, and assess how the rate will influence on the performance and profitability of companies. According to a study conducted by Smith (1990) in the United States, it was observed that stock prices move up or down almost just when the Federal Reserve announces a change in the monetary policy rate.

2.2.4 Exchange Rate and Stock Return

Out of the various macroeconomic variables, exchange rate has been determined as influencing stock prices through trade (Geske and Roll, 1983). Exchange rate is how much of a given currency is exchanged for another currency. The output and profit of organisations and businesses in Ghana that are import or export dependent are significantly affected by how the cedi is exchanged relative to other major currencies. When the domestic currency depreciates, it leads to increase in volume of export if the demand for export goods is elastic. The increased exports lead to higher income for domestic companies, thereby causing stock prices to increase. On the other hand,

if the demand for export goods is inelastic, the fall in prices of exports due to depreciation will result in a less than proportionate increase in the volume of export, hence fall in export earnings. The fall in export earnings will reduce the corporate earnings and subsequently corporate profit, thereby causing the stock prices to fall. However, when the domestic currency appreciates, it leads to decrease in volume of export if the demand for export goods and services has elastic demand. This is because the increase in the price of exports will result in a more than proportionate fall in quantity demanded. The fall in exports leads to lower income for domestic companies, thereby stock prices to fall. The reverse is true when the demand for exports is inelastic. The increased prices of goods as a result of the currency appreciation will lead to a less than proportionate decrease in quantity demanded and hence increased income. This will ultimately increase corporate profit and hence increased share prices. Though there is scanty literature on how exchange rate impacts on stock price behaviour, various theoretical models asserts that the two are positively related (Maku and Atanda 2010).

Empirically, Ajayi and Mougoue (1996) found out that when currency depreciates, prices of stocks go down immediately and thus, it is expected that stock prices and exchange rate relate negatively. This inverse relationship is explained that as currency depreciates, higher inflation in the future is suggested, giving a lot of concern to investors and makes them unsure about the growth potentials of companies. This negatively affects the quantity for stocks demanded. All things being equal, the stock return will fall.

Also, studies like Ozcam (1997) and Altay (2003) found out that exchange rates impact on stock returns. Investors may also examine the exchange rate as an

important risk factor. Such an expectation agrees with the conclusion by Bilson et al. (2001), that a drop in the value of the local currency negatively affects stock returns. The information on exchange rate was obtained from Bank of Ghana. As such, it is hypothesised that exchange rate will inversely relate stock returns.

2.3 EMPIRICAL LITERATURE REVIEW

Aside the numerous theories explaining how macroeconomic variables and share price return relate, several empirical studies have also been undertaken to corroborate the theoretical postulations. These empirical studies can broadly be categorized into two. The category that looks at the how macroeconomic variables have impacted on stock prices and the second category that focuses how macroeconomic factors affect stock market volatility. This study adopts the first category since the study focuses on the stock prices.

In Thailand, Brahmasrene and Jiranyakul (2007) investigated on how some selected macroeconomic variables (money supply, exchange rate, oil prices and industrial production) and share price index relate. Time series analyses were performed. They found out that money supply positively affect stock market index, while exchange rate, industrial production (a proxy for economic growth) and oil prices negatively impact on stock prices.

In Latin America, Abugri (2008) assessed how selected macroeconomic indicators like money supply, industrial production, interest rates and exchange rate influence market return for four selected Latin American countries. The study was conducted by using a six-variable VAR model. The findings established that the countries' economic variables affect stock return.

In New Zealand, Gan et al. (2006) assessed how seven selected macroeconomic variables indeed relate with stock market. The data for the study was collected from January 1999 to January 2003. Times series analyses were conducted. The results showed that the macroeconomic variables tested and stock market index relate in the long run in New Zealand. With respect to the causality test, it was detected that the stock index in New Zealand did not significantly influence macroeconomic variables. However, generally, money supply, interest rate and real GDP were found to consistently influence the stock market in New Zealand.

A study was conducted by Robert (2008) to assess how oil price and exchange rate impact on stock market performance of Russia, Brazil, China and India. Based on data on monthly basis from March 1999 to June 2006, the study found no significant relationship between macroeconomic variables and stock returns (both past and present). This result showed that, the capital markets of Russia, Brazil, China and India showed a weak and inefficient form of market efficiency. Also, he found out that, there was no significant relationship between their respective exchange rate and oil price on the stock market index of the four countries studied.

Mukherjee and Naka (1995) examined how the stock market return in Japan relates with a number of macroeconomic variables such as inflation, money supply, exchange rate, industrial production, long-term government bond and call money rate. Their investigations revealed that the market and the set of variables are cointegrated. This shows that the market return and the selected macroeconomic variables relate in the long run.

In a study conducted by Mookerjee and Yu (1997) in Singapore, the authors sought to examine how stock market relate with exchange rate, foreign exchange reserves, narrow money supply and broad money supply. The study employed data on monthly basis from 1984 to 1993. The results showed that foreign exchange reserves, narrow and broad money supply impact on stock returns in the long run, whiles the exchange rate does not have any impact on stock returns.

In Malaysia, using Vector Error Correction Model and cointegration techniques, Rahman et al. (2009) embarked upon a study to investigate the macroeconomic variables that influence the stock returns for the Malaysian stock market. The data employed in the analysis was derived on monthly basis from January 1986 to March 2008. Their findings revealed that interest rates, reserves, industrial production index and stock market returns relate positively. However, money supply and exchange rate relate negatively with stock market returns. With respect to the causality test, they found that stock market return and interest rates were bi-directionally related.

In a study to explore how stock exchange index of Karachi and macroeconomic variables relate, Akbar et al. (2012) used data from January 1999 to June 2008. They employed cointegration and Vector Error Correction Model. They found a relationship between stock market index and the set of macroeconomic variables in the long run. They further found out that short-term interest rates and money supply positively relate with stock prices whereas inflation and foreign exchange and stock prices inversely relate.

In Nigeria, Asaolu and Ognumuyiwa (2011) conducted a study on how a selected macroeconomic variables impact on Average Share Price. Gathering data from 1986 to 2007, they conducted causality test. It showed that Average share price of the

Nigerian stock market does not Granger cause any of the nine macroeconomic variables. However, exchange rate was found to Granger cause Average share price. In spite of the findings, it was found out that average share price and the macroeconomic variables were related in the long run, from the Johansen Co-integration test.

Ray and Vani (2003) conducted a study on the Indian Stock Market. They gathered data on monthly basis from April 1994 to March 2003 to investigate how transactions of the market affect actual economic factors. They employed the Vector Autoregression model. They found out that supply of money, rate of inflation, industrial production, rate of interest and exchange rate significantly influence equity prices. However, there was no significant relationship between fiscal deficit, foreign direct investment and stock market transactions.

Ahmed (2008) used time series analyses to examine the association between stock prices and the macroeconomic variables in India. He employed Johansen co-integration approach and Granger causality test. He used data on quarterly basis from March 1995 to March 2007. He found out that stock prices in India and foreign direct inflows, money supply, economic growth had a long run relationship. The study also found out that a causal relationship existed between stock price movement and industrial production.

Pal and Mittal (2011) examined how stock markets in India and macroeconomic indicators relate. They gathered data on quarterly basis from January 1995 to December 2008. They employed Johansen's cointegration approach. It was found that the stock market index relate with a number of macroeconomic indicators in the long run. They also found out that rate of exchange and inflation sufficiently impact on the

stock return whereas with respect to gross domestic saving and interest rate, the impact was not significant.

A study undertaken by Bernanke and Kuttner (2003) focused on the impact on unanticipated variations in monetary policy on prices of equity. They argued that anticipated variations in money policy are unlikely to influence prices of equity since those anticipated policies should be considered in the discount rate by investors on the stock market. The researchers found that, though, monetary policy matters moderately affect stock market, it was not a major influence on as far as equity prices are concerned. Also, Bernanke and Kuttner (2003), considered why variations in monetary policy affect stock return. The study found out that unanticipated variations in monetary policy affect stock return. The effect was not too much a result of influencing expected dividends, but rather by affecting the anticipated risk level of stocks. They perceived the result to be surprising, interesting and more difficult. For instance, investors see stocks as more risky investments when monetary policies are tight. As such, they demand for higher returns to hold stock. This higher performance can only be achieved by a drop in the prevailing return on stock for a given path of expected dividends. This finding has interesting implications on how stock return influence monetary policy actions or the broader economy and vice versa.

Vejzagic and Zarafat (2013) examined how selected macroeconomic variables and stock market in Malaysia relate. They gathered data on month to month basis from September 2006 to September 2012. The macroeconomic variables used for the study were interest rate, money supply, consumer price index and exchange rate. They employed cointegration test and VAC to examine long run and causal relationship. They found out that the stock market index relate with a number of macroeconomic

indicators in the long run. They also found out that the Malaysian Shariah Index played a critical role in the economy since it influences the major economic indicators. The Index significantly impacted negatively on interest rate and exchange rate and positively impacted on money supply. However, its impact on CPI was insignificant.

