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**EFFECTS OF ELECTION YEARS IN KENYA ON PERFORMANCE OF SHARES AT THE
NAIROBI SECURITIES EXCHANGE IN KENYA: THE MEDIATING ROLE OF MARKET
EFFICIENCY**

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**A RESEARCH PROPOSAL SUBMITTED TO THE SCHOOL OF MATHEMATICAL SCIENCES IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF FINANCIAL ECONOMICS
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Declaration

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the Research Proposal contains no material previously published or written by another person except where due reference is made in the Research Proposal itself.

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I would first like to thank God the Almighty for giving me the strength and wisdom to get this far. I am thankful to my supervisors Dr. Samuel Chege and Research Director Ferdinand Othieno for shaping my thinking and giving direction when it mattered most. Your feedback was invaluable.

Dedication

This research project is dedicated to you my mum, Lucy Njoroge, for being my constant source of inspiration. I thank you for your patience, understanding and moral support. God bless and keep you always.

Table of Contents

DECLARATION.....	II
ACKNOWLEDGEMENT.....	III
DEDICATION.....	IV
TABLE OF CONTENTS	V
ABBREVIATIONS AND ACRONYMS.....	VII
DEFINITION OF TERMS.....	VIII
LIST OF TABLES AND DIAGRAMS	IX
ABSTRACT	X
CHAPTER ONE	1
INTRODUCTION.....	1
1.1 Motivation of Study	1
1.2 Problem Statement	2
1.3 Research Objectives.....	2
1.4 Research Hypothesis.....	3
CHAPTER TWO	4
LITERATURE REVIEW	4
2.0 Introduction.....	4
2.1 Conceptual Framework.....	4
2.1.1 Elements of Conceptual Framework.....	5
2.2 Theories Supporting the Project.....	5

2.2.1 Efficient Market Hypothesis.....	5
2.2.2 Partisan Theory of Macroeconomic Cycles.....	7
2.2.3 Prospect Theory.....	8
2.3 Links between the Different theories.....	8
2.3.1 Link between Political Risk (Election) and Share Price Volatility.....	8
2.3.2 Link between Political Business Cycles and Share Prices/Returns and Market Efficiency	10
2.3.4 Link between public sentiment during election year and share prices	12
CHAPTER THREE	13
METHODOLOGY	13
3.1 Data types and data sources	13
3.2 The Model.....	13
CHAPTER FOUR	18
RESULTS, DATA ANALYSIS AND DISCUSSIONS	18
4.1 Data Analysis.....	18
4.2 Results and Discussion.....	18
4.2.1 Significance of Equation Coefficients.....	18
4.2.2 Election Business Cycle	19
4.2.2 Market Efficiency	20
CHAPTER FIVE	22
CONCLUSION, RECCOMENDATION AND POLICY IMPLICATIONS	22
APPENDIX	23
WORKS CITED	26

Abbreviations and Acronyms

EMH- Efficient Market Hypothesis

NASI- Nairobi All Share Index

PBC - Political Business Cycle/ Election Business Cycle

PEV –Post Election Violence

NSE20- NSE 20 Share Index

CHAPTER ONE

INTRODUCTION

The Efficient Market Hypothesis is a core theory which explains how the securities markets work. It proposes that capital markets are efficient to varying degrees where in this context, the term efficient means that the price of a share reflects information that pertains to the company (Fama, 1969). There are two types of investors, those who can consistently make above average returns and the other, those who lose their money due to unfavorable movements in the market. According to (Fama, 1969) market players can't earn an above average return on their investment from information trading as long as markets are efficient, where information trading is making investment decisions based on information acquired on various securities. This gives rise to phenomena which can't be explained by EMH. Examples are 'day of the week' effect and 'month of the year' effect which shows that on certain days, returns are lower than on others. (Gao, 2005) shows that an investor making decisions based on such phenomena could very well earn abnormal returns

Expectations on election outcomes tend to influence the level of business activity in a country (Faal, 2007). (Otieno, 2016) shows that during election years, the GDP of Kenya contracts due to factors including expectations of investors on the election outcome and uncertainty about future changes in the legal aspect of conducting business. This is contrary to evidence from some developed as well as other emerging economies where (Block, 2002) states that an economy expands as a result of fiscal stimulus prior to election years as an incumbent administration chases something tangible to show for in bid to get votes.

Politics and financial markets have an important link as the markets act as a source of funds for government expenditure. Governments use Repos and Reverse Repos as monetary policy instruments as well as sovereign bonds for various projects. The markets also, through share prices, act as mirrors of public expectations on the outcome of the elections following the tenets of EMH. Some markets, such as the Iowa Electronic Market are used to predict election outcomes with great accuracy via the share prices, indices and the volumes traded during these election periods (Berg, 2008).

1.1 Motivation of Study

Numerous studies have investigated links between General Elections, volatility of share returns over this period, political business cycles and market efficiency both in developed and emerging markets. (BialKowski, 2008) discusses the effects of elections on volatility of share returns and effects of elections

on the stock market, (Menge, 2013) examines the performance of stocks pre and post-election where he finds that stock returns are significantly higher before than after an election. (Lusinde, 2012) Investigates effects of the same on volatility of returns using 20 blue chip companies where he finds that volatility stock returns increases during general elections. While this work is commendable as recent and pioneer work in Kenya, it is neither conclusive nor adequately representative where (Lusinde, 2012) looks at the twenty top performers at the NSE which are hardly representative of the economy and (Menge, 2013) is inconclusive as he looks at only market return as the only factor that affects company performance.

This project investigates the impact of elections on the share prices or the face value of the firms listed in the NASI and the implications it has on EMH. The use of the NASI index would give a robust illustration of general election effects on stocks at the NSE as it is a benchmark index comprising of all stocks of companies listed on the NSE. Looking at the implications this would have on EMH adds to existing literature on this field. To the best of my knowledge, there is limited work in Kenya showing the relationship between EMH and Election Periods and volatility of share returns over Election Periods.

1.2 Problem Statement

Past studies done on volatility, election period and EMH in Kenya, have a gap between the volatility of share returns around the election period and EMH. Studies which have been carried out thus far in Kenya have focused on the effects of elections on the stock market and volatility of returns of NSE 20 listed companies around general elections in Kenya leaving out the aspect of overall market efficiency.

