INFLUENCE OF SECURITIES BEHAVIOUR ON PERFORMANCE OF NAIROBI SECURITIES EXCHANGE INDICES

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Influence of Securities Behaviour on Performance of Nairobi Securities Exchange Indices

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other university

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DEDICATION

I would like to dedicate this Thesis to my family; my wife Judy, son CK, daughter Njeri, Parents Mr. & Mrs. Charles Karungu and my brother Edward Njogu. To my wife, thank you for the patience you had when I would spend sleepless nights working on my Thesis. To CK and Njeri, you have always given me the impetus to work hard to make your lives better. To my dad, thank you for always being concerned about my academic progress; you believed in me and you and I know that you carry a great share of this success. To my mum, you have always been a silent beetle that pushed me to achieve what you didn't have an opportunity to achieve. To my brother, you are a very strong man and my role model; you have go through so much but you never give up.

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ACRONYMS AND ABBREVIATIONS

ACAR	Average Cumulative Abnormal Returns
ACR	Average Cumulative Returns
AIMS	Alternate Investments Market Segment
APT	Arbitrage Pricing Theory
AR	Abnormal Returns
ARCH	Auto Regressive Conditional Heteroskedasticity
ASI	All Sector Index
BSE	Bombay Stock Exchange
CAPM	Capital Asset Pricing Model
CAR	Cumulative Abnormal Returns
CBK	Central Bank of Kenya
CDS	Credit Default Swap
DJIA	Dow Jones Industrial Average
DSE	Dar-es-Salaam Stock Exchange
ECM	Error Correlation Methods
EMH	Efficient Market Hypothesis
FCE	Financial Contagion Effect
FTSE	Financial Times Stock Exchange

G7	Great Seven Economies
GARCH	General Auto Regressive Conditional Heteroskedasticity
GEMS	Growth Enterprise Market Segment
LSE	London Stock Exchange
LTCM	Long Term Capital Management Crises
ME	Momentum Effect
MHE	Market Herding Effect
MIMS	Main Investments Market Segment
NASDAQ	National Association of Securities and Dealers in Automated Quotations
NASI	Nairobi Securities Exchange All Share Index
NSE	Nairobi Securities Exchange
NYSE	New York Stock Exchange
OLS	Ordinary Least Squares
ROE	Return on Equity
RWH	Random Walk Hypothesis
SPSS	Statistical Package for Social Sciences
SPV	Share Price Volatility
T-GARCH	Threshold General Auto Regressive Conditional Heteroskedasticity

UK	United Kingdom
USA	United States of America
VIF	Variance Inflation Factor
WHE	White Noise Effect

DEFINITION OF TERMS

Bubble: This is an irrational strong price increase that implies a predictable strong decline (Fama, 2014)

Financial Contagion Effect: This is a situation in which a stock price which is performing poorly causes otherwise good performing stocks to have problems. It often becomes a great problem for direct neighbours than distant neighbours (Islam, 2014).

Financial shocks: Exogenous shifts in financial conditions that influence or predict future economic activity (Affleck, Money, & Troskei, 1980).

Market Herding Effect: This is used to describe an investment strategy to follow market consensus or intimate activities of financial gurus (Chen, 2013).

Momentum Effect: this is when some stocks outperform (underperform) the average returns in the past few months and continue to perform better (worse) than the average returns over the subsequent few months (Hameed & Kusnadi, 2002).

Stock Index: This is a basis with which a stock market uses to establish its performance. A stock index should be revised regularly in order to enhance its reliability. Owido, Onyuma, and Owuor (2013), define an index as a general price movement indicator based on a sample or all security market companies.

Security Market Indices: these are measures a stock exchange in a country may adapt to measure the performance of that stock exchange. In the case of Kenyan Securities Market these indicators include NSE 20 Share Index, NASI Index, Market Capitalization, Turnover, FTSE NSE Kenya 25 Index, and FTSE NSE Kenya 15 Index (Osoro & Jagongo, 2013).

Volatility: this is a statistical measure of returns for a given security or market index. It can either be measured using standard deviation or variance between returns from that same security or market index. The higher the volatility, the more risk the security. (http://www.investopedia.com/terms/v/volatility.asp)

White noise effect: this refers to random variations in the stock price and volume which normally distract the trader from the real price patterns. Persistence of over-or under reaction of noise trading can make asset prices diverge from the value of fundamentals (James, 2012).

ABSTRACT

This study aimed at establishing the influence of investor's behaviour on the performance of Nairobi Securities Exchange (NSE) indices. A reliable security market index should assist investors in making investment decisions but this is not always the case: investors at times invest in stock whose performance is not reflected in the indices. This study was guided by specific objectives that included; to establish the influence of momentum effect, financial contagion effect, white noise effect, security price volatility, and market herding effect (all as independent variables) on performance of NSE indices as the dependent variable. This study was anchored to random walk theory, rational bubbles theory, smart money and noise trader's theory, price formation and discovery theory, and information disclosure theories. The study was based on a period of 12 years starting from January 2004 to December 2015. The population of this study comprised of all firms (69) listed in the NSE and all the market participants licenced by the Capital Markets Authority (CMA) for secondary data and 20 licensed market participants for primary data. Secondary data was obtained from NSE, CMA and Kenya National Bureau of Statistics (KNBS). In data analysis, a significance level of 5% was used on all hypotheses and a multiple regression model on each objective was used. The Statistical Package for Social Sciences (SPSS) was used on primary and secondary data and excel spread sheets were used to prepare secondary data for analysis. The findings for primary data showed all the indices to be insignificantly influenced by the securities behaviour but the overall NSE indices performance was statistically affected. Hypotheses were tested at 0.05 level of significance. The first hypothesis on momentum effect was not rejected b on primary and but was rejected on secondary data analysis. The second hypothesis on financial contagion effect was rejected on both the primary and secondary data analysis. On the hypothesis of white noise effect, it was not rejected on primary data analysis but was rejected on secondary data analysis. The hypothesis of security price volatility effect was not rejected on primary data analysis. The hypothesis of market herding effect was rejected both on primary and secondary data analysis. In respect to momentum effect, the study concludes that just like what experts observed, there exists momentum effect on NSE indices. For financial contagion, though there were mixed reactions, the study concludes that financial contagion influences the performance of NSE indices. In the third objective of white noise effect, the researcher concludes that white noise influences the performance of NSE indices as was measured by the rational bubbles. For share price volatility, the conclusion is that it does not have a significant influence on performance of NSE indices though the most volatile firms are those in the FTSE NSE 25 being a composition of the most liquid firms in Kenya. It was finally concluded that all the indices play a complimentary role thus the need for the retention of all. NSE is highly contagious of the events that happen around it. The study recommends that future researchers should increase the respondents also include investors as well. The study would also recommend that in the future researchers, the research be conducted sector by sector basis instead of the entire exchange. This would help remove the smoothing elements that would distort the results. The researcher also recommends that future studies should look at other aspects of financial contagion since this study only looked at systematic contagion and only on the aspects of the international

markets. The researcher would recommend to the NSE to ensure that data for the four indices is readily available and be cost free so as to encourage research. It was found some listed companies that didn't have functional websites. This makes the researcher to recommend to the regulator, CMA, to ensure that all listed firms abide to the rules of free accessibility of their information.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The Kenya economy has been growing at a rate of less than 7% in the first one and half decade of 21st century. The growth rate has been at 1.5%, 2.7%, 5.8%, 4.3% and 4.6% for the years 2008, 2009, 2010, 2011 and 2012 respectively (Kenya Institute for Public Policy Research and Analysis, 2013) with the growth rate in 2013 revised to 5.7% while that of 2014 established at 5.3% (The World Bank, 2014). The financial sector plays an important role in the economic development process towards the achievement of Kenya Vision 2030-the blue print for Kenya's economic development. This achievement would heavily depend on the macro economy, which comprises of banks, deposit taking micro finance institutions and insurance companies (Kenya Institute for Public Policy Research and Analysis, 2013). A country's macro economy heavily relies on the financial markets in its prosperity and a financial market is represented by stock markets amongst other players. Financial variables include items that characterises demand and supply of financial instruments relevant for economic activity (Mishkin, Schoenholtz, Watson, Hooper, & Bank, 2010)

Most of the macro economic factors are best captured in a stock exchange and thus the price is always said to be right (Cuthbertson & Nitzsche, 2004) and a stock market can be considered as a yard stick for economic strength and development (Luong & Hu, 2011). In a securities exchange, prices change according to the market activity as influenced by the forces of supply and demand as noted by Aroni, Namusonge, and Sakwa (2011). (Schneemeier, 2014), observes that for a stock market to be efficient, private and public information must be incorporated in stock prices and thus in an economy, prevailing stock prices should be important for both traders and real decision makers. Aroni et al. (2011), notes that there are many financial conditions notably inflation, exchange rates, interest rates and money supply that may influence the security prices. Financial conditions Index should measure exogenous shocks, which are influenced by factors such as the country and

the state of economy in that particular country. Pilinkus (2010), notes that stock prices will be influenced by some fundamental economic variables, which may influence investment decisions meaning that when economic situations improve, the stock market performs more actively. When economists speak of capital markets being efficient, they usually consider asset prices and returns as being determined by forces of demand and supply of rational investors.

Collection of literature observes that stock returns predictability is related to business-cycle indicators such that the stock market is a creature of everyday economic forces (Kadilli, 2014). Future stock returns are highly dependent on the magnitude of real shocks caused by business cycles. Literature also has evidence that the correlation between financial returns and different measures of economic activity is positive. It goes further to establish that stock returns react negatively to inflation and that short term interest rates are a robust predictor of stock returns (Kadilli, 2014).

A stock exchange, also known as a securities exchange, is a formal organization regulated and approved by an Act of parliament and is a physical location where members assemble to trade. The major function of a stock Market is to assist in the transfer of savings to invest in productive enterprises as an alternative to keeping the savings idle (Osoro & Jagongo, 2013). A stock market performance can be measured by use of market capitalization, market turnover or a market index (Kithinji & Ngugi, 2009), where the most recommended is the securities market index. (Betz, Hautsch, Peltonen & Schienle, 2016). Schick (2014) notes that a market index is an aggregate value produced by combining several stocks or other investment vehicles together and it is based on a sample or all of the security market companies (Owido, Onyuma, & Owuor, 2013a). A stock index is calculated on a daily basis and according to (Affleck, Money, & Troskei, 1980), it can be computed in five different ways namely: Arithmetic Average of Price (DJ Index), Market Capitalization Index (SP Index), Arithmetic Average of Return (UP Index), Geometric Average of Return (VL Index) and ESE Indices (ESE Index). The security market index is intended to represent an entire stock market and thus track the market changes over time (Schick, 2014). After combining these values, their total values are expressed against a base

value from a specific date. Behavioural finance considers human behaviour in finance where it attempts to understand how emotions and cognitive errors influence individual investor's behaviour (Luong & Ha, 2011). The authors' identified five types of investor's behaviours that were herding, market, prospect, overconfidence-gambles fallacy and anchoring-ability bias. In their findings, they found that only three factors (herding, prospect and heuristic behaviours) influence investment performance.

1.1.1 Security Market Indicators in the Developed Markets

Security market indicators have come to perform a variety of functions: they serve as benchmarks and help answer questions in respect to daily price movements (Fabozzi & Peterson, 2003). The most commonly quoted security market indicator is the Dow Jones Industrial Average (DJIA) while other security market indicators in the developed countries that are performing excellently include Standards and Poor 500 Composite (S&P 500), New York Stock Exchange Composite Index (NYSE Composite) and the National Association of Securities and Dealers in Automated Quotations (NASDAQ) composite index. In respect to stock markets, the most effective markets worldwide are the American NYSE, German and Netherlands Stock Exchanges (Hájek, 2007).

If security indices indicate poor performance, investors, especially debtors would be required to append more cash or securities to get credit facilities (Shen, 2011). Ozkan and Unsal (2012), observe that the global financial crises that took place in the 2000's were triggered by problems in the developed economies that quickly spread to developing economies. A study by Blair, Poon, and Taylor (2000), on Standard and Poor's 100 indexes intended to enquire the predictive quality of volatility forecasts from ARCH models. The study notes that the S&P 100 is the most common index used by American companies. The study also sought to address the importance of selecting a measure of realized volatility in assessing the predictive accuracy of volatility forecasts. A study by Ozkan and Unsal (2012), found that there is lower Financial Contagion Effect from global financial shock on the domestic economy. The research found that low contagion enables domestic countrys to recover from

global financial shocks rapidly on the back of capital flows freeing from foreign towards the domestic economy.

It has been established that the majority of contagion in equity markets are sourced through US equity markets while contagion in bond markets is primarily associated with the events in Russia (Dungey & Gajurel, 2015) (Dungey, Fry, González-Hermosillo, & Martin, 2007) Financial contagion can be best explained by why the recent 2008 globsl financial crisis have been relatively shortlived for a number of emerging economies (Ozkan & Unsal, 2012) A collection of literature by Kadilli (2014), observes that stock returns may be predictable because of market inefficiency triggered by investor misperceptions of publicly available information.While this is stated, theory appears to state otherwise information about predictabilility. Sornette (2003), observes that markets are efficient and that only revelation of a dramatic piece of information can cause a crash. However, the author notes that most research is not conclusive as to what this piece of information might be. The collapse of the dot-com bubble in the start of the 21st Century had severe consequences on the financial markets of US and some Asian countries.