In Nigeria, Osamwonyi and Evbayiro-Osagie (2012) employed VAC to examine the short run relationship and the long run relationship between macroeconomic variables such as interest rate, inflation, exchange rate, fiscal deficit, GDP, M2 and the stock market index. They gathered yearly data from 1975 to 2005. The results showed that the selected macroeconomic variables and the stock market index relate in the long run, implying that these macroeconomic indicators influence stock market in Nigeria. With respect to the short run relationship, the findings showed that interest rate and GDP inversely relate with the stock market, though not significant. However, money supply significantly and inversely relate with the stock market. Also, they found out that inflation, fiscal deficit and exchange rate positively relate with the stock market in the short run.

In India, Singh (2010) explored causality relationship between the stock market index (BSE Sensex) and Wholesale Price Index (WPI), Index of Industrial Production (IIP) and exchange rate. He gathered data on month to month basis from April 1995 to March 2009. He conducted correlation, unit root and Granger causality test. The results from the Granger causality test indicated a two-directional causality relationship between IIP and BSE Sensex. The results further showed uni-directional

causality that BSE Sensex Granger-cause WPI. However, there was no causality between BSE Sensex and exchange rate.

In Ghana, Issahaku et al (2013) examined how macroeconomic variables relate with stock returns in the long run and short run, as well as their causal relationship. They used exchange rate, inflation, interest rate, treasury-bill rate, M2 and FDI. They gathered time series monthly data spanning from January 1995 to December 2010 for the study. They employed VAC to examine the short run and long run relationship. With respect to the long run relationship, all the macroeconomic variables, except treasury bill rate, were statistically significant indicating that macroeconomic variables and the stock market relate in the long run in Ghana. In the short run, inflation, M2 and treasury bill rate significantly and negatively relate with the stock prices. With respect to causality, both CPI and exchange rate Granger-caused the stock return, though unidirectional. Also, with respect to the Granger causality test conducted, stock price was found to Granger-cause interest rate, money supply and FDI. This relationship was unidirectional.

In India, Agrawalla and Tuteja (2008) explored the long run and causal relationship between the share price index and industrial production (proxy for economic growth), money supply, credit to private sector, exchange rate, wholesale price index and money market rate. Johansen cointegration and multivariate Granger-causality tests were conducted on the monthly data that spanned from November 1965 to October 2000. The results from the Johansen cointegration test showed one cointegrating equation, implying that the macroeconomic variable selected and the share price index relate in the long run. With respect to the causality, the study was aimed at examining

whether share prices caused better economy or it was the better economy that caused the share price to appreciate. The multivariate Granger-causality test showed a unidirectional causality from industrial production to share prices. This result implied that the state of the economy affected share price in India but the share prices did not have impact on the state of the economy.

Abeyratna et al. (2004) examined how macroeconomic variables influence the stock market equity in Sri Lanka. The macroeconomic variables identified in their study included treasury bill rate (as a measure of interest rate), money supply, exchange rate and consumer price index (as a measure of inflation). They gathered data on month to month basis from January 1985 to December 2001. They employed time series data analysis techniques (unit root, cointegration and VAC) to analyse the data collected. Their results showed that the macroeconomic variables identified had a long run relationship with the stock market index. Also, with respect to the short run relationship, VAC results showed that consumer price index, treasury bill rate and money supply had significant impact on the share price but the exchange rate did not.

Adam and Tweneboah (2008) explored how macroeconomic variables relate with the stock prices in Ghana in the short run and long run. The macroeconomic variables used for their study were foreign direct investment (FDI), treasury bill rate, consumer price index (CPI) and exchange rate. The Databank Stock Index was used to proxy for the Ghana stock market. They gathered secondary data on month to month basis from January 1999 to April 2006. They employed Johansen multivariate cointegration and innovative accounting techniques to analyse the data. Their results showed that the variables were cointegrated, hence the selected macroeconomic variables relate with

the stock prices in the long run in Ghana. Also, they found out that inflation and exchange rate has significant influence on the stock market prices in the short run, whereas interest rate and inflation influenced the stock prices in the long run.

In Sri Lanka, Menike (2006) undertook a study to find out how macroeconomic variables impacted on the Colombian stock market in the short run. He gathered data on monthly basis from September 1991 to December 2002. The macroeconomic variables employed were money supply, exchange rate, inflation rate and interest rate. He employed the multiple regression model to do the analysis. The results showed that there was a strong relationship between macroeconomic variables and stock prices. Exchange rate, inflation rate and interest rate were found to be inversely related to stock prices whereas money supply was positively related to stock price in Sri Lanka.

Naik and Padhi (2012) undertook a study in India to assess how five selected macroeconomic variables namely industrial production index, wholesale price index, money supply, treasury bill rate and exchange rate relate with the stock prices. They gathered data on month to month basis from April 1994 to June 2011. Johansen cointegration test, VAC and Granger causality test were conducted. The results showed that the variables were cointegrated, indicating that the macroeconomic variables and stock prices were related in the long run. Money supply and industrial production were positively related with stock prices whiles inflation showed an inverse relationship with stock returns. With respect to causality, the results showed bidirectional causality between stock price and industrial production. There was also

unidirectional causality from money supply to stock price, from interest rate to stock price and from stock price to inflation.

Talla (2013) undertook a study to assess the impact of macroeconomic variables on the Stockholm Stock Exchange. The macroeconomic variables selected were consumer price index (proxy for inflation), exchange rate, money supply and interest rate. He gathered monthly data from January 1993 to December 2012 and employed unit root test, multivariate regression and Granger causality to do the analysis. The results showed that inflation and currency depreciation were significantly and inversely related to stock prices, interest rate was negatively related to stock price but not significant, whereas, money supply was positively related with stock price but also not significant. With respect to the Granger causality test, the results showed no unidirectional causality, except from stock price to inflation.

In Turkey, Acikalin et al (2008) explored how macroeconomic variables and the Istanbul Stock Exchange relate. They identified gross domestic product (GDP), exchange rate, interest rate and current account balances to assess the relationship. They gathered quarterly data from the last quarter of 1991 to the last quarter of 2006 to assess the long run and causal relationship. They conducted unit root test, cointegration, VAC and Granger causality tests. The results showed that the variables were cointegrated, indicating that the macroeconomic variables related with the stock return in the long run. The Granger causality test showed that there was a unidirectional causal relationship from macroeconomic variables to stock price. The results, further, showed a unidirectional causality from GDP, exchange rate and

current account balance to stock price and a unidirectional causality from stock price to interest rate.

2.4 TRENDS IN MACROECONOMIC PERFORMANCE IN GHANA

The macroeconomic performance of Ghana has been changing over the years. In 2006, the indicators showed a better performance from previous years. Although the fiscal deficit of government in general increased from 6.6% to 12.4%, the growth in real GDP saw an increase from 5.9% in 2005 to 6.2% in 2006. Net FDI rose from 1.6% of GDP in 2001 to 3.37% of GDP in 2006.

On monetary policy, the Bank of Ghana undertook policies aimed at controlling inflation and interest rates, stability of the Cedi and maintaining money supply. Interest rates reduced by almost 31%, from 40.95% by December 2001 to 9.95% by December 2006, the rate of the cedi / US dollar deprecation dropped from 104.4% in 1999 to 2.0% in 2006 and 17.4% by 2012.

Inflation dropped from 59.56% in 1995 to 32.91% in 2001 and then to 10.96% in 2006 but rose to 13.5% by the ending 2013. Moreover, the monetary policy rate dropped from 45% in 1996 to 12.5% in 2007 and up to 18% by December, 2013.

CHAPTER THREE

METHODOLOGY AND PROFILE OF THE STUDY AREA

3.0 INTRODUCTION

The study is to examine how macroeconomic variables in Ghana relate to return on stock using monthly data from the stock exchange from January 1995 to December 2014. This chapter provides the methodology adopted in conducting the study. Specifically, the chapter looks at the research design, research approach and strategy, study population, sources of data, econometric models and techniques used to analyse the data as well as the profile of the Ghana Stock Exchange.

3.1 RESEARCH DESIGN

The study employed secondary data to explore how macroeconomic variables and share price index are related. Data gathered for the study were sourced from two main sources. Data covering stock price index on monthly basis were sourced from the Ghana Stock Exchange (GSE), whiles data on monthly basis for Inflation, Monetary policy rate (MPR), Money Supply (M2) and Cedi/ US dollar rate of exchange were obtained from Bank of Ghana official website. Data used for the study involved month to month data from January 1995 to December, 2014. Time series analysis techniques were employed. Unit Root test examined the stationarity of the variables employed. Johansen Cointegration test, VAC and Granger causality test were also employed to assess the short run, long run and causal relationship. EVIEWS statistical software was used to perform the analysis.

3.2 RESEARCH APPROACH

Deductive approach requires the development of hypothesis (Saunders, Lewis and Thornhill, 2009). This study examines how related are stock return and macroeconomic variables in Ghana. Therefore, hypotheses which state there is a certain relationship between the variables were formulated. Thus, this reflects a deductive approach. Besides, deduction requires the researcher to be independent of observation (Saunders et al., 2009, p. 125). The study involved quantitative data based on the data collected. Hence, the researcher was independent of what was observed and also objective in data gathering. Therefore, the research approach is consistent with deductive approach.