(Kithinji, 2005) studies the impact of general elections in Kenya on stock market performance which involves undertaking a monthly trend analysis of the NSE 20. He concludes that it is difficult to safely confirm that the general election is an event that causes the difference in market performance.

(Murigi, 2008) carries out research investigating the effect of General Elections on returns of securities at the NSE. He examines excess returns for every market segment in the NSE 60 days pre and post-election during the 1992,1997 and 2002 elections .The market model is used in this study with the conclusion being that that the Financial and Investments segment experiences higher change in security prices during election years.

1.3 Research Objectives

The objectives of the study are as follows

1. To investigate if share prices at the NSE experience excess volatility around election period

2. To establish if the excess volatility implies an Election Business Cycle and its implications on Market efficiency.

1.4 Research Hypothesis

The research hypotheses are two and they are

H_{01} : Share prices do not experience excess volatility around election period

H_{A1} : Share prices experience excess volatility around election period

H_{02} : The excess volatility does not imply an Election Business Cycle and has no implications on Market efficiency

H_{A2} : The excess volatility implies an Election Business Cycle and has implications on Market efficiency

1.5 Scope of the Study

This paper limits its scope to election years where there was a significant change in government regime such as the 2002 General election or the changing from coalition government to multiparty elections such as the 2013 general elections. The study compares share return volatilities and actual share returns from 2011 to 2015

1.6 Significance of the study

One intended outcome of this paper is to show that uncertainty related to election outcomes has implications for the risk-averse investor. According to (Baxter, 1997), majority of investors hold domestic assets which may expose them to diversifiable risk i.e. country specific political risk. A portfolio of mainly domestic risk is subject to this country specific risk on the onset of elections. This is illustrated by the volatility of returns experienced around election period which would otherwise be avoided by holding a portfolio with mixed asset classes of different geographical regions.

This paper also proposes that investment in equities around election period would be a bad decision for risk-averse investors. Over this period, returns are more volatile and the likelihood for an adverse outcome occurring is significantly higher. This is a result of market wide fluctuations in response to election shocks augmenting the systematic volatility of all stocks listed.

CHAPTER TWO LITERATURE REVIEW

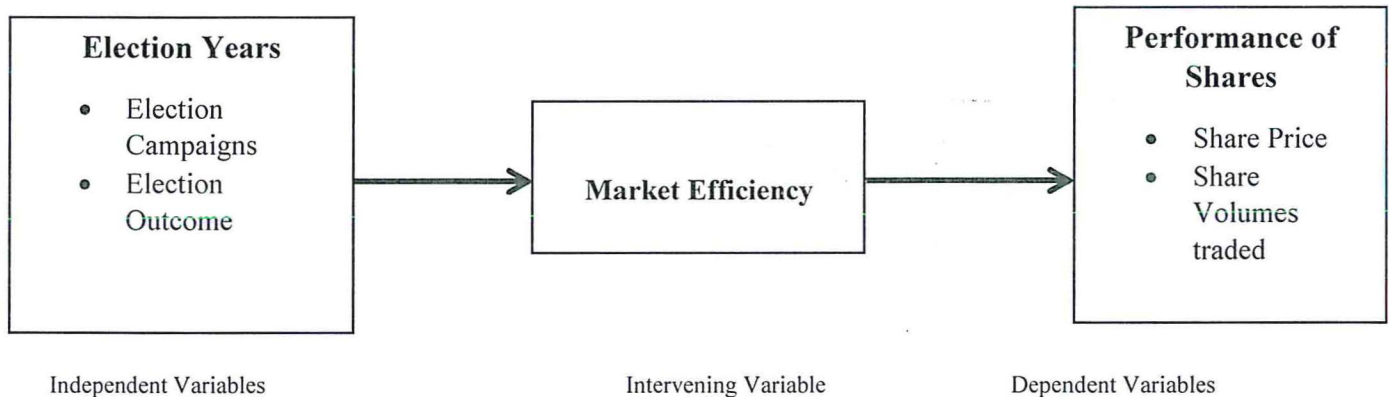
2.0 Introduction

Effects of elections on the performance of shares on different exchanges across the globe have been an area of interest in Finance and Economic academia for quite some time. In Economics, more specifically Macroeconomics, this would allude to presence of Political Business Cycles which would make valid cases for Monetary Authority Independence (Mishkin, 2000) and (Alesina, 1993). For Finance, on the other hand, this would disprove an established theory such as EMH (Fama, 1969). Of course this would be hinged on the particular market under study as different markets have different characteristics. For example a market might have majority of participants believing in the Information View of Investment (Durnev, 2010). Market phenomena of similar stature that have received like interest are, the January effect and the Day of the Week effect of share prices where share returns are considerably low on certain days of the weeks or certain months (Gao, 2005). According to (Lean, 2007), there are different reasons for the day of week effects, such as companies releasing bad news on Fridays. The above studies may have implications for market efficiency due to the predictability of these cycles but these are relatively short periods on which to base cycles on. Election periods are longer periods for which propositions of cycles would undermine the validity of Market Efficiency if it was proven that there is increased volatility of share prices over election periods and thus a predictable pattern that could be exploited.

According to the efficient market hypothesis (Fama, 1969), in an efficient market, share prices reflect all currently available information. More in the context of presidential elections, information about future economic policies and sector inclination in a given country mostly can be inferred from changes in the political landscape through a party's manifesto during campaigns and the personal make up of a president candidates and his intended administration. On one hand this information will be reflected in share prices if the market is efficient and on the other, it would affect expectations of investors differently and these expectations directly affect the price of shares.

In the Kenyan context research by (Lusinde, 2012) concludes that blue chip stocks at the NSE experience higher volatility around the election period (3 days to and after the election period). His focus is on individual companies of the NSE20. He studies the volatility at a three day event window (that is 3 days post and ex the election) while this study intends to have its event window as a year ex and post.

2.1 Conceptual Framework



2.1.1 Elements of Conceptual Framework

2.1.1.1 Election Campaigns

Also known as political campaign, this is an organized effort which seeks to influence decision making process within a specific group

2.1.1.2 Election Outcome

These are the results of a presidential general election

2.1.1.3 Market Efficiency

This is a core theory in finance which proposes that when a market is efficient, the share price reflects all available information pertaining to that share (Fama, 1969).

2.1.1.4 Share Price

This is the highest amount that someone is willing to pay for the stock or the lowest amount that it can be bought for.