1.1.2 Security Market Indicators in the Emerging Markets

A study aimed at investigation the dynamics of security market indicators by Sinha and Agnihotri, (2015) considered three indices of market capitalization where: S & P BSE Sensex represented large capitalization firms, BSE mid-cap represented mid-capitalization firms and BSE small-cap representing small capitalization firms. Asset pricing models and portfolio allocation methods rely on the precision of volatility. The volume of traded stocks can be taken as proxy for the infomation flow in the market (Lamoureux & Lastrapes, 1990) in (Sinha & Agnihotri, 2014) and Securities Price Volatility has a direct link with information flow in the markets. Sinha and Agnihotri (2014), note that information is not disseminated in a regular way: informed traders always have an advantage over the non-informed traders in the shortrun. They futher observe that dissemination of information from trader to trader is correlated with the number of transactions and arrival of new information can increase the traded volumes.

Volume and price movements are clustered in time because of traders who have choice of timing at their discretion (Admati & Pfleiderer, 1988) and traders are motivated by either liquidity or information dissemination (Sinha & Agnihotri, 2014). Period of high trading volumes tend to be followed by periods of positive excess returns whereas periods of low volume tend to be followed by negative excess returns. This observation is also supported by Pástor, Stambaugh, and Taylor (2016), who found that average turnover positively and significantly predicts a funds future return. Apart from market fundamentals, other factors also affect Securities Behaviours: a notable factor here is socio-cultural factors which may influence investors risk tolerance. Olweny, Namusonge, and Onyango (2013), found that socio-cultural factors such as education and financial knowledge specialization were very significant factors in respect to risk tolerance while other factors such as marital status and ethnic background were not significant factors influencing risk tolerance amongst investors in the Kenyan market. Amata and Muturi (2016), studied about the influence of macro economic variables, investor Market Herding Effect and stock market volatility in kenya.

The Kenyan Securities Market is known as the Nairobi Securities Exchange, which was previously Nairobi Stock Exchange. Investors in the exchange can be local retail, local institutional, international individual or international institutional investors. The NSE Currently has 68 listed firms with 61 firms actively trading (Nairobi Securities Exchange, 2018). The NSE has had tremendous developments namely automation of its services, increasing its trading hours and most recently (on July 1, 2014) demutualization. After demutualization, NSE was subsequently listed in the MIMS under the subsector of investment services (Nairobi Securities Exchange, 2014). In the East African Stock Markets, there are nine firms that are currently cross listed in more than one stock market with three firms currently listed in all the three former East African Markets (Onyuma, Mugo, & Karuiya, 2012). These are Kenya Airways, Jubilee Insurance, East African Breweries, KCB, Equity Bank, NMG, Umeme and Bank of Kigali Group. All these companies are Kenyan based with exception of the latter two. The Kenyan Securities Market is the most robust among the four East African stock markets. This is evidenced by the fact that out of the eight firms that are cross-listed, it is only Umeme Ltd which is Ugandan

firm with the rest being Kenyan based firms. In the East African Community, the market in Uganda is known as Uganda Stock Exchange, the Tanzanian Market is known as Dar-es-Salaam Stock Exchange, while that of Rwanda is called Rwandese Stock Exchange. Burundi currently is the only East African Country without an established Stock Market (Onyuma et al., 2012)

The NSE is the third largest security exchange in Africa by market capitalization and the seventh largest by the number of listings (Capital, 2014). In terms of market capitalisation, only Johanesburg Stock Exchange (JSE) and Nigerian Stock Exchange (NiSE) are larger than NSE, while in terms of the number of listings, NSE is preceded by Egyptian Stock Exchange with (833), JSE (402), NiSE (223), Stock Exchange of Mauritius (88), Casablanca Stock Exchange (81) and Zimbabwe Stock Exchange (64). The exchange has four major segments namely Main Investments Market Segment (MIMS), Alternate Investments Market Segment (AIMS), Growth Enterprise Market Segment (GEMS) and Fixed Income Securities Market Segment (FISMS) (Nairobi Securities Exchange, 2014).

Each sector has its threshold requirements for a company to be categorized among firms in that segment. The MIMS requires a firm with a minimum issued and fully paid share capital of Sh. 50 Million with net assets before listing of not less than Ksh. 100 Million. At the time of listing, the firm must not be in breach of any of its loans covenants particularly in regards to the maximum debt capacity (Nairobi Securities Exchange, 2013). In addition, the firm must have a clear future dividend policy and before admission to the MIMS, it must have been profitable in at least three of the five years to the date of listing. A firm in MIMS should not be insolvent and at least 25% of the shares outstanding must be held by not less than one thousand shareholders excluding employees.

The AIMS sector requires companies to have authorized and issued shares of at least Ksh. 20 Million and the net assets before listing should not be less than Ksh. 20 Million. Just like the MIMS, the shares should be freely transferable and not subject to any restrictions. The firms listed in this sector must have a future dividend policy and must have been in existence in the same line of business at least two years with a

good growth potential (Nairobi Securities Exchange, 2013). The share capital of companies in this sector after listing of 20% must not be held by less than 100 shareholders. Those firms in the GEMS must have an ordinary share capital of Ksh. 10 Million and they must have no less than one hundred thousand shares in the issue.

NSE is the second securities exchange to be demutualized after the Johannesburg Stock Exchange. Demutualization is the act of separation of ownership and management. This means that there is a firm listed in the Nairobi Securities Exchange investment services sector by the name Nairobi Securities Exchange Ltd and this would imply more accountability in the management of the operations of the NSE as opposed to previously where the NSE was owned by 20 stock brokers and dealers (Nairobi Securities Exchange, 2014).

In Kenyan Securities Market, we have several approaches of measuring performance and these include; the Nairobi Securities Exchange 20 Share Index, NSE All Share Index (NASI), Financial Times Stock Exchange (FTSE) NSE Kenya 15 Index and FTSE NSE 25 Index. The NSE 20 share index is the most common and oldest while the others were launched in the year 2008 and 2011 respectively. According to Osoro and Jagongo (2013), NASI was developed in February 2008 as a complimentary index due to the inherent shortcomings of the NSE 20 Share Index. Since its only 20 companies, constituting the index out of the currently listed 64 companies may suggest that the NSE 20 Share Index is biased. Computation of the NSE 20 share index is rarely revised (Osoro & Jagongo, 2013) and this leads to biasness for companies that were initially given the same weight several years ago, may be different in terms of sizes but the same formula used years ago is still used without revising. In 2008, the NSE All Share Index (NASI) was introduced with its base year being 1st January 2008 and its base value of 100. NASI incorporates all securities trading at the NSE regardless of the year of listing, the company's performance and the size of the company (Osoro & Jagongo, 2013). The FTSE Kenya 15 Index and FTSE 25 Index were launched in November 2011 (Nairobi Securities Exchange, 2014), which was because of an extensive market consultation process with local asset owners and fund managers. The aim of their launch was due to the growing interest in new domestic investment and diversification opportunities.

During the launch, the Chief Executive of NSE noted that FTSE NSE Kenya 25 Index would be aimed at reflecting the performance of the 25 most liquid stocks trading on the NSE, while FTSE NSE Kenya 15 Index would reflect the performance of the largest 15 stocks ranked by full market capitalisation on the NSE (Nairobi Securities Exchange, 2014). NSE, which is an emerging stock market, is highly correlated with the developed markets despite going against the theory (Komo & Ngugi, 2013). The authors established that the NSE and the UK exchange had a very high correlation implying that even though NSE is an emerging stock market, it is not isolated from the capital markets of other developed countries. Stock prices signify the perceived value of the investments; they represent they reflect the marginal productivity of capital (Komo & Ngugi, 2013). Increase in productivity of capital could imply increase in investment activities. The authors noted that there is a positive correlation between changes in stock prices and investment growth. There have been arguments that the above average performance of the macro economy may not always reflect the micro economic performance. In a country where the poverty index is high for most parts of the country, it becomes fundamentally important to test the models that are used in performance evaluation.

Price movements in the Nairobi Securities Exchange cannot go beyond 10% up or down (Nairobi Securities Exchange, 2014). The purpose of this price cap is to enhance stability of the firms in the exchange and to increase investor confidence. A study by Kakiya, Mugo, Onyuma, Owuor, and Bosire (2013), analysed the Cumulative Abnormal Returns (CAR) and Abnormal Returns (AR) for 31 firms and established that NSE is not efficient in the semi-strong form and another by Lukanima (2014), found that there is inefficient price discovery at the DSE associated with some moments of structural shifts. A market that is inefficient can be noted by features such as inactive trading, illiquidity and high dependency on foreign investors, overdependence on dividends as the main source of income, and uncompetitive trading among brokers (Lukanima, 2014).

1.2 Statement of the Problem

Security markets are a very critical part of the economy; they allow redistribution of financial resources among various economic entities (Pilinkus, 2010) Their performance is best captured in a securities market index, which should ensure that it assists investors in making prudent investment decisions. A securities market index should always give reliable information; the unfortunate fact is that this is not always the case. For instance, the Kenyan economy has been growing at 1.5%, 2.7%, 5.8%, 4.3%, 4.6%, 5.7% and 5.3% for the years 2008 through to 2014, while the NSE indices have not been reflecting this trend the NSE 20 share index declined in 2009, increased in 2010, decreased in 2011 and increased in 2012 (KIPPRA, 2013). The NASI decreased in 2009, increased in 2010, decreased in 2011 and increased in 2012 (KIPPRA, 2013). In their collection of literature, Aroni *et al* (2014), observe that EMH is steadily becoming deficient in providing explanations for the market behaviour. Osoro and Jagongo (2013), observe that the NSE 20 Share Index-may not at all times capture the most accurate information. The authors note that with the adoption of NSE All Share Index (NASI) in 2008, there was no improvement on the performance of NSE indices.

African stock markets are illiquid and most are characterised by thin trading (Pilinkus, 2010) and this may imply that a security market indicator in Africa may not accurately portray the state of a country's economic performance. During the 2008 global financial crisis, the NSE was hardest hit by the crisis (Ahmed, 2010) yet Kenya is a developing country that is quite distanced from the epicentre of credit crisis in terms of economic growth, industrialization and economic integration (Komo & Ngugi, 2013). Shen (2011), notes that when distressed traders are subjected to regulatory or leverage constraints, they have to liquidate their positions and this may lead shareholders incurring mark-to-market losses thus being forced to liquidate as well. When a security market indicator is not well composed, there is a risk of financial contagion. Dungey *et al* (2007), observe that if there is financial contagion, there is continous nervousness, and this can lead to near collapse of an economy. In as much as fundamental or macro-economic factors are the main factors that are used to establish market performance of a stock, the public opinions on a

stock is also important (Robert, 2012) this being called white noise effect. The 2008 global financial meltdown was the worst crisis in history. It started in the developed countries and spread all over the world. In fact a phrase was coined that, 'when United State catches a cold, Europe gets a flu'. Aduda, Oduor and Onwonga (2012), found that that investors experience positive results when they exhibit rationality, but experience negative results when exhibit irrationality and Market Herding Effect. This study, therefore, aimed at providing insights and add knowledge in respect to the Influence of securities behaviour and the performance of NSE indices.

1.3 Objectives of the Study

1.3.1 General Objective

The general objective of this study was to evaluate the Influence of securities behaviour on the performance of the Nairobi Securities Exchange indices.

In order to address the general objective, the study delved into some specific objectives.

1.3.2 Specific Objectives

This study was guided by the following specific objectives:

i. To establish the influence of momentum effect on the performance of Nairobi Securities Exchange indices
ii. To determine the Influence of financial contagion effect on the performance of the Nairobi Securities Exchange indices
iii. To establish the Influence of white noise effect on the performance of the Nairobi Securities Exchange indices
iv. To establish the Influence of security price volatility and performance of the Nairobi Securities Exchange indices.
v. To determine Influence of market herding effect on the performance of Nairobi Securities Exchange indices.

1.4 Research Hypotheses

This study aimed at testing the following null hypotheses:

$H_0$1: There is no significant Influence of Momentum Effect on the Performance of Nairobi Securities Exchange indices

$H_0$2: There is no significant Influence of Financial Contagion Effect and the performance of Nairobi Securities Exchange indices

$H_0$3: There is no significant Influence of white noise effect and the performance of Nairobi Securities Exchange indices

$H_0$4: There is no significant Influence of Security Price Volatility and the performance of Nairobi Securities Exchange indices

$H_0$5: There is no significant Influence of Market Herding Effect and the performance of Nairobi Securities Exchange indices

1.5 Significance of the Study

Kenyan stock market being among the best performing in the African continent would greatly benefit from the results of this study. The study would help the management of NSE in its policymaking. Investors in Kenya would be able to learn more about the links between financial markets and economic performance of a country. This study would add value to scholars for they would understand how our stock market operates. Studies have been done on the NSE about the announcements (Price, earnings, rights, corporate personalities), stock splits, cross listing, rights issue and socio-cultural behaviours but no study has been done on determining the Influence of Securities Behaviour and performance of NSE Indices. It would also be of great benefit to practitioners and financial analysts who will attempt to know the efficiency of the market indicators they regularly use in making investment decisions. Financial analysts and policy makers may get some insights from the results of this study about what methodologies to continue applying and those ones

that they should overhaul. The study would also highlight the areas of future research to enable Kenya accomplish its vision 2030.

