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CHANGING POLITICAL REGIMES AND PERFORMANCE OF THE NAIROBI
SECURITIES EXCHANGE

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A research project submitted to the school of economics in partial fulfillment of the
requirements for the award of the degree of master of economics of Kenyatta University.

NOVEMBER, 2014

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DECLARATION

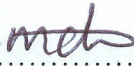
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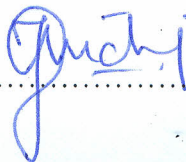
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DEDICATION

I dedicate this work to my wife and children.

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TABLE OF CONTENTS

DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGEMENTS	iv
LIST OF TABLES	viii
LIST OF FIGURES	ix
ACRONYMS AND ABBREVIATIONS	x
OPERATIONAL DEFINITION OF TERMS	xi
ABSTRACT	xii
CHAPTER ONE	1
INTRODUCTION	1
1.1 Background of the Study	1
1.2 Stock Returns and Political Regime Change Variables	5
1.3 Nairobi Securities Exchange	9
1.4 Stock Market Performance in Kenya	13
1.5 Statement of the Problem	19
1.6 Research Questions	20
1.7 Objectives of the Study	20
1.8 Significance of the Study	21
1.9 Organization and Scope of the Study	21
CHAPTER TWO	22
LITERATURE REVIEW	22
2.1 Introduction	22
2.2 Theoretical Literature	22
2.2.1 Efficient Market Hypothesis	22

2.2.2 Uncertain Information Hypothesis (UIH)	23
2.2.3 Over Reaction Hypothesis.....	24
2.2.4 Market Momentum.....	25
2.2.5 Political Business Cycle Hypothesis	26
2.2.6. TGARCH Model	26
2.4 Overview of Literature	31
CHAPTER THREE	33
METHODOLOGY	33
3.1 Introduction	33
3.2 Research Design.....	33
3.3. Theoretical Model	33
3.3.1 Theory of Political Business Cycle	33
3.4 Model Specification and the Estimation Procedure	35
3.6 Definition, Source and Measurement of Variables	37
3.7 Data Type and Source	39
3.8 Data Analysis	39
CHAPTER FOUR	40
EMPIRICAL FINDINGS	40
4.1 Introduction	40
4.2 Descriptive Statistics for Variables.....	40
4.3 Correlation Analysis Results.....	40
4.4 Stationarity Test	40
4.5.1 Co integration test results	42
4.5.2 Exogeneity Tests	43
4.6 The relationship between Political Variables and the Stock Returns.....	44
4.7 Diagnostic Test Results.....	47

4.8. T- Garch Results 48

CHAPTER FIVE.....53

SUMMARY, CONCLUSION AND POLICY IMPLICATION53

5.1 Summary 53

5.2 Conclusions..... 54

5.3 Policy implications..... 54

5.4 Areas for Further Research 55

REFERENCES57

APPENDIX70

LIST OF TABLES

Table 1.1 Trends of company listing and delistings	11
Table 1.2 Economic and stock market performance (%) in Kenya 1990 - 2012	17
Table 3.1 Definition and Measurement of Variables	38
Table 4.1.(a); ADF Unit Root Tests at Levels	41
Table 4.1.(b) ; ADF Unit Root Tests at First Differences.....	42
Table 4.2 (a) Johansen Cointegration test	42
Table 4.2 (b) Cointegration equations.....	43
Table 4.3 Results of the Regression Model	45
Table 4.4 T- Garch Result For Industrial And Allied Sector and stock returns.....	49
Table 4.5.T- GARCH Results for Agriculture (AG) and the Stock Returns	50
Table 4.6 T- Garch Results for Alternative market segment and the Stock Returns	50
Table 4.7 T-Garch Results for Fixed Income Market Segment and the Stock Returns.....	51
Table 4.8 T- Garch Results for Finance and Investment Segment and Stock Returns	51
Table 4.9 T- Garch Results for Commercial and Services and the Stock Returns.....	52

LIST OF FIGURES

Figure1.1: World Bank governance indicators comparing Kenya (upper bar) with the regional average (lower bar).....	7
Figure 1.2 NSE gross market statistics 1993-2011	12
Figure: 1.3 NSE 20 share index from January 2010 to February 2013.....	15
Figure 1.4 Stock Market Performance for the Period 1995-2011	18

ACRONYMS AND ABBREVIATIONS

AIMS	-	Alternative Investment Markets Segments
ARCH	-	Auto-regressive Conditional Heteroscedasticity
ATS	-	Automated Trading Segments
CBK	-	Central Bank of Kenya
CPIA	-	Country Policy and Institutional Assessment
EGARCH	-	Exponential Generalized Autoregressive Conditional Heteroscedasticity
FISMS	-	Fixed Income Securities Market Segment
FTSE	-	Financial Times Stock Exchange
GRS	-	Generalized Regime Switching
IEBC	-	Independent Electoral and Boundaries Commission
IPO		Initial Public Offer
KADU	-	Kenya African Democratic Union
KANU	-	Kenya African National Union
KNBS	-	Kenya National Bureau of Statistics
MIMS	-	Main Investments Market Segment
MRS	-	Markov Regime Switching Model
MS	-	Markov switching
NEMU	-	National Elections Monitoring Unit
NSE	-	Nairobi Securities Exchange Limited
SW GARCH	-	Switching exponential generalized Autoregressive conditional Heteroscedasticity
TGARCH		Threshold generalized Autoregressive conditional Heteroscedasticity

OPERATIONAL DEFINITION OF TERMS

- A proxy variable** – Is a variable that is used to measure an unobserved quantity of interest and is strongly related to the variable of interest
- Leverage effect** - It is an asymmetric response of conditional variance to positive and negative shocks in errors.
- Stock market** - A highly organized market facilitating the purchase and sale of securities and operated by professional stock brokers according to fixed rule.
- Stock market returns:** NSE market capitalization weighted index of 20 companies measured by quarterly average of indices. Its in form of profits or dividends paid out to investors in the NSE.
- Structural break** - The use of a series of equations in different regimes to determine volatility of stock returns
- Volatility** - The relative rate at which price of a security moves up and down.

ABSTRACT

The stock market all over the world play a critical role as one of the most sensitive indicators of the business cycle and one of the most influential variables in the government index of leading economic indicators. Companies quoted on the Nairobi Securities Exchange have been undergoing turbulent times due to fluctuation in the prices of shares, consequently affecting investors either way and hence making them uncertain about the future. This study, first sought to evaluate the effect that political regime changes have on returns that investors get on Nairobi Securities Exchange. Secondly, the study determined the effect of political regime change across different market segments. Published time series quarterly data was sourced from the Central Bank of Kenya, Kenya National Bureau of Statistics and Nairobi Securities Exchange data bases. In order to achieve all the specific objectives a regression model, and threshold generalized autoregressive conditional heteroscedasticity models were used to ascertain the volatility of stock returns. Empirical results of the regression model revealed that there was a weak relationship between changing political regimes and the performance of the NSE. Also the study found out that different political variables affect different market segments differently.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The stock market is a market that deals with the exchange of securities issued by publicly quoted companies and the government (Reilly, et al, 1997). The market in essence serves as a mechanism for price discovery and information dissemination while providing privatization programs (Fabbozi, 1995). The overall development of the economy amongst other things is a function of how well the stock market performs. Empirical evidence has shown that the development of a capital market is essential for economic growth (Asoulu and Ogumuyiwa, 2010). How the stock market performs is of great interest to various parties including investors, the capital market, the government, among others.

There are various factors that may affect and influence the performance of the stock market among them being how the government conducts its business and the general performance of the economy (Ho, 2012). In particular, the incentives and uncertainties associated with possible changes in government policy or national leadership have implications for the behaviour of both politicians and firms. Election outcomes are relevant to corporate decisions as they have implications for industry regulation, monetary and trade policy, taxation and in more extreme cases the possible expropriation or nationalization of private firms (Julio and Yook, 2012).

Political regime is a set of political structures that make up a state. These political systems range from direct democracies to totalitarian regimes such as military dictatorships. How frequent a government changes is what constitutes political regime change and its measured in terms of whether that change was major and abrupt or whether there regime persistence. If a polity has coherent authority relations and avoids accumulation of performance crises then apparently it will persist very long in its present constitutional form. (Lichbach et al 1996).

In Kenya this happens after every 5 years when Kenyans elect their leaders. A number of studies especially in the developed countries like the U.S.A have estimated performance of the stock market in reference to changing political regimes which are in terms of how the stock market reacts to changing political party regimes. For example Siegel (1998) and Riley (1980) have provided consistent evidence that the immediate market reaction to the election of a republican president is positive (Increase in stock index). In Kenya, the party effect has not been so much pronounced but rather different personalities who have held power. Kenyans have also had the behavior of changing political parties frequently to realign to new alliances that can take over power (Allison, 2013).

The elections which gave rise to the first independence were held in May 1963 under the supervision of the colonial government. The 1969, 1974, 1979, 1983 and 1988 general elections were held under one party system. The 1992,1997,2002,2007 and

2013 were held under the multi party system after the constitution was changed in 1991 to introduce multi party system in Kenya (commonwealth, 2013).

The political platform of an incumbent with respect to economic policy may have asymmetry effects on investments cycles. Firms are likely to view a possible shift in leadership from a market friendly leader to a socialist leader as worse news than a possible shift in the other direction (Chang et al, 2013).

African markets experience frequent changes in government policies and at times unfavorable political climate. Example is Zimbabwewan downturn due to the dramatic price swing in the wake of government farm and pension policies. This had the effect of moving a market that had previously grown (1996) by a phenomenal 89.9% down by more than 50% by the last quarter of 1997 (Senbet and Otchere, 2008).

Political instability has been treated as a serious problem which harms economic performance, (Aisen and Veiga, 2011). A study comparing GDP growth and political stability was done and conclusions show that GDP growth is significantly lower in countries that experience higher frequency of government collapse (Alesina et al, 1996).

A similar study was also undertaken in 2011 and found similar results and on top examined the channel of transmission between the political instability and lower GDP per capital (Aisen and Veiga, 2011).

The study identified how political instability affects economic growth mainly through its adverse effect on total factor productivity (TFP) rate. Besides, physical capital accumulation and growth of human capital are another two channels which unstable politics transmit its negative effect to economic growth.

Research has been done to compare the difference in corporate investment behavior due to fluctuations in political uncertainty in the year of election and non- election in 48 countries between 1980-2005. Results basically support the polity and uncertainty hypothesis and concludes that the political uncertainty during national elections period create cycles in corporate investment (Julio and Yook, 2012).

In France a study of the behaviour of well- connected firms was done during municipal elections and it was discovered that CEOs who are politically connected will normally boost the investment of their firms during election years, probably because they attempt to help their political cronies get re-elected (Betrand et al, 2006).

Besides the theory of political uncertainty explaining the phenomena of election induced cycles in investment, investors tend to change their investment decision or behaviour to ensure that their political cronies remain in control of the political regime through the election cycle (Julio and Yook, 2012). Research has been done in a few selected African countries to determine the volatility dynamics in African stock markets and results failed to capture heteroscedasticity in all the selected stock markets except that of Kenya (King, et al 2014).

1.2 Stock Returns and Political Regime Change Variables

The relationship between stock returns and political regime change is a subject under discussion by many researchers. While increasing evidence showing that standard economic variables perform poorly in capturing stock price movements, political uncertainty is emerging as a new avenue to explore the forces driving market movement (Ert et al, 1996, Mei and Guo, 2004).

The effects that world events have on stock prices has intrigued financial economists for decades, especially after the dramatic rises and falls of stock markets in recent years. Intuitively, in times of political and civil unrests, it is not uncommon for stock markets to experience increased levels of volatility as the occurrences of major political events signal potential shift in policy which may cause market- wide valuation changes (Karolyi, 2006).

Trends in literature show drastic changes in excess returns when political risk increased or decreased indicating political risk is an important pricing factor in the cross- section of stock returns. Empirical literature on stock market volatility has generally focused on the link between stock prices and the business cycle. (Susmel, 1994). Yet one source of volatility that worries investors namely political uncertainty, has seldom been analyzed. Major political events can have a big impact on stock prices simply because they affect business confidence, investment, consumption and

output (Bittlingmayer, 1998). On the other hand, investors may downplay political risk if they are viewed as having a temporary effect on the economy. To gauge the impact of political uncertainty on stock volatility, one has to examine a context where key political events can be clearly identified.

Political variables that have been used in many researches include; the political competition, types of law and order and situations of democracy. These variables have depicted variations and volatility in different stock markets in the world. In Kenya, recent political reforms have strengthened the governance record though it remains mixed.

The world banks CPIA for Kenya improved to 3.8 in 2011 to 3.9 (the highest in Africa) in 2012 due to significant progress in policies and institutions for growth and poverty reduction. Positive indicators include; strong macroeconomic environment in the past three years but concerns remain in climate reforms which are essential for private sector led growth and job creation. (World Bank, 2013). World wide governance indicators which are used as political variables include: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption. The figure 1.1 shows Kenya's performance index as according to world wide governance indicators project for a single country for the last two decades.