2.2 Theories Supporting the Project

There are theories which form the backbone of this project paper and these are EMH, Partisan Theories of Macroeconomic Cycles, Prospect Theory and Political or Election Business Cycle. Each theory deals with individual disciplines which when linked together form the basis of this project

2.2.1 Efficient Market Hypothesis

(Malkiel, 1970) states that the role of a capital market is allocation of ownership of the economy's capital stock. They state that the ideal world is a capital market is one which firms can make production

investment decisions and investors can choose among securities that represent ownership over these activities assuming that these prices at any time fully reflect all available information. From this aspect of fully reflecting all available information is called efficiency. A few assumptions are made in earlier works on EMH in-order to support the statement share prices fully reflect all available information. These are i) successive price changes are independent and ii) successive price changes are identically distributed. These two assumptions imply the random nature or the random walk model of share prices

In-order for the capital market efficiency to hold, there is a set of sufficient conditions that has to be met. One should consider a market where there are no transaction costs in trading securities, all available information is costlessly available to all market participants and all market participants accept the implications of the freely available information on the prices (current and future) of shares. However looking at the sufficient conditions, some of them would only exist in an ideal world and current securities markets exist and operate in a very different manner. For one there are transaction costs that arise when trading securities, these can be brokerage fees, costs of gathering information and secondly information is costly and not all individuals have access to information or rather different market participants have different sets of information. Regardless of this problem of information asymmetry (Akerlof, 1970) and there being transaction costs, these capital market conditions are sufficient but not necessary. According to (Malkiel, 1970) transaction costs, information that is not freely available to investors and disagreement among investors about the implications of given information are potential sources of market inefficiencies.

According to (Malkiel, 1970) there are types of information subsets that share prices adjust to, giving rise to three forms of efficiency which are weak form efficiency, semi-strong form efficiency and strong form efficiency. When a market is efficient in the weak form, share prices reflect all historical data on the share prices. One implication of weak form efficiency is that an investor cannot make an abnormal return by trading from studying historical share data (technical analysis). When a market is efficient in its semi strong form, share prices reflect all publicly available information, the implication being an individual cannot make above abnormal returns by acting upon all publicly available information (fundamental analysis). When a market is efficient in its strong form, the shares reflect all available information, publicly available and the non-publicly available. This implies that an investor acting upon information that is not publicly available cannot make an abnormal return. (Chordia, 2008) finds that liquidity encourages arbitrage activity which in turn enhances market efficiency. The implication is that in more liquid regimes, a market is more efficient as a result of investors trying to take advantage of arbitrage opportunities. Arbitrage is an instance when an investor can make a riskless return on an investment.

This world of efficient capital markets is an idealistic one, however it has been observed that most developed markets are efficient in the semi strong form and most emerging markets are efficient in the weak form (Mobarek, 2008). For example in our case, (Mlambo, 2007) and (Appiah-Kusi, 2003) hold that the Nairobi Securities Exchange, among others, are efficient in the weak form.

2.2.2 Partisan Theory of Macroeconomic Cycles

Theory of macroeconomic policy proposes that political parties weight nominal and real economic performance differently. According to (Hibbs, 1994), left party governments are more inclined than right wing ones to pursue expansive policies which are ultimately meant to yield lower unemployment and higher growth but also assuming the risk of higher inflation. (Norberto, 1997) holds that a left wing party is one that supports social equality through the welfare state through industrial democracy while a right wing party is a conservative party that is rooted in social hierarchy and un-equality and seeks to conserve that and one that supports Laissez Faire capitalism. The welfare state is concept of government where the state plays a key role in the protection and promotion of social and economic well-being of its citizens. (Vergne, 2009) and (Faal, 2007) hold that the Partisan Theory does apply to emerging markets in Africa and more specifically Kenya but and this helps explain the emergence of business cycles in the Kenya and thus see its implications on EMH.

According to (Hibbs, 1994) the main aim of the governing party is implementing policies that favor their core voters. This means that when there is a shift of government, economic policy and outcome fluctuations are political signals with higher output and inflation plus a lower unemployment rate being a hallmark of left wing parties.

One of the main propositions of Partisan theory is that each party has its own *Modus Operandi* regarding to its Economic Policy. Therefore a party that has more sound economic policies or has those which have a proven track record should have most of the indicators in its favor. (Menge, 2013) holds that apart from inflation, gross domestic growth and unemployment, a countries stock exchange should also reflect this by having a higher return on average . (Nordhaus, 1975) stipulates that politicians are able to repeatedly fool voters even though voters have formed a view of outcome of upcoming elections. These early political business cycle models are based on the assumption that voters are myopic which is explained by faster rates of real growth and higher inflation in pre-election periods. More recent work deviates from this assumption and instead base the models on the Lucas Critique (Lucas, 1976) which proposes that

economic actors form rational expectations by optimally using all available information to forecast the future

2.2.3 Prospect Theory

People respond to risk and uncertainty in different ways based on their character. The securities exchanges, like other markets, are comprised of buyers and sellers who are essentially people with different behavioral traits. These behavioral and character traits ultimately influence how market participants make decisions under uncertainty and risk. (Kahneman, 1979) propose that people assign less value to outcomes which are only probable to outcomes that are obtained with certainty. This is called the certainty effect which causes individuals to be risk averse when making choices that involve sure gains and to be risk seeking when making choices that involve sure losses. When we say an individual is risk averse, they prefer an outcome or a prospect that is certain to any risky prospect that has an expected but not certain outcome.

When making decisions, individuals usually eliminate or factor out aspects of the outcomes which are similar to each other. This tendency is called the isolation effect and it causes an individual to have inconsistent preferences when making a decision on the same prospect but presented in different forms.

They conclude that investors however are not consistently risk averse and that their behavior changes with the outcomes facing them. (Kahneman, 1979) conclude by saying that investors are risk averse when they are facing gains and are risk seeking when they are facing losses. These findings are inconsistent with the findings of Expected Utility Theory which proposes that individuals weigh decisions based on how much their total wealth will be after the outcome. This is not the case however as individuals look at prospects as gains or losses and not as total wealth after the outcome.