3.3 RESEARCH STRATEGY

According to Yin (2003), there are five main research strategies that can be used. They comprise survey, experiment, case study, archival study and Histories. For the purposes of this research, archival strategy was used. This strategy involved collecting data from administrative records. The sets of data were obtained BOG official website and the GSE. Since the data was from an independent source, the researcher considers archival strategy as the more appropriate strategy for the study.

3.4 STUDY POPULATION

According to Busha and Harter (1995) the population of a study comprises persons, objects or institutions having at least one common feature. With respect to this study, the population consists of companies that are quoted on the GSE from 1995 to 2014. The relevant feature of the population was the Composite Index. The index was examined in relation to the selected macroeconomic variables.

3.5 SOURCES OF DATA

Data for research can be accessed from either primary or secondary sources. According to Saunders et al. (2009), primary data constitutes fresh data collected specifically for a purpose, while secondary data constitutes already existing data previously collected for some other purpose. This research mainly employed secondary data to establish how stock market return and macroeconomic variables relate. The secondary data on key variables in the Ghanaian economy used in the study included monetary policy rate, supply of money, inflation and exchange rate. Data on these variables were sourced from the BOG official website. Data on the share index was sourced from GSE.

3.6 SPECIFICATION OF ECONOMETRIC MODELS

According to Fonta et al. (2009), an econometric model is a representation of the basic features of an economic phenomenon. A Number of econometric models were employed to analyse the data used for the study. These included Pearson's correlation analysis, Unit root, Johansen cointegration, VAC and Granger Causality tests. These models are further discussed as follows.

3.6.1 Correlation Analysis

Examining how two or more financial variables relate with each other is very important. Several methods are employed to assess how sets of data relate to each other. But mostly, scatter plots and correlation analysis are used. For the purposes of this study, the correlation analysis method was employed.

Correlation coefficient measures how close two sets of data are related. Precisely, it determines the direction and degree of the relationship. The coefficient values rage between one and negative one. The implication of the coefficient values is that, if the value is greater than zero then that the variables are associated positively. The variables are related negatively when the value is less than zero. A coefficient equal to zero implies that the variables are not related linearly. The degree or extent of the correlation depends on how close the coefficient is to either negative one or one. The relationship between the study variables is estimated by the following model.

$$r = \frac{n\sum x_i y_i - \left(\sum x_i\right)\left(\sum y_i\right)}{\sqrt{\left[n\sum x_i^2 - \left(\sum x\right)^2\right]\left[n\sum y^2 - \left(\sum y\right)^2\right]}}$$

Where

x and y represent the variables being correlated:

n represents the number of observations.

This model can test whether or not the correlation coefficient (r) is significantly different from zero. Thus, the null hypothesis (H0) and the alternative hypothesis (H1) can be tested.

H0: The correlation coefficient is equal to zero (r=0)

H1, The correlation coefficient is not equal to zero (r≠0)

3.6.2 Stationarity Test

In principle, it is often assumed that time series data are non-stationary, thought in practice they are not. Therefore, a test should be undertaken to determine how stationary the variables are. Stationarity implies that the time series variable is distributed evenly and does not change over time. Stationarity, at least in the probabilistic sense, implies that there is no difference between the future and the past. However, in practice, this

is not the case. Many economic time series data show trend. As such, stationarity test is conducted to assess the trend in each of the variables and hence the how many times that a variable must be differenced to achieve stationarity. Besides, it is also to avoid the situation of a spurious regression.

Therefore, ADF test was conducted to examine the existence of a trend or not in the variables used. ADF test, in logarithm terms, was applied to the variables at level and also at their first differences. The null hypothesis indicated that there was a unit root among the variables whiles the alternative hypothesis indicated there was none. ADF tested whether the p-value equals zero or not.

$$\Delta Y_{t-1} = \alpha + \gamma Trend + \rho Y_{t-1} + \sum \delta . \Delta Y_{t-1} + \varepsilon_t$$

ADF tests the null hypothesis (H_0) as against the alternative hypothesis (H_1)

H_0: Variable has unit root

H_1: Variable has no unit root

3.6.3 Cointegration Model

Several methodologies have been employed to estimate the cointegrating properties among variables. Common among these methodologies are the modified OLS, Johansen (1998) and Johansen-Juselius (1990), the residual based approach by Engle and Granger (1987), and the like. For the purpose of this study, a multivariate Johansen test on all the variables was conducted. The process is the maximum likelihood method that determines the number of cointegrating vectors in a non-stationary time series, Vector Autoregression (VAR), with restrictions imposed, known as Vector Error Correction Model. The Johansen's estimation model is as follows:

$$\Delta X_t = \mu + \sum_{i=1}^{n} \phi_i \Delta X_{t-1} + \alpha\beta' X_{t-1} + \varepsilon_t$$

Where:

X= (n x 1) vector of all the non-stationary indices in the study

ϕ **= (n x n)** matrix of coefficients

α = (n x r) matrix of error correction coefficients where r is the number of cointegrating relationship in the variables. This calculates the speed at which the variables adjust to their equilibrium.

β = (n x r) matrix of r cointegrating vector, so that 0 < r < n. representing the long run relationship between the variables.

The Johansen method of cointegration defines two test statistics for cointegration, namely Trace test and Maximum Eigenvalue test. Trace test examines the null hypothesis that there is no cointegration (HO: r = 0) jointly with the alternative hypothesis that there is cointegration (H1: r > 0). With respect to the Maximum Eigenvalue test, it examines each eigenvalue of the null hypothesis that the number of cointegration vectors is equal to *r* separately as against the alternate hypothesis of *r +1* cointegrating vectors (Brooks, 2008). These tests test are represented in equation (1) and (2). Equation 1 represents the trace test whiles equation 2 represents the maximum eigenvalue test.

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^{g} \ln(1-\hat{\lambda}_i), \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

$$\lambda_{\max}(r, r+1) = -T \ln(1-\hat{\lambda}_{r+1}), \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

Where

r = number of vectors cointegrating under the null

$\hat{\lambda}_i$ = estimated ith ordered eigenvalue from the $\alpha\beta'$ matrices

If the eigenvalue is not zero and also significant number, then it indicates that the vector cointegration is significant.

3.6.4 Granger Causality

Though correlation is used to test relationship among variables, it does not really imply causation. In order to test for how the variables cause each other, Granger Causality test, developed by Engle-Granger (1969) was employed. The main purpose of this test was to investigate how stock market return causes macroeconomic variables and vice versa. In the Granger Causality test, X is deemed to Granger cause Y if past values of X can be used to precisely predict Y. Generally how two variables (X and Y) cause each other can be determined by the model as follows: If Xt and Yt are two stationary time series with zero means. The simple causal model is

$$X_t = \alpha_0 + \sum_{i=1}^{m} \alpha_i . X_{t-1} + \sum_{j=1}^{m} b_j . Y_{t-j} + u_t, \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$$Y_t = b_0 + \sum_{j=i}^{m} b_j . Y_{t-j} + \sum_{i=1}^{m} \alpha_i . X_{t-1} + \eta_t, \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Based on (1) and (2), it can be said that Y Granger cause X if b_j is statistically significant whereas conclusion can be drawn that X Granger cause Y and if α_1 is statistically significant. Based on this study, the hypothesis to respond to the causality between macroeconomic indicators and the stock performance is indicated as follows:

H_0: The macroeconomic variable does not Granger cause the GSE Composite Index

H_1: The macroeconomic variable does Granger cause the GSE Composite Index

This implies that if the null hypothesis is not confirmed or is rejected, then macroeconomic variable can be said to Granger-cause the GSE Composite index. However, if the null hypothesis is not rejected, then macroeconomic variables cannot be said to Granger-cause GSE Composite index.

3.7 MODEL SPECIFICATION

Based on the literature reviewed, it is suggested that the implicit functional model of stock market returns takes the form as indicated below:

$$CI = f(INF, MPR, EXR, M2) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where

CI is the GSE Composite Index;

INF is inflation;

MPR is monetary policy rate;

EXR represents the Exchange rate;

M2 represents broad money supply.

Log-linearizing equation (1) yields the following statistic long-run model:

$$\ln ASI = \alpha + \beta_1 \ln INF + \beta_2 \ln MPR + \beta_3 \ln EXR + \beta_4 \ln M2 + \mu_t, \ldots\ldots\ldots\ldots\ldots (2)$$

Where μ_t represents the error term; in is natural logarithm operator;

$\alpha = \ln\beta_0$ represents the constant term in the model

$\beta_1, \beta_2, \beta_3,$ and β_4 are long-run parameter estimates.

Other variables are already defined.

Equation (2) is modelled using Johansen cointegration test and Granger causality test examined.