1.6 Scope of the Study

This study was based in Kenya and specifically in the city of Nairobi where primary data was collected from the market participants of the NSE. The target population included all the firms listed in the exchange. The variables that constituted Securities Behaviour included momentum effect, Financial Contagion Effect, white noise effect, Security Price Volatility and Market Herding Effect. The study was done from the month of January 2015 to the month of December 2016 and it would cost Ksh. 500,000 in its budget.

The study used monthly market data obtained from the Nairobi Securities Exchange for the periods from 2004-2015. This translated to 12 years or 144 observations which Hajek (2007), acknowledges that such a period is significant enough to obtain robust data for analysis. All firms of the exchange were studied (with exception of Hutching Biemer and Kurwitu Venturers) and data was analysed according to its availability. For instance, if a firm was not listed or had been suspended, the data that is available is the only that was used in the analysis.

However, the objective of Financial Contagion Effect was studied for the less than 10 years and it compared the Kenyan securities market indicators with those in the developed markets in order to establish the extent to which Kenyan Securities Markets react to Financial Contagion Effect. In respect to analysis, each objective was analysed independently and an overall regression model was established for all objectives. However, the above only applied to each security market indicator individually. That is, there is a regression model for NSE 20 Share Index, NASI, FTSE 15 Index, and FTSE 25 Index. A multiple regression model for each security market indicator was obtained in the analysis. An important point to observe is that in computing the stock market performance, some indicators are subset of others: For example, the NSE 20 Share Index, FTSE NSE Kenya 15 Index and FTSE NSE Kenya 25 index are subsets of NASI Index (Nairobi Securities Exchage, 2014).

However, each was computed on its own as they each reflect a certain component of the Nairobi Securities Exchange performance.

1.7 Limitations of the Study

This study had the challenge of compiling data that was very voluminous and scattered. This was overcome by hiring research assistants who assisted in the data entry. There was also limitations in respect to accessing data from the companys websites. This was addressed by checking hard copy financial statements at the CMA library. The researcher also experienced difficulties in getting the employees of market participants in filling the questionnaire. This was addressed by the persistence of the researcher which eventually bore fruits.

1.8 Paradigm used in the Study

(Greener, 2008a) observes that there are four research paradigms namely functionalist, radical humanist, interpretive and radical structuralist. Fuctionalist mostly concentrates on problem solving while radical humanist looks at finding ways of changing a social arrangement called organization (Saunders, Lewis, & Thornhill, 2009b). Radical structuralist looks at organisations as products of power balances that keep on changing. Here, conflicts are always present. Interpretive looks at the various perceptions that people have about those organisations. These research paradigms, however, are mutually exclusive (Greener, 2008a). This thesis adopted a functionalist paradigm

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter concentrates on the tests that are used to evaluate the Influence of securities behaviour and performance of a stock exchange, theories that are used in the stock markets, related studies in the area of security market indicators, and shows the relationships between the independent and dependent variables. The chapter explores on all the literature that is related to the topic and thus gives the readers a solid literature on the topic.

2.2 Theoretical Review

This research was guided by finance theories that acted as its base. These theories include random walk theory, rational bubbles theory, smart money and noise traders' theory, and price discovery and information discovery theory (Sakr, 2015).

2.2.1 Random Walk Theory

Random Walk Theory assumes that prices of securities are unpredictable (Fabozzi & Peterson, 2003). In random walk, we look at Efficient Market Hypothesis (EMH) to measure it. This theory acknowledges the fact that stock prices cannot be predicted stochastically, but instead they depend on so many factors. In a rational market, an individual will not have any advantage in the acquisition of information (Cuthbertson & Nitzsche, 2004; James, 2012), and no investor should make abnormal profits in the longrun. In efficient markets, since prices carry all the information with them, no investor was able to outperform the market by gaming because all investors are assumed to be rational and will ensure that all prices are fair (Lukanima, 2014). Investors form rational expectations of future prices and instantaneously discount all market information into expected prices in the same way (Demirer & Kutan, 2006). Dow and Gorton (2006), observe that Rational Expectations Equilibrium (REE) gave formal content to the notion of market efficiency which has been a central concept in financial economics for over forty years.

Equilibrium is said to be REE when uninformed agents learn form the prices and actions taken by informed agents who trade on their information knowing that the uninformed agents will infer some or all of the information. If current and past information is incorporated to stock prices, then only new information should cause changes in prices. Since news are unpredictable, then price returns should be unpredictable: thus stock prices should be having the orthogonality property. James (2012) notes that one of the variables that affects stock prices are rumours. The stock world is borderless and so interconnected such that the slightest rumour of war, rising oil prices or interest rates would detonate stock prices which react unpredictably.

Stock markets depict the same reaction to the economic turn of events despite the economic development of the country in which they are based (Komo & Ngugi, 2013). In an efficient market, agents are assumed to know all the relevant information (Cuthbertson & Nitzsche, 2004) and they know the complete probability density function of the possible outcomes for returns. Market prices are more volatile during periods of market stress since this induces increased levels of dispersion as individuals' returns differ in their sensitivity to market returns (Demirer & Kutan, 2006).Under EMH investors know their true economic model that generates future returns and use all relevant information to form their best forecast of the expected return. Stock prices will only follow a random walk under the EMH if the risk free rate, *r* and the risk premium *rp* are constant and dividends are zero. (Fama, 2018), observes that stock prices should follow a random walk if they are independent and this would lead to a normal distribution if a large collection of independent prices takes place. (Lukanima, 2014) observes that there are two antagonistic price behaviours; market efficiency does not necessarily imply a random walk, but random walk implies market efficiency. He however notes that market efficiency does not guarantee normality distribution of returns. Stock returns contain a predictable component from macro economic and financial indicators that follow business cycles (Kadilli, 2014) and the variability of this predictability with business cycles suggests the use of models that take into account of such patterns.

The findings of the study establishes that in a research on 20 developed countries from January 1999 to August 2011 finds that there is substancial predictability component in the long-term financial returns. Iwarere and Barmish, (2014), did a research on stock trading over a lattice via linear feedback whose aim was addressing problems which arise from stock trading and portfolio balancing. The authors adopt both model based approaches and model free approaches: in their binomial model they observe that stock prices can either go up or down.

Some studies have found that Random Walk Hypothesis is not followed in all instances (Alam & Uddin, 2009; Kakiya et al., 2013; Lukanima, 2014; Miralles-Marcelo, Miralles-Quiros, & Miralles-Quiros, 2014). Alam and Uddin (2009) found that none of their studies in 15 countries (a mixture of developed and developing) implied that they were not efficient in weak form while Kakiya *et al.* (2013), found that none of the stocks they had studied in the Nairobi Securities Exchange expressed a semi-strong efficiency. (Miralles-Marcello *et al.,* 2014) found that EMH is not always observed since there could be market over and under reactions while (Lukanima, 2014) also confirmed that efficient price discovery in infant African stock markets does not follow a random walk. Through their literature, Miralles-Marcello *et al* (2014), observe that extreme movements in stock prices are followed by movements in opposite direction to correct the initial observation and this is not consistent with EMH and this violation of EMH is known as overeaction effect.

A study on Efficient market Hypothesis: evidence from African stock markets was conducted by Chipo and Biekpe (2007), who observed that most African Stock Markets lack the capacity to deal with capital market dynamics. The authors conclude that insider trading is one of the anomalies facing the African stock markets and this could partly be due to inadequacy of legislation and or existence of unenforceable laws. A study by Demirer and Kutan (2006), observes that though the rational pricing theory is observed in price movements of the Shanghai and Shenzhen stock markets, the co-efficient values for upside and downside moves of the market, return dispersion during extreme downsides moves are much lower than those for upside moves. The objective of this study on momentum effect was based on this model.

2.2.2 Rational Bubbles Theory

Bubbles have been in existence since organised markets began; investors are usually believed to be rational for they rapidly assimilate any information that is relevant to the determination of asset prices and adjust prices accordingly (Cuthbertson & Nitzsche, 2004). The price movements in stocks adopt a bubble approach where there are irrational and rational bubbles (Engsted, 2014). Prices rationally reflect available information such that the markets are informational efficient. Eugene Fama argues that irrational bubbles lack reliable evidence that price declines are predictable. Rational bubbles operate on the notion that they exist today only if they are expected to exist tomorrow. Rational bubbles cannot be negative and if they exist today in an asset, they must have existed since the trading began in the asset and they cannot exist if there is an upper limit on the price. Engsted (2014) found that rational bubbles cannot exist in situations where rates of stock returns exceed the growth rate of the economy-they thrive in dynamically efficient economies.

The genesis of rational bubbles in early literature was not clear but later research established that bubbles arise initially due to rational investors confidence and other pscyological biases. The most appropriate example of a rational bubble was the stock market boom of the 1990's (LeRoy, 2004) The author notes that strict theoretical arguments against bubbles are unlikely. To the author, interpretation of a rational bubble is that agents are aware that they trade bubble-inflated prices and that there are no unexploited profitable trading opportunities despite the bubble. A rational bubble in a scenario with constant expected returns doesnot imply predictable price declines; it may have a prediction of when it will burst and its expected returns may remain constant but it is impossible to predict how it would burst (Engsted, 2014). It has been observed by Cuthbertson and Nitzsche (2004), that rationality places no restrictions on the form of the second and higher moments of the distributions of the error term ($\acute{\varepsilon}_{t+1}$). For instance, the variance of the error term may be related to its past value without violating the Rational Expectations: this is what develops the Auto Regressive Conditional Heteroskedasticity (ARCH) process.

Engsted (2014), notes that stock prices can be determined by adding the fundamental value and the rational bubble component. The fundamental value is the present discounted value of expected future dividends that incorporates all factors that could be affecting the price of a security. The author observes that to eliminate a bubble, a transversality condition needs to be imposed and equated to zero. Transversality could imply two intersecting manifolds where at every intersecting point, their separate tangent spaces at that point together generate the tangent space of the ambient manifold at that point. In the above case, it would only mean that prices only reflect their fundamental value. This theory supported the objective of white noise effect and its relationship with the performance of NSE indices.

2.2.3 Smart Money and Noise Traders Theory

Behavioural finance theories, which are based on psychology, attempt to understand how emotions and cognitive errors influence individual's investor's behaviour (Luong & Ha). Smart money and noise traders' theory assumes that the market contains a positive trader whose demand for stocks increases after there has been a price rise (Cuthbertson & Nitzsche, 2004).$1 + E_t R_{t+1} = k^*$Where k^* is a constant, $E_t R_{t+1}$ are expected returns over time t+1. If only smart money (fundamental) traders were present in the market, prices would only respond to news (James (2012), Cuthbertson and Nitzsche (2004), Komo and Ngugi (2013), and Lukanima, 2014). If these rational traders happen to be positive feedback traders, any good news would be met by purchasing of the stock increasing its price above its fundamental value. Cuthbertson and Nitzsche (2004) notes that when a rational trader recognizes the above mispricing they dispose off their stocks and the price moves back to its fundamental value: when this happens, prices are said to be mean reverting.

Rational traders or smart money believe that expected equilibrium returns are constant. Sapp and Twari (2004), observe that smart money effect is the ability to select good stocks. Ross, Randolph, and Jordan (2010), observes that a rational trader views the variance of his or her portfolio return as the proper measure of the portfolio risk. This is even in the case of holding one security in the portfolio where the variance of the security's returns becomes the variance of the portfolio returns. In

a world where all investors were rational, when new information is released in the market place, all investors would adjust their estimates of stock prices in a rational way. In good news over the short horizon, positive returns are positively serially correlated (they are followed further by positive returns) while in bad news over the short horizon, negative returns are negatively serially correlated (they are followed further by bad news) as observed by Cuthbertson and Nitzsche (2004). Over the long horizons, returns are negatively serially correlated as rational traders move back to their fundamental values. The serial correlation over different time horizons implies that buying recent 'winners' tends to yield 'winners' in the next period and this is called the momentum strategy. Momentum strategy may lead to the attitude of investors buying a low price stock if their aims is to increase the value of the stock after sometime.

A study on whether funds make more whey they trade more was conducted by Pastor, Stambaugh and Taylor (2014), where this research was based on the fact that as of 2013, mutual funds worldwide had about $30 trillion of assets under management, half of which were managed by US mutual funds. Out of the mutual funds, 52% of U.S mutual funds were in equity and in these, 81.6% were actively managed. Pastor et al. (2014) sought to understand why despite funds charging higher fees and trading costs, they were still doing more trade than non-fund investors. The period under this study was from 1979-2011. The authors observe that there is high turnover for funds that charge higher fees as well as those funds that are smaller in size, and that funds trade more when expectations are high. This may suggest that stocks are mispriced when funds collectively perceive greater profit opportunities. From the research, it can be established that a funds performance not only depends on its own turnover, but also on other funds turnover.