2.3 Links between the Different theories

2.3.1 Link between Political Risk (Election) and Share Price Volatility

Political Risk refers to the risk that investment returns could suffer as a result of change in political regime or instability in a country. This is associated with the uncertainty of the business landscape in

which a firm operates in, which is in turn is hinged on the government in administration, which is a multi-party state is determined by the outcome of an election. In a period preceding national elections there is usually a lot of uncertainty pertaining to business and economic prospects of a country. This is particularly evident in Kenya and other emerging economies (although not limited to) in the world. Prior to the 2007 election, research shows that most prudent business' postponed purchase of inventory and new supplies and instead opted to sell of their current inventory. In response to this uncertainty rational managers and investors postpone investments until this uncertainty is resolved after the elections (Julio, 2012)

(Durnev, 2010) posits that during election years, company share prices are less volatile. This is a result of investors being of the belief that shares do not reflect sufficient firm specific information to be decision making criteria. This is caused by election outcome uncertainty and the pre-election period policy changes. This makes stock prices noisier signals for an investor to follow when making investment decisions. Following these rationale investors would not base their decisions on the share prices but rather on other factors such as fundamentals. An investor would thus rely less on share prices if he had more information on a company relative to other investors. Information that would affect decision making would be information such as tender awards or likely economic government stances like Jubilee government's stance on digital integration.

This however can be disproved owing to the fact that not all investors are rational and are aware of the informational view of investment causing the share prices to be volatile due to investor beliefs and expectations as follows from efficient market hypothesis and not everybody is privy to this information(insider dealing) which is a convictable offence.

(BialKowski, 2008) seeks to link election shocks with the level volatility of shares in different countries in the OECD. Election shocks are the investor's surprise at the final outcome of the elections. Here indexes as representative of each country's stock market and counter specific political risk. These shocks are strongly reflected in share prices in accordance to (Fama, 1969) and increased levels of volatility are observed. The paper highlights that market participants tended to act in a volatile manner when elections were closely contested, change in political orientation in the government and if the country had compulsory voting laws. The first two factors contributed to the uncertainty and hence volatility while voting laws improved certainty as reduced the chance of marginal voting groups causing surprises in the voting outcome

In support of the arguments forwarded above, (Kim, 2001) asserts that political events such as presidential elections have a significant impact on the market volatility and returns. The paper makes use a components jump filter to identify market return and volatility jumps and then subsequently selects those associated with political developments.

2.3.2 Link between Political Business Cycles and Share Prices/Returns and Market Efficiency

A phenomenon that poses a valid challenge to the Efficient Market Hypothesis is that of Political Business Cycles (Nordhaus, 1975) or Election Business Cycles (Julio, 2012)

These Political cycles of investment or election business cycles are caused when the incumbent government attempts to synchronize their spending pattern with their terms in office. This means pursuing expansionary policies when election years are near and when they are re-elected they adopt contractionary measures to curb inflation (which was caused by the same expansionary policies) (BialKowski, 2008).

(Julio, 2012) alludes to the existence of political cycles of investment and show that electoral uncertainty decreases corporate investments at the firm level. Their main argument is that political uncertainty creates uncertainty whether the investment will payoff in the future.

(Wong, 2009) map the presidential election cycle in United States stock markets. Their study reveals that approximately four decades from January 1965 through to December 2003, US stock prices closely followed the four-year Presidential Election Cycle where in general, stock prices fell during the first half of a Presidency, reached a trough in the second year, rose during the second half of a Presidency, and reached a peak in the third or fourth year. This trend is found to have been adopted by greater part of the last ten United States administrations,

(Nordhaus, 1975) also postulates that, irrespective of their political orientation, incumbents parties primary goal is vote maximization and thus policies are pursued to solely to win elections. Following this, the incumbents will try to self-servingly attune their spending to the timing of elections. The result is a Political Business Cycle that has troughs and peaks. However the incumbent government can only pursue such tactics successfully if the public do not have rational expectations (Rogoff, 1990).

(Booth, 2003) states that the U.S. stock market tends to perform better in the final two years of the presidential term. This affirms (Allvine, 1980) on existence of electoral business cycle but can also be explained behaviorally. One reason for improved performance is that investors have high expectations that the new administration will deliver on its pre-election promises. However when these expectations are not met the optimism wears off and this reflected accordingly in the stock market.

(Allvine, 1980) find that stock performance is stronger in the 2 years preceding an election compared to 2 years after. In the paper different investment strategies are pursued to see the behavior of stock prices pre and post-election year. Their results do have interesting implications for the random walk assumptions of shares being unpredictable and un-exploitable in (Fama, 1969). Based on the time series properties of stocks (i.e. Stocks having a generally upward trend and the trend having significant movements) one implication is that an investor can earn a positive return in the stock market if he manages to invest in a representative set of stock and holds them for a long enough period for the positive and negative movements to cancel each other out, leaving the trend growth as price appreciation. The second implication is that if an investor can predict these movements with accuracy then he/she would make even greater returns.

(Morgenstern, 1963) discovered a statistical dependence (thus challenging efficient market hypothesis on the randomness of share prices) in change of stock prices over long cycles but underplayed the importance in the following manner: "The evidence of 'cycles' obtained in our studies is so weak that cyclical investment is at best only marginally worthwhile. Even this small margin will rapidly disappear as it is being made use of. "

To test the above (Allvine, 1980) compare the use of a buy and hold strategy and a trading strategy. The trading strategy is set up to buy/switch from stocks to money market instruments in accordance to the presidential cycle in stock prices. Here the presidential cycle in this context is the four year political business cycle where politicians have a strong incentive to stimulate economy prior to an election year then pursue contractionary policies after the election year. While this may hold true for the US economy, this may not be the case for Kenya. In Kenya business is considered to slow down in an election year due to uncertainty concerning the political stability of the country. The findings indicate that share prices are more sensitive during election years and also a trading strategy is superior to a buy and hold strategy thus discrediting Efficient Market Hypothesis.

2.3.4 Link between public sentiment during election year and share prices

When a market is efficient, share prices reflect all publicly available information (Fama, 1969), including public sentiment pertaining to an election. This public sentiment could cause changes in the volatility of share prices depending on public mood and general atmosphere during the pre and post-election period.

There are many ways of measuring public sentiment in a bid to predict elections and one of those ways is use of opinion surveys or polls. During election campaigns and key legislative processes, polls are important tools which act as a forecast to as how events will shape up. Earlier methods of polling were often inadequate as predictive tools if not plain expensive to conduct. Some of these methods included stopping people in the streets or visiting people in their households (MacInlay, 1997). When covering a large population this proved to give unrepresentative samples and was costly. This method was abandoned in favor of telephone based surveys where pollsters use randomizing systems to come up with lists of numbers to dial. However a more efficient method of measuring public sentiment pertaining to elections especially in Kenya would be coming up with samples from voter registration lists (Green, 2003). This, albeit a long way from achieving this, would greatly improve the accuracy of pre-election polls and furnish public and politicians alike with valuable information.