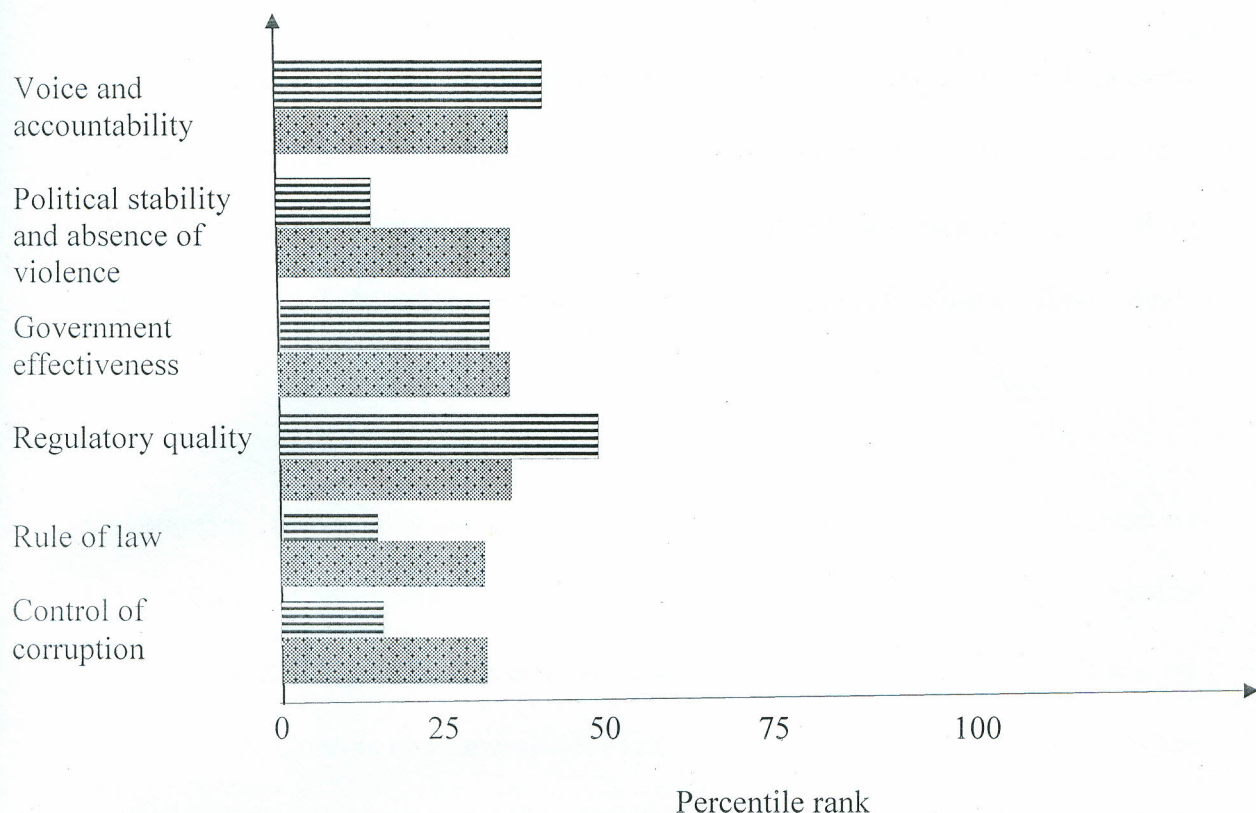


Figure1.1: World Bank governance indicators comparing Kenya (upper bar) with the regional average (lower bar)

Source: World Bank, 2013

The bar graph shows the country's percentile rank on each of the six governance indicators. The composite political risk index is 100 points scale. The highest overall rating (theoretically 100) indicates the lowest risk and the lowest score (theoretically 0) indicates the highest risk. Political risk is a priced factor for which investors are rewarded and that strongly affects the local cost of equity (World Bank, 2013).

Voice and accountability index captures how citizens participate in the democratic process of electing representatives. Media freedom is also represented in this index (Butt, 2009). Political stability and absence of violence Index-measures government stability and how vulnerable the government is from frequent collapse (World Bank, 2013).

Government effectiveness index measures how effective public service is and also the independence of the public service from political manipulation. Regulatory quality index measures regulatory burdens imposed by various government policies for example price controls and supervision of banks. Rule of law index measures how the judicial system is effective and the willingness of the citizens in observing law and order (Ojwang, 2008).

Control of corruption index measures various mechanisms that are in place in a particular country to control both high level corruption and low level corruption (Butt, 2012). Kenya has undergone various political changes. At independence, two national parties were formed that is KANU and KADU. The two parties merged into KANU thereafter independence.

KANU ruled the country alone until 1991 when multiparty was allowed. Also the constitution was changed to limit the presidential term of office to two five-year terms.

During the 1992 general elections a total of eight political parties contested the elections. The incumbent was re-elected and the party (KANU) won a strong majority

in parliament (NEMU, 1992). The 1997 general elections were hotly contested and again the incumbent won the election. As for the 2002 general elections, the incumbent was constitutionally barred from vying, and the National Alliance Rainbow Coalition (NARC) party won the elections.

The 2007 general elections were conducted on December 27, and these elections have so far been regarded as the most competitive in the country's history. The electoral commission of Kenya declared the incumbent as having won but this was against the will of majority population. Consequently, the results were disputed, and what followed was post-election violence that saw many citizens die while others displaced. Through the efforts of the international community a coalition was formed following the dispute over the election results. The 2013 General elections were hotly contested too between the jubilee alliance and the coalition for reforms and democracy (CORD), but these were conducted peacefully and the Jubilee alliance won the election (NEMU, 2013).

1.3 Nairobi Securities Exchange

Nairobi Securities was constituted in 1954 as a voluntary association of stock brokers registered under the societies Act (Ngugi, 2005). This was made possible after clearance was obtained from the London Stock Exchange (LSE) which recognized the NSE as an overseas stock exchange. At that time 46 companies were listed. Change in governance at independence and the enthusiasm in the country's economic development between 1963-1970 saw the government engage in deliberate efforts to

encourage the development of the financial systems. The period between 1966-1970 statistics show that there were a total of 12 IPO's all of which were heavily over subscribed, (Ngugi and Njiru, 2005). Information on the period 1971-1980 is slightly blurred as it is indefinite which of the total 11 public issues were new issues and which were secondary market issues, (IFC/CBK, 1984). The period 1981-1989 witnessed only 3 IPO's and a divestiture of government shares in one of the financial institutions. The period was also characterized by economic reforms and major delistings which saw a generation of the new companies that replaced the companies that were initially listed such that the number of companies at the beginning was the same as at the end (57).

The next period (1990 - 1999) the government privatized many government parastatals. This saw the government offloading substantial shareholding in the national Bank, the Kenya commercial Bank, Kenya Airways and Uchumi supermarkets (Kiboi, 2012). The last IPO in this period was offered in 1997 where the ordinary shares accounted for 75% of the total listed securities with the number of companies standing at 58. The indication from this marginal increase in the number of companies show that the initiatives and reforms such as the tax- free venture capital funds removal of capital gains tax and allowances of beneficial ownership by foreigners seem not to have achieved much (Kibuthu and Ngugi, 2005).

The period 2000-2009 saw the segmentation of the market into three market segments: The main investment market segment (MIMS), the alternative investment

market segments, (AIMS) and Fixed income securities market segments (FISMS) (NSE Website 2013). During these period the market witnessed the listing of the first information technology company (African lakes) and the first sugar company (Mumias sugar co. Ltd) through privatization efforts (Kiboi, 2012).

In 2006, the largest IPO since Kenya airways was witnessed through the Kengen IPO that was over subscribed by 236% (Kengen Website). Also in 2008, the floating of Safaricom shares signaled the need of continuous education of new and existing investors on the risks and rewards of investing directly in the equity markets (Kiboi, 2012). The NSE has also experienced changes in the composition of firms that are listed as in the table 1.1.

Table 1.1 Trends of company listing and delistings

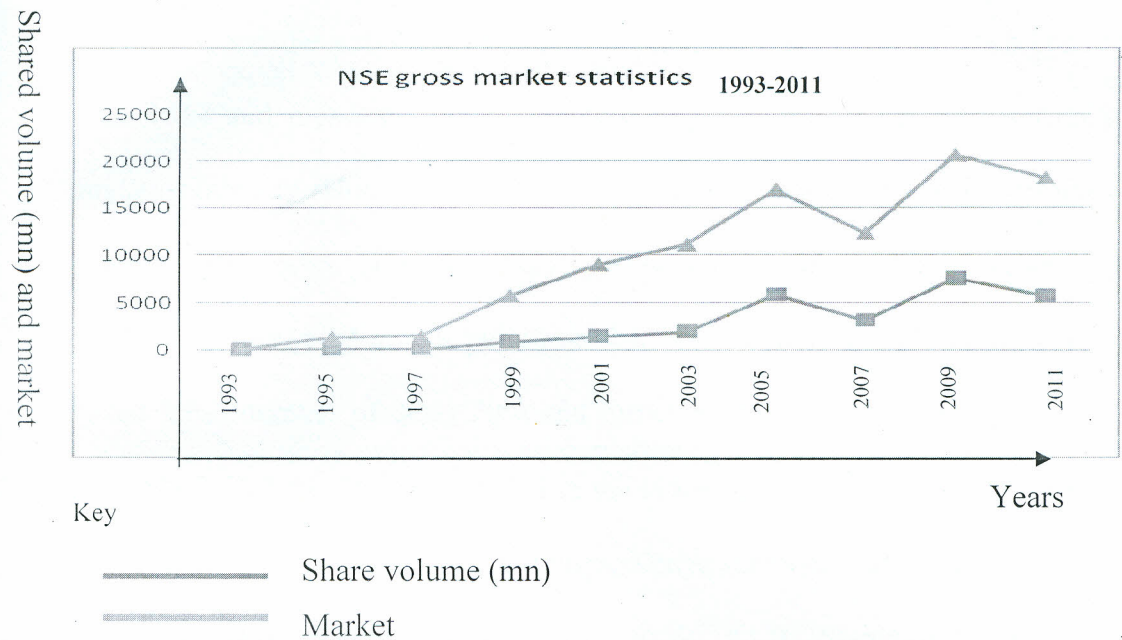
Period	Number of listed companies	New IPO listings	Number of delistings
1954	46	-	-
1955-1959	55	13	4
1960-1969	63	19	11
1970-1979	57	5	11
1980-1989	57	3	3
1990-1999	56	4	5
2000-2009	55	10	12
2010-2013	61	5	6

Source: CMA annual reports (2001-2013)

From table 1.1 there has been a gradual growth in companies listed on the bourse but also many delistings have occurred due to poor performance of many firms. The NSE

has also undergone changes in market capitalization especially after the formation of a regulatory body in 1989; The Capital Markets Authority. The figure 1.2 shows gross market statistics.

Figure 1.2 NSE gross market statistics 1993-2011



Source: Nairobi Securities Exchange

The figure 1.2 shows a trend of improved stock market performance after stock market liberalization in 1995. The volume of shares traded rose from 11 million in 1990 to 7,546 million in 2010. Based on data, the shares traded jumped from 11.0 million in 1990 to 141.6 million in 2000 following the opening of the market for foreign participation and has consistently remained at a considerably higher level thereafter (Nyang'oro, 2012). Turnover increased from a low of Kshs 0.2 billion in 1990 to kshs 3.3 billion in 1995 reaching a high of ksh 110.3 billion in 2010. The

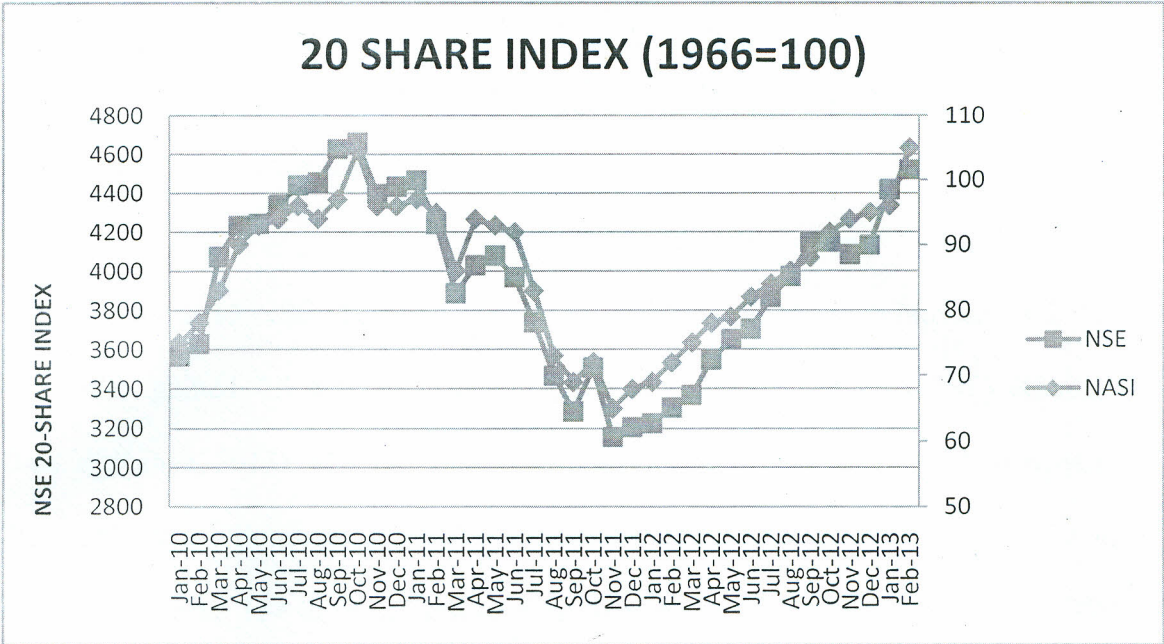
same trend was also followed by the market capitalization, with the highest level of ksh 13,070 billion being recorded in 2010.