The Binomial model according to (Iwarere & Barmish, 2014) can be established by computing the probability of price gain in securities. Probability of investment gain is a resultant of taking a time varying stock price and multiplying it with the amount invested. Iwarere and Barmish (2014), note that when the sum of initial investment and amount invested are positive, the investors are in a long position while if they are negative, an investor is in a short position and profits accrue if the time varying stock

price decreases. Bloomfield, Hara, and Saar (2005), observe that noise traders adversly affect informational efficiency of the market as they drive prices away from fundamental values. They note that the further away a market moves from its fundamental values, the stronger the White Noise effect becomes.

2.2.4 Price Discovery and Information Discovery theory

Prices could be bid (offer to buy) or ask (offer to sell) and the agreed price is called transaction price. Order on the other hand is an authorization given by a trader to his or her agent (Vishwanath & Krishnamurti, 2009). Basing on the price authorized by the trader we can have a market or a limit order: where market orders are buy or sell orders that are to be executed immediately at the current market prices (Bodie, Kane, & A, 2014). Limit orders occur where investors specify prices at which they are willing to sell or buy a security. The transaction is executed when prices fall below the limit in a buy order while in a limit to sell order; the transaction is executed as soon as prices go above a specific limit. Market microstructure may have participants such as dealer and agency markets (Vishwanath & Krishnamurti, 2009). A dealer buys or sells shares in their own name and right while an agent buys or sells shares on behalf of the investor. In Kenyan scenario, most dealers are investment bankers while most of the agents are stockbrokers.

African stock markets are illiquid and characterised by thin trading in comparison to stock markets in other regions (Mlambo & Biekpe, 2007). In such markets, there is high volatility due to small size and unstable political and economic environments. The author also notes that African markets lack integration with global equity markets and with each other. However, the author notes that this could act as an advantage to the international investors since this lack of integration may make African stocks potentially good portfolio diversifiers (Chipo & Biekpe, 2007).

In price formation and price discovery, Vishwanath and Krishnamurti (2009), observes that markets have two main functions, which are provision of liquidity and facilitation of price discovery. Prices evolve and this evolution is influenced by the nature of the players in the market and in the trading system. In our Kenyan Securities exchange, for instance Onyuma *et al.* (2012) observes that it is a frontier

market. Currently fundamentals have changed making NSE and Johannesburg Stock Exchange (JSE) the only stock markets in Africa that have fully demutualized (Nairobi Securities Exchange, 2014). This would mean that a new classification would place the NSE in the league of Emerging markets such as JSE and the likes. Vishwanath and Krishnamurti (2009), notes that price formation and price discovery theory classifies investors into two categories: informed traders and uninformed traders where the former have an informational edge regarding the stocks that the latter do not possess. Informed traders exploit information advantage while trading while uninformed traders trade just for the sake of it-these are at times referred to as noise traders (Vishwanath & Krishnamurti, 2009).

2.3 Empirical Literature

This subsection would provide verifiable studies about the Influence of the securities behaviour and performance of NSE indices. It would discuss literature as per objectives outlined.

2.3.1 Influence of Momentum Effect on the Performance of NSE Indices

This was first empirically determined in the early 1980s (Muga & Santamaría, 2007b) and it is an anomaly that continues to challenge the market efficiency hypothesis. The authors' notes that momentum effect is not exclusive to any one market: it exists both in developed and emerging markets though intensity in emerging markets is less than in developed markets. A study done by Zhang (2006), investigated the role of information uncertainty in price continuation anomalies and cross-sectional variations in stock returns. The author believed that if short-term price continuation was due to investor behavioural biases, greater price drifts ought to have been observed when there is greater informational uncertainty. This information uncertainty should produce relatively higher expected returns following good news and relatively lower returns following bad news. Studies agree that greater information uncertainty about the impact of news on stock value leads to higher expected stock returns following good news but lower expected returns following bad news relative to the returns of stocks about which there is less information asymmetry (Zhang, 2006; Muga & Santamaria, 2007).

Momentum effect and information asymmetry go hand in hand (Muga & Santamaria, 2007; Islam, 2014): information asymmetry is also know as leverage effect (Islam, 2014). The author did a study aimed at testing the two variants of GARCH models in estimating stock returns volatility from three Asian countries: Malaysia, Singapore and India. For the symmetric model they used the standard GARCH while Threshold GARCH (T GARCH) was used for the asymmetric model. The study period was from 02/01/2007 to 31/12/2013 which involved 1724 observations from Malaysia, 1743 from Singapore and 1725 from India. The author observe that there is strong evidence that the daily stock returns can be characterised by the above two models. In the methodology, (Islam, 2014), used daily closing prices of stock index of each market collected from online database over the period from January 2007 to December 2013. The findings of the study indicated that the estimates of the standard GARCH parameters α and β were positive and statistically significant for all specifications. The values of β were found to be very high, ranging between 83% to 91% and this could imply persistent volatility clustering. On the results of asymmetry, T GARCH appeared to be significant and with the correct sign suggesting that the existence of momentum effect all in the three markets.

A research titled Fama on Bubbles whose main aim was to test Fama's views on rational bubbles and discussed whether such bubbles are consistent with Fama's empirical findings. Engsted (2014), argued that there is neglect on Fama's public statements about asset markets. On one hand, Fama expresses a strong belief in the rational efficient market paradigm: but on the other hand, he is completely silent about the paradigm that deals with rational bubbles. In respect to Fama's research, "irrational bubbles" appear 10 times in an article and in those few additional cases where the word "bubble" appears without "írrational" infront of it, it is clear that Fama refers to irrrational bubbles.

The research continues to discuss on how Fama completely ignored rational bubbles yet it was a hot topic in academic literature with both theoretical aand empircal contributions being published in the mid 1980's. Going further to the 1990's Fama completely ignored the discussion about bubbles and only gets back to it during the global financial meltdown of 2008. During his Nobel Laureate Lecture, Fama had a

section labelled bubbles (Fama, 2014). In the literature review Engsted (2014), discusses how some findings deviated from Fama's observations. The first one concluded that a scatter diagram of longterm returns against price earnings ratio suggests substancially negative returns, on average, for the next 10 years while the second concluded that linear regression of price changes and total returns on the log valuation ratios suggest substancial declines in real stock prices and real stock returns below zero, over the next 10 years. In conlusion of the research, Engsted (2014), notes that it is still not known on Fama's views on rational bubbles.

A research on testing the market efficiency of the Czech Capital Market on some selected issues. The approach in this study was an analysis of stock return behaviour from year 1995 to 2005. Hajek (2007) notes that if time series of Index returns are dependent and their dependence are econometrically significant, then the market is inefficient in terms of the weak form EMH. The implication of weak form efficiency is the Random Walk Hypothesis (RWH), which indicates that future price changes are unpredictable and follow one another independently (J. Chen, 2008) and fundamental analysis may be used to investigate departures of stock prices from their fair values if the market reaches the weak form efficiency but fails to be semi-strong efficient. The author further notes that numerous studies have proved that stock returns are conditional heteroskedasticity.

Heteroskedasticity-consistent variance r-ratio test is used because it ensures that in case of uncorrelated returns the variance ratio asymptotically approaches unity even if the variance is time-variable. Prices of new issues are determined by investment bankers while prices of existing issues are determined by the forces of demand and supply (James, 2012). Another study was on Banks and their effects on global interest has been of interest to everyone especially in connection to the 2008/2009 global financial crises conducted by Komo and Ngugi (2013). This study observed that most of the African stocks, with exception of the Nairobi Securities exchange are rarely affected by global crisis (the most recent being the 2008/2009 financial meltdown). In conclusion, Hajek (2007), notes that weak form EMH cannot be validated on the Czech stock Market. Daily price changes on individual stocks and indices are systematically linearly dependent and dependencies cannot be explained

by the non-trading factor, historical information on stock prices or indices may have statistically significant values.

Another conclusion made by the study is that the Czech stock market seems weak form efficient when the lower frequency data (weekly) are applied: short term dependencies must be exploited to become abnormally profitable. Homm (2009), did a research titled 'Testing for Speculative Bubbles in Stock Markets, A comparison of Alternative methods'. The author compares the observations from initial sample and this is extended forward until all observations are included. This is according to Philips, Wu, and Yu, (2011), who used the model to estimate the date of emergence of a bubble in the National Association of Securities and Dealers in Automated Quotations (NASDAQ) Stock Index.

A study to comparing the investors perceptions on NASI and NSE as performance measurement indicators sought to find out whether the introduction of NASI eliminated bias or brought any improvement. Osoro and Jagongo (2013), specific objectives were to find out whether there exists a difference between the NSE 20 Share Index, to find out whether difference exists in the Influence of the two indices and underlying market capitalization, and to find out whether difference exists in the Influence of the two indices and the underlying stock price. Their last objective was to find out which of the two indices is a better performance measure indicator. Osoro and Jagongo (2013) adopted three theories in their research namely; price pressure theory, imperfect subsitutability theory and information theory.

They adopted a comparative study to compare the two indices. They observed that investors perception would be affected by the reliability, accuracy, effectiveness and representativeness of the two indices. In their methodology, Osoro and Jagongo (2013), a correlation analysis was adopted where a z test was adopted at a 5% level of significance. The population of the study consisted of the then 52 listed companies at the NSE and 17 NSE member firms who were actively trading. Primary and secondary data was used in the analysis, where primary data was collected through self administered questionnaires and interview guides while secondary data was collected through a purchase at the NSE data vendors. In respect to primary data,

random sampling was used to select one analyst from each of the 17 NSE member firms.

The findings of the research found that there was no statistically significant difference between the NSE 20 Share Index and the NASI: their z statistical showed a result of 1.148 while the z critical was at 1.96 at 5% level of significance. However from their primary data, Osoro and Jagongo (2013), the key informants were of the opinion that there was a significant difference between the two. Their second objective aimed at establishing the correlation between the two indices using product moment correlation. The results indicated a correlation co-efficient of 0.807. The results also found a strong correlation between NASI and market capitalization (coefficient of 0.96) and that of NSE 20 Share index and market capitalization with a correlation co efficenct of 0.65. objective three aimed at determining the Influence of blue chip companies stock market performance and the overall stock performance. The researchers found that there was a very weak correlation of 0.24 and 0.02 for NASI and NSE 20 Share Index respectively. The statistical results indicated that there was a significant difference between the two indices and stock price movements. Through the primary data, the researchers also found out that 70% of the respondents felt that there was a direct Influence of the performance of NASI and that of other market indicators such as market capitalization, turnover and share price movements.

A likert scale of 1-5 was used in finding out which among the NSE 20 Share Index and NASI was a better performance indicator. On reliability, the NSE 20 Share Index performed better with a mean of 4.1 and NASI a mean of 3.8 while on accuracy and representation, the NASI was better with an average of 4.2 and 4.2 respectively as compared to the NSE 20 Share Index with an average of 3.7 and 3.7 respectively. The inferential statistics, Z test indicated that the results were not statistically significant.

A research titled a GARCH approach to measuring efficiency: a case study of Nairobi Securities Exchange was done by Owido, Onyuma, & Owuor (2013). The authors adopted a GARCH approach because of the weakness of the Ordinary Least

Squares (OLS) where it assumed a constant variance error term and this assumption does not hold always. In their approach they dismissed the OLS approach because of its assumption of a constant error term. They observed that economic data has been known to exhibit volatility clustering such that fluctuations in returns are not uniform over a period. They also observed that the one or more relevant independent variables may have been omitted from the model such that the predictor variables may not explain the model well thus leading to conclusions that may be wrong.

The above researchers concluded that the NSE is not efficient in weak form. The P-P and Q-Q plot results indicated that the distribution of returns were not quite linear in the middle and tail sections. The data indicated that the distribution was skewed to the right. The researchers also indicated that there was significant degree of autocorrelation betweeen adjacent and near adjacent observations which implied non-randomness. The data showed significant partial autocorrelation between Monday and Friday, Monday with Thursday and Wednesday but not Monday and Tuesday returns. The study concluded that Monday returns, as it was the norm, can be said to be lower than other days returns. They observed that stock returns on a particular day would depend on the previous activity and in particlular the previous three days.

It was found that changes in stock liquidity coincide with a later movement into the stock by retail investors (Karuitha, Onyuma, & Mugo, 2013). A potential explanation, the authors observe, could be due to funding problems faced by the retail investors and that is why individual investors may not be the first to take shares that are cheap. The researchers accepted the null hypothesis that stock splits cause portfolio shifts which are related to stock liquidity changes. A study by Aroni (2011), on factors influencing stock prices for firms listed in the NSE concentrated on factors such as inflation, exchange rates, interest rates and money supply. The author employed secondary data obtained from NSE and CBK statistics. In modelling, a multiple regression was used to estimate the effect of the selected factors on stock prices. The findings were that inflation, exchange rates and interest rates were statistically significant and money supply-though exhibiting positive correlation-was not statistically significant. Aroni (2011), notes that inorder for

investors to forecast future trends, they need to formulate appropriate investment strategy by constantly reviewing their current financial and economic conditions.

Literature has suggested that the four factor model is the best model in measuring the momentum effect: This is evident in the works of (Titman, Wei, & Xie, 2009a), (Sapp & Tiwari, 2004), (Agarwalla, Jacob, & Varma, 2014), (Zhang, 2006) and (Avramov & Chordia, 2006). The four factor model brings the momentum effect in addition to the three factors identified previously by Fama.