(Bollen, 2011) use a novel approach in measuring this public sentiment by using of data from twitter feeds to gauge effect of public sentiment on the Dow Jones Industrial Index over the period of 2008 elections. One might imagine that this is a new way of gathering public sentiment but this is hardly far from it. Social media platforms and the internet have provided marketers, analysts and pollsters with a rich toolbox to conduct with research. An example would be how Google search queries have been used to provide early indicators of consumer spending patterns and disease outbreaks or in the case of consumer profiling, where firms offer other corporations profiles of individuals, which are made up from an individual's day to day navigation of the internet (Bughin, 2013). In (Bollen, 2011), they state that the calmness (or excitement levels) of the public on twitter is thus predictive of the DJIA rather than general levels of positive sentiment.

In general, rational investors will strive to assess voter sentiment using all available sources of information, such as polls, macroeconomic data, electoral debates, or media reports. According to (BialKowski, 2008), in an efficient market, investor expectations will be aggregated into a consensus forecast, and stock prices will move to reflect it

The link between mood and public sentiment during election year and share prices is also well illustrated in (Nofsinger, 2004), who is of the school of thought that stock market is a barometer of public sentiment and its movements can indicate whether incumbents will be re-elected prior to an election year.

CHAPTER THREE METHODOLOGY

3.1 Data types and data sources

The data set to be used are the daily returns from which the daily volatilities of the NSE20 will be extracted. In the study the frequency of data employed is daily returns and volatilities to allow heteroskedasticity during the shocks (election period) to be more evident as proposed by (Rigobon, 2003). Data on the index will be obtained from the Nairobi Securities Exchange.

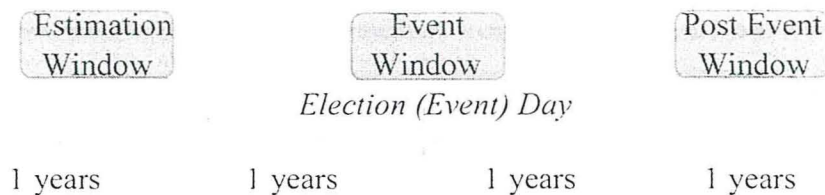
The data will span from 2011 to 2015 in order to capture the effects of the 2013 general election and to see the returns over the 4 year cycle. This period of time was chosen because there was a significant change in government regime, from coalition government to multiparty elections.

3.2 The Model

We gauge the impact of the shocks (presidential elections) on the second moment of return distribution using a volatility event study approach as outlined in (MacInlay, 1997)

The procedure is as follows:

- i. Identification of the event of interest. Here the events of interest are the presidential elections in Kenya for the years 2002, 2007 and 2013.
- ii. Definition of the event window. The event window shall be one year to election day and the one year after election day as follows



- iii. Selection of the sample set of firms (NSE20) to be included in the analysis
- iv. Prediction of a “normal” return during the event window in the absence of the event. Here we shall need to predict what the return would have been had there been no elections using both NSE20 and NASI returns.
- v. Estimation of the “abnormal” return within the event window, where the abnormal return is defined as the difference between the actual and predicted returns, without the event occurring. This explained further below
- vi. Compare visually the plot of the actual variance and the benchmark variance through the election cycle.
- vii. Testing whether the abnormal return is statistically different from zero

The study will involve computing the changes recorded in share returns which will be gotten from past NSE20 prices.. To arrive at conclusive results, the study will compare the performance of the NSE20 before, during and after general 2013 elections

This will be done by first conducting an analysis by isolating the NSE20 component of variance within a GARCH (1,1) framework:

$$R_{i,t} = \alpha + \beta R_t^* + \varepsilon_{i,t}, \varepsilon_{i,t} \sim N(0, h_{i,t}) \quad 1.1$$

$$h_{i,t} = \gamma_0 + \gamma_1 h_{i,t-1} + \gamma_2 \varepsilon_{i,t-1}^2, \quad 1.2$$

Where:

$R_{i,t}$ and R_t^* are the continuously compounded (log) returns on the NSE20 and a proxy of the market (represented by Nairobi All Share Index) on day t, respectively.

$\varepsilon_{i,t}$ denotes the NSE20 returns, and $h_{i,t}$ stands for its conditional volatility.

Equation (1.1) and (1.2) are estimated jointly using the Maximum Likelihood (ML-ARCH/Marquardt) method over a period immediately preceding the event window, the event window being the time the event occurs.

(Brown, 1985) prescribe the use of 250 daily returns to estimate the benchmark model. However this might prove inadequate to model GARCH processes accurately and a larger number of daily returns are required. We choose a time period of 1242 trading days divided accordingly into 3 periods, one year as the estimation window, two years as the event window and one year as the post estimation period. We then proceed to measure abnormal volatility which to do this, we need to consider variation in $\varepsilon_{i,t}$ around the event date in relation to its regular level when the event is not occurring. We use the GARCH model to predict what the volatility would have been had the election not happened.

However as noted in (BialKowski, 2008), equation (1.2) is a one step ahead forecast and won't generate an event-independent projection. To remedy this, we make the volatility forecast conditional on the information set available prior to the occurrence of the event. The benchmark for volatility for the n-th day we will use shall be defined as follows.

$$E[h_{i,t^*+n}|\Omega_{t^*}] = \hat{\gamma}_0 \sum_{j=0}^{n-1} (\hat{\gamma}_1 + \hat{\gamma}_2)^j + (\hat{\gamma}_1 + \hat{\gamma}_2)^{n-1} \hat{\gamma}_1 h_{i,t^*} + (\hat{\gamma}_1 + \hat{\gamma}_2)^{n-1} \hat{\gamma}_1 \varepsilon_{i,t^*}^2. \quad (1.3)$$

The distribution of the residuals during the event window can be described as

$$\varepsilon_{i,t} \sim N(AR_t, M_t \cdot E[h_{i,t}|\Omega_{t^*}])$$

Where:

M_t , is the multiplicative effect of the event on volatility,

AR_t Is the event induced abnormal return and $t > t^*$.