3.8 VARIABLE SELECTION AND DESCRIPTION

This research is aimed at identifying relationship between stock return and macroeconomic variables. Four macroeconomic variables were identified and chosen as likely factors to possess the power of explaining stock returns on the market. This had mainly been done in line with previous research such as Roll and Ross (1980), Groeneworld and Fraser (1997), and Karamustafa and Kucukkale (2003), whose works more or less had shown that these variables have some relationship with stock returns. The variables considered for the purposes of this study are; GSE composite index, Inflation, Exchange rate, Monetary Policy Rate and Money Supply. The variables are defined and further explained as follows:

GSE Composite Index (GSE CI)

The GSE Composite Index, calculated by the GSE, is used as the market indicator of the stock market in Ghana. The GSE Composite index is used to represent the stock market return. It measures the cumulative gain of the market. This index is calculated as natural logarithms of GSE composite index at a particular time or month. It is used as the dependent variable. The data on GSE CI was obtained from the Ghana stock exchange

Inflation

Inflation is a persistent rise in the general price levels for goods and services. It is measured as a yearly percentage rise. Economic theory indicates that inflation decreases the purchasing power of business cash flow. Changes in inflation

expectation therefore affect the purchasing power of businesses, hence it is expected that inflation will correlate negatively with stock returns. Hence, inflation was used as one of the independent variables. The data on inflation was obtained from the Bank of Ghana (BOG).

Monetary Policy Rate (MPR)

Monetary policy rate is a way the central bank of a country controls the amount of money in circulation. MPR usually targets interest rate in the economy which is aimed at promoting economic growth and stability. The MPR is done through the trading of several financial instruments, such as treasury bills and so on. The MPR is done principally to bring about price stability and also to reduce the rate of unemployment. The primary tool of monetary policy is open market operations. Studies such as Sprinkel (1971), found out that MPR and stock market return are related positively. He explains that changing monetary growth promotes the acquisition or expansion of liquidity leading to increase in market fluctuations. Based on this relationship, MPR was used as one of the independent variables. The data was obtained from the BOG

Exchange Rate (EXR): (Cedi-US Dollar Exchange Rate)

Exchange rate is defined as how much of a country currency is needed to exchange a unit of another country's currency. In this study, the exchange rate is how much cedi is needed to exchange for a unit of US dollar. Due to globalization, business transactions in modern days are affected by international activities. Hence, changes in exchange rate may influence the competitiveness of companies and industry operations as well. Based on this relationship, the cedi-Us Dollar exchange rate was used as one of the independent variables. The data was obtained from the BOG.

Broad Money Supply (M2)

M2 is defined as circulating money and money in accounts, plus savings accounts and deposits. Money supply has been found to influence stock market return. For instance, Sprinkel (1971) showed that a decline in the rate of monetary growth precedes bear markets by an average of nine months, while an increase in monetary growth rate leads bull markets by an average of two months. Therefore, it is expected that money supply will positively relate stock returns. Based on this relationship, broad money supply was used as one of the independent variables. This variable was also obtained from BOG.

3.9 PROFILE OF THE GHANA STOCK EXCHANGE

In Africa, a number of countries established stock exchanges during the 1990s as a prerequisite to introduce market economies under the IMF sponsored structural adjustment programme (SAP). The SAP was introduced with the motive of promoting privatisation of enterprises owned by the state. The quest to have reforms in African economies led to the establishment of new financial markets and the improvement in the existing ones. However, in Ghana, the idea of establishing a stock market was conceived as far back as 1968. The idea led to the enactment of the Stock Market Act of 1971. This paved the way for the establishment of the Accra Stock Market Limited in 1971. However, as a result of poor economic, political and social environments, the start of the so called Accra Stock Market Limited was unduly delayed. Notwithstanding the earlier setbacks, National Trust Holding Company Ltd and National Stockbrokers Ltd, now Merban Stockbrokers started trading over-the-counter in shares of some foreign-owned companies before the Ghana Stock Exchange was established.

In 1983, IMF and its agencies supervised Ghana to undertake a structural reform. The reforms were aimed at eradicating distortions in the economy and bringing into being better economic and financial reforms. These included policies such as removal of credit controls, deregulation of interest rates, floating of exchange rates and the like. After these reforms, it became necessary and unavoidable for the stock market in Ghana to take off.

In July 1989, The Stock Exchange in Ghana, popularly known as the GSE was set up as a privately-owned company limited by guarantee but the status changed to a public company limited by guarantee in April 1994 under the Ghana Companies' Code, 1963(Act179). However, it was the Stock Exchange Act of 1971 (Act 384) that recognised it as an authorized stock exchange in October1990. Transactions at the Exchange began on November 12, 1990. The listed companies numbered 13 in 1991. The number rose to 19 in 1995 and to 37 in 2014. This growth also reflected in market capitalization. In 1994, the index gained 124.3% and in 1995, the index rose by 6.3%. The market capitalization stood at US$ 2,644 million by 2004 ending. Annual turnover ratio remained about 3.2% in 2004, from a highest of 6.5% in 1998. By the end of the year 2006, The GSE recorded a market capitalization of over $11.5billion. The exchange is governed by a council with representation from licensed dealing members, listed companies, the banks, insurance companies, money market and the general public with the managing director as an ex-officio member. Trading on the Ghana Stock Exchange (GSE) is undertaken during working days with the exception of the shares of AngloGold Ashanti which has the potential of being traded through the OTC over-the-counter when trading hours are exhausted, or through the GSE during trading hours in the day. However such over the counter transactions must be taken note of and presented to the exchange at the beginning of the subsequent trading

session. Although there are other indices, the major indices are the GSE Composite Index and the Databank Stock Index.

CHAPTER FOUR

PRESENTATION OF DATA AND ANALYSIS

4.0 INTRODUCTION

The preceding chapter looked at the methodology used and sources of data. This chapter is designed to present and analyse the data collected in comparison with the study's objectives. The chapter examines the descriptive statistics of the various variables, as well as the correlation among these variables. The tests of unit root are provided and briefly explained. The Johansen cointegration test, VAC and Granger causality test are conducted to examine how the variables relate. Finally, the findings will be discussed and compared with existing literature on the subject.

4.1 DESCRIPTIVE STATISTICS

The descriptive statistics of the variables used in the model are summarised and shown in Table 4.1. The table provides statistics such as the mean, median, standard deviation, the minimum and maximum values. The result reveals that, for the selected period, the stock return for the listed companies averaged 31.9% with a standard deviation of 0.46, indicating high levels of dispersion from the mean. This may be attributed to instability in the stock prices over the period as a result of macroeconomic instability for the past two decades. Table 4.1 shows the details of the results.

Table 4.1 Descriptive Statistics of variables

	LNEXR	LNINF	LNM2	LNMPR	SR
Mean	-0.3683	2.8791	7.4892	3.0856	0.3190
Median	-0.1278	2.8034	7.6163	2.9178	0.2381
Maximum	1.1801	4.2599	12.3522	3.8067	1.5467
Minimum	-2.4079	1.8469	4.5799	2.5257	-0.4658
Std. Dev.	0.9062	0.5429	1.6966	0.4248	0.4618
Observations	240	240	240	240	240

Source: Result of the analysis of study data, July 2015

Key: LNEXR (Natural logarithm of Exchange Rate); LNINF (Natural logarithm of Inflation); LNM2 (Natural logarithm of Broad Money Supply); LNMPR (Natural logarithm of monetary policy rate); SR (Stock Return)

4.2 CORRELATION ANALYSIS

The correlation analysis of all variables included in the study is shown in Table 4.2. The result from shows that stock return has a significant positive relationship with money supply and monetary policy rate. The result, further, shows that stock return has negative and significant relationship with exchange rate and inflation. The correlation result shows that the independent variables are not highly correlated, indicating that there is no problem of multicolinearity among the independent variables. Pallant (2011) argued that having correlation of more than 0.8 or 80% between independent variables suggest some form of multicolinearity. However, the Pearson's correlation coefficients in Table 4.2 clearly show that there is no problem with multicolinearity since the correlation coefficients are less than 0.8.

Table 4.2 Pearson's Moment Correlation Coefficient Table

		lnCI	lnMPR	lnINF	lnM2	lnEXR
lnCI	Pearson Correlation	1				
	Sig. (2-tailed)					
lnMPR	Pearson Correlation	.193**	1			
	Sig. (2-tailed)	.003				
lnINF	Pearson Correlation	-.276**	-.666**	1		
	Sig. (2-tailed)	.000	.000			
lnM2	Pearson Correlation	.210**	.655**	-.707**	1	
	Sig. (2-tailed)	.001	.000	.000		
lnEXR	Pearson Correlation	-.174**	-.659**	.781**	-.559**	1
	Sig. (2-tailed)	.007	.000	.000	.000	
	N	240	240	240	240	240

**. Correlation is significant at the 0.01 level (2-tailed).
Source: Researcher's Own Construction, July 2015

4.3 UNIT ROOT TEST

Economic variables are expected to be stationary before they can be used for meaningful statistical analysis. However, practically, many economic time series are not stable and as such causes the conventional OLS-based statistical inferences to be spurious. To avoid this problem, the variables were subjected to stationarity test. The ADF test was performed on the examined variables at level and also at first difference. The ADF tested the null hypothesis (H_0) as against the alternative hypothesis (H_1) that the variables are non-stationary and that the variables are stationary respectively. The results showed that all, apart from the stock return, the other variables are not stationary at level but at first differenced, they all become stationary.