1.4 Stock Market Performance in Kenya

The performance of the NSE to a large extent reflects on policy, institutional framework and the political environment. The NSE 20-share index has been in use since 1964 and measures the performance of 20 blue chip companies with strong fundamentals and which have consistently returned positive financial results. It's a price weight index. The members are selected based on a weighted market performance for a 12-month period as follows: Market capitalization 40%, shares traded 30%, number of deals 20% and turnover 10%. Index is updated end of day only (NSE Website, 2012). Included in the index are Mumias sugar, Express Kenya, Rea Vipingo, Sasini Tea, CMC holdings, Kenya airways, Safaricom, Nation Media Group, Barclays bank- Kenya, Equity Bank, KCB, Standard Chartered Bank, Bamburi Cement, B. A.T Kengen, Centum Investment Company, East African Breweries Limited, East African Cables, KPLC and Athi River Mining (NSE Website, 2013).

Another measure of the performance is the NSE all share index (ASI) which is a market capitalization weighted index consisting of all the securities on the NSE. Prices are based on the last trade information from NSE's automated trading system. The FTSE NSE Kenya 15 index measures stocks performance of 15 largest Companies by market capitalization while the FTSE NSE Kenya 25 index measures

performance of 25 most liquid stocks at the stock exchange. In Feb 18 1994, the NSE 20-share index recorded an all- record high of 5030 points and it was rated by the international finance corporation as the best performing market in the world with a return of 179% in dollar terms. In May 2012, the NSE 20share index was still above the 3500 points psychological market while, market capitalization remained above the million shillings market. On the downward side was equity turnover and total shares traded. The bonds market recorded gains in turnover, but decline in deals. The FTSE NSE Kenya 15 index gained to 107.53 points on May 18 from 105.23 points on May 10, 2012. Similarly the FTSE NSE Kenya 25 index gained 109-94 points from 107.58 points in the same period. Bonds trading in the fixed income securities segment increased to sh. 15.5 billion for the week ending May 18, from sh. 8.3 billion with corresponding deals declining to 119 from 143 by close of May 10 2012, owing to a shift by investors to the secondary market given falling interest rates on government securities in the primary market. The figure 1.3 shows how the market was behaving between 2010-2013.



Source: Nairobi Stock Exchange

Figure: 1.3 NSE 20 share index from January 2010 to February 2013

From figure 1.3, the NSE 20 share index has been fluctuating over time. The performance of the equity market was mixed in October 2010 as reflected by the trend in NSE share index as shown in the figure. The NSE 20 share index rose by 29.8 points (0.6 percent) to close at 4659.06 in October 2010. Increased equity share index was as a result of improved prices in some counters that were active (Central Bank of Kenya, 2010).

Despite increase in number of traded shares on March 2011, the NSE 20 share index lost by 353.1 points (8.3 percent) to close at 3887.1. This was on account of low share prices which can be attributed to depreciation of Kenya shilling against US dollar to a low of Kshs 107 per dollar (Central Bank of Kenya, 2011). The overall stock market

declined in November 2011 as showed in figure1.3. The NSE share index shed 351.88 points to level at 3155.46 points from 3507.346 points in October 2011 (Central Bank of Kenya, 2011).

By February 2013 NSE share index touched a monthly high since November 2010. The index gained 7.5 percent to reach 4,518.59 points in February 2013 (Central Bank of Kenya, 2013). The volatility in NSE share prices are as a result of changes in the economic environment which if not closely monitored may impact negatively on the share returns. The table 1.2 shows NSE market performance for the period 1990 to 2012.

Table 1.2 Economic and stock market performance (%) in Kenya 1990 - 2012

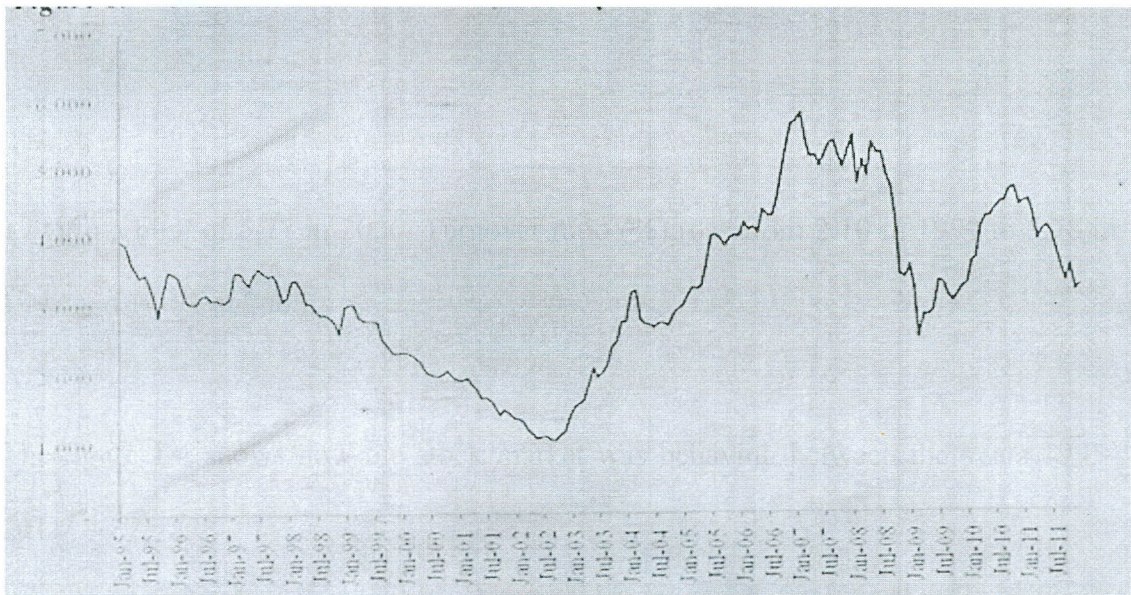
	GDP growth (annual %)	Market capitalization of listed companies (%of GDP)	Stock traded total value (% of GDP)	Stock traded, turnover ratio (%)	Gross fixed capital formation (annual % growth)
1990	4.19	5.28	0.12	2.10	0.84
1991	1.44	5.56	0.13	2.43	3.09
1992	-0.80	7.76	0.15	2.20	-10.19
1993	0.13	18.43	0.24	1.65	9.32
1994	2.63	43.09	0.87	3.00	10.21
1995	4.41	20.85	0.72	2.62	8.44
1996	4.15	15.32	0.56	3.59	6.25
1997	0.47	13.91	0.81	5.78	3.12
1998	3.29	14.36	0.56	4.11	8.09
1999	2.31	10.93	0.57	4.32	-0.76
2000	0.60	10.10	0.37	3.53	8.26
2001	3.78	8.08	0.31	3.41	12.38
2002	0.55	10.82	0.28	2.94	-6.12
2003	2.93	28.03	1.40	7.46	-7.95
2004	5.10	24.17	2.14	8.54	7.34
2005	5.91	34.07	2.69	9.83	27.80
2006	6.33	50.56	5.77	14.63	18.54
2007	6.99	49.15	4.84	10.6	13.58
2008	1.53	35.83	4.72	11.83	9.54
2009	2.74	35.17	1.63	4.59	2.78
2010	5.76	44.91	3.37	8.60	7.72
2011	4.38	3.35	2.61	7.12	12.55
2012	4.30	39.37	2.71	8.07	12.86

Source: World Bank, 2013

Table 1.2 shows the economic performance in Kenya in terms of GDP growth and stock market performance as percentage of GDP. Stock market performance is measured in terms of turnover ratio, total value of stocks traded and market capitalization of listed companies. These indicators are shown in the table as percentage of GDP. The stock market shows significant improvements in all indicators with stocks traded, total value (% of GDP) rising from a low of 0.12 in

1990 to a high of 5.77 in 2006. Turnover ratio (%) rose from 2.10 in 1990 to 5.78 in 1997 and 14.63 in 2006.

The figure 1.4 shows how the stock market was behaving between the years 1995-2011



Source: Nairobi Securities Exchange

Figure 1.4. Stock Market Performance for the Period 1995-2011

Investors enter stock markets for diversification and also to maximize returns. Financial market theory suggests that, over the long run, higher returns should compensate for the higher risks of emerging markets (Tokat, 2004). For investors, return depends on the price of the stock at the beginning and end of the period and on exchange rate, thus returns is approximately equal to the sum of domestic return on security and return on foreign currency (Sharpe et al, 2003). This means that the rate

of return of a country's currency has an impact on the pricing of equities in the domestic market. The turbulence and the uncertainty in the NSE performance has been the assortment of ills and has left the market volatile. There is therefore need to understand the dynamics that drive the market so that investors can make informed decisions and take appropriate actions.

1.5 Statement of the Problem

The NSE 20 share index has undergone frequent change in its performance. The movement has been high to levels of 6000 points (2007) and to low levels of 1000 points in 1992 and averaging at 2987.72 index points from 1990-2014. This has violated the NSE rules and regulations where stocks should not lose more than 10% of their value on a daily basis (NSE, rules and regulations, 2003). The highest drop in the value of shares was 21.1% in the year 2000 (kalou, 2000). The daily upward and downward movement of security prices being witnessed at the Nairobi securities exchange has been behind the assortment of ills that has left the market turbulent with stock prices dipping low (Kirui, 2013).

Majority of the studies that have been done to evaluate the impact of general elections on the stock markets mainly emanate from developed countries like the USA and Britain where there is evidence that stock performance differ between different political party regimes. Studies on emerging markets and especially in Africa are scanty and limited. Dopke and Pierdzioch (2006) found no strong evidence that support the impact of political events on stock market movement. Bialkowski et al

(2008) examined the degree of stock market volatility around national elections in 27 industrialized nations. They found out that investors are surprised by the election outcome and that market behavior may be explained by the general election. As far as could be determined, however stock market volatility dynamics within and across multiple African markets have not been considered under a regime switching framework (King et al, 2014). There's therefore need for an in-depth analysis of the Nairobi securities exchange to establish whether accounting for structural changes through the use of T-Garch would improve estimate and forecasts of stock return volatility, especially when analyzing political regime change and performance of the stock market.

1.6 Research Questions

This study sought to answer the following question;

1. How does Political Regime changes affect returns that investors get on the Nairobi Securities Exchange?
2. How does the effect of Political Regime change differ across different market segments?

1.7 Objectives of the Study

The General objective of the study was to determine the effect of political regime change on the performance of the Nairobi Securities Exchange Limited.

The Specific Objectives of this study were to;

- i. To determine the effect of Political Regime changes on the returns that investors get on the Nairobi Securities Exchange?
- ii. To determine how Political Regime change effects differ across different market segments.

1.8 Significance of the Study

This study will contribute to the body knowledge about how stock markets behave especially before and after general elections with an intentional bias to Kenya. This will add to the limited literature on the Nairobi Securities Exchange Limited by evaluating the relationship between political regime change and performance of the NSE. The study will also be instrumental to government, investors and many stakeholders in the economy and it will go a long way towards improving the stability, forecasting and efficiency of stock markets. Investors will find the study very helpful so that they make informed decisions towards investing in the stock markets. Researchers, academicians and even government will find the study very important in forming the basis to undertake further research.

1.9 Organization and Scope of the Study

This study is organized as follows: First chapter is the introduction. Chapter two reviews the theoretical literature pertaining the presidential election cycle and the empirical literature on the relationship between political regime change and performance of the NSE. Chapter 3 discusses the methodology, research design, the type of data and data collection methods. The study covered the period from the year: 1991-2013.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter contains three sections. The first section deals with the theoretical explanations about political regime change and performance of the NSE. The second deals with the empirical part of the literature. The chapter is concluded with a critique of the literature overview.

2.2 Theoretical Literature

The relevant approach that has been used to estimate stock returns and political regime change is the efficient market hypothesis, uncertain information hypothesis, overreaction hypothesis, market momentum, political business cycle hypothesis and the ARCH-GARCH models.