With our null hypothesis that the investors are not surprised by the outcome of the election, M_t should be equal to 1 as there is no multiplicative effect of the election on the volatility of returns. When we demean the residuals with the cross section average (i.e. subtract the cross sectional average from each observation), this would make them normally distributed with a mean of zero. Their variance, under the assumption of residual orthogonality, would be given by:

$$\begin{aligned} \text{var} \left(\varepsilon_{i,t} - \frac{1}{N} \sum_{i=1}^N \varepsilon_{i,t} \right) &= M_t [E[h_{i,t} | \Omega_{t^*}]^{\frac{N-2}{N}} + \frac{1}{N^2} \sum_{j=1}^N E[h_{i,t} | \Omega_{t^*}]] \\ &= M_t \cdot EIDRV_{i,t}, \end{aligned} \quad (1.4)$$

Where:

$EIDRV_{i,t}$, Stands for the event-independent demeaned residual variance and N is the number of events included in the sample.

The parameter of interest is M_t which measures the effect of election shock on volatility in the exchange. (Hillard, 2002) gives us a means in which to estimate this parameter (How? And why.. on combining residual standardization with a cross-sectional approach in the spirit of Boehmer et al. (1991. To answer why—to come up with M_t for the actual observed data)), where we calculate the estimate as cross-sectional variance of demeaned residuals, standardized by the event-independent demeaned residual standard deviation $[EIDRV_{i,t}]^{1/2}$

$$\widehat{M}_t = \frac{1}{N-1} \sum_{i=1}^N \frac{(N \cdot \widehat{\varepsilon}_{i,t} - \sum_{j=1}^N \widehat{\varepsilon}_{j,t})^2}{N \cdot (N-2) \cdot [E[h_{i,t} | \Omega_{t^*}] + \sum_{j=1}^N E[h_{i,t} | \Omega_{t^*}]} \quad (1.5)$$

Where $\widehat{\varepsilon}_{j,t} = R_{i,t} - (\widehat{\alpha} + \widehat{\beta} R_t^*)$ and $t > t^*$

Under the null hypothesis, the demeaned standardized residuals follow a standard normal distribution because M_t equals one. Consequently, the abnormal percentage change in volatility on any day t of the event window is $(\widehat{M}_t - 1)$. For a given event window (n_1, n_2) the cumulative abnormal volatility can be calculated as

$$CAV(n_1, n_2) = \left(\sum_{t=n_1}^{n_2} \widehat{M}_t \right) - (n_2 - n_1 + 1) \quad (1.6)$$

The null hypothesis can thus be expressed as

$$H_0: CAV(n_1, n_2) = 0 \quad (1.7)$$

Which is equivalent to

$$H_0: \sum_{t=n_1}^{n_2} M_t (N-1) = (n_2 - n_1 + 1) \cdot (N-1) \quad (1.8)$$

Since under the null, M_t is a variance of N independent $N(0,1)$ random variables $\widehat{M}_t (N-1) \sim \chi_{N-1}^2$ and $\sum_{t=n_1}^{n_2} \widehat{M}_t (N-1) \sim \chi_{(N-1)(n_2-n_1+1)}^2$. The test statistic for Eq.(1.7) will be

$$\varphi(n_1, n_2) = \sum_{t=n_1}^{n_2} \widehat{M}_t(N-1) \sim \chi_{(N-1)(n_2-n_1+1)}^2 \quad (1.9)$$

CHAPTER FOUR

RESULTS, DATA ANALYSIS AND DISCUSSIONS

This chapter presents findings on the Arch Model employed and the significance of the test statistic from the collected and analyzed data. The data analysis is presented in form of a line graphs and tables. It depicts the volatility of abnormal returns (subtracting the predicted returns from the actual returns).

Depending on the results, we are able to make inferences on the election business cycle and its implications on market efficiency at the NSE.

4.1 Data Analysis

This part describes the steps undertaken to analyze the data. NSE20 and NASI Index return data for a period of 2yrs before the election and 2 years after the election is collected with the event date being 4th March 2013

The data is tested for presence of ARCH effects (Appendix i) and subsequently a GARCH model is employed in estimating the mean and the variance equations.(Appendix ii).From the variance equation we then extract the conditional volatility which we then use to estimate the benchmark volatility. This is the volatility that would be experienced in absence of the event.

Using the benchmark volatility, we find the multiplicative effect of the event, which is then used to come up with a test of significance which has a chi square distribution. Equation (1.9) in the previous chapter.

4.2 Results and Discussion

4.2.1 Significance of Equation Coefficients

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000151	0.000117	1.987044	0.2002
NASI_LOG_RET	0.046677	0.005853	7.974266	0.0000
Variance Equation				
C	6.30E-06	5.64E-07	11.16318	0.0000
RESID(-1)^2	0.298494	0.022305	13.38236	0.0000
GARCH(-1)	0.608750	0.019546	31.14486	0.0000

Table 1: shows the results of the coefficients of the estimated mean and subsequent variance equation.

The constant and the coefficient of Nairobi All Share Index in the mean equation are statistically different from zero at 95% confidence interval while in the Variance equation, all coefficients are also statistically different from zero. This allows us to examine the effect of the independent variable on the dependent variables well.

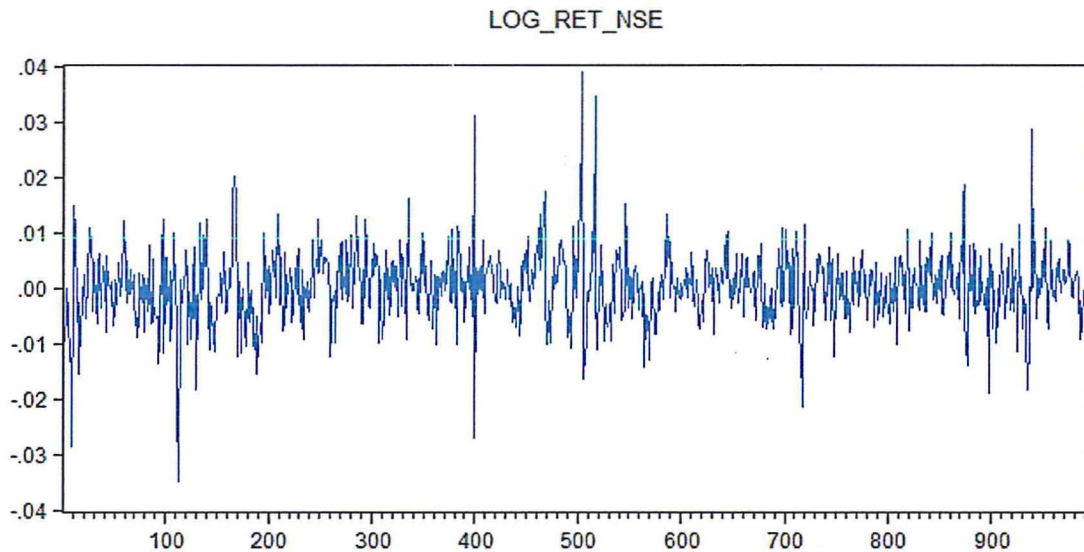
Below is the chi square test for the test statistic