H_0: Variable has unit root

H_1: Variable does not have a unit root

Table 4.3: ADF Unit Root Tests Results

Variable	*T-statistics*	*P-Value*
At Level		
lnCI	-6.413***	0.000
lnINF	-1.695	0.432
LnMPR	-1.486	0.538
LnEXR	-1.644	0.458
LnM2	0.910	0.995
First Difference		
Δ *lnCI*	18.316***	0.000
Δ *lnINF*	-13.695***	0.000
Δ *lnMPR*	-5.853***	0.000
Δ *lnEXR*	-16.058***	0.000
Δ *lnM2*	-23.668***	0.000

Source: Researcher's Own Construction, July 2015

*Notes: ***, denotes that the null hypothesis is rejected at the 0.01 significance levels.*

The results from the above table show that, at level, all the study variables were not stationary, with the exception of the stock return. However, when first differenced they all become stationary.

4.4 TESTING THE LONG RUN RELATIONSHIP BETWEEN THE VARIABLES.

To assess how the variables are related in the long run, Johansen cointegration test was conducted with the help of EVIEWS statistical Software. The results are presented in Table 4.4 below

Table 4.4 Johansen Test of Cointegration

Trace Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.1414	71.8386	69.8189	0.0342
At most 1	0.0753	36.0133	47.8561	0.3957
At most 2	0.0523	17.6156	29.7971	0.5945
At most 3	0.0190	4.9952	15.4947	0.8093
At most 4	0.0021	0.4831	3.8415	0.4870

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

** denotes rejection of the hypothesis at the 0.05 level*
***MacKinnon-Haug-Michelis (1999) p-values*

Source: Researcher's Own Construction, July 2015

Maximum Eigenvalue Test

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.1414	35.8253	33.8769	0.0289
At most 1	0.0753	18.3977	27.5843	0.4624
At most 2	0.0523	12.6204	21.1316	0.4877
At most 3	0.0190	4.5121	14.2646	0.8017
At most 4	0.0021	0.4831	3.8415	0.4870

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level*
***MacKinnon-Haug-Michelis (1999) p-values*

Source: Researcher's Own Construction, July 2015

The results from Table 4.4 show that there is one (1) cointegrating equation at 0.05 level of significance. This result clearly shows that the variables cointegrate and as such the variables are related in the long run.

4.5 TEST OF SHORT RUN RELATIONSHIP BETWEEN THE VARIABLES

The Vector Error Correction Model was employed to examine how the study variables are related in the short run. The results are presented in Table 4.5 as follows.

Table 4.5 Short run relationship among stock return and macroeconomic indicators

ECM (Using lag 2)	Coefficient	T-statistics	Probability(at 5% level)
Constant	-0.0139	-0.2074	0.8358
ΔLNCI(-1)	-0.0141	-0.2042	0.8382
ΔLNCI(-2))	0.0758	1.1537	0.2489
ΔLNINF(-1))	-0.2146	-0.3331	0.7391
ΔLNINF(-2))	-0.8653	-1.3407***	0.0180
ΔLNEXR(-1)	0.1069	0.0929	0.9260
ΔLNEXR(-2)	1.5348	1.3511	0.1769
ΔLNM2(-1)	-0.4131	-1.4381***	0.0150
ΔLNM2(-2)	0.4054	1.0123	0.3116
ΔLNMPR(-1)	2.1120	1.1684	0.2429
ΔLNMPR(-2)	0.5266	0.2952	0.7679

R-Square	17.9088
Adjusted R-Square	13.8955
F-Statistics	4.638
Prob of F-statistics	0.001

Source: Analysis of Field Data, July 2015

The result shows that lag 2 of inflation (**ΔLNINF(-2)**) and lag 1 of money supply (**ΔLNM2(-1)** have significant negative impact on stock return. The other variables have no significant impact on stock returns be it positive or negative. This is because of their *p* values at 0.05 level of significance.

4.6 TEST OF CAUSAL RELATIONSHIP AMONG THE VARIABLES.

A number of arguments have been made regarding how certain macroeconomic variables impact on stock return. This study empirically examines the degree to which the selected macroeconomic variables impact on stock return in Ghana. This analysis was undertaken using Granger Causality test. The results are presented as follows:

4.6.1 Granger causality between inflation and stock return

The Granger causality test with respect to stock return and inflation is presented in Table 4.6a. From the result presented, the null hypothesis, which indicated that inflation does not Granger-cause stock return is rejected and concludes that inflation indeed does Granger-cause stock return. However, the reverse is not rejected and concludes that stock return does not Granger cause inflation. As a result, it can be inferred from the result that, the inflation can be seen as one of the leading indicators that may influence or help in estimating the stock returns.

Table 4.6a Granger causality between inflation and stock return

Null Hypothesis	F-statistics	Probability	α= 0.05
LNINF does not Granger-cause LNCI	3.7433	0.0500	Rejected
LNCI does not Granger-cause LNINF	0.0354	0.8508	Not Rejected

Source: Analysis of Field Data, July 2015

4.6.2 Granger causality between exchange rate and stock return

Due to globalization, capital has greatly moved across the globe as a result of trade. Hence, the exchange rate becomes a key determinant of business profitability and equity prices. Against this backdrop, the study examines how exchange rate impacts on the performance of stock index. Table 4.6b provides the result of the Granger causality test between stock return and exchange rate. It can be inferred from the result that, the null hypothesis, which indicated no Granger causality between exchange rate and stock return, is not rejected. This implies that exchange rate does not Granger cause stock return in Ghana. The reverse is also not valid. This indicates that exchange rate is not a key factor that affects stock return.

Table 4.6b Granger causality between exchange rate and stock return

Null Hypothesis	F-statistics	Probability	α= 0.05
LNEXR does not Granger-cause LNCI	1.4131	0.2357	Not Rejected
LNCI does not Granger-cause LNEXR	0.1606	0.6890	Not Rejected

Source: Analysis of Field Data, July 2015

4.6.3 Granger Causality between broad money supply and stock return

In Table 4.6c, the result of the Granger causality test between stock return and money supply is presented. It can be inferred from the result that, the null hypothesis, which indicated no Granger causality between money supply and stock return, is rejected. This implies that broad money supply indeed Granger-causes stock return. However, the reverse is not valid. The implication of this finding is that money supply is a significant factor to be considered when estimating stock

Table 4.6c Granger causality broad money supply and stock return

Null Hypothesis	F-statistics	Probability	α= 0.05
LNM2 does not Granger-cause LNCI	1.2905	0.0257	Rejected
LNCI does not Granger-cause LNM2	1.7169	0.1914	Not Rejected

Source: Analysis of Field Data, July 2015

4.6.4 Granger Causality between monetary policy rate and stock return

Table 4.6d depicts the result of the Granger causality test between monetary policy rate and stock return. The result shows that, the null hypothesis which indicated no Granger causality between monetary policy rate and stock return is not rejected. This implies that monetary policy rate does not Granger cause stock return in Ghana. The reverse is also valid. This implies that the monetary policy rate is not a key indicator in estimating stock return in Ghana.

Table 4.6d Granger causality monetary policy rate and stock return

Null Hypothesis	F-statistics	Probability	α= 0.05
LNMPR does not Granger- Cause LNCI	1.7547	0.1866	Not Rejected
LNCI does not Granger- Cause LNMPR	0.3318	0.5652	Not Rejected

Source: Analysis of Field Data, July 2015

4.7 DISCUSSION OF RESULTS

The analysis of the time series data revealed that, in the long run, foreign exchange rate, inflation, monetary policy rate and money supply relate with stock return. This result agrees with Sprinkel (1971), who found out that inflation, money supply and exchange rate relate with stock return in the long run. This result implies that for the stock index to be improved in the long term, these macroeconomic variables should be stabilized and improved. The study further established that in the short run, stock return and two macroeconomic variables namely inflation and money supply have a significant negative relationship. This finding is not surprising because inflation reduces the real disposable income of individuals and consequently reducing investor's ability to save and invest. Hence, in theory, inflation and stock returns are expected to have a negative relationship. The finding is also in agreement with the findings of Ray and Vani (2003) who found that stock return and inflation are negatively related in the short run. Money supply, also, in most cases lead to inflation when it is not accompanied by equivalent productivity. In addition, the study found out that, two macroeconomic variables namely inflation and money supply Granger-cause stock returns. However, the reverse is invalid. These results imply that, money supply and inflation are among the key indicators that influence stock return. The finding is in agreement with the findings of Fama and Schwert (1977), Saunders and

Tress (1981) and Nishat and Shaheen (2004), who found unidirectional causality from inflation to stock returns.