Several studies have been conducted in support of the four factor model which I intend to use in this study: Titman et al. (2009) did research on capital returns and stock returns. The authors observes that increased investment expenditures should be viewed positively. This is because higher expenditure is associated with greater investment opportunities and also higher investment expenditure may indicate that capital markets have greater confidence in the market. Titman et al. (2009), however also notes the drawbacks of event studies supporting the two arguments above. They note that there is tendency for firms to publicly announce only those investment expenditures that are likely to be viewed positively and that higher stock prices may make it easier for firms to increase investment expenditures. The authors note that with increased investment expenditure, it may actually result in negative returns.

These negative returns may occur if investors fail to appreciate management incentive to oversell their firms, stock returns subsequent to an increase in investment expenditure are likely to be negative. This is especially for managers who are empire builders (Titman et al., 2009a). Investors tend to undereact to empire building implications of increased investment expenditures. When firms increase their investment expenditure, most tend to underperform form their benchmark over the following five years. This underperformance is most prevalent moreso around earnings announcements. In the methodology, they used three different strategies: the first they used characteristic-based benchmarks portfolios which measures size, book to market values and momentum effects. The second approach used is the Caharts model of calculating excess returns. Finally they used Chopra et al model to examine returns around a short window sorrounding the firms announcement dates. The

intercept of Caharts four factor model captures the risk-adjusted returns which is also known as the momentum effect.

Daniel, Grinblatt, Titman, and Wermers (1997), did a research on measuring mutual fund performance with characteristic based benchmarks. They also adopted Cahart model approach. They identified a matching passive portfolio return for each fund return. This passive return which is substracted from the fund return to generate alpha, a weighted average of the returns of a one-month treasury bill. Cahart matching passive portfolio is based on the covariance of the fund returns with the returns of characterstic-based factor portfolios.

Sapp and Twari (2004) did a study titled, Does stock return momentum explain the smart money effect? The researchers also used the Cahart model. According to the authors, stock momentum phenomenon can be able to explain the smart money effect. Literature shows that investors prefer to invest in stocks that were recent winners. According to the authors, smart money effect is the ability to select good stocks. Investors have the ability to base their investment decisions on fund specific information-they have the ability to identify superior managers and invest accordingly. Smart money effect is best explained by the stock return momentum. Sapp and Twari (2004) conducted research to establish whether investors are chasing funds with momentum styles or they are just naively chasing funds with large past past returns.

If investors chase funds with momentum styles in an effort to exploit return momentum, then smart money effect may have an explanation consistent with a group of sophisticated fund investors taking advantage of cheap momentum strategies. They also examine whether funds with high momentum momentum exposure persistently enjoy positive cashflows as would be the case if investors were successful in indentifying fund managers that follow momentum strategies. The research period was from 1970 to year 2000. The authors rank funds at the start of each quarter in the sample period in deciles, based on their exposure to the momentum factor and then examine the proportion of funds within each decile to examine the proportion of funds within each decile that experiences positive net cash

flows during the formation of quarters and the next four quarters. In the findings, (SAPP & TWARI, 2004) observed that only 49% if the funds in the top momentum decile enjoy positive net cash flows in the formation quarter, while 34% of the funds enjoy positive net cash flows after four quarters. Their findings also show not only that fund investors are able to identify superior managers with their cash flows but they also do not identify momentum increment styles.

L'Her, Masmoudi, and Suret (2004) did a study that aimed in establishing evidence to support the four factor pricing model from the Canadian stock market. The study was conducted between 1960 and april 2001 where they found that size factor returns are substancially greater in january than other months. They found that momentum returns are always significant except in January. Book to market factor returns are positive (negative) and highly (barely) significant in down markets (up markets). L'Her et al. (2004), note that Fama and French three factor pricing model captures most market anomalies except the momentum anomally. Sood and Tellis (2009), did a study entitled, 'Do innovations really pay off? Total stock market returns to innovations'. The authors note that literature from critics highlight that stock markets react positively to announcements of immediate earnings but negatively to announcements of investment in innovation that have uncertain long term pay off. They used Caharts momentum factor among other models on 5481 announcements from 69 firms and 19 technologies between 1977 and 2006.

2.3.2 Influence of Financial Contagion Effect and the Performance of NSE Indices

In the world today, there is increased market integration, and this has led to escalated real financial linkage (Islam, 2014). When there is negative co-movement of asset prices, investors get motivated to act, and this motivation comes as a result of the fear of shocks. They react by trying to rebalance their portfolios but since there is information heterogeneity, they experience the contagion effect and volatility spill over. Shen (2011), observes that investors can be able to respond to financial crises in a timely manner if they hold only low degree assets. Financial Contagion Effects are spread through direct credit exposure and indirect linkages through holding the

same assets and Dungey *et al.* (2007), observe that large markets act as centres in distributing shocks to periphery markets.

A study that looked at financial contagion crisis effect on the Great Seven (G7) economies where the author noted that the Russian crisis, Asian flu and the 2008 Global Financial Crisis were among the most pronounced crisis that have taken place in the past 20 years was conducted by Hmida (2014). The author concentrates on the 2008 financial crisis, which is the worst financial crisis after the Great Depression of the 1930s. Its outcome was the collapse of mega financial institutions, bail out of banks by national governments and down turns in stock markets worldwide. This crisis staggered all the way to 2012 inform of a persistent global recession where it was estimated that declines in consumer wealth of trillions of US Dollars were lost. Hmida (2014), observe that there are two cases of contagion: fundamental and shift contagion and through literature, the author establishes that contagion can be measured using correlation co-efficient. Islam (2014), on the other hand, notes that there are two types of contagion: shift contagion and pure contagion. The shift contagion illustrates the propagation of shock beyond normal level in the presence of a crisis period while pure contagion arises due to unexplained fundamentals generally identified in post-crisis periods. In this case, contagion would be present if correlation increases significantly during the crisis period since this would suggest strengthening of links between the markets. The study was based on co-integration theory because it allows study of non-stationery series whose combination is linear and stationery. The hypothesis of the study was that the spread of the crisis between USA and other G7 countries was an act of shift contagion and not an act of fundamental contagion.

The researcher tested the hypothesis through two steps: the first being to establish the correlation co-efficients between the stability and crisis periods, and the second by testing the non-linearity through long term co-integration Influence of the financial markets. In their methodology, daily returns data for USA, UK, France, Germany, Japan, Italy and Canada was used. The study period was divided into two sub-periods: the stability period (from April 10, 2006 to July 31,2007) and period of turmoil and crisis (from August 1 2007 to December 30, 2008).

The author used adjusted correlation test (which measures co-movements between two markets by looking at the correlation co-efficients) and co-integration, linear Error Correlation Methods (ECM) and modelling contagion via nonlinear ECM. In the findings, Hmida (2014), observed that the co-efficient of kurtosis was very high (greater than three) confirming existence of great probability of extreme values. The study also established negative skewness except for USA, France, Germany and Italy. The results indicated that the adjusted correlation co-efficient where the majority of the Z test results were significant at 0.05 LS ans 0.01 LS. This was interpreted as evidence of existence of shift contagion.

A research on behaviour of bank prices and their impact on national security indices was conducted by Komo and Ngugi (2013). Their objectives were: to examine the behaviour of national security market indices across countries at different levels of economic development, to estimate the impact of share prices of leading banks on respective national securities market index, to compare the mean of national stock market idices before (2006-2007) and during (2008-2009) the crisis and to compare the mean and behaviour of bank stock prices across countries at different levels of economic development before (2006-2007) and during (2008-2009) the credit crisis. The study adopted a multiple regression model and used correlation co-efficient. Among the banks selected in the study were kenyan banks namely Barclays Bank of Kenya, Kenya Commercial Bank Ltd, Standard Chartered Bank Ltd, NIC Bank Ltd, and National Bank of Kenya Ltd.

In respect to objective one, it was found that six out of nine security market indices were significantly positively correlated with exception of the NSE Index, UK Securities market index and the Brazilian Securities market index. Correlation between the kenyan and the American securities market index was the highest with a coefficient of 0.928. The findings indicated that all indices were affected by global financial crisis. According to Komo and Ngugi (2013), these findings showed a convergence between the results and existing theories that security market indicators react negatively to news of a failing global market. In the findings, a suprise observation was that the security market indices of Kenya (NSE 20 Share Index) and UK (FTSE 100) had the second highest correlation-that is following the highest

correlation coefficient which was between FTSE and NYSE. This contradicts the notion that less developed countries are relatively isolated from capital markets of other countries.

In objective two, in respect to Kenyan banks, it was only two banks out of the five that were found to impact significantly on NSE 20 share index at 95% confidence level: these were NIC and Standard Chartered Bank where NIC affected the index negatively while Standard Chartered Bank affected the index positively. The adjusted r^2 explained the variations to the extent of 87%. On objective three, a paired sample Z test was carried out to test the mean differences before and during the credit crisis. The results indicated that all the indices studied had a statistically significant mean difference. The results also indicated that all countries except Brazil and India had statistically significant negative correlations. This, according to Komo and Ngugi (2013), could probably indicate that the crisis spread at different times across different countries or some countries were hard hit than others. The findings were that the correlation for indices before and after crisis was not statistically significant for the countries in the emerging countries. The results of paired sample correlation analysis of security market indices and mean bank share prices before and during the crisis showed that those indices that were statistically significant were negatively correlated. NSE had the highest correlation (-0.909) indicating that before the crisis, the prices moved in one direction and during the crisis they moved in opposite direction.

A study on a paper titled Fama on Bubbles, where he was looking at the rational bubbles on stock returns predictability. The researcher called for Fama's views on rational bubbles and discussed whether such bubbles are inconsistent with Fama's empirical findings on returns predictability. Rational bubbles are determined by the fundamental value of a firm. Islam (2014), observes that when there is financial contagion, risks that are idiosyncratic in nature (country based) fuels the transmission of shocks through non contigent channels into countries of different peripheries with minimal or no financial linkage. The author observes that it is through small but highly correlated risk factors that the overall risk is compounded during crisis periods. A working paper by Ozkan and Unsal (2012), on Global Financial Crisis,

Financial Contagion and Emerging Markets and found that a small economy facing a sudden stop of capital inflows due to financial distress in a developed country is likely to suffer a more prolonged crisis than the origin country of the crisis. This is because the country with the small economy may be unable to get out of the crisis due to slump in its consumer demand. Contrary to theory, the authors also found that if a financial shock originates domestically, the host country may be able to recover because the direct effect would be the depreciation of its currency which would result in a current account reversal. Dungey and Gajure (2014), did a research on contagion and banking crisis during the 2007-2009 crisis fro 50 countries. Through collection of literature, the authors observe that banking crises transmitted from other jurisdictions present a higher risk than that provided by currency or debt crises. The results establish that systematic contagion may not significantly increase the chances of a crisis arising out of a crisis elsewhere if there have already been current policy responses being implemented. The authors found that banking sector is strongly related through idiosyncratic contangion which represents the unanticipated impact of shocks affecting the crisis originating asset. Systemic contagion is the transmission of common shocks which may hit a global or regional market and they originate from the same source.

It was observed that the Russian and Long Term Capital Management Crises (LTCM) originated in bond markets but were rapidly transmitted through international equity markets (Dungey *et al.,* 2007). In 1998, there was great nervousness in the Russian banking and financial sectors which resulted to the suspension of payment of Russia's sovereign bond and floating of the Russian currency in August 1998. Russian crisis were soon followed by the near default of the US hedge fund LTCM and these shocks had far reaching effects on the global markets. The primary shocks began in bond markets but their repercussions were felt in the financial markets and high volatility in the international bond markets.

The above authors uses the factor model to identify the transmission mechanisms of financial crises where the model identifies financial contagion during crises periods. The authors did a research on six emerging equity markets (Argentina, Brazil, Hong Kong, Thailand, Poland and Russia) and four industrial equity markets (Germany,

Japan, United Kingdom and United States). The returns of the 10 countries were represented by Vector Autoregression (VAR) where equity returns of a country *i* at time *t* would be obtained from the sum of various variables. These variables are mean vector of parameters that allowed for non-zero means in equity returns, matrix for autoregressive parameters that would correspond the *i*th lag, and multivariate disturbance process with zero mean, variance, and variance-covariance matrix which would represent shock to equity markets which are assumed to have been derived from a set of factors. The authors note that the length of the lag distribution of Vector Autoregressive is given by p and they analyse two factors that distinguish the emerging markets and the developed markets. One factor captures the specific shocks in the emerging markets and is the size is controlled by Gamma factor while the other factor captures the shocks in the four industrial developed equity markets with the size controlled by the Delta factor.

A benchmark period to begin on January 5 1998 and end on July 31 1998. The Russian crisis began on August 3 and ended on August 31 was selected by Dungey *et al.* (2007). The Long Term Capital Management (LTCM) crises was chosen to run from August 31 to October 15. From the findings, it was observed that the parameter estimates of the common factor showed that all equity markets react in the same direction to world shocks with the effect tending to be larger in emerging markets than in industrial developed markets: infact the latin American Stock Markets experienced more than double the shock impacts received by the US and the only slight difference was the Japanese Market. The findings on the contagion parameter estimates showed that countries such as Germany and the UK react negatively to the Russian crises with positive results between the Russian crises and the emerging markets which were all statistically insignificant.