2.2.1 Efficient Market Hypothesis

This model was developed by Fama (1970), who argued that investors can be confident that a current market price fully reflects all available information about a security and the expected return based upon this price is consistent with its risks. He further divided the overall Efficient Market Hypothesis (EMH) and empirical tests of the hypothesis into three forms depending on the information set involved: (1) weak form EMH (2) semi- strong form EMH, and (3) strong- form EMH.

This study looks at the Efficient Market Hypothesis (EMH) in its semi strong form. The semi- strong EMH asserts that the current stock quickly adjust to reflect all public available information. This semi- strong form EMH encompasses the weak form EMH because all public information includes all security market information as well as non- market information such as news about economy and political news.

In the world of EMH the level of asset price fluctuation, or volatility, reflects the underlying economic fundamentals (Junkin, 2011). EMH has been criticized because of its inability to model the rational behavior of market players in an uncertain environment. Lasfer et al (2003) has also proven that semi strong form EMH does not hold for developed market as positive stocks give rise to subsequent large abnormal returns and vice versa.

Many attempts to consistently prove the existence of EMH has in fact failed. That is due to the fact that the market participants do not usually adjust prices immediately after arrival of unexpected information because they are uncertain about the underlying risks. (Shachmurove, 2002).

2.2.2 Uncertain Information Hypothesis (UIH)

This hypothesis models the rational behaviour of market players in an uncertain environment as proposed by Brown, et al, (1988). Theoretically grounded on the core assumption of EMH that investors in the capital markets are rational in making decisions, the UIH further proposed that although the investors are able to determine

the direction of the coming news they are however unable to identify the embedded risk and impact of the news surprise. This theory predicts that announcement of dramatic financial news will increase the risk and expected return of the affected firms systematically and stock prices tend to react more strongly to bad news than to good news (Yu et al, 2010). In general, stock will be under priced in environment full of uncertainties initially when the news surprise arrives. As the uncertainty has been clarified a few days later, prices would usually go up to reach their new equilibrium price.

Musa and Murshed (2003) used the daily return of Dhaka stock exchange (DSE) to test UIH. The authors explain that when a new surprise arrives, investors view its uncertainty as additional risk and require additional premium thus causing them to under price the stock. The implication behind is that when the uncertainty has been removed later, post negative events abnormal return will be positive and post-positive events abnormal return will be non-negative,. However the results from their tests failed to support UIH in this case (Ho, 2012).

2.2.3 Over Reaction Hypothesis

The Overreaction Hypothesis (OH) was proposed by De Bondt and Thaler (1987) based on the evidence of US stock market that the loser portfolios over the past three to five years tend to outperform the winner portfolios over the next three to five years period. The OH contradicts the EMH from two fronts. First the OH assumes that investors are not always rational in making decisions, at times, they are guided by

intuition instead of rational thinking. Second, according to OH, the post- event stock returns are predictable and therefore arbitrage trading opportunity is possible. This contradicts the core implication of EMH that security returns are unpredictable and arbitrage trading profits do not exist (Ho, 2012).

2.2.4 Market Momentum

According to Shefrin (2007), finance trends show that stock returns feature momentum a phenomenon where recent loser stocks continue to under perform and winner stock continue to outperform the market in the short-term. Three explanations were given of this observation. This first explanation is that investors tend to under react to new information. The second explanation is that investors are overconfident with a stock and subsequent arrival of information will further lead to the overreaction behaviour of the investors (Spyrou et al, 2007).

The third explanation is based on the prospect theory which suggests that risk aversion investors tend to sell off their stock at a gain relative to the purchase price when positive news arrive, thus slowing down the increase of stock price. On the other hand, when bad news about a stock arrives, aversion to sure loss predisposes investors to hold their loser portfolios, therefore retarding the decrease of the stock price (Shefrin, 2007). Lasfer et al (2003) define market momentum as a phenomenon where positive stocks are followed by positive abnormal returns and negative stocks are followed by negative abnormal returns.

2.2.5 Political Business Cycle Hypothesis

This theory was developed by Kalacke (1943). There are two approaches of explaining the economic fluctuation around election. The first approach is the opportunistic cycle discussed by Vordhaus (1975) which basically deals with the issues of whether government will use fiscal and monetary policy in order to manipulate the level of economic activity before an election in the hope to increase the probability of winning the forthcoming election. The opportunistic model predicts that on average the economic activities before an election should be higher and the actions used by the incumbent to stimulate the economy will have a crowding out effect on private investment.

The second approach- partisan approach – contends that political parties set their policies differently because they have different ideologies and serve the interests of different social groups in the society (Swank, 1993). As a consequence economic fluctuations only arise if the regime after elections falls to the alternative political party which will possibly set policies different from the previous incumbent party (Ho.2012).

2.2.6. TGARCH Model

TGARCH is a variation of GARCH introduced independently by Zakoian (1990) and Gloster, Jaganathan and Runkle (1993). It is sometimes referred to as GJR. Is a modification of the GARCH model which considers the possibility of asymmetry in the data generating processes. Among the coefficient to be estimated is the leverage

effect (test for asymmetry), whose sign and test of significance have an implication on the impacts of good news and bad news on volatilities of stock returns.

In this model, the impact of good news ($\varepsilon_t < 0$) and bad news ($\varepsilon_t > 0$) is tested to show if they have different impact on conditional variance. The model takes into account the fact that downwards movements in the market are followed by higher volatilities than upwards movements of the same magnitude. Its conditional variance as:

$$\sigma_t^2 = \omega + \alpha \varepsilon_{t-1}^2 + \beta \sigma_{t-1}^2 + \gamma \mu_{t-1}^2 I_{t-1}$$

Where γ is leverage effect and $I_{t-1} = 1$ if $\mu_{t-1} < 1$ and 0 otherwise.

2.3 Empirical Literature

Huang (1985) examined whether there exists a pattern of stock market return during the four year presidential cycle in the US and whether the stock market return is affected by the different party administration. His results show that on average the stock market gains in the third and fourth year of the cycle and losses during the second year. In addition, although the market favours the republican administrations, historical results show that higher average returns were obtained during the democratic administrations (Huang, 1985; Santa Clara and Valkanov, 2003). This study however did not focus on young and emerging markets like Kenya.

Alesina and Perotti (1992) did a survey on literature regarding political instability and economic growth. They found that political instability can be defined in two ways. The first uses a sociopolitical unrest index (SPI) that comprises various political riots and social violence. The second way uses the executive turnover, namely the frequency of government collapse, as the indicator of political instability. The research however could not capture higher statistical moments in stock returns.

Nickles (2004) identified potential investment strategies based on the US presidential election cycles. He found that full cycle occurs every four years, where market is bullish for about three years and bearish for less than a year. He concluded that investing 27 months before the Election Day can be more profitable than investing after the election.

Beaulieu et al (2005) examined the link between political risk and stock market movement in Canada, with the aim of separating Quebec from Canada. A bivariate - modified GARCH model was used. The findings did show that although the political news did affect the conditional volatility of the stock return, it does not affect the mean returns itself, thus suggesting that the political risk can actually be diversified away and hence, the required return by the investors is not affected. However this study was not undertaken under a regime switching framework to account for structural changes in the stock market.

Jensen and Schmith (2005) examined the impact of the 2002 Brazilian presidential election on the stock market response. By using time series regression models, they

intended to find the impact of the four presidential candidates (Lula, Serra, Ciro Gomes and Garotinho) on the mean and variance of the stock market returns.

The results of the study did not find strong evidence that the newly rise president, Lula lead to downfall of the Brazilian stock market. The plummeting of the Brazilian stock market might have been due to the slumping world economy. However while no evidence was found on the relationship of mean return and the rise by Lula, there was significant impact of this event on the stock market volatility, which conforms to the candidate uncertainty hypothesis. This uncertainty is not because of the uncertainty of the election results, but rather the uncertainty of Lula's policies. This study was limited in its application as it only focused on Brazilian economy.

Aktas and Oncu (2006) examined the pricing behaviour of the Turkish and stock market after the Turkey parliament rejected a bill to allow deployment of US troops in Turkey on 3 March 2002, which created significant economic implication for market participants. 50 stocks were obtained each from ISE- national 50 index and ISE- national 100 index to form two portfolios from 20 February 2002 to 7 March 2002. Results show that the test statistics for Abnormal Return for both portfolios on the announcement day and four days after are all insignificant thus suggesting that there was no sign of overreaction and under reaction that violates the EMH. This study did not focus on political regime change and performance of the stock market.

In Malaysia, Ali et al (2010) discussed the evidence of long-term overreaction of stock market. Six political announcements were selected which included the announcement of the four general elections in 1990, 1995, 1999 and 2004, as well as the announcement of removal of Anwar Ibrahim as the deputy prime minister and the resignation of Mahathir Mohammed, the then prime minister. Winner and loser portfolio were formed by ranking the cumulative abnormal return (CAR). Results showed that in the long term significant overreaction behaviour is observed in the Malaysian stock market upon the arrival of announcement of removal of Anwar Ibrahim and the resignation of Mahathir Mohammed. However, results did show that the market tends to under-react on the election announcement in the long term. The study did not focus on Kenya.

Kithinji A and Ngugi W. (2010) analyzed the general performance of the stock market between 1991 to 2008. Using line graphs, percentages and the Pearson's correlation coefficient, their study also failed to attribute performance of the stock market to regime changes. In addition, their study did not do a deeper analysis of how different segments of the market behaves when there are various regime changes like political regime change, announcement of dividends, etc. Also, the study was not undertaken in a regime switching framework and could not account for structural changes through the use of Markov switching models.

In Kenya, Kiboi (2012) did a cross-sectional study of the specific factors influencing company listings based on the Nairobi Stock Exchange. The study sought to establish

what factors affect those companies which have met threshold listing requirement but have not opted to publicly list on the stock exchange market. A multiple regression analysis was used for analysis and found out that the most influential factor considered in the listing decision was the political environment which was characterized by a change in political regime and the legal and regulatory framework. This study however did not focus on political regime change and the performance of the NSE.

Chang et al (2013), examined the cross- sectional dependency between stock prices and political uncertainty as well as heterogeneity across sample OECD countries, by applying the bootstrap panel causality proposed by Konya (2006). They found out that the causal relationship between political uncertainty and stock prices differs across countries. However, Kenya was not among the countries under study by Chang et al (2013).

2.4 Overview of Literature

From the theoretical literature, the study adopted the T-GARCH and the regime switching SW GARCH model. The SW GARCH model is superior to other models because of its ability to calculate changing variance under different regimes. The GARCH (1, 1) and EGARCH (1, 1) are too restrictive in their specification of adequately model the dynamics of stock return volatility.

The GARCH (1, 1) have also been criticized for being unable to account for one important feature of stock return volatility, namely the presence of leverage effects. From the empirical literature, majority of the studies have been done in the USA and Britain and a 4- year cycle called the presidential election cycle established. Megna and Xu (2003) used indicators to forecast the economy and cycles for USA. Booth and Booth (2003) confirmed the previous findings and found that the presidential cycle had explanatory power beyond the business condition proxies that have been shown to be important in explaining stock returns. However Santa-Clara and Valkanov (2003) found that the difference in returns could not be explained by business cycle variable that were related to expected returns and were not concentrated around election dates. The differences in returns through the presidential cycle remains a puzzle.

Contrary to many studies, this study adopted the T-GARCH model. Previous literature utilized the Arch, GARCH, and Regime switching models (Barsher and Sordisky, 2006), which only consider the mean and standard deviation of returns, thereby leaving out higher statistical moments in the search for seasonal patterns in returns. This study tried to identify regime shift by studying and analyzing time varying conditional volatility.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter sets out the methodology to be used to achieve the objectives set out in chapter one. The second section presents the research design to be used in the study. The third section gives the theoretical framework to be adopted in the study. The fourth section presents empirical model specification. The last two sections, highlight the data type, and the procedure for analysis.

3.2 Research Design

A non experimental research design was adopted because it is a design that does not involve manipulation of study variables and also because of the secondary nature of data employed

3.3. Theoretical Model

3.3.1 Theory of Political Business Cycle

This theory was developed by Kalacke (1943). There are two approaches of explaining the economic fluctuation around election. The first approach is the opportunistic cycle discussed by Vordhaus (1975) which basically deals with the issues of whether government will use fiscal and monetary policy in order to manipulate the level of economic activity before an election in the hope to increase the probability of winning the forthcoming election.

The opportunistic model predicts that on average the economic activities before an election should be higher and the actions used by the incumbent to stimulate the economy will have a crowding out effect on private investment.

The second approach- partisan approach contends that political parties set their policies differently because they have different ideologies and serve the interests of different social groups in the society (Swank, 1993). As a consequence economic fluctuations only arise if the regime after elections falls to the alternative political party which will possibly set policies different from the previous incumbent party. To measure correlation between returns and political variables the relationship was implicitly written as follows: $SR=f (Pr,U_t)$

.....3.1

Where the regression was run as follows; $S.R= \alpha+\beta\pi t+U_{t+1}$ 3.2

and where π stands for political variables, and SR are the stock returns and U_{t+1} is the error term in period t+1

Based on the theoretical and empirical literature reviewed, the methodology adopted by the study is anchored on the T-GARCH model. The choice of this model over arch and E- Garch models is that it has the ability to calculate changing variance under different regimes. E-Garch have been criticized for being too restrictive in its specification to adequately model the dynamics of stock return volatility.