4.8 PREDICTIVE POWER OF THE VECTOR ERROR CORRECTION MODEL

The Adjusted R-squared figure of 13.89 indicates that almost 14% of the stock returns fluctuations are explained by dynamics in the macroeconomic variables used for this study. This implies that, there are other significant variables which can explain about 86% of fluctuations of return on stock. Further, the F-statistics value of 4.6138 shows that the selected macroeconomic variables put together greatly affect the stock returns.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.0 INTRODUCTION

The analysis of the data collected and discussion of the result was done in chapter four of this study. This chapter summarises the key findings. Also, conclusion and recommendations are made in this section.

5.1 SUMMARY OF FINDINGS

The initial analysis of the result reveals that there is no multicolinearity among the study variables. Therefore all variables, comprising of exchange rate, money supply, inflation and monetary policy rate were included in the model.

The variables were tested using Augmented Dickey Fuller Test (ADF) with respect to their stationarity. The result shows that, with the exception of stock returns, the other variables were not stationary at level but became stationary at first difference.

Also, the trace test and maximum eigenvalue test from the Johansen Co-integration test show that there is one cointegrating equation at 0.05 level of significance. The result clearly shows that there is cointegration among the variables. In other words, there is long run equilibrium relationship among the study variables.

Vector Error Correction Model (VAC) was employed to test if the variables are related in the short run. The result shows that, In Ghana, inflation and stock return significantly relate negatively in the short run. It further reveals that money supply, in the short run, relate with stock return. However, the study found no relationship between stock return and exchange rate and monetary policy rate.

With respect to the Granger causality test, the results show that broad money supply (M2) and inflation do Granger-cause stock returns. However, the relationship is unidirectional, indicating that the reverse is not valid. The study further reveals that exchange rate and monetary policy rate do not granger cause stock return. The reverse is also invalid.

5.2 CONCLUSION

This study examines the nature of the relationship between stock return and key macroeconomic variables such as exchange rate, money supply, inflation and monetary policy rate. Data on monthly basis from January 1995 to December 2014 was analysed using time series techniques. These techniques include Augmented Dickey-Fuller unit root test, Johansen cointegration test, Vector Error Correction Model and Granger causality test. The results showed one co-integrating equation among the study variables, indicating that the variables are related in the long run. The results, also, showed that both inflation and money supply significantly and inversely affect stock return in the short run. The results further showed that inflation and money supply Granger cause stock return. However, the reverse was found to be invalid. The study provides useful guidance for key stake holders such as investors, government and firms listed on the GSE.

5.3 RECOMMENDATIONS

The results of the study provide useful lessons for stakeholders such as listed companies, policy makers, academicians and the like. This work contributes empirically to the discussions about macroeconomic variables relate with stock market returns. Considering the results, recommendations are made as follows:

In the first place, Bank of Ghana must undertake pragmatic policies aimed at controlling money supply within acceptable limits, since money supply is seen to inversely affect stock return in Ghana.

Secondly, the listed firms must work assiduously to improve upon the attractiveness of the shares to investors. This is because a lot of investors see the stock market as an avenue for hedging their risks over a long period. This requires that the listed companies to undertake profitable ventures to enhance their profitability. This is so because investors are encouraged to invest with businesses with future prospects. The companies must undertake measures to cut down on cost of production and also to increase productivity. The net effect will be increased profit margins and, consequently, an increase in the returns on their shares.

5.4 SUGGESTION FOR FURTHER RESEARCH

The study suggests that further research should be conducted into examining the relationship between macroeconomic variables and share prices of listed companies on the Ghana Stock Exchange by using other macroeconomic variables such as interest rate, gross domestic product, balance of trade and the like.

REFERENCES

Abeyratna, G; Pisedtasalasai, A., and Power D.,(2004), Macroeconomic influence on the stock market: evidence an emerging market in South Asia. Journal of Emerging Market Finance, 3(3), 85-304

Acikalin S., Aktas R. And Unal R., (2008), Relationship between stock markets and macroeconomic variables: an empirical analysis of the Istanbul Stock Exchange; Investment Management and Financial Innovations, 5(1), pp 8-16

Abugri, B. A. (2008), „Empirical relationship between macroeconomic volatility and stock returns: Evidence from Latin American markets" , *International Review of Financial Analysis*, Vol.17, Issue 2, pp. 396–410

Adam, A. M. and Tweneboah, G. (2008), „Macroeconomic Factors and Stock Market Movement: Evidence from Ghana" [Online] Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1289842 [Accessed 8 February 2009].

Agrawalla, R.K and Tuteja, S.K. (2008), Share Prices and Macroeconomic Variables in India: An approach to investigate the relationship between Stock Markets and Economic growth, Journal of Management Research, 8(3)

Ahmed, S. (2008). Aggregate Economic Variables and Stock Market in India, International Research Journal of Finance and Economics, 14: 14-64.

Ajayi R.A. and Mougoue M (1996). On the dynamic relation between stock prices and exchange rates // Journal of Financial Research, 1996. – 19. – pp. 193-207.

Akbar, M., Ali, S. and Khan, M. F. (2012). The Relationship of Stock Prices and Macroeconomic Variables revisited: Evidence from Karachi Stock Exchange, African Journal of Business Management, 6 (4): 1315-1322.

Altay, E. (2003). The Effect of macroeconomic factors on Asset Returns: A Comparative Analysis of the German and the Turkish Stock Markets in an APT framework, The Journal of Finance, 43(2): 327-338

Asaolu, T. O. and Ogunmuyiwa, M.S. (2011). An Econometric Analysis of the Impact of Macroeconomic Variables on Stock Market Movement in Nigeria, Asian Journal of Business Management, 3 (1): 72-78.

Bank of Ghana Monetary time Series Data: http://www.bog.gov.gh/index.php?option=com wrapper&view [Date accessed 17th March, 2015]

Bernanke, B. and Kuttner, K.N. (2003), "What explains the stock market's reaction to federal reserve policy?", Journal of Finance, Vol. 60 No. 3, pp. 1221-57.

Bilson, C, Brailsford, T. J. & Hooper, V. 2001. Selecting macroeconomic variables as explanatory factors of emerging stock market returns. Working Paper Series available at http://ssrn.com/abstract=201908

Brahmasrene T. and Jiranyakul K. (2007). Cointegration and causality between stock index and macroeconomic variables in an emerging market, Academy of Accounting and Financial Studies Journal, 11 pp 17-30

Brooks, C. (2008), *Introductory Econometrics for Finance*, Second Edition, The ICMA Centre, University of Reading

Busha, C. H., and Harter, P. H., (1980). Research Methods in Librarianship: Techniques and Interpretation. Orlando, FL: Academic Press, Inc

Chandra, P. (2004). *Investment Analysis and Portfolio Management*. New Delhi: McGraw-Hill.

Chen, N. F., Roll, R. & Ross, S. (1986). Economic forces and the stock market. *Journal of Business* 59(3): 83-403

Dickey, D.A. and Fuller, W.A. (1979). Distribution of the Estimators for Autoregressive Time Series with a Unit Root; Journal of American Statistical Association, 74: 427-431

Engle, R.F. and Granger, C.W.J. (1987), Cointegration and error correction presentation, estimation and testing. Econometrica 55: 251-276

Fama, E. F. (1981), Stock Returns, Real Activity, Inflation, and Money", *The American Economic Review*, Vol. 71, No. 4, pp. 545-565

Fama, E. F. and Schwert, G. W. (1977), Asset Returns and Inflation", *Journal of Financial Economics*, Vol. 5, Issue 2, pp. 115-146

Frimpong, S., (2011). Speed of adjustment of stock prices to macroeconomic information: Evidence from Ghanaian Stock Exchange (GSE). International Business and Management, 2(1): 151-156.

Gan, C., Lee, M., Yong, H. and Zhang, J. (2006). Macroeconomic Variables and Stock Market Interactions: New Zealand Evidence. Investment Management and Financial Innovations, 3 (4): 89-101.

Geske, R and Roll, R. (1983), „The Fiscal and Monetary Linkage Between Stock Returns and Inflation," *The Journal of Finance*, Vol. 38, No. 1, pp. 1-33

Ghana Stock Exchange (2014): http://www.GSE.com.gh/index1.php?linkid=46 [Date accessed 20th March, 2015]

Granger, C.W.J., (1969). Investigating causal relation by econometric and cross sectional method. Econometrica, 37(3): 424-438

Humpe, A. and Macmillan, P. (2007). Can macroeconomic variables explain long term stock market movements? A comparison of the USA and Japan, CDMA Working, Journal of Finance, 30: 209-245

Johansen, S. & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration with application to the demand for money. *Oxford Bulletin of Economics and Statistics* 52: 169-210.

Johansen, S., (1998). Modeling of cointegration in the vector autoregressive model. Economic Modeling, 17: 359-373.

Karamustafa, O. and Kucukkale, Y. (2003), „Long Run Relationships between Stock Market Returns and Macroeconomic Performance: Evidence from Turkey" [Online] Available at: http://129.3.20.41/eps/fin/papers/0309/0309010.pdf [Accessed 9 June, 2015].

Kyereboah-Coleman, A. and K.F. Agyire-Tettey, 2008. Impact of macroeconomic indicators on stock market performance. The case of the Ghana Stock Exchange. The Journal of Risk Finance, 9(4): 365-378.