In contrast to the Russian crises, Dungey *et al.* (2007), observed that the effects of contagion of the LTCM crises were all statistically significant. Their conclusions were that contagion was found to be the highest in the industrial markets and especially latin American markets that were geographically close to the US. The authors suggested that future researchers should combine both bonds and equities to test the importance of contagious transmission mechanisms across international

borders. They also propose development of a multiple regime model that would allow for multiple crises.

2.3.3 Influence of White noise effect and the Performance of NSE Indices

Traders are said to be noise oriented if they trade securities for non-information based reasons (Dow & Gorton, 2006). According to Dow and Gorton (2006), are agents whose theoretical experience has been hypothesized to solve fundamental problems in stock markets. According to Milgrom and Stokey (1982), and Grossman and Stiglitz (1980), as cited in Dow and Gorton (2006), noise traders do not speculate and noise trading is the solution to speculation. The authors concentrated on collection of literature and they found that it is impossible for an agent with superior information to benefit from it by trading. These traders are likely to lose money on average when they trade and these may be referred to as noise traders or liquidity traders. Dow and Gorton (2006), had aim of critically evaluating whether noise traders existed and if they did how they survived when they are perenially losing money while trading. If investors put in place a stock-based compensation to motivate their CEOs, there tends to be an overuse of price information for the CEO. The result of this is that stock prices become excessively volatile and exposed to non-fundamental noise (Schneemeier, 2014). Dow and Gorton (2006), through their literature, identify two types of traders: informed and uninformed where the former take positions based on their information while the uninformed have no information, but they know that prices will reflect information of the informed traders.

Though equilibrium prices reveal information perfectly, private incentives of collecting information are eliminated (Dow & Gorton, 2006). To earn a return on information gathering, informed traders create a noise for if there is no noise and information gathering is costly, no equilibrium would exist when information is collected and perfect market would breakdown. When information is costly, noise is incorporated in the asset supply and this may bring about uncertainty in the asset prices which makes uninformed traders to be unsure that prices reflect the information of informed traders. As a result, uninformed traders will confuse the private information with uncertainty (Dow & Gorton, 2006). It is this uncertainty or

noise that makes it possible for the informed traders to trade without revealing their information and this results in profits. Adding noise to aggregate supply will result in an equilibrium that is partially revealing and this may not be clear as it has no assumptions and it would not be clear what white noise effect is responding to in reality.

The authors observe that noise trading came about by certain people trading without basing their decisions or actions on information and that noise trading acts as an insurance motivator to trading actions by risk averse investors. If noise traders are irrational, smart money traders will take advantage and eliminate them. This is because smart money traders or rational traders use information to make trading decisions and they are wealth maximizers (Dow & Gorton, 2006). Irrational traders would eventually be driven out of the money because they perenially make losses. However, this is not always the case: noise traders at times survive. The authors observe that noise traders will survive if they persist a little longer because with persistence, smart money traders will start incurring losses and this will drive prices away further from the fundamentals.

White noise effect model can be used to measure the market opinion that is not captured by fundamental factors or macro-economic factors (James, 2012). Fundamental factors include financial performance while macro-economic factors include the interest rates and inflation rates. Every individual is entitled to his or her own opinion and stock markets react on these opinions be they truthful or falseful. Stock prices can react very fast to an unfounded rumour thus easily rising or dropping depending on the type of information given, and once the market realizes the truth, it can correctly adjust itself at the same pace. Kadilli (2014), notes that noise trading should increase during business cycle troughs and this may lead to a higher stock return predictability component from investors sentiments during business cycle periods. During times of crisis investors express misperception of publicly available information. This noise trading is called investor sentiment and could be the origin of herd behaviour in crisis time (Kadilli, 2014).

Market noise is caused by investors coming into the market for different reasons: these reasons include but not limited to liquidation of stocks, different trading objectives or currency transactions aimed at hedging (James, 2012). Sinha and Agnihotri (2014), observes that liquidity or noise traders are motivated by factors other than expected payoffs. The best examples of these are institutional investors who may be trading out of the pressure from the liquidity needs of their clients. Hiemstra and Jones (1994), through their collection of literature identifies some causes of the causality nature between prices and trading volumes. These could be new information, tax and non-tax related motives, White Noise effects and trading volume as a level of disagreement.

Miralles-Marcello et al. (2014), did a study on stock market behaviour after shocks-the importance of bull and bear markets in the Spanish market. The purpose of their study was to analyze in depth the behaviour of Spanish Stock Market using intraday data to determine whether underreaction or overreaction exists over very short time periods following large price changes. The authors approach was in the following ways: first, in the analysis of stock behaviour they used Average Cumulative Returns (ACR) and Average Cumulative Abnormal Returns (ACAR) and this methodology is similar to the works of Kakiya et al. (2013), Kithinji, Oluoch, and Mugo (2014). Secondly, the authors dwelt on analysis for six days after the shock unlike the traditional situation when studies were carried out one day after the financial shocks. Thirdly, the researchers compared the market behaviour after different sizes and different phases of the bull and bear markets. Miralles-Marcello et al. (2014) found that in a bull market, after initial overreaction effect, there is a significant underreaction effect which is considered normal due to the optimistic environment. The researchers however observe that in bear markets, there are higher returns in both approaches after positive shocks than after negative shocks.

A study on the limits of noise trading was done by Bloomfield et al. (2005), Bloomfield et al. (2006), where they investigate the behaviour of noise traders and their impact on securities performance that involves an experiment to determine how noise traders fair in competitive market with other traders and also how equilibrium changes if securities transactions are imposed. In this research, it was found that

noise traders lose money on average since they do not engage in extensive liquidity provision. Another reason why they lose is because their attempt to make money by following trends is unseccessful since they lose most in security whose prices experience large moves.

A study done by Homm and Breitung (2009) noted that if a bubble is present, any rational investor, who is willing to buy that stock, must expect the bubble to grow at a rate that equals the prevailing interest rates. in this case, the government interest rate on the 91 day treasury bills. the authors further observe that if the bubble factor is positive, the stage for speculative investor behaviour is built. A rational investor will here be willing to buy an 'overpriced' stock holding the believe that through price s/he will be sufficiently compensated for the bubble. The authors observe that when positive bubbles exist, fundamental analysis is ignored. if enough investors have this expectation and buy shares, the stock prices will indeed go up and complete the chain of a self fulfilling prophecy. this is what is referred to as the Noise Effect.

2.3.4 Influence of Security Price Volatility and the Performance of NSE Indices

Volatility is the variation in the returns provided by the stocks due to changes in the daily price and is measured by standard deviation or variance (Islam, 2014). The authors observe that the usual ups and downs on prices are good for a stock market unless the price changes are unusually sharp or very rapid over very short time periods. It is these sharp fluctuations in price levels that make a security returns uncertain hence becoming very risky. Sinha and Agnihotri (2014), did a study that aimed at empirically examining the causal relationship among stock market returns, trading volume and volatility of securities market index returns where companies were divided into three categories. The researchers believed that by examining the dynamic relation between volume and returns, one could study how the nature of investor heterogeneity determines the behaviour of asset pricing. Literature has found that time series of market returns is drawn from conditional distributions with varying degrees of efficiency and this explains the presence of GARCH effect in daily stock movements.Volatility is said to be persistent if today’s return shock have large effect on the forecast variance many periods ahead in the future.

Chordia and Swaminathan (2000), found that the daily returns of stocks with high trading volumes were higher than the daily returns of stocks with low trading volume. The researchers noted that this could have been attributed to the tendancy of high volume stocks responding promptly to market wide information. Aggregate stock returns are positively autocorrelated in the shortrun but negatively correlated in the longrun because of noise trader models, who do not trade on the basis of the economic fundamentals (Hiemstra & Jones, 1994). Tan and Floros (2012), did a study on stock market volatility and bank performance. The study analyzed 11 Banks (Four State owned and seven joint-stock commercial banks) that were listed in the Chinese Stock Exchange. The study aimed at examining effects of stock market volatility, competition and ownership on bank performance in China. It found that stock market volatility can translate into higher Return On Equity (ROE) and Excess Return On Equity (EROE). It also found that the level of ownership did not have any effect on the profitability of Chinese Banks.

A study on price discovery and memory effects in infant African Stock Markets was done by Lukanima (2014), and was based on the Tanzanian stock market. The main objective was to study the efficiency of price discovery in relation to its dynamics and deterministic market features using All Sector Index (ASI). According to the author, the main features of price discovery were: inactive trading, illiquidity and high dependence of foreign investors to boost market activities, investors main dependence on dividends as the main source of income rather than stock trading, and uncompetitive trading among brokers. In modelling the memory effects in pricing mechanism, the author used the simple rooZ test where time series data is nonstationary and the moment of the stochastic process depend on time (t). For large samples, the author considered lagrange multiplier (LM) and this tested the null hypothesis that there is no serial correlation in residuals up to a specified lag order. In the research, heteroskedasticity was tested using the ARCH-LM test. This test is based on regressing the squared residuals on a constant and lagged squared residuals.

In the findings, Lukanima (2014), found strong evidence of non-normality in the index with high level of leptokurtic distribution in returns. Leptokurtic is a statistical distribution which where points in the x-axis are clustered, resulting in a higher pea

that the curvature found in normal distribution (Kothari, 2004.). The high peak and corresponding fat tails means that the distibution is more clustered around the mean and will have a relatively lower standard deviation. The second was that both index levels and stock returns appear to be stationary (Lukanima, 2014). The third finding was that ASI appear to exhibit structural shifts mainly associated with stock listings and the last finding was that DSE stock index does not follow a random walk suggesting inefficient price discovery. However, the author notes that the inefficient price discovery was not sufficient to conclude that the stock market itself is inefficient.

Demirer and Kutan (2006), observes that volatility may at times not be felt because of herd behaviour: this would lead security returns not to deviate from the overall market returns. The reason for this, the authors argue, is that individuals may suppress their own beliefs and make investment decisions based solely on the collection actions of the market. Rational asset pricing models suggest that dispersions in prices will increase with absolute value of market returns, since each asset will differ in its sensitivity to the market returns but the Market Herding Effect disputes this argument.

Amata and Muturi (2016), studied the Influence of macro economic variables, investor Herding Effect and stock market volatility in kenya. The authors used time series data spanning from January 2001 to December 2016. In their analysis, they tested short run causality with granger causality test and long run causality was tested by the use of Vector Error Correction Model (VECM). The researchers found out that there was a positive and significant Influence of inflation and stock market volatility. They also found that there wa a negative and significant Influence of interest rate and stock market volatility.

Nyamute, Lishenga, and Oloko (2015) did a study on the effects of inflation on stock returns and volatility at the NSE. In this study, an event was conducted where a market model was used. The study emphasized on volatility based on rights announcement dates. Eight firms were positively selected 20 days before and after the rights announcement were made. The researchers found out that kenyan markets

react positively to rights issues. The authors also observed that volatility and expected returns were proxies for risk and reward and that volatility of stock prices increases without bound over time.

2.3.5 Influence of Market Herding Effect and the Performance of NSE Indices

This is an investment strategy where market consensus is followed or activities of financial gurus are imitated whether they are right or wrong (Chen, 2013). In Market Herding Effect, rational investment is not followed in all circumstances (Demirer & Kutan, 2006) and investors will suppress their own beliefs in favour of market consensus during large price changes. Literature has established three main reasons why investors herd: First, it is based on psychological effect where investors may have preference for conformity with the market consensus (Chen, 2013; Demirer & Kutan, 2006) and this is because investors will feel secure when they join herds.

The second reason is information-driven effect where it is believed that the actions of more informed investors are right. The argument for this is that the financial gurus may know something about the returns on the particular investments and their actions reveal this information (Chen, 2013; Demirer & Kutan, 2006). The third reason for herd behaviour is principal-agent relationship where money managers might be drawn to imitating others as a result of the incentives provided by the compensation scheme, terms of service or in order to maintain their reputation (Demirer & Kutan, 2006).

Herd behaviour does not always indicate that investors are irrational: circumstances such as compensation dictate it is rational to follow others to avoid low returns (Demirer & Kutan, 2006). The study of herd behaviour by Demirer and Kutan (2006), was conducted in the Chinese market and it observed that though China as a country may be characterised by tremendous growth, its stock exchanges are not mature to the extent of that of a developed country. There are few institutional investors in Chinese stocks and about two-thirds of the Chinese stocks are not publicly tradable. This may make the trading behaviour of the Chinese market different from other markets and the Chinese market microstructure is unique because traders have to cope with communism. In China, herd behaviour mostly

takes place in Shenzhen as opposed to Chinese market: this is because the former mainly consists of manufacturing and export markets doing business in Hong Kong while the latter consists mostly large state owned enterprises.

In their literature, the authors suggest that herd behaviour is most likely to take place in Shenzhen market because exposure to export-oriented business may allow them to be more informed about global developments. Demirer and Kutan (2006) also anticipate that sectors with smaller capitalization and small retail investors are more likely to be subject to herding. The hypothesis of the study is that Securities Behaviour may be different in the stock exchanges and sectors causing different herd formation. The methodology that was used in the study was cross-sectional standard deviations because the presence of the herd behaviour would lead security returns not to deviate from the overall market returns. This was because individuals may suppress their own beliefs and make investment decisions based solely on the collection actions of the market. Linear autoregression model was used to estimate the behaviour of standard deviation during period of market stress.