3.4 Model Specification and the Estimation Procedure

The relationship between political regime change and the performance of the Nairobi securities exchange will be implicitly specified as follows;

$SR_t = f(\text{Index}, PR, \text{sector } i)$ 3.3

Where SR_t represents returns, index is the 20-share index, PR-are the political variables: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption, while sector represents different sectors of the Nairobi Securities Exchange limited

As specified by Beaulieu m.c, et al 2006, Julio and Yook, 2012, Paolo p, et al 2014 And Santa Clara, Valkanov 2003, Yartey 2004, Alesina, Roubinni and cohen 1999, Kaufmann et al 1999, Knack and keifer 1995) ,the regression to be estimated is given as follows ;

$SR_t = \alpha_0 + \alpha_1 \text{index} + \alpha_2 PR_{2i} + \alpha_3 \text{sector } 3_i + e$
.....3.4

This equation can explicitly be written as follows :

$SR_t = \alpha_0 + \alpha_1 \text{index} + \alpha_{21} Va + \alpha_{22} Ps + \alpha_{23} ge + \alpha_{24} rq + \alpha_{25} rl + \alpha_{26} cc + \alpha_{31} ag + \alpha_{32} ai + \alpha_{33} ia + \alpha_{34} fIM + \alpha_{35} fl + e$
.....3.5

Where SR_t represents the returns, Index represents the NSE 20-share index ,PR represents the political variables, sector i represents the five different market segments namely Agriculture(Ag), industrial and allied (AI), Finance and investment (FI),Alternative market segment(As) and the Fixed income market segment(FIM).

PR and Sector i are dummy variables. Sectors i where $i = 1, 2, 3, 4, 5$. Sector D31=1 if agriculture and 0 otherwise, Sector D32=1 if alternative market(ai) and 0 otherwise, Sector D33=1 if industrial and allied and 0 otherwise, Sector, D34= 1 if fixed income market segment and 0 otherwise, Sector D35=1 if finance and investment and 0 otherwise. Political variable D21 =1 if voice and accountability(va) and 0 otherwise.,political variable D22=1 if political stability and 0 otherwise,Political variable D23= I if government effectiveness(GE) and 0 otherwise .Political variable D24=I if regulatory quality(RQ) and O otherwise .Political variable D25= I if rule of law and 0 otherwise .Political variable D26= I if control of corruption and 0 otherwise.

Secondly, the threshold generalized autoregressive conditional heteroscedasticity model, (TGARCH) was also estimated to capture the impact of news of political variables on stock returns volatility. It was developed by Zakoian (1994) and Glosten et al (1993). It explains the impact of news on volatility. The generalized version is given as:

$$\delta_t^2 = \omega + \alpha_1 \varepsilon_{t-1}^2 + \gamma d_{t-1} \varepsilon_{t-1}^2 + \beta_1 \delta_{t-1}^2$$

Where d_{t-1} is a dummy variable, that is;

$$d_{t-1} = \begin{cases} 1 & \text{if } \varepsilon_{t-1} < 0 \text{ bad news} \\ 0 & \text{if } \varepsilon_{t-1} > 0 \text{ good news} \end{cases}$$

γ is the leverage effect or symmetry. If it is found that $\gamma = 0$, the model collapses to the standard GARCH forms. Otherwise when there is good news (positive shocks), the effect on volatility is α_1 , but when there is bad news (negative shocks), the effect on the volatility is $\alpha_1 + \gamma$. Hence if γ is significant and positive, negative shocks have a larger effect on δ_t^2 than positive shocks (Carter, 2007).

3.6 Definition, Source and Measurement of Variables

The description and measurement of variables is explained in table 3.1 as shown

Table 3.1 Definition and Measurement of Variables

Type	Variable	Description and measurement
Dependent variable	Stock return (SR)	Its in form of profits or dividends paid out to investors and its an NSE stock market return market capitalization weighted index of companies measured by quarterly average of indices
Independent variables	Voice & accountability (VA)	Voice and accountability index is measured by the international country risk guide developed by the world bank and it ranges between 0 and 6.
	Political stability and absence of violence (PS)	Political stability and absence of violence is measured on an 100 points scale theoretically 100 implying lowest risk and the lowest score 0 indicating the highest risk as per the international country risk guide and measured by the world bank.
	Government effectiveness (GE)	Government effectiveness being public perception of public service provision is measured on a scale ranging between 0 and 4 developed by the international country risk guide and is measured by the world bank.
	Regulatory quality (RQ)	Regulatory quality measures incidences of unfriendly policies such as price controls and its scale is provided by the international country risk guide and measured by the world bank.
	Rule of law(RL)	Rule of law is an assessment of the strength and impartiality of the legal system and it ranges from 0 to 6 and is measured by the world bank.
	Control of corruption (CC)	Control of corruption is measured on a 0 to 6 scale with the lowest value indicating very high risk and the highest value indicating very low risk and is measured by the world bank.
	NSE 20 share index (NSI)	Tracked by changes in value of shares/equities of 20 blue chip companies with strong fundamentals and which have consistently produced positive financial results, represented by either changes in percentage or NSE share points and measured by quarterly average of indices.
	Sectors I Agriculture (AG) Finance and investment (FI), Commercial services (CS), Industrial and allied (IA), Alternative mkt (AI)	Performance of different market Segments in the general stock market measured by quarterly average of indices which are the returns that go to each market sector. Sectors i is a dummy variable and includes the following; agricultural sector, commercial and services, finance and investment, alternative market segment, the fixed income market segment (FIM), and the industrial and allied sector.

3.7 Data Type and Source

Data was sourced from published time series data from the Kenya, National Bureau of Statistics (KNBS), the Central Banks of Kenya (CBK), the Nairobi Securities Exchange Limited (NSE) Databanks and the Kenya statistical Abstracts plus data from the World Bank data base. Data about the elections and the results was obtained from the independent electoral and boundaries commission (IEBC) database. The data spanned from 1991 to the first quarter of the year 2013.

3.8 Data Analysis

Before estimation of the model was done, diagnostic tests were carried out to test for non stationarity. Non- stationary time series data often leads to spurious results. The augmented dickey fuller test was performed to test for the existence of the unit root (Dickey, 1979, Fuller 1979). To test for autocorrelation, the Durbin - Watson test was carried out. The preferred software for data analysis was E-views simply because its best suited for time series analysis. The parametric volatility GARCH (1, 1) models have one weakness; they are unable to account for one important feature of stock return volatility, namely the presence of leverage effects. Objective one was achieved by the long run equation. The second objective was achieved by using the T-GARCH.

CHAPTER FOUR

EMPIRICAL FINDINGS

4.1 Introduction

This chapter presents empirical results including descriptive statistics, unit root tests, error correction regression models, relevant econometric tests and key findings from the investigations.

4.2 Descriptive Statistics for Variables.

The summary of the statistical characteristic of all the variables are shown in Table A.1 in the appendix. Sample mean, standard deviation, skewness and kurtosis and the Jacque- Bera statistics and the P. value, have been reported. The high standard deviation of stock returns (SR) implies that there was high volatility at the stock market.

4.3 Correlation Analysis Results

A serial correlation was done and the results are reported in table A. 2 of the Appendix Also political stability and the NSE 20 share index performance were highly correlated at 0.92.

4.4 Stationarity Test

As a preliminary analysis each time series variable is subjected to ADF test to test for stationarity. If variables are not stationary in levels appropriate differencing is required until the variables become stationary. Both drift and constant terms are

included in the test equation and use. The results of unit root tests using ADF are shown in table 4.1. The results showed that for stock returns (SR), the null hypothesis of non- stationary was reflected implying that it was stationary at level. Evaluation of the results was guided by the critical values provided by Mackinnon (1996). This implied that stock returns (SR) is integrated of order zero 1 (0). Other variables like Rule of law, control of corruption were found to be non- stationary at level. However they became stationary after the first difference. This means that they are integrated of order, I (I)

Table 4.1.A ADF Unit Root Tests at Levels

VARIABLE	ADF Statistic test	1% critical value	5% critical value	10% critical value	Result
A1	-6.532022	-3.600987	-2.935001	-2.605836	Stationary
AG	-6.820853	-3.600987	-2.935001	-2.605836	Stationary
CC	-1.398978	-3.653730	-2.957110	-2.606857	Non stationary
IA	-2.018150	-3.605593	-2.936942	-2.604867	Non- stationary
NSI	-6.193082	-3.596616	-2.933158	-2.604867	Stationary
PS	-3.463508	-3.605593	-2.936942	-2.606857	Stationary
RL	-1.991290	-3.605593	-2.936942	-2.606857	Non- stationary
RQ	-2.884404	-3.605593	-2.936942	-2.606857	Stationary
SR	-3.855490	-3.596616	-2.933158	-2.604867	Stationary
VA	-4.304037	-3.626784	-2.945842	2.611531	Stationary

Source: Eviews output from research data

Table 4.1.B ; ADF Unit Root Tests at First Differences

VARIABLE	ADF Statistic test	1% critical value	5% critical value	10% critical value	Result
IA	-4.304037	-3.626784	-2.945842	2.611531	Stationary
RL	-5.164698	-3.600987	-2.935001	-2.605836	Stationary
CC	-6.217146	-3.600987	-2.935001	-2.60583	Stationary

Source: Research data

4.5.1 Co integration test results

Co integration was done so as to test for the presence of long run relation among two or more variables. Johansen test was used to test for cointegration.

Table 4.2 (a) Johansen Cointegration test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.873252	137.1791	47.85613	0.0000
At most 1 *	0.565719	52.49134	29.79707	0.0000
At most 2 *	0.315142	18.29471	15.49471	0.0184
At most 3	0.065430	2.774423	3.841466	0.0958

Trace test indicates 3 cointegrating equations at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: Research data

Table 4.2 (b) Cointegration equations

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.873252	84.68772	27.58434	0.0000
At most 1 *	0.565719	34.19663	21.13162	0.0004
At most 2 *	0.315142	15.52029	14.26460	0.0315
At most 3	0.065430	2.774423	3.841466	0.0958

Max-eigenvalue test indicates 3 cointegrating equations at the 0.05 level

*** denotes rejection of the hypothesis at the 0.05 level**

****MacKinnon-Haug-Michelis (1999) p-values**

Source:Eviews output from research data

Johansen co integration test showed that the trace statistic column exceed the critical values so that the null of no cointegrating vector is rejected

.This continues until we do not reject the null hypothesis. The max test shown in the second panel confirms this result.

4.5.2 Exogeneity Tests

To analyse the short-run causal relationships among the variables, the study considered chi-square (wald) statistics for the significance of the endogenous variables in the equation. The table in the appendix shows the results that political variables, the NSE 20-share index, and the different market segments cause changes in the stock returns. It validates findings of the long-run relationship among stock returns, the NSE 20-share index, political variables and the different market segments. The statistic in the last row (All) is the chi-squared statistic for joint significance of all other endogenous variables in the equation. From the output, the

value of the test statistic is higher than the p-value so the study fails to reject the null hypothesis, which means the sample does not support the notion that stock returns granger causes political variables, NSE 20-share index, and the different market segments. The political variables, NSE 20-share index and the performance of the different market segments of the stock market have influence on stock returns. Hence stock returns (SR) is the dependent variable.

4.6 The relationship between Political Variables and the Stock Returns.

The relationship between stock returns and political variables, the NSE 20 share index and the different market segment of the NSE was established by estimating a regression equation. It involved regressing value of stock returns on the NSE 20 share index, the political variables and the different market sectors of the NSE. The results are estimated in the Table 4.3.

Table 4.3 Results of the Regression Model

Variables Dependent variables: stock returns	Coefficient estimates	t- statistics	P values
NSI-20 share index	-1.44	-1.45	0.1582
Control of corruption	-1.066	-2.505	0.0191
Regulatory quality	-2.087	-2.063	0.0496
Political stability and absence of violence	-0.2546	-1.323	0.1976
Agriculture	0.0463	0.219	0.8284
Alternative investment market segment	0.517	2.347	0.0271
Finance and investment	0.000439	0.4778	0.6369
Fixed income market segment	0.000966	0.417	0.6912
Adjusted R-squared = 0.344669,	Prob F-statistic = 0.027057,	Durbin Watson = 1.792	

Source; Construction from the estimation results

From the table 4.3 adjusted R^2 is 34%. This shows that 34% of the variations in the value of the stock returns are explained by the NSE 20 share index, the political variables and the performance of different sectors of the NSE. The F- statistics is significant implying that the hypothesized relationship between the stock returns and the NSE 20 share index, political variables and the performance of the different sector of the NSE was validated. Also the value of Durbin- Watson was 1.79 which implies that the model was not suffering from autocorrelation problems.