Kevin, S. (2000), Portfolio Management, Delhi, Prentice-Hill

Maysami, R. C. & Sim, H. H. (2002). Macroeconomics variables and their relationship with stock returns: error correction evidence from Hong Kong and Singapore. *The Asian Economic Review* 44(1): 69-85.

Maysami, R.C., Lee, C.H. and Mohammed, A.H. (2004), Relationship between Macroeconomic variables and Stock Market indices: Cointegration evidence from Stock Exchange of Singapore's All-S Sector Indices. Journal Pengurusan 24: 47-77

Menike L.M.C.S, (2006), The effect of macroeconomic variables on Stock prices in Emerging Sri Lanka Stock Market, Sabragamuwa University Journal, Vol 6(1), pp 50-67

Mohammad, S.D., Hussain, A.M, Anwa, J.M. and Ali, A. (2009). Impact of macroeconomics variables on stock prices: Empirical evidence in case of KSE (Karachi Stock Exchange). European Journal of Scientific Research, 38(1): 96-103.

Mokerjee, Rajen and Qiao Yu (1997). Macroeconomic Variables and Stock Prices in a Small Open Economy: The Case of Singapore. *Pacific-Basin Finance Journal*, 5, 377-388.

Mukherjee, T., Naka, A. (1995), *Dynamic Linkage between Macroeconomic Variables and the Japanese Stock Market: An Application of a Vector Error Correction Model*, Journal of Financial Research, 18, 223-237.

Naik P.K. and Padhi, P., (2012), The Impact of macroeconomic fundamentals of Stock Prices Revisited: Evidence from Indian Data, Eurasian Journal of Business and Economics, Vol 5(10), pp 25-44

Nishat, M. And Shaheen, R. (2004), „Macroeconomic Factors and Pakistani Equity Market" , *The Pakistan Development Review*, Vol. 43, No. 4, pp. 619-637

Okoli, M.N., (2012). Return-volatility interactions in the Nigerian stock market. Asian Economic and Financial Review, 2(2): 389-399.

Osamwonyi, I.O. (2003). Forecasting as a Tool for Securities Analysis. *A Paper Presented at a Three-day Workshop on Introduction to Securities Analysis, Organized by Securities and Exchange Commission,* Lagos August 17th.

Osamwonyi, I.O. and Evbayiro-Osagie E.I. (2012): The Relationship between Macroeconomic Variables and Stock Market Index in Nigeria, Journal of Economics, 3(1): 55-63

Ozcam, M. (1997)."An Analysis of TheMacroeconomic Factors that Determine Stock Return in Turkey,Capital Market Board Of Turkey", Publication Number 75.

Pal, K. and Mittal, R. (2011). Impact of Macroeconomic Indicators on Indian Indian Capital Markets, Journal of Risk Finance, 12 (2): 84-97.

Pallant, J. (2011). SPSS Survival Manual; A step by step guide to data analysis using SPSS (4 edn), Everbest Printing Co. China

Pesaran, M.H. & Shin, Y. (1997). An autoregressive distributed lag modeling approach to cointegration analysis. A revised version of a paper presented at the Symposium at the Centennial of Ragnar Frisch, The Norwegian Academy of Science and Letters, Oslo, March 1995.

Priyanka, A. and Kumar, M.M. (2012). Effects of economic variables of India and USA on the movement of Indian Capital Market, An empirical study. International Journal of Engineering and Management Sciences, 3(3): 379-383

Rahman, A. Abdul, Noor, Z. Mohd Sidek and Fauziah H. T. (2009). Macroeconomic Determinants of Malaysian Stock Market, African Journal of Business Management, 3 (3): 95- 106

Ratanapakorn, O. and Sharma, S. C. (2007). Dynamics analysis between the US Stock Return and the Macroeconomics Variables, Applied Financial Economics, 17 (4): 369-377.

Ray, P. and Vani, V. (2003). What moves Indian Stock Market: A study on a linkage with Real Economy in the post reform era, Working Paper, National Institute of Management, Kolkata, 1-19.

Robert, D.G. (2008). Effect of Macroeconomic Variables on Stock Market Returns for four Emerging Economies: Brazil, Russia, India and China. International Business & Economics Research Journal, 7 (3): 1-8

Roll, R. and Ross, S.A (1980). "An Empirical Investigation of the Arbitrage Theory," The Journal of Finance, 61(3) pp1073-1103.

Rozeff, M.S. (1994). Money and stock prices. *J of Financial Economics*, 65-89. Smith G 1990. *Investments*, Illinois & London: Glenview

Samadi, S., Bayani, O. and Ghalandari, M. (2012). The Relationship between Macroeconomic Variables and Stock Returns in Tehran Stock Exchange. *International Journal of Academic Research in Business and Social Sciences, 2*(6), 559-573.

Saunders, A.and Tress, R. B. (1981), „Inflation and stock market returns: some Australian evidence" , *The Economic Record*, Vol. 57, Issue 156, pp. 58-66.

Saunders, M., Lewis, P. and Thornhill, A. (2009). Research Method for business students. England: Pearson education limited Harlow

Singh D. (2010). Causal relationship between Macro-Economic Variables and Stock Market. A case study for india: Pakistan Journal of Social sciences, Vol. 30(2), 263-274

Singh, T., Mehta, S. & Vasha, M. S. (2011). Macroeconomic factors and stock returns: Evidence from Taiwan. *Journal of Economics and International Finance, 2*(4), 217- 227.

Smith, G. (1990). Investments, Illinois and London, Glenview.

Sprinkel, B.W.(1971). "Money and Markets: A Monetarist View". Richard D. Irwin Homewood, IL.

Talla, T.T., (2013), Impact of macroeconomic variables on the stock market prices of The Stockholm Stock Exchange (OMXS30), Master's Thesis within International Finance Analysis, Jonkoping International Business School.

Vejzagic M. And Zarafat H. (2013), Relationship between macroeconomic variables and Stock Market Index: Cointegration evidence from FTSE Bursa Malaysia Hijrah Sharian Index. Asian Journal of Management Sciences and Education, Vol 2 No 4

Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.), Thousand Oaks,CA: Sage..

APPENDIX: Vector Error Correction Model

ECM	D(LNASI)	D(LNEXR)	D(LNINF)	D(LNMPR)	D(LNM2)
CointEq1	-0.287521	0.000315	-0.006945	0.003771	0.012570
	(0.05223)	(0.00303)	(0.00544)	(0.00193)	(0.00890)
	[-5.50495]	[0.10418]	[-1.27745]	[1.95787]	[1.41171]
D(LNASI(-1))	-0.014110	0.000386	0.005585	-0.004643	-0.014478
	(0.06909)	(0.00400)	(0.00719)	(0.00255)	(0.01178)
	[-0.20424]	[0.09647]	[0.77669]	[-1.82279]	[-1.22927]
D(LNASI(-2))	0.075778	-0.001501	0.000535	-0.002034	-0.000399
	(0.06568)	(0.00381)	(0.00684)	(0.00242)	(0.01120)
	[1.15373]	[-0.39418]	[0.07823]	[-0.83970]	[-0.03560]
D(LNEXR(-1))	0.106927	-0.022690	0.266055	0.039585	0.016902
	(1.15147)	(0.06674)	(0.11985)	(0.04246)	(0.19631)
	[0.09286]	[-0.34000]	[2.21991]	[0.93230]	[0.08610]
D(LNEXR(-2))	1.534792	-0.036301	0.046878	0.030614	-0.115045
	(1.13592)	(0.06583)	(0.11823)	(0.04189)	(0.19366)
	[1.35115]	[-0.55140]	[0.39650]	[0.73088]	[-0.59407]
D(LNINF(-1))	-0.214602	0.013604	0.066221	0.069570	-0.011107
	(0.64422)	(0.03734)	(0.06705)	(0.02375)	(0.10983)
	[-0.33312]	[0.36437]	[0.98760]	[2.92864]	[-0.10113]
D(LNINF(-2))	-0.865303	-0.004892	0.049909	0.002120	-0.034737
	(0.64542)	(0.03741)	(0.06718)	(0.02380)	(0.11003)
	[-1.34068]	[-0.13077]	[0.74294]	[0.08908]	[-0.31570]
D(LNMPR(-1))	2.111962	0.107908	0.312807	-0.144442	-0.112074
	(1.80753)	(0.10476)	(0.18813)	(0.06665)	(0.30816)
	[1.16843]	[1.03006]	[1.66267]	[-2.16713]	[-0.36369]
D(LNMPR(-2))	0.526565	0.062505	0.451306	0.226865	0.502650
	(1.78394)	(0.10339)	(0.18568)	(0.06578)	(0.30413)
	[0.29517]	[0.60455]	[2.43056]	[3.44878]	[1.65273]
D(LNM2(-1))	-0.413051	0.000743	0.013659	0.008558	-0.009150
	(0.28723)	(0.01665)	(0.02990)	(0.01059)	(0.04897)
	[-1.43805]	[0.04464]	[0.45687]	[0.80797]	[-0.18685]
D(LNM2(-2))	0.405414	0.001234	-0.003958	0.018551	-0.962039
	(0.40048)	(0.02321)	(0.04168)	(0.01477)	(0.06828)
	[1.01233]	[0.05317]	[-0.09496]	[1.25621]	[-14.0906]
C	-0.013939	0.015603	-0.006196	-0.003885	0.057493
	(0.06722)	(0.00390)	(0.00700)	(0.00248)	(0.01146)
	[-0.20735]	[4.00491]	[-0.88554]	[-1.56744]	[5.01670]