Mt(N-1)	Comment
293.103921	This value exceeds the chi sq critical value

4.2.2 Election Business Cycle

In the overall period from 4th March 2012 to 4th March 2014(event window), the Nairobi Securities exchange has experienced excess volatility compared to the estimation window, 4th March 2011 to 3rd March 2012, and the post estimation window period, 5th March 2014 to 4th March 2015

During an election business cycle, the rationale of the incumbent is to secure more votes by building or implementing visible projects when the elections are nearing. This will serve as an example that is fresh in the minds of the voters of their “committed” stance towards development. This implies that towards the Election Day, there will be more fiscal spending in private and public sectors. This is the cause of the excess volatility during the event window relative to the estimation and post estimation window



X - observations/days

Y - Volatility

Estimation window- observation 0-250

Event Window- observation 251-738

Post Estimation Window 739 - 1000

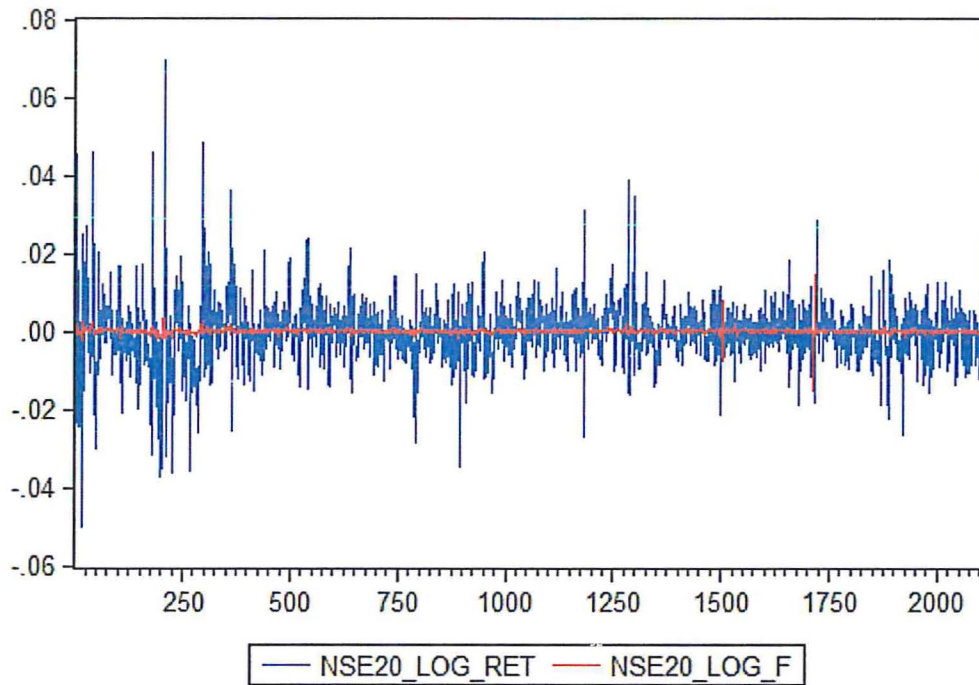
From the graph of volatility, it can be noted that the period with the most number of spikes and also with the highest magnitude is the event window

4.2.2 Market Efficiency

Market efficiency at the NSE would have been proved if there were no deviations from the mean. This would be true if the null hypothesis fails to be rejected would simply imply that the Actual Return is equal to the Expected Return

This is inferred from the derivation of the Multiplicative effect because under the null hypothesis M_t (multiplicative effect) is equal to 1. This means that the outcomes of the election don't surprise investors and hence the abnormal percentage change in volatility on any day t of the event window is $(\widehat{M}_t - 1)$ which in this case will be 0

This is illustrated clearly by use of a graph plotting variances of forecasted NSE log returns and Actual NSE log returns.



x- Days where n=2208
y- Volatility

From the above graph, we can infer from observation that the variance of the Actual NSE log returns is higher than the Forecasted NSE log returns.

Apart from visual observation, the value for the test statistic $\sum_{t=n_1}^{n_2} \widehat{M}_t(N-1)$ is greater than the chi square critical value thus rejecting the null. (Appendix i)

CHAPTER FIVE

CONCLUSION, RECCOMENDATION AND POLICY IMPLICATIONS

The empirical evidence shows the existence of election business cycle and the lack of efficiency at the Nairobi securities Exchange. The volatility in the event window was tremendous in terms of frequency and magnitude when compared to both the estimation window and post estimation window periods. Also, when comparing actual volatility versus forecasted volatility (where there is no effect of election), the actual volatility is higher than the forecasted/conditional volatility.

An implication could be informed investors and market speculators could be making money from a strategy that involves selling stocks and buying bonds around the event window and switching back to stocks after selling bonds in the post estimation period. (Allvine, 1980)

Presence of Election Business Cycle in Kenya may lead to inflationary pressure in pre-election periods and deflation in the periods after elections. (Pfeifer, 2014) states that election business cycles cause policy risk. This is the uncertainty about monetary policy, taxes and fiscal spending. Although the effect of uncertainty is not large, it can affect the transmission of monetary policy. This is valuable information for the Central bank of Kenya or any monetary policy authority to have when formulating their policy.