The regression results in the table 4.3 shows that the value of stock returns was affected by the NSE 20 share index. For a one percentage increase in the NSE 20 share, returns change by 1.4 percent. Also from the results of the regression model, the agricultural sector was not affected by all the political variables namely voice and accountability, Rule of law, government effectiveness, political stability and control of corruption. Finance and investment sector was affected only by the Rule of law at 10% significance.

The industrial and allied sector was affected by voice and accountability and Rule of law variables at 1%, 5% and 10% significance respectively. Alternative investment market segment was affected by only voice and accountability at 10% level of significance.

Throughout the period of study, each market segment of the NSE had average negative monthly returns. This implies that the monthly prices and therefore holding period returns had a general declining tendency. For example the period after 2007 elections the NASI index points has not rose back to the 2008 base levels. The agricultural sector had the most volatile risk of returns as shown by the variance and standard deviation in returns.

The commercial and services sectors and the industrial and allied sectors had a moderate risks and the finance and investment sector which reported and the lowest relative risk among all the four sectors. On average the findings imply that the systematic risk in each of the market segments is unique and distinct from each of the

other remaining segments. Throughout the study period, there was difference between election and non- election year in returns of investment in all the market segments. This was similar to the findings of the study by Oluoch (2012) which documented that unique factors affect each of the sectors differently from the way it affects any other.

4.7 Diagnostic Test Results

The regression model of values of the stock returns dependable variables, against values of NSE 20 share index, political variables, different marked sectors, and the interacted variables between political variables and the 20 share index plus the sectors and the results are reported. Diagnostic tests for the estimated model were done and the results are hereby discussed.

Serial correlation is a statistical term used to describe the situation when the residual is correlated with lagged values of itself which is not desirable. Breusch- Godfrey serial correlation LM test was used to test for the presence of serial correlation on the residuals. The null hypothesis is of no serial correlation. From the results in table A 4. In the appendix the p-value is 0.4396 (43%) which is more than 5 percent ($p > 0.05$), hence null hypothesis could not be rejected. This means that residuals (u) are not serially correlated which is desirable.

Heteroscedasticity is a term used to describe the situation when the variance of the residuals from a model is not constant. Breusch- pegan, Godfrey test (B-P-G-Test)

was used to test for the presence of heteroscedsticity. Table A.5 in the appendix reports a p- value of 0.3172 (31%) which shows that null hypothesis of homoscedasticity cannot be rejected. This implies that the residuals have constant variance which is desirable. One of the assumptions of the regression model is that the error term, follows the normal distribution. Jarque Berra statistics was used for test for normality. The results in the figure A.1 shows that its values is 0.716379 and the corresponding p value is 0.698941. Since p value was greater than 5 percent the null hypothesis of normal distribution cannot be rejected meaning that population residual was normally distributed which fulfills the assumption of a good regression line.

4.8. T- Garch Results

The effect of changes in the explanatory variables on the volatility of stock returns was analyzed by estimating the T-Garch model, whereby the coefficient of the Arch term given by γ measures the presence of leverage effects or asymmetry. If the coefficient of leverage effect is positive and significant, then there is presence of leverage effects which implies that periods of low volatility tends to be followed by another period of low volatility for a prolonged period of time and vice versa.

Garch term coefficient (α) measures the forecast variance from last period. $\alpha + \gamma$ measures the persistence of shocks to volatility which depends on $\alpha + \gamma$ parameters such that if $\alpha + \gamma < 1$ imply a tendency for the volatility response to decay over time, $\alpha + \gamma = 1$ imply indefinite volatility persistence to shocks over time, and $\alpha + \gamma > 1$

imply increasing volatility persistence over time. When γ is significant and positive, negative shocks have a larger effect on volatility (δ_t^2) than positive shocks (Carter, 2007).

Table 4.4 T- Garch Result For Industrial And Allied Sector and stock returns.

Name of the coefficient	Value of coefficient	Probability value	z-statistics
Constant [ω]	0.001275	0.6662	0.431409
GARCH term [α]	1.141788	0.00	4.595784
Coefficient for leverage effect or arch term [γ]	-0.235624	0.1993	-1.283626

Source: Eviews output on data from NSE

From the table 4.4 results in the table above γ is insignificant. The insignificance of the coefficient estimates indicates that political news (bad news) do not have a large effect on the conditional variance (volatility) in this market segment. This means that periods of low volatility are not followed by another period of low volatility for a prolonged period of time and vice versa.

Table 4.5.T- GARCH Results for Agriculture (AG) and the Stock Returns

Name of the coefficient	Value of coefficient	Probability	z-statistics
Constant [ω]	0.001213	0.6808	0.411308
GARCH term [α]	1.1273	0.00	4.312642
Coefficient for leverage effect or arch term [γ]	-0.213424	0.1822	-1.333870

Source: Eviews output on data from NSE

In the table 4.5 the coefficient of leverage effect γ is negative meaning that negative political news does not have a larger effect on volatility than positive news. This is an indication that bad news does not increase volatility in the market and hence existence of leverage effect is low in the agricultural sector.

Table 4.6 T- Garch Results for Alternative market segment and the Stock Returns

Name of the coefficient	Value of coefficient	z-statistics	Probability
Constant [ω]	0.001105	0.301436	0.7631
GARCH term [α]	0.534007	0.376900	0.7062
Coefficient for leverage effect or arch term [γ]	0.043566	0.063849	0.9491

Source:Eviews output on data from NSE.

The coefficient of leverage effect γ was insignificant implying that these effects were not more pronounced during the sample periods. Volatility persistence is not reported since its coefficient is insignificant in this market segment.

Table 4.7 T-Garch Results for Fixed Income Market Segment and the Stock Returns

Name of the coefficient	Value of coefficient	Probability value	z-statistics
Constant [ω]	0.011887	0.4527	0.750908
GARCH term [α]	-0.2225323	0.8623	-0.173474
Coefficient for leverage effect or arch term [γ]	0.165277	0.4657	0.729473

Source: views output on data from NSE.

The coefficient of leverage effect is insignificant implying volatility persistence is not reported in this market segment. The lack of volatility persistence in this market segment is a sign of market efficiency in this market segment.

Table 4.8 T- Garch Results for Finance and Investment Segment and Stock Returns

Name of the coefficient	Value of coefficient	Probability value	z-statistics
Constant [ω]	0.001257	0.6091	0.511419
GARCH term [α]	1.161903	0.0000	5.761560
Coefficient for leverage effect or arch term [γ]	-0.248805	0.1384	-1.481915

Source:Views output on data from NSE

The coefficient of leverage effect is negative and therefore insignificant. This implies that negative political news do not have a larger effect on volatility than positive shocks in this market segment.

Table 4.9 T- Garch Results for Commercial and Services and the Stock Returns

Name of the coefficient	Value of coefficient	Probability value	z-statistics
Constant [ω]	0.00752	0.7762	0.28468
GARCH term [α]	1.203060	0.00	4.733422
Coefficient for leverage effect or arch term [γ]	-0.250590	0.2240	1.215893

Source: views output on data from NSE

The coefficient of leverage effect is negative meaning that negative political news do not have a larger effect on volatility than positive shocks. Also the value of $\alpha + \gamma$ is less than one meaning that volatility persistence was absent.

Volatility persistence was absent in all the market segments of the NSE as the value of $\alpha + \gamma$ was not important (less than one). Thus from the T-Garch results above political noise does not have substantial effect on the performance of different market segments of the NSE. The results are similar to those found out by Olweny and Omondi (2011) in their study.

CHAPTER FIVE

SUMMARY, CONCLUSION AND POLICY IMPLICATION

5.1 Summary

Quoted companies at the Nairobi Securities Exchange have been experiencing high stock returns volatility which has left the market turbulent with stock prices dipping low. The study undertook to test whether changing political regime changes had a significant impact on the performance of the NSE. Time series data was employed in this study comprising quarterly observations. A regression analysis was undertaken and also volatility of stock returns in response to changes in the political regime was traced by the T-Garch model to determine how political variables affected different stock market segments

From the study it was established that there was some correlation between the changing political regimes and the performance of the NSE. Also from the study findings it was established that different political variables affect different market segments uniquely and that each market segment was unique. The systematic risk in each of the market segments was unique and distinct from each of the other remaining segments. The empirical evidence on how each market segment performed under changing political regimes indicated that the coefficient of leverage effect was insignificant. Thus from the foregoing, political noise seems to have little effect on the performance of the different market segments as the stock market seems to have

shock absorbers and is able to withstand negative political news. Also the empirical evidence on the effect of political regime changes on stock return volatility was that news impact was not asymmetric. This implied that negative political news did not have a larger effect on volatility than positive political news.

5.2 Conclusions

The results of the regression showed that there was some correlation between stock returns, the NSE 20 share index, political variables and the performance of different sectors of the NSE. The NSE- 20 share index had a direct impact on the returns while political variables influence on the returns was at the lowest. Each market segment of the NSE exhibited unique risks that affected it and was distinct from each other. Therefore it was difficult to conclude that political regime changes were the ones that caused differences in the performance of stock market during the period of study.

The effect of changes in explanatory variables on volatility of stock returns revealed that the impact of political news is not asymmetric and there were no leverage effects. This was concluded that negative political news did not have a larger effect on the conditional variance (volatility) of stock returns than positive political news of the same magnitude.

5.3 Policy implications

The following policy implications arise from the study findings; investors in the Kenyan market face an informational efficient market such that the prices of the various companies reflect the risk levels of each of the companies and segments. The

government should sustain this momentum and put in place mechanisms that will ensure that no political interference will infiltrate the performance of the NSE. This kind of policies would significantly increase stock market activity with resultant positive effects for the economy. Investors should focus on better investment portfolios and strategies as political regime changes have little effect on the performance of the NSE. The government should develop a policy framework to bring about a conducive environment to reduce high levels of volatility in the stock markets as this demotivates investors. Also the government should help minimize risks in the agricultural sector as this would help improve investments in this sector. The resilience of the NSE should be a clear reflection of the Kenyan economy as a whole and this should attract both local and foreign investors to invest in different sectors of our economy as they are assured of better returns.

5.4 Areas for Further Research

Further studies may be conducted to determine factors that bring about differences in the sizes of the various segments of the market as reflected by the differences in the number of companies quoted at each segment as well as the values of segmental capitalizations.

Further studies on persistence of news on stock returns will be useful to investors in making rational investment decisions and aid in policy formulation. This will be enhanced by the use of other volatility models that account for structural changes like the markov regime switching models .

Also future studies may be considered to identify other macroeconomic variables which were not captured in this study that significantly affect stock returns. It is therefore suggested that a wide range of factors may be relevant in determining the stock market returns. Such variables may include but not limited to Gross Domestic Product, Employment/unemployment levels, export earnings, Exchange rate regime, regional stock market indices, regional retail sales among others.

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APPENDIX

Table A1 . Descriptive statistics

	SR	AG	AI	CCI	CCXAGI	FI	FIM	GEI	GEXAI	NSI
Mean	0.004128	1.669048	1.072381	-3574.188	1.511567	29.29929	97.59000	-2373.600	0.636303	4054.349
Median	0.020000	0.375000	0.520000	-3382.780	0.351750	23.82500	100.0000	-2078.481	0.276300	3495.850
Maximum	0.225100	26.93000	13.17000	3843.334	24.77540	77.72000	101.0000	-668.3569	7.506900	30341.61
Minimum	-0.290000	0.000000	0.000000	-24955.97	0.000000	0.600000	68.00000	-17901.55	0.000000	1061.330
Std. Dev.	0.109998	4.289958	2.321686	3802.320	3.922906	21.07500	7.608956	2583.694	1.369141	4361.677
Skewness	-0.334335	5.068504	4.021343	-4.181532	5.165534	0.597767	-3.086688	-5.324582	3.823551	5.240855
Kurtosis	3.912419	30.09963	19.81299	25.39742	30.94693	2.275583	11.08454	32.63870	17.88438	32.21402
Jarque-Bera	0.814833	1465.011	607.8826	1000.274	1553.583	3.419639	181.0731	1735.750	490.0401	1725.957
Probability	0.665367	0.000000	0.000000	0.000000	0.000000	0.180898	0.000000	0.000000	0.000000	0.000000
Sum	0.177500	70.10000	45.04000	-150115.9	63.48582	1230.570	4098.780	-99691.20	26.72474	174337.0
Sum Sq. Dev.	0.508182	754.5532	220.9993	5.93E+08	630.9568	18210.39	2373.744	2.74E+08	76.85638	7.99E+08
Observations	43	42	42	42	42	42	42	42	42	43