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.287521	0.052229	-5.504949	0.0000
C(2)	-0.014110	0.069085	-0.204237	0.8382
C(3)	0.075778	0.065681	1.153726	0.2489
C(4)	-0.214602	0.644216	-0.333121	0.7391
C(5)	-0.865303	0.645419	-1.340684	0.1803
C(6)	0.106927	1.151467	0.092861	0.9260
C(7)	1.534792	1.135916	1.351149	0.1769
C(8)	-0.413051	0.287230	-1.438053	0.1507
C(9)	0.405414	0.400478	1.012325	0.3116
C(10)	2.111962	1.807525	1.168427	0.2429
C(11)	0.526565	1.783937	0.295170	0.7679
C(12)	-0.013939	0.067223	-0.207355	0.8358
C(13)	-0.006945	0.005436	-1.277454	0.2017
C(14)	0.005585	0.007191	0.776687	0.4375
C(15)	0.000535	0.006836	0.078228	0.9377
C(16)	0.066221	0.067053	0.987599	0.3236
C(17)	0.049909	0.067178	0.742939	0.4577
C(18)	0.266055	0.119850	2.219908	0.0266
C(19)	0.046878	0.118231	0.396497	0.6918
C(20)	0.013659	0.029896	0.456868	0.6479
C(21)	-0.003958	0.041683	-0.094956	0.9244
C(22)	0.312807	0.188135	1.662672	0.0967
C(23)	0.451306	0.185680	2.430558	0.0152
C(24)	-0.006196	0.006997	-0.885539	0.3761
C(25)	0.000315	0.003027	0.104175	0.9170
C(26)	0.000386	0.004004	0.096468	0.9232
C(27)	-0.001501	0.003807	-0.394184	0.6935
C(28)	0.013604	0.037337	0.364367	0.7157
C(29)	-0.004892	0.037407	-0.130771	0.8960
C(30)	-0.022690	0.066736	-0.339999	0.7339
C(31)	-0.036301	0.065834	-0.551402	0.5815
C(32)	0.000743	0.016647	0.044643	0.9644
C(33)	0.001234	0.023211	0.053170	0.9576
C(34)	0.107908	0.104759	1.030064	0.3032
C(35)	0.062505	0.103392	0.604550	0.5456
C(36)	0.015603	0.003896	4.004914	0.0001
C(37)	0.012570	0.008904	1.411715	0.1583
C(38)	-0.014478	0.011778	-1.229267	0.2192
C(39)	-0.000399	0.011198	-0.035599	0.9716
C(40)	-0.011107	0.109829	-0.101134	0.9195
C(41)	-0.034737	0.110034	-0.315698	0.7523
C(42)	0.016902	0.196307	0.086097	0.9314
C(43)	-0.115045	0.193656	-0.594068	0.5526
C(44)	-0.009150	0.048968	-0.186849	0.8518
C(45)	-0.962039	0.068275	-14.09058	0.0000
C(46)	-0.112074	0.308155	-0.363694	0.7162
C(47)	0.502650	0.304134	1.652726	0.0987
C(48)	0.057493	0.011460	5.016701	0.0000
C(49)	0.003771	0.001926	1.957869	0.0505
C(50)	-0.004643	0.002547	-1.822788	0.0686
C(51)	-0.002034	0.002422	-0.839697	0.4013
C(52)	0.069570	0.023755	2.928637	0.0035
C(53)	0.002120	0.023799	0.089079	0.9290
C(54)	0.039585	0.042459	0.932302	0.3514
C(55)	0.030614	0.041886	0.730883	0.4650
C(56)	0.008558	0.010591	0.807971	0.4193
C(57)	0.018551	0.014767	1.256211	0.2093
C(58)	-0.144442	0.066651	-2.167130	0.0304
C(59)	0.226865	0.065781	3.448785	0.0006
C(60)	-0.003885	0.002479	-1.567435	0.1173

Vector Error Correction Estimates
Date: 08/02/15 Time: 20:29
Sample (adjusted): 1995M04 2014M12
Included observations: 237 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LNASI(-1)	1.000000
LNEXR(-1)	-0.436431 (0.74846) [-0.58310]
LNINF(-1)	1.733966 (0.56108) [3.09040]
LNMPR(-1)	0.040734 (1.02487) [0.03975]
LNM2(-1)	0.547218 (0.42455) [1.28892]
C	-16.80228

Error Correction:	D(LNASI)	D(LNEXR)	D(LNINF)	D(LNMPR)	D(LNM2)
CointEq1	-0.287521 (0.05223) [-5.50495]	0.000315 (0.00303) [0.10418]	-0.006945 (0.00544) [-1.27745]	0.003771 (0.00193) [1.95787]	0.012570 (0.00890) [1.41171]
D(LNASI(-1))	-0.014110 (0.06909) [-0.20424]	0.000386 (0.00400) [0.09647]	0.005585 (0.00719) [0.77669]	-0.004643 (0.00255) [-1.82279]	-0.014478 (0.01178) [-1.22927]
D(LNASI(-2))	0.075778 (0.06568) [1.15373]	-0.001501 (0.00381) [-0.39418]	0.000535 (0.00684) [0.07823]	-0.002034 (0.00242) [-0.83970]	-0.000399 (0.01120) [-0.03560]
D(LNEXR(-1))	0.106927 (1.15147) [0.09286]	-0.022690 (0.06674) [-0.34000]	0.266055 (0.11985) [2.21991]	0.039585 (0.04246) [0.93230]	0.016902 (0.19631) [0.08610]
D(LNEXR(-2))	1.534792 (1.13592) [1.35115]	-0.036301 (0.06583) [-0.55140]	0.046878 (0.11823) [0.39650]	0.030614 (0.04189) [0.73088]	-0.115045 (0.19366) [-0.59407]
D(LNINF(-1))	-0.214602 (0.64422) [-0.33312]	0.013604 (0.03734) [0.36437]	0.066221 (0.06705) [0.98760]	0.069570 (0.02375) [2.92864]	-0.011107 (0.10983) [-0.10113]
D(LNINF(-2))	-0.865303 (0.64542) [-1.34068]	-0.004892 (0.03741) [-0.13077]	0.049909 (0.06718) [0.74294]	0.002120 (0.02380) [0.08908]	-0.034737 (0.11003) [-0.31570]
D(LNMPR(-1))	2.111962 (1.80753) [1.16843]	0.107908 (0.10476) [1.03006]	0.312807 (0.18813) [1.66267]	-0.144442 (0.06665) [-2.16713]	-0.112074 (0.30816) [-0.36369]

D(LNMPR(-2))	0.526565	0.062505	0.451306	0.226865	0.502650
	(1.78394)	(0.10339)	(0.18568)	(0.06578)	(0.30413)
	[0.29517]	[0.60455]	[2.43056]	[3.44878]	[1.65273]
D(LNM2(-1))	-0.413051	0.000743	0.013659	0.008558	-0.009150
	(0.28723)	(0.01665)	(0.02990)	(0.01059)	(0.04897)
	[-1.43805]	[0.04464]	[0.45687]	[0.80797]	[-0.18685]
D(LNM2(-2))	0.405414	0.001234	-0.003958	0.018551	-0.962039
	(0.40048)	(0.02321)	(0.04168)	(0.01477)	(0.06828)
	[1.01233]	[0.05317]	[-0.09496]	[1.25621]	[-14.0906]
C	-0.013939	0.015603	-0.006196	-0.003885	0.057493
	(0.06722)	(0.00390)	(0.00700)	(0.00248)	(0.01146)
	[-0.20735]	[4.00491]	[-0.88554]	[-1.56744]	[5.01670]
R-squared	0.179088	0.010536	0.083051	0.160560	0.478405
Adj. R-squared	0.138955	-0.037838	0.038222	0.119521	0.452904
Sum sq. resids	194.0011	0.651652	2.101719	0.263785	5.638639
S.E. equation	0.928562	0.053817	0.096649	0.034240	0.158305
F-statistic	4.462321	0.217799	1.852623	3.912348	18.76080
Log likelihood	-312.5652	362.4237	223.6601	469.5924	106.7140
Akaike AIC	2.738946	-2.957162	-1.786162	-3.861539	-0.799275
Schwarz SC	2.914544	-2.781564	-1.610564	-3.685941	-0.623677
Mean dependent	0.011310	0.014293	-0.003949	-0.002612	0.023240
S.D. dependent	1.000686	0.052826	0.098550	0.036490	0.214025

Determinant resid covariance (dof adj.)	6.45E-10
Determinant resid covariance	4.97E-10
Log likelihood	857.0725
Akaike information criterion	-6.684156
Schwarz criterion	-5.733000