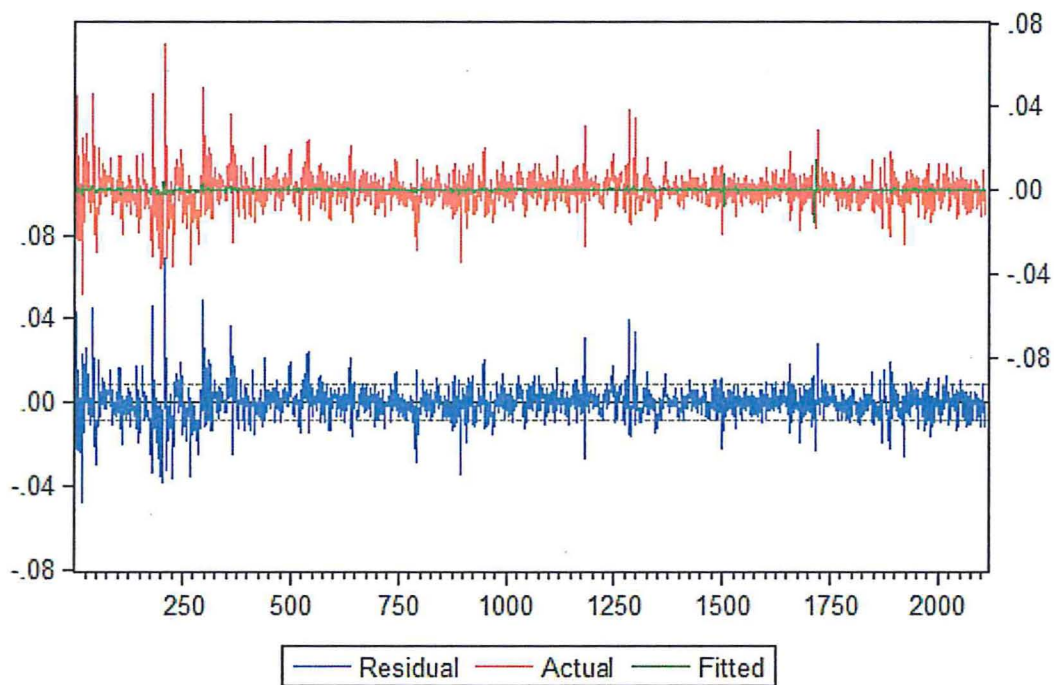
5.1 Problems encountered in the course of the study

Still on this field, a good area of future research would be investigating effects of elections on share volatilities and the implications it has on market efficiency with more than one election cycle. The problem facing this research is the absence of enough data points as the proxy for the market (Nairobi all Share Index) was only founded recently (2008).An alternative to waiting well into the future to carry out this research would be to employ the use univariate models.

APPENDIX

I. Graph of Actual, Fitted and Residuals of continuously compounded NSE20 returns

The first step of the data analysis is to find out if the returns are affected by Arch effects. This is characterized by volatility clustering whereby periods of high volatility leads to continued periods of high volatility and periods of low volatility lead to continued periods of low volatility



X- Number of observations/days

Y- Returns

II. Mean Equation and Variance Equation

After finding the arch effects in the data sample, we proceed to estimate the Mean and Variance equations using a Garch (1,1) model. Below are the results

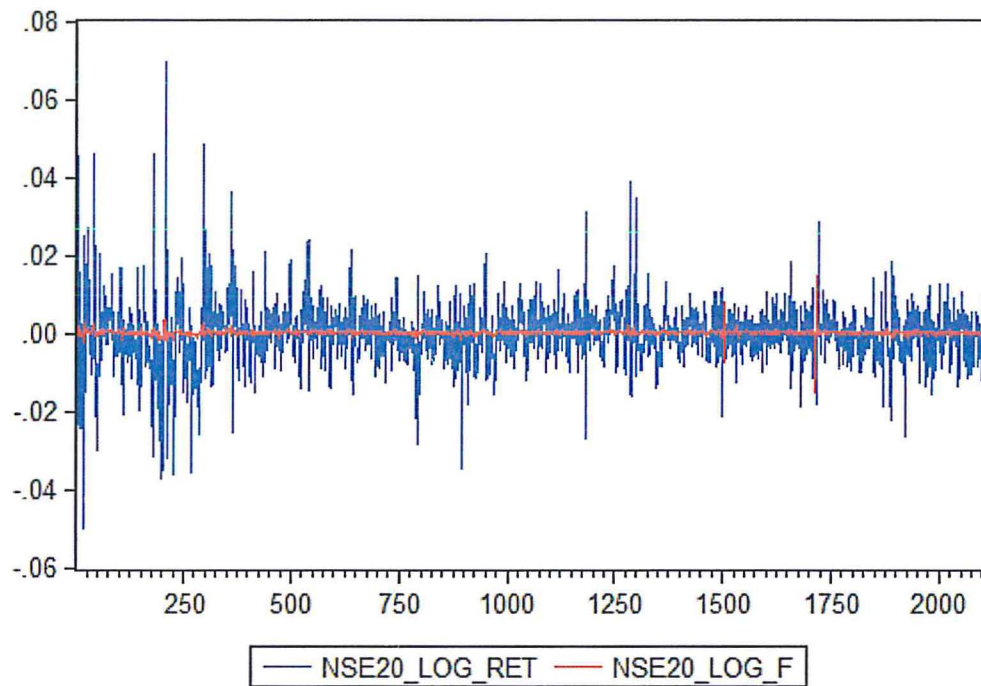
Dependent Variable: NSE20_LOG_RET
 Method: ML - ARCH (Marquardt) - Normal distribution
 Date: 11/27/16 Time: 17:24
 Sample: 1 2110
 Included observations: 2110
 Convergence achieved after 10 iterations
 Presample variance: backcast (parameter = 0.7)
 GARCH = C(3) + C(4)*RESID(-1)^2 + C(5)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.000151	0.000117	1.281044	0.2002
NASI_LOG_RET	0.046677	0.005853	7.974266	0.0000
Variance Equation				
C	6.30E-06	5.64E-07	11.16318	0.0000
RESID(-1)^2	0.298494	0.022305	13.38236	0.0000
GARCH(-1)	0.608750	0.019546	31.14486	0.0000
R-squared	0.153022	Mean dependent var		-0.000169
Adjusted R-squared	0.168552	S.D. dependent var		0.008401
S.E. of regression	0.008365	Akaike info criterion		-7.154700
Sum squared resid	0.147520	Schwarz criterion		-7.141301
Log likelihood	7553.208	Hannan-Quinn criter.		-7.149793
Durbin-Watson stat	1.153138			

Conditional Variance

The variance based on information up to the last day of the estimation window and is used to compute the benchmark volatility.

Volatility of Actual Log Return v Forecasted Return



X- Number of observations/Days

Y- Volatility

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