PS	PSI	PSXFI	RLI	RQ	RQI	RQXIA
-1.228155	-4891.897	36.61068	-3412.780	-0.196310	-829.8542	7.330326
-1.223750	-4626.418	28.98440	-3344.117	-0.203750	-647.5299	6.101650
-1.050000	3552.550	87.88400	4790.768	-0.070000	-193.6927	22.42500
-1.430000	-37244.33	0.630000	-26776.47	-0.260000	-7888.819	0.055000
0.099321	5561.490	24.99869	4278.592	0.050934	1158.071	6.109176
-0.290258	-4.742561	0.549423	-3.750303	0.757524	-5.565443	0.737197
2.377838	28.78441	2.206558	22.70054	2.866646	34.50887	2.545998
1.267147	1320.905	3.214772	777.6482	4.048024	1954.235	4.164923
0.530692	0.000000	0.200411	0.000000	0.132124	0.000000	0.124623
-51.58250	-205459.7	1537.649	-143336.8	-8.245000	-34853.88	307.8737
0.404451	1.27E+09	25622.32	7.51E+08	0.106365	54986247	1530.203
42	42	42	42	42	42	42

Source: Eviews output

Table A2: Correlation of variables

	AG	AI	CC	CCI	CCXAG	CCXAG1	CS	FI	FIM	GE	GEI	GEXAI	IA
AG	1												
AI	-0.05281	1											
CC	0.157632	0.285307	1										
CCI	-0.10204	0.08639	-0.20569	1									
CCXAG	0.181542	-0.19692	-0.17471	0.299658	1								
CCXAG1	0.999483	-0.05411	0.141568	-0.08094	0.188012	1							
CS	-0.10218	-0.26718	-0.50301	0.005182	-0.08347	-0.0982	1						
FI	-0.02303	-0.14157	0.253694	-0.03965	0.231709	-0.02834	-0.09607	1					
FIM	0.035202	-0.15505	-0.08765	-0.08423	0.102266	0.041778	0.085032	0.111181	1				
GE	0.09564	-0.12546	0.222244	-0.19969	-0.17951	0.091847	0.149489	0.033904	-0.15625	1			
GEI	-0.11996	0.057666	-0.24117	0.94133	0.318242	-0.09805	0.064781	-0.02147	-0.09861	-0.04292	1		
GEXAI	-0.05218	0.99823	0.274469	0.088802	-0.20085	-0.05332	-0.26933	-0.13219	-0.14104	-0.15398	0.055392	1	
IA	0.097273	0.27729	0.620008	-0.02556	-0.21863	0.087852	-0.4313	-0.04184	0.077446	-0.00171	-0.10552	0.271572	1
NSI	0.118366	-0.06935	0.25095	-0.95049	-0.32721	0.096392	-0.04874	0.028204	0.095425	0.098202	-0.99816	-0.06888	0.103296
PS	0.301341	0.136413	0.706554	0.082925	0.244908	0.29412	-0.48138	0.148555	-0.122	0.265152	0.064059	0.129543	0.417852
PSI	-0.11091	0.064455	-0.16119	0.929453	0.295044	-0.08994	0.005078	-0.06366	-0.08948	-0.07349	0.974236	0.063641	-0.01386

PSXFI	-0.06274	-0.10802	0.079888	-0.09816	-0.04865	-0.06793	0.079936	0.448181	0.08817	-0.16987	-0.08062	-0.09558	-0.24483
RL	0.241711	0.275379	0.797285	0.072559	0.251036	0.231559	-0.58236	0.235599	-0.06725	-0.18263	-0.03554	0.279133	0.541424
RLI	-0.11122	0.039181	-0.19643	0.876828	0.411919	-0.09076	-0.05563	0.052413	-0.05396	-0.02572	0.924785	0.037773	-0.02998
RLXCS	-0.13714	-0.2057	-0.44811	0.011618	-0.12463	-0.1314	0.233117	-0.25378	-0.00634	0.226464	0.093395	-0.20974	-0.11327
RQ	-0.17402	-0.23107	-0.59821	0.006487	-0.15973	-0.16419	0.314348	-0.19956	0.177872	-0.00522	0.092517	-0.23044	-0.39819
RQI	-0.14482	0.032783	-0.328	0.916559	0.242543	-0.12163	0.107977	-0.06648	-0.05596	-0.05385	0.980973	0.032149	-0.15842
RQXIA	0.148077	0.332813	0.702758	-0.02979	-0.15564	0.136779	-0.34527	0.042613	0.034714	0.010605	-0.12259	0.325904	0.846015
SR	-0.04055	-0.07356	0.171983	-0.20739	-0.16191	-0.05058	-0.02406	0.055606	0.364922	-0.27329	-0.23893	-0.06063	0.24223
VA	-0.17106	0.180689	0.161139	-0.31132	-0.98638	-0.17686	0.1056	-0.19976	0.049098	0.152554	-0.33168	0.186386	0.243509
VAI	-0.16748	0.101001	-0.16738	0.872413	0.188316	-0.14706	0.0113	-0.00472	-0.02598	-0.01275	0.910909	0.102976	0.017311

NSI	PS	PSI	PSXFI	RL	RLI	RLXCS	RQ	RQI	RQXIA	SR	VA	VAI
1												
-0.05545	1											
-0.97518	0.131868	1										
0.076622	-0.17375	-0.12338	1									
0.020077	0.802021	0.051898	0.015875	1								
-0.92259	0.102051	0.895123	-0.06209	0.036961	1							
-0.07519	-0.44499	0.026933	-0.06424	-0.55064	0.133326	1						
-0.0861	-0.35231	0.038821	-0.05712	-0.68596	-0.03326	0.250261	1					
-0.9793	0.006308	0.949548	-0.09725	-0.14694	0.882742	0.122609	0.269093	1				
0.119006	0.453714	-0.02239	-0.22728	0.641095	-0.13842	-0.25217	-0.5864	-0.21032	1			
0.226439	-0.03208	-0.18342	0.05341	0.135782	-0.26387	-0.12961	0.087673	-0.20027	0.257251	1		
0.340105	-0.27633	-0.30803	0.072778	-0.26807	-0.41816	0.132634	0.181633	-0.25045	0.173802	0.207586	1	
-0.90917	0.097968	0.897101	-0.25997	0.001855	0.852095	0.047802	0.037489	0.903187	-0.00159	-0.17882	-0.18719	1

Source: Eviews output

DIAGNOSTIC TEST RESULTS

Figure A. 1. Jarque-bera

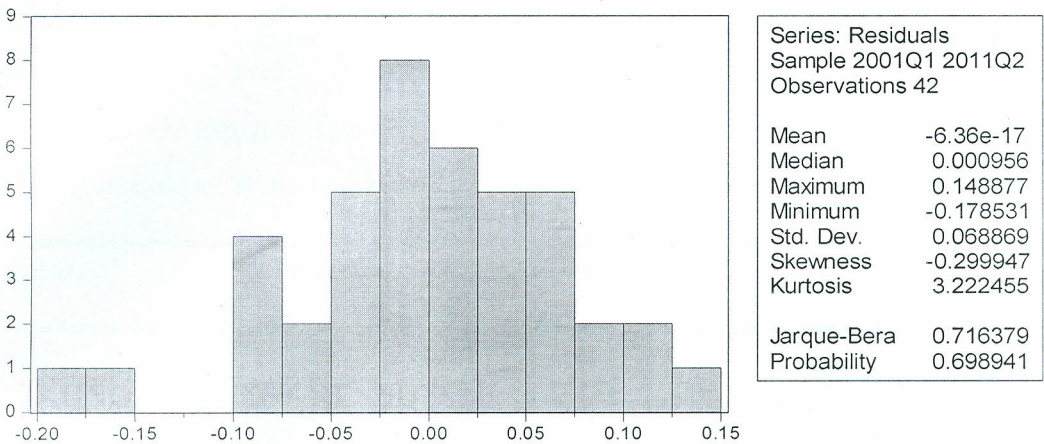


Table A 4 Serial correlation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.468405	Prob. F(2,23)	0.6318
Obs*R-squared	1.643746	Prob. Chi-Square(2)	0.4396
R-squared	0.039137	Mean dependent var	-6.36E-17
Adjusted R-squared	-0.712843	S.D. dependent var	0.068869
S.E. of regression	0.090133	Akaike info criterion	-1.672479
Sum squared resid	0.186850	Schwarz criterion	-0.886391
Log likelihood	54.12206	Hannan-Quinn criter.	-1.384347
F-statistic	0.052045	Durbin-Watson stat	1.973976
Prob(F-statistic)	1.000000		

Table A 5

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.185011	Prob. F(16,25)	0.3425
Obs*R-squared	18.11474	Prob. Chi-Square(16)	0.3172
Scaled explained SS	7.132086	Prob. Chi-Square(16)	0.9706

Source: Eviews output

Results of the regression model

Regression by ols

Dependent Variable: SR

Method: Least Squares

Date: 05/12/14 Time: 15:06

Sample (adjusted): 2001Q1 2011Q2

Included observations: 42 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AG	0.046366	0.211618	0.219101	0.8284
AI	0.517834	0.220596	2.347427	0.0271
CCI	4.52E-06	1.22E-05	0.371183	0.7136
CCXAGI	-0.049768	0.230296	-0.216104	0.8307
FI	0.000439	0.000918	0.477869	0.6369
FIM	0.000966	0.002405	0.401797	0.6912
GEI	-0.000402	9.43E-05	-4.263421	0.0003
GEXAI	-0.822427	0.353424	-2.327028	0.0284
NSI	-1.44E-05	9.87E-06	-1.454697	0.1582
PS	-0.254693	0.192438	-1.323506	0.1976
PSI	1.84E-05	1.39E-05	1.328960	0.1959
PSXFI	0.001763	0.000915	1.927181	0.0654

Source: Eviews output

Dependent Variable: SR

Method: ML - ARCH (Marquardt) - Normal distribution

Date: 05/23/14 Time: 11:41

Sample (adjusted): 2001Q1 2011Q3

Included observations: 43 after adjustments

Convergence achieved after 13 iterations

Presample variance: backcast (parameter = 0.7)

GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
----------	-------------	------------	-------------	-------

AG	-0.001183	0.003818	-0.309960	0.7566
Variance Equation				
C	0.001213	0.002949	0.411308	0.6808
RESID(-1)^2	-0.213424	0.160004	-1.333870	0.1822
GARCH(-1)	1.127320	0.261399	4.312642	0.0000
R-squared	-0.001514	Mean dependent var		0.004128
Adjusted R-squared	-0.001514	S.D. dependent var		0.109998
S.E. of regression	0.110081	Akaike info criterion		-1.573201
Sum squared resid	0.508951	Schwarz criterion		-1.409369
Log likelihood	37.82383	Hannan-Quinn criter.		-1.512785
Durbin-Watson stat	1.121340			

Dependent Variable: SR

Method: ML - ARCH (Marquardt) - Normal distribution

Date: 05/23/14 Time: 11:42

Sample (adjusted): 2001Q1 2011Q3

Included observations: 43 after adjustments

Convergence achieved after 23 iterations

Presample variance: backcast (parameter = 0.7)

GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
AI	-0.000710	0.004647	-0.152894	0.8785
Variance Equation				
C	0.001275	0.002955	0.431409	0.6662
RESID(-1)^2	-0.235624	0.183561	-1.283626	0.1993
GARCH(-1)	1.141788	0.248442	4.595784	0.0000
R-squared	-0.000047	Mean dependent var		0.004128
Adjusted R-squared	-0.000047	S.D. dependent var		0.109998
S.E. of regression	0.110001	Akaike info criterion		-1.584349
Sum squared resid	0.508205	Schwarz criterion		-1.420516
Log likelihood	38.06350	Hannan-Quinn criter.		-1.523932
Durbin-Watson stat	1.098647			

Dependent Variable: SR

Method: ML - ARCH (Marquardt) - Normal distribution

Date: 05/23/14 Time: 11:43

Sample (adjusted): 2001Q1 2011Q3

Included observations: 43 after adjustments

Convergence achieved after 32 iterations

Presample variance: backcast (parameter = 0.7)

GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
----------	-------------	------------	-------------	-------

GEI	-7.59E-06	8.91E-06	-0.852047	0.3942
Variance Equation				
C	0.011887	0.015830	0.750908	0.4527
RESID(-1)^2	0.165277	0.226570	0.729473	0.4657
GARCH(-1)	-0.222523	1.282751	-0.173474	0.8623
R-squared	0.037451	Mean dependent var		0.004128
Adjusted R-squared	0.037451	S.D. dependent var		0.109998
S.E. of regression	0.107919	Akaike info criterion		-1.484143
Sum squared resid	0.489150	Schwarz criterion		-1.320311
Log likelihood	35.90908	Hannan-Quinn criter.		-1.423727
Durbin-Watson stat	1.006926			

Dependent Variable: SR

Method: ML - ARCH (Marquardt) - Normal distribution

Date: 05/23/14 Time: 11:44

Sample (adjusted): 2001Q1 2011Q3

Included observations: 43 after adjustments

Convergence achieved after 29 iterations

Presample variance: backcast (parameter = 0.7)

GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
GEXAI	0.006272	0.011592	0.541008	0.5885
Variance Equation				
C	0.001257	0.002457	0.511419	0.6091
RESID(-1)^2	-0.248805	0.167894	-1.481915	0.1384
GARCH(-1)	1.161903	0.201665	5.761560	0.0000
R-squared	-0.015348	Mean dependent var		0.004128
Adjusted R-squared	-0.015348	S.D. dependent var		0.109998
S.E. of regression	0.110839	Akaike info criterion		-1.605226
Sum squared resid	0.515981	Schwarz criterion		-1.441394
Log likelihood	38.51236	Hannan-Quinn criter.		-1.544810
Durbin-Watson stat	1.189304			

Dependent Variable: SR

Method: ML - ARCH (Marquardt) - Normal distribution

Date: 05/23/14 Time: 11:45

Sample (adjusted): 2001Q1 2011Q3

Included observations: 43 after adjustments

Convergence achieved after 36 iterations

Presample variance: backcast (parameter = 0.7)

GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
----------	-------------	------------	-------------	-------

PSXFI	0.000378	0.000421	0.895927	0.3703
Variance Equation				
C	0.000752	0.002646	0.284268	0.7762
RESID(-1)^2	-0.250590	0.206095	-1.215893	0.2240
GARCH(-1)	1.203060	0.254163	4.733422	0.0000
R-squared	-0.005793	Mean dependent var		0.004128
Adjusted R-squared	-0.005793	S.D. dependent var		0.109998
S.E. of regression	0.110316	Akaike info criterion		-1.628773
Sum squared resid	0.511126	Schwarz criterion		-1.464941
Log likelihood	39.01862	Hannan-Quinn criter.		-1.568357
Durbin-Watson stat	1.122489			

Dependent Variable: SR

Method: ML - ARCH (Marquardt) - Normal distribution

Date: 05/23/14 Time: 11:46

Sample (adjusted): 2001Q1 2011Q3

Included observations: 43 after adjustments

Convergence achieved after 41 iterations

Presample variance: backcast (parameter = 0.7)

GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
RQ	-0.181236	0.036928	-4.907771	0.0000
Variance Equation				
C	0.001405	0.000745	1.884750	0.0595
RESID(-1)^2	-0.246223	0.083849	-2.936489	0.0033
GARCH(-1)	1.139790	0.103825	10.97801	0.0000
R-squared	-0.107900	Mean dependent var		0.004128
Adjusted R-squared	-0.107900	S.D. dependent var		0.109998
S.E. of regression	0.115780	Akaike info criterion		-1.731441
Sum squared resid	0.563014	Schwarz criterion		-1.567609
Log likelihood	41.22599	Hannan-Quinn criter.		-1.671025
Durbin-Watson stat	1.018157			

Dependent Variable: SR

Method: ML - ARCH (Marquardt) - Normal distribution

Date: 05/23/14 Time: 11:47

Sample (adjusted): 2001Q1 2011Q3

Included observations: 43 after adjustments

Convergence achieved after 28 iterations

Presample variance: backcast (parameter = 0.7)
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
RQI	-1.63E-05	2.62E-05	-0.619678	0.5355
Variance Equation				
C	0.012263	0.017648	0.694901	0.4871
RESID(-1)^2	0.149078	0.232350	0.641613	0.5211
GARCH(-1)	-0.231236	1.427727	-0.161961	0.8713
R-squared	0.031906	Mean dependent var		0.004128
Adjusted R-squared	0.031906	S.D. dependent var		0.109998
S.E. of regression	0.108229	Akaike info criterion		-1.471956
Sum squared resid	0.491968	Schwarz criterion		-1.308124
Log likelihood	35.64706	Hannan-Quinn criter.		-1.411540
Durbin-Watson stat	1.010190			

Dependent Variable: SR				
Method: ML - ARCH (Marquardt) - Normal distribution				
Date: 05/23/14 Time: 20:01				
Sample: 2001Q1 2011Q3				
Included observations: 43				
Convergence achieved after 17 iterations				
Presample variance: backcast (parameter = 0.7)				
GARCH = C(27) + C(28)*RESID(-1)^2 + C(29)*RESID(-2)^2 + C(30)				
*GARCH(-1)				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.249055	9.290018	0.026809	0.9786
AG	0.623713	0.841842	0.740891	0.4588
AI	-0.113532	0.906943	-0.125181	0.9004
CC	0.288893	3.226137	0.089548	0.9286
CC_X_AG_1	-0.677005	0.909640	-0.744256	0.4567
CC_X_AG_6	-0.032743	0.080155	-0.408494	0.6829
CCI	-6.57E-06	0.000190	-0.034629	0.9724
CS	0.000705	0.002852	0.247300	0.8047
FI	-0.000142	0.002900	-0.048945	0.9610
FIM	0.016275	0.026876	0.605556	0.5448
GE	1.670619	7.636019	0.218781	0.8268
GEI	-0.000249	0.000895	-0.278023	0.7810
GEXAI	0.183543	1.586185	0.115714	0.9079
IA	-0.000565	0.003851	-0.146826	0.8833
NSI	-2.07E-05	0.000597	-0.034620	0.9724
PS	-2.202137	3.385997	-0.650366	0.5155
PSI	1.57E-05	0.000142	0.110372	0.9121
PSXFI	-0.000179	0.001502	-0.119309	0.9050
RL	3.513115	9.729501	0.361079	0.7180
RL_X_CS	-3.09E-05	0.001544	-0.020012	0.9840
RLI	1.17E-05	5.43E-05	0.216042	0.8290
RQ	0.997641	4.600978	0.216832	0.8283
RQI	0.000425	0.000972	0.437176	0.6620
RQXIA	0.008963	0.012564	0.713355	0.4756
VA	-3.420540	8.090174	-0.422802	0.6724
VAI	1.58E-05	0.000159	0.099420	0.9208
Variance Equation				
C	0.001105	0.003666	0.301436	0.7631
RESID(-1)^2	0.129350	0.483789	0.267369	0.7892
RESID(-2)^2	0.043566	0.682329	0.063849	0.9491
GARCH(-1)	0.534007	1.416839	0.376900	0.7062
R-squared	0.709161	Mean dependent var		0.004128
Adjusted R-squared	0.281455	S.D. dependent var		0.109998
S.E. of regression	0.093242	Akaike info criterion		-1.461347
Sum squared resid	0.147799	Schwarz criterion		-0.232603

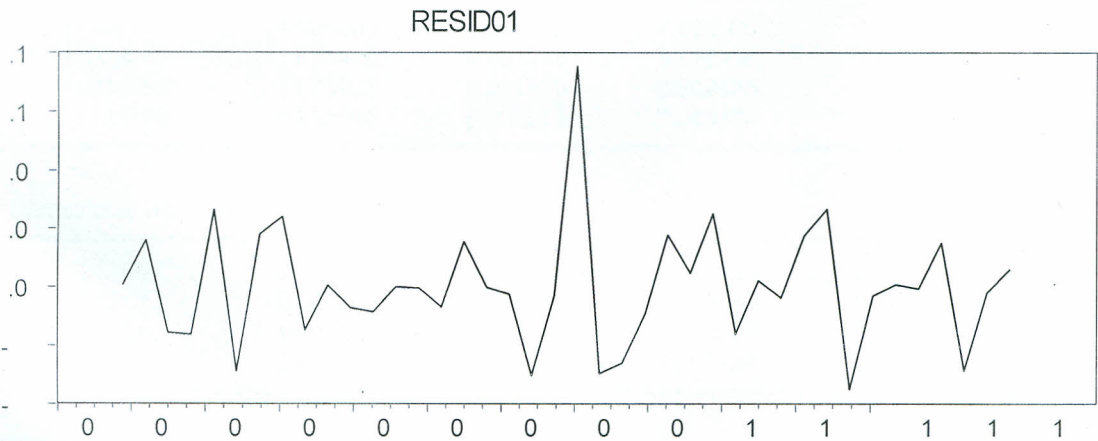
Pairwise granger causality tests

SR	f-statistics	Prob
AG does not granger Cause SR	0.187	0.8299
SR does not granger cause AG	4.70	0.0153
GE does not granger cause SR	3.16	0.0544
SR does not granger cause GE	0.2282	0.7971
GEI does not granger cause SR	4.4764	0.0184
SR does not granger cause GEI	1.27934	0.02906
NSI does not granger cause SR	4.79360	0.0158
SR does not granger cause NSI	1.20216	0.3123
PSI does not granger cause SR	4.79360	0.0143
SR does not granger cause PSI	0.87229	0.42266
RLI does not granger cause SR	7.48942	0.0019
SR does not granger cause RLI	1.010295	0.3733
RQI does not granger cause SR	4.21263	0.0227
SR does not granger cause RQI	0.77649	0.4676

ADF TEST FOR RESIDUALS

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.247148	0.0000
Test critical values:		
1% level	-3.600987	
5% level	-2.935001	
10% level	-2.605836	

GRAPH FOR RESIDUALS



Johansen Cointegration

Date: 06/05/14 Time: 15:59

Sample (adjusted): 2001Q3 2011Q3

Included observations: 41 after adjustments

Trend assumption: Linear deterministic trend

Series: AG CC RQI VAI

Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.873252	137.1791	47.85613	0.0000
At most 1 *	0.565719	52.49134	29.79707	0.0000
At most 2 *	0.315142	18.29471	15.49471	0.0184
At most 3	0.065430	2.774423	3.841466	0.0958

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.873252	84.68772	27.58434	0.0000
At most 1 *	0.565719	34.19663	21.13162	0.0004
At most 2 *	0.315142	15.52029	14.26460	0.0315
At most 3	0.065430	2.774423	3.841466	0.0958

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b*S11*b=I):

AG	CC	RQI	VAI
0.356453	-4.028039	1.88E-05	7.08E-05
0.023247	-11.74418	-0.001285	8.97E-06
-0.044583	15.75963	0.001849	-0.002465
-0.133488	4.239765	0.003671	-0.003864

Unrestricted Adjustment Coefficients (alpha):

D(AG)	D(CC)	D(RQI)	D(VAI)
-3.150210	-0.001227	149.3145	158.9547
-0.836381	0.005194	809.7193	762.8993
-0.341025	-0.005775	423.8523	438.7734
0.056699	0.003694	77.83280	91.29717

1 Cointegrating Equation(s): Log likelihood -552.4578

(60.7333)

(3384.84)

(0.37983)

VAR Granger Causality/Block Exogeneity Wald Tests

Date: 06/05/14 Time: 16:36

Sample: 2001Q1 2011Q3

Included observations: 41

Dependent variable: AG

Excluded	Chi-sq	df	Prob.
CC	10.94727	2	0.0042
RQ	148.0227	2	0.0000
VA	198.9583	2	0.0000
SR	1.497407	2	0.4730
All	220.5917	8	0.0000

Dependent variable: CC

Excluded	Chi-sq	df	Prob.
AG	0.425777	2	0.8082
RQ	0.391067	2	0.8224
VA	0.163358	2	0.9216
SR	1.827288	2	0.4011
All	3.323917	8	0.9124

Dependent variable: RQI

Excluded	Chi-sq	df	Prob.
AG	0.510777	2	0.7746
CC	4.208327	2	0.1219
VA	3.965259	2	0.1377
SR	1.078935	2	0.5831
All	12.14830	8	0.1447

Dependent variable: VA

Excluded	Chi-sq	df	Prob.
AG	0.487284	2	0.7838
CC	3.206626	2	0.2012
RQ	1.045716	2	0.5928
SR	0.975765	2	0.6139
All	4.998647	8	0.7577

Dependent variable: SR

Excluded	Chi-sq	df	Prob.
AG	0.342612	2	0.8426
CC	1.391243	2	0.4988
RQ	0.617961	2	0.7342
VA	1.749320	2	0.4170
All	11.01667	8	0.2008

VAR Granger Causality/Block Exogeneity Wald Tests

Date: 06/05/14 Time: 16:36

Sample: 2001Q1 2011Q3

Included observations: 41

Dependent variable: AG

Excluded	Chi-sq	df	Prob.
CC	10.94727	2	0.0042
RQ	148.0227	2	0.0000
VA	198.9583	2	0.0000
SR	1.497407	2	0.4730
All	220.5917	8	0.0000

Dependent variable: CC

Excluded	Chi-sq	df	Prob.
AG	0.425777	2	0.8082
RQI	0.391067	2	0.8224
VAI	0.163358	2	0.9216
SR	1.827288	2	0.4011
All	3.323917	8	0.9124

Dependent variable: RQI

Excluded	Chi-sq	df	Prob.
AG	0.510777	2	0.7746
CC	4.208327	2	0.1219
VAI	3.965259	2	0.1377
SR	1.078935	2	0.5831
All	12.14830	8	0.1447

Dependent variable: VAI

Excluded	Chi-sq	df	Prob.
AG	0.487284	2	0.7838
CC	3.206626	2	0.2012
RQI	1.045716	2	0.5928
SR	0.975765	2	0.6139
All	4.998647	8	0.7577

Dependent variable: SR

Excluded	Chi-sq	df	Prob.
AG	0.342612	2	0.8426
CC	1.391243	2	0.4988
RQI	0.617961	2	0.7342
VAI	1.749320	2	0.4170
All	11.01667	8	0.2008