In their study, Demirer and Kutan (2006), analyzed data in two forms: first they took 18 industry groups and the second data set, they observed the daily sector indexes of Shanghai and Shenzhen stock exchanges. They obtained data for Shanghai from May 3 1993 to November 16 2001 and this totalled to 180 daily observations. Data from Shenzhen stock exchange, which contained five sectors, was for the sample period from July 20 1994 to November 16 2001 which totalled 1544 observations. Data was analyzed using the Newey-West heteroskedasticity and autocorrelation standard errors where two sets of dummy variables were used to identify days with extreme movements. They used a significance level of 1% and 5% to restrict the returns on both the upper and lower tails of the market return distribution. The findings were that there was no evidence of herd formation during periods of large market swings. Though rational pricing theory was observed in price movements, the coefficient values for the upside and downside moves of the market return dispersion during extreme downsides moves are much lower than those for upside moves.

It was established that herding does not take place in either the industry groups or sector indexes and after finding that there was no data that supported herding in Chinese stock markets, the authors decided to conduct a more robust analysis. They analysed the impact of the Asian financial crises of 1997, which culminated in the collapse of Hang Seng Index, and decided to introduce dummy variables for october and July to check the sensitivity of results but their conclusion about herd formation in Chinese markets remained the same: there was no Market Herding Effect. In their conclusion Demirer and Kutan (2006), observes that: first market participants in Chinese stock markets make investment choices rationally and the second was that lack of Market Herding Effect should provide confidence for Chinese policy makers that they do not have to be concerned about potential destabilizing effects. This would imply that market segmentation is not necessarily a barrier for efficient flow of information.

2.4 Security Market Operations in Kenya

The Kenyan security market is known as Nairobi Securities Exchange. It is among the leading security markets in the region in terms of market capitalization and its linkage with the developed stock markets.

2.4.1 Measuring the Performance of Nairobi Securities Exchange

A security market indicator can be used as a benchmarking tool, proxy for market portfolio, research tool for scholars and technicians can use it to predict price movements (Osoro & Jagongo, 2013). In selecting the companies to constitute the index, both non-random and random selection are used. Non random selection is used to select the various segments of a stock exchange while random selection is used to select the companies on the segments. Non-random are important especially for companies that are so important in the stock market such that ignoring them would result into inconclusive findings. For Instance a company like Safaricom Ltd. must be included in the analysis of the Nairobi Securities Exchange. This is because of its size in terms of market capitalisation, volume of shares outstanding, volume of shares traded and profitability, and being the only company listed in its sector. For instance, in the month of April 2014, the Market Capitalization of all firms listed in

the NSE stood at around 2.1 Trillion and at the same period the market value of Safaricom Ltd. stood at around 528 Billion while its total shares outstanding amounted to 40.6 Billion (Nairobi Securities Exchange, 2014). The above when computed would imply that Safaricom constitutes around 25.1% and ignoring this firm on the analysis would not reflect the true picture of the Kenyan Securities Markets.

Indices are selected from different firms and base years and thus the percentage change is more important than the value of the index (Osoro & Jagongo, 2013). The difference in the movement of index depends on the way the index is constructed (Fabozzi & Peterson, 2003). The factors considered in index construction are: the universe of the stocks represented by the sample underlying the index, weight assigned to the stocks on the index and the method of averaging across all stocks. A good security market indicator need to be highly correlated with key sectors in the economy: Komo and Ngugi (2013), notes that most stock indicators tend to be highly correlated with the banking sector development. The possible explanation could be due to the fact that the banking industry performance is an aggregated averaged performance of all other sectors in the economy.

According to Osoro and Jagongo (2013), two methods of averaging may be used: arithmetic average and geometric average. Arithmetic average is a simple average while geometric average involves multiplication of components after which the product is raised to power of 1/No. of components. Fung, Sierra, Yau, and Zhang (2008), found a significant mutual feed back of information between the stock market and the high yield Credit Default Swap (CDS) in terms of pricing and volatility. The CDS market plays a more significant role in volatilty spillover than the stock market. The authors also found out that volatility of investment grade and high-yield CDS seem to lead to stock market volatility and high-yield CDS has a feedback effect to that of the high-yield CDS market only.

2.4.2 Security Market Indicators in Nairobi Securities Exchange

The oldest securities market index in Kenya is the NSE 20 Share index (Osoro & Jagongo, 2013) and this index should be constantly reviewed to be in agreement with

the best global practises (Nairobi Securities Exchage, 2014). The market index is reviewed periodically to ensure that it reflects accurate picture of the market performance. NSE 20 Share Index is a price weight calculated as mean of the shares of the 20 listed companies. They are selected basing on a weighted market performance during the period under review based on the following criteria: the first is trading activity measures such as market capitalization, shares traded, deals or liquidity and turnover during the period under review are weighted in the ratio of 4:3:2:1 respectively (Nairobi Securities Exchage, 2014). The second prerequisite of inclusion in the NSE 20 Share Index, according to the NSE website, is that a company must have a free float of atleast 20% where free float is simply the shares that are available for trading-this implies that for a firm to become a constituent member of the NSE 20 Share Index, at least 20% of its shares must be issued to the public for trading. The third is that a company must have a minimum market capitalization of Ksh. 20 Million and the last is that the company should ideally be a blue chip with a superior profitability and dividend record.

Among the constituent firms in the NSE 20 Share Index, there is one firm in the Agricultural subsector, six firms in Banking subsector, three firms in the Commercial and Services subsector, two firms in Construction and Allied subsector, three firms in Energy and Petroleum subsector, one firm in the Insurance subsector, one firm in Investments subsector, two firms in the Manufacturing and Allied subsector, and one firm in the Telecommunications and Technology subsector (see the table on appendix 8). The subsectors that are not represented in the NSE 20 Share Index are: Automobiles and Accessories subsector, Investment Services subsector and Growth and Enterprise Market subsector. This implies that out of the 12 subsectors of the NSE, 9 are represented in the computation of the NSE 20 Share Index while three are not incorporated in the index construction.

The second index to be established in the NSE was the NSE All Share Index (NASI) in 2008, (Osoro & Jagongo, 2013), and it incorporates all firms listed in the NSE (Nairobi Securities Exchange, 2014). NASI was to act a complimentary Index to address the weaknesses that were inherent in the NSE 20 Share Index. It is a weighted index based on the size of all respective companies listed in the NSE and is

based on the entire market capitalization of the NSE. Currently, its base year is January 1 2008 with a base value of 100. According to Osoro and Jagongo (2013), NASI was introduced as a part of recommendation by International Finance Corporation (IFC) and regulators of word stock markets. Its major aim was to ensure that there was smooth dissemination of information to investors as all securities listed in the NSE were included in its computation.

There are two other indices that were introduced in 2014. FTSE NSE kenya has two indices, FTSE NSE Kenya 15 Index and FTSE NSE Kenya 25 Index (Nairobi Securities Exchange, 2014). According to the NSE website, FTSE NSE is designed to present the perfomance of the Kenyan companies listed on the NSE, providing investors with comprehensive and complimentary set of indices with which to measure the performance of major capital and industry segments of the NSE. FTSE NSE Kenya Index is calculated in Kenya Shillings where prices are calculated in real time. The indices are supposed to be reputable where the most outstanding companies are reflected in their reports. The aim of these indices is to attract investors, mostly large institutional, to come and invest in the kenyan securities markets for they only capture the most attractive stocks in terms of market value and liquidity.

FTSE NSE Kenya may exist in five states (Nairobi Securities Exchange, 2014): the first is called firm state where indices are active and are calculated during official market hours (9:30-3.00 PM). The second is called closed state and this occurs when the calculations for the day have been stopped. The third is called held where the index has exceeded the present operating parameters and calculations have been suspended pending resolutions of the problem. The message held is displayed against the last index calculated by FTSE. The fourth state is called indicative and this occurs when the index is being calculated. Under these circumstances, the index will be declared indicative. According to NSE website, the last state is called part: and under this, if a the indices being calculated during the normal official index period hours, but there are less than 75% of the constituents by capitalization available with firm prices, then the index will be displayed with the message ‘PART’ to indicate that only a proportion of the security prices are included. FTSE is usually responsible

for monitoring the perfomance of FTSE NSE Kenya Index series and from advise from NSE, FTSE determines the status of each index. The two indices only incorporate the ordinary shares and shares of firms that are registered in Kenya.

In FTSE NSE Kenya 25 Index, liquidity is tested semi-annually by calculation of its weighted average mean daily trading per month. In the computation of average daily mean trades per month, a minimum of 5 trading days in each day must exist (Nairobi Securities Exchange, 2014). If the firm had been suspended from trading, the suspension period was not included and prorata period was used when the testing period is less than 12 months.

According to Nairobi Securities Exchage (2014), constituent firms of the FTSE NSE Kenya 15 Index are: eight firms are form the Banking subsector, one firm form the Commercial and Services subsector, one firm from the Construction and Services subsector, one firm from the Insurance subsector, one firm from the Investment subsector, two firms from the Manufacturing and Allied subsector and one firm from the Telecommunications and Technology subsector. Firms from Agricultural subsector, Automobiles and Accessories subsector, Energy and Petroleum subsector and Growth and Enterprise subsector are not represented in the FTSE NSE Kenya 15 Index. This means that seven subsectors out of the twelve are represented in the FTSE NSE Kenya 15 Index. The top five companies in FTSE NSE Kenya 15 Index are Safaricom, East African Breweries (EABL), Equity Bank, Kenya Commercial Bank (KCB) and Standard Chartered Bank while the top five companies in FTSE NSE Kenya 25 Index are EABL, Safaricom, Equity, Barclays and KCB (Nairobi Securities Exchage, 2014).

2.5 Research Gaps

A number of studies have been done in developed countries testing the reliability of security market indicators (Hajek, 2007). However this has not yet been done in developing countries such as Kenya. There are also discrepancies in respect to interpretation of these market indicators. A study by Osoro and Jagongo (2013) about the investors perception on the NASI and NSE 20 Share Index as market performace indicators was not conclusive. The results of the researchers seems to have used very

simple statistical analysis techniques and they over relied on primary data in their analysis. The statistical techniques that were used were mainly product moment correlation and z test which the research just explained descriptively without supporting with tables. For primary data, the researcher over relied on the opinion of key stake holders in the financial sector without depending much on statistical data. This research ought to have been done in a more vigorous and robust manner so as to establish the statistical back up of the perception of the investors towards the NSE 20 Share Index and NASI. The research was not thorough in its analysis where, for instance, the authors used a likert scale to find which of the two indices was a better performance indicator. This likert scale was based on questionnaire responses and this could be a biased measure of data collection.

Research by Schneeimier (2014), shows that in developed countries, giving CEOs stock based incentives may motivate them to work harder but this in the longrun diminishes the financial markets ability to transmit information. This study sought to establish whether the above notion would hold water in Kenya's financial markets. A study by Komo and Ngugi (2013), on behaviour of bank share prices and their impact on National Security market indices concentrated on 9 countries at three different economic levels. One of the countries in the study, in the emerging economic levels was Kenya. The study compared recessionary and non recessionary periods. The findings of the study found that even though Kenya is a developing country, its banks stocks were significantly connected with the performances of bank share prices in the developed market. This study would have as one of its objectives that would analyse the extent to which the Kenyan market is affected by financial contagion. The study would now concentrate on the entire securities market (as opposed to Komo and Ngugi (2013), who only concentrated on five Kenyan banks) to establish the level of financial contagion that affects the Kenyan Securities Markets.

Studies on herd formation mainly dwelt on more developed markets and those that touched on the Kenyan securities markets, just took the NSE as one of the study samples. A study by Demirer and Kutan (2006), tried to establish whether Market Herding Effect existed in the Chinese stock markets while that by Chen (2013), was

trying to establish whether investors herd in th global markets. Demirer and Kutan (2006), concentrated purely on the Chinese stock markets while Chen (2013) included Kenya among the frontier markets that he studied.

Other studies in Kenyan Securities markets includes those of Onyuma et al. (2012), which dealt on cross listing and financial performance, Kakiya et al. (2013), Kakiya, who dwelt on announcements and their effect on the efficiency of NSE, Karuitha et al. (2013), who dwelt on stocks splits and their effects on ownership concentration, Amata and Muturi (2016) who studied macro economic behaviours and Kithinji et al. (2014), who evaluated rights issue announcement and its effects on share performance. Aroni (2011) studied on the influence of macro economic factors such as inflation, exchange ratess, interest rates and money supply on the stock prices of NSE and found that the first three factors did have a significant influence but the last factor was not found to significantly influence the stock prices at the NSE. Olweny *et al*. (2012), studied investors behavior in the dimension of social cultural attributes and how they influence their investment decisions in the perspective of risk tolerance. Mweu (2017) did a study on factros influenceing investment decisions in NSE where the researcher collected data from Dyer and Blair Investment Bank. Aduda et al. (2012) concentrated on how Securities Behaviour influence financial performance of companies listed at the NSE. Amata and Muturi (2016) on the otherhand concentrated on how macro-economic variables influence Securities Price Volatility in Kenya. Therefore not much research has been done in Kenya on the Influence of Securities Behaviour and performance of Nairobi Securities Exchange indices.

2.6 Conceptual Framework

The independent variables in this study was momentum effect, financial contagion, White noise effect, Securities Price Volatility and Market Herding Effect. For a securities market to operate efficiently there should be no irregular flow of information. This study would establish the Influence of securities behaviour and the performance of NSE indices. Securities markets performance is measured by the use

of indices-and in the case of NSE, we have NSE 20 Share Index, NASI, FTSE NSE Kenya 25, and FTSE NSE Kenya 15 Indices.

Zhang (2006) observes that momentum effect occurs due to post-analyst revision drift in which the market respond to recently released information gradually so tha prices exhibit predictable drift patterns. Financial contagion would simply try to determine the effects of spill overs of information in outside markets and how they affect the performance of the security market indicators in Kenya. The variable white noise effect would look at the variations in stock price and volume which normally distracts traders from following market fundamentals in trading (James, 2012). Dow and Gorton (2006), observes that white noise effect traders are individuals who are less rational for they are subjected to behavioural biases. White noise effect involves two category of traders: the informed and the uniformed, where the informed make decisions basing on information they have while the uninformed make decisions basing on the prices that are being reflected by the actions of the informed traders. When volatility persistence is low, reaction of volatility on past market movements are much intensive, and shocks in volatility disappears quickly (Rozga & Arneric, 2009). The most frequently used predictor among the financial variables is Dividend Yield (DY) which is found to have predictive power on financial returns for different horizons (Kadilli, 2014). Market Herding Effect would look at the Influence of the actions of investors to follow consensus instead of rationality and their effects on the performance of security market indicators in Kenya (Chen, 2013a).

The dependent variable in the study is the NSE indices and their main purpose is to ensure for investors possibility to estimate not only the state of separate stocks but the state of the entire stock market, sector or region (Pilinkus, 2010). The NSE Indices include NSE 20 Share Index, NASI Index, Market, FTSE NSE 15 Index, and FTSE NSE 25 Index. The independent variables were tested against each of the dependent variables highlighted above. This is represented in the Figure 2.1.

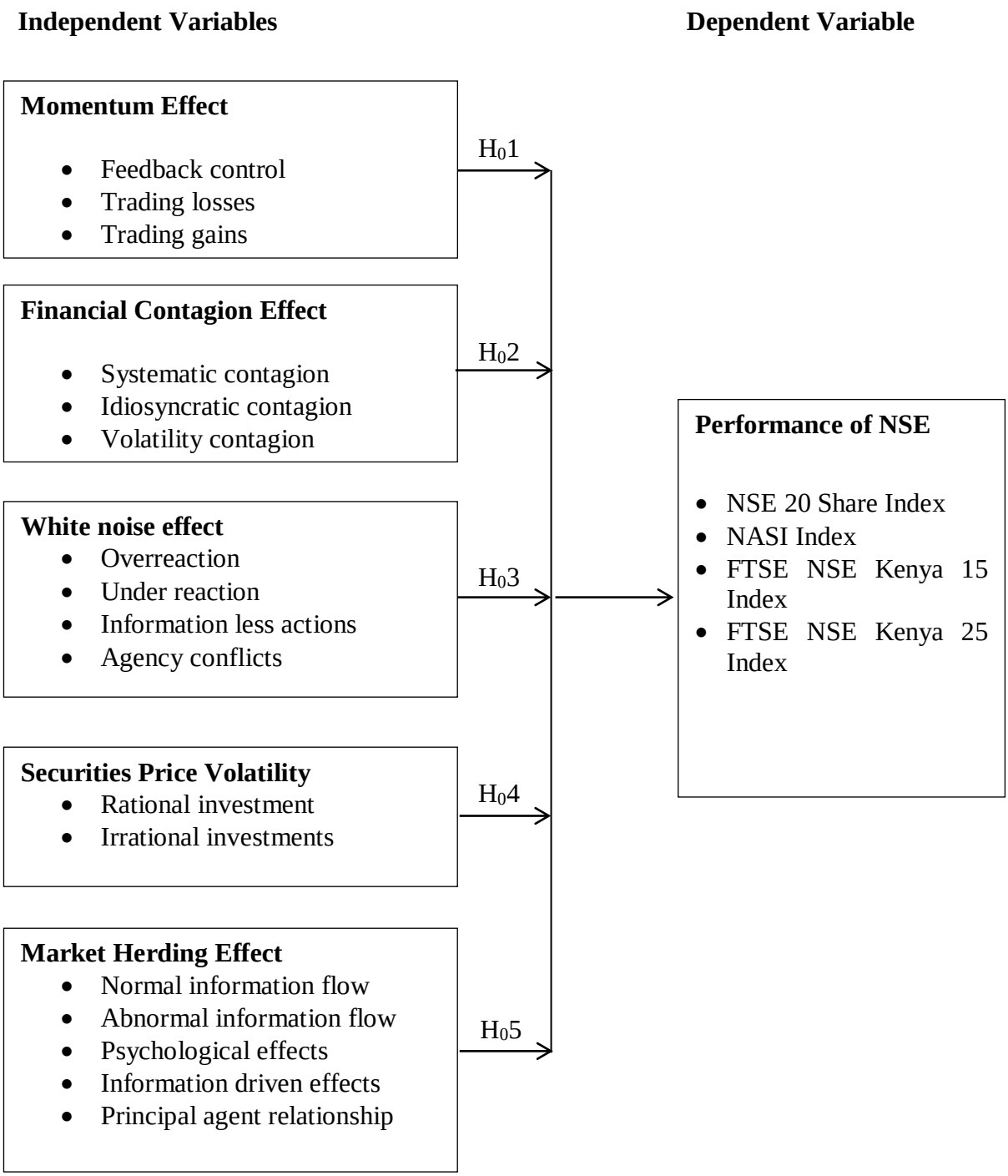

Figure 2.1: Conceptual Framework

2.7 Summary of the Reviewed Studies

This chapter ends after exhaustively addressing all the literature and therefore opens floor for the research methodology in the following chapter. The following observations can be drawn from the literature: that the presence of noise in financial markets distorts the equilibrium. From the reviewed, studies it can be seen that no study has been done in the Kenyan perspective about the Influence of securities behaviour and performance of NSE indices and therefore this study would provide good information to scholars, investors and financial analysts about the behaviour portrayed by our investors. The objective of momentum effect borrows heavily from Komo and Ngugi (2013), who did a study on the behaviour of stock prices at different economic times. The objective on Financial Contagion Effect borrowed a lot from the works of Islam (2014), who through his study shows that increased market integration has led to escalated financial linkage. The objective of white noise effect has depended mostly on the works of James (2012), who found that white noise effect is caused by investors coming into the market for different reasons such as liquidation of stocks, trading objectives or currency transactions with the aim of hedging. The objective of Security price volatility uses the works of Sinha and Agnihotri (2014), who studied the causal relationship among stock returns. The objective of Market Herding Effect notes that in order for investors at times herd to avoid low returns and thus follow others. This is borrowed from the works of (Demirer & Kutan, 2006).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents methodology that were used: it concentrated on the research design, target population, census design, research instruments, pilot testing, data collection, and how the data collected was analysed. Models that were used to analyse each objective on secondary data were shown while the model for analysing primary data were shown.

3.2 Research Design

Cooper and Schindler (2011) in their many definitions observe that a research design is the plan and structure of investigation so conceived so as to obtain answers to research questions. The plan is the overall scheme or program of the research. They note that it includes an outline of what the investigator will do from writing hypothesis and their operational implications to the final analysis of data. This study adopted a quantitative research design. This design is determined before commencing the project, suitable for a single method or mixed methods and its consistency is critical (Cooper & Schindler, 2011). A quantitative design is less likely to be associated with a deductive approach to testing a theory (Morgan, 2014). It is a natural science model/ positivist model and very objective in the view of the objects studied (Greener, 2008). The method of analysis in this research involved Causal Comparative Approach. This method of analysis involves either a cross-sectional or a longitudinal approach. It is used to explore relationships between variables and it determines reasons or causes for the current status of the phenomenon under study (Kothari, 2004). The variables of interest cannot be manipulated unlike in experimental research. The approach was suitable for this research because it allowed a comparison of groups without having to manipulate the independent variables and it can be done solely to identify variables worthy of experimental investigation.

3.3 Research Philosophy

In research, there must be a believe in the way how research is intended to be done and results are to be interpreted (Greener, 2008a). (Crewswell, 2009) observes that philosophies influence the practice of research and need to be identified. There are four world research philosophies namely positivism, realism, interpretivism and pragmatism (Saunders et al., 2009b). In positivism, the researchers view is external, objective and independent of social actors while in realism, the researchers view exists independently of human thoughts though its interpreted through social conditions.

In the interpretivism philosophy, the researchers view is socially directed and is rarely consistent while the pragmatic view, the researchers opinion is external and dynamic chosen often to fit the best prevailing situation (Saunders, Lewis, & Thornhill, 2009a). (Kothari, 2004) observes that research philosophies differ from one science to another. This thesis adopted the positivism approach as this is evident in the studies by (Kariuki & Kiambati, 2017); (Condado, 2014), (Lindvall & Lindbergh, 2014) who all did studies based on stock markets.

This research adopted a deductive approach. This is when a research is built on an existing theory and furthering it (Cooper & Schindler, 2014). This is in line with the research of (Amata & Muturi, 2016) who adopted a similar approach in their study. This research adopted the strategy of .quantitative which goes hand in hand with deductive reasoning (Hariharan, 2012). This approach is commendable where numbers and facts of objects studied are used (Greener, 2008a).

3.4 Target Population

This is the universe of things or items from which a sample would be selected (Greener, 2008a). This study considered all the securities listed in the Nairobi Securities exchange (NSE) for secondary data and all the licenced market participants for primary data. The NSE is divided into four major segments: Main Investments Market Segment ((MIMS), Alternate Investment Market Segment (AIMS), Growth and Enterprise Market Segment (GEMS) and Fixed Income

Securities Market Segment (FISMS) (Nairobi Securities Exchange, 2014). The exchange is further classified into 11 subsectors according to the nature of business they engage in. These are Agricultural ,Automobiles and Accessories, Banking, Commercial and Services, Construction and Allied, Energy and Petroleum, Insurance, Investment, Investment Services, Manufacturing and Allied, Telecommunication and Technology and Growth Enterprise Market Segment. Please refer to appendix ix. The study would also target the stockbrokers and investment bankers who are members of the Nairobi Securities Exchange to obtain some primary data from these market participants. The stockbrokers and investment bankers have first-hand information pertaining to securities behaviours.

3.5 Census Design

This study adopted a census of all firms listed in the Nairobi Securities Exchange that have been actively trading for period starting 2004-2015. This implied firms that have not been listed for 10 years or whose trading has not been consistent for 10 years were included in the study but only information that is available was used. In respect to stockbrokers and investment bankers, the researcher drafted structured questionnaire that was administered to senior managers of the stock brokerage firms.

Since this study focused on all firms listed in the NSE and all market participants, it was not be based on sampling but instead a census of all firms and market participants were conducted. When all firms are included in the study, this is the ideal approach to use (Payne & Payne, 2011). Therefore, all the 69 listed companies (for the purpose of secondary data) and 20 market participants (for the purpose of primary data) were used in the study.

3.6 Research Instruments

This research used both secondary and primary data as data collection instruments. For secondary data, the researcher used customized data collection sheet for each objective targeting all the firms listed in the NSE (See Appendix iii for the combined data collection sheet). Secondary data was necessary because of the kind of data that the researcher intended to collect. Information on the monthly stock prices over time

was obtained and this enabled the research to establish the behaviours portrayed by the investors over the 12-year period. Secondary data was the main form of data that was used since the research. This was in agreement with Saunders, Lewis, and Thornhill (2009), who recommends such kind of data collection tool for panel data. For primary data, the study used structured questionnaires addressed to the market participants of the NSE (see Appendix ii on research questionnaire). These were inform of a likert scale and helped gather key informants view about the Influence of investor's behaviour and performance of NSE indices. The data from the key informants was be very crucial for they gave information that they have acquired over time in their day to day operations in the security markets.

3.7 Data Collection Procedure

This involves the approach that the researcher used in obtaining the research data with the intention of further analysis. The research concentrated on both primary and secondary data. Secondary data is data that the researchers did not collect for themselves directly from the respondents (Greener, 2008), and it could lead to discovering unforeseen or unexpected relationships for it is unbiased. Secondary data was obtained from the data vendors at the Nairobi Securities exchange (in respect to monthly prices and NSE 20 Share Index values), Central Bank (monthly risk free rate of return), KNBS (inflation rates)and Capital Markets Authority (Dividend per share, number of shares outstanding for the listed companies) in respect to all objectives except for Financial Contagion Effect, which was obtained from the websites of the New York Stock Exchange and London Stock Exchange in addition to some data being obtained from the NSE data vendors. The time horizon for this study was longitudinal covering a span of years understudy. This is in agreement with the research of (Komo & Ngugi, 2013); (Olweny et al., 2013); (Owido, Onyuma, & Owuor, 2013); (Kakiya et al., 2013) whose all studies spanned over a span of more than 10 years. This data was the monthly price movements for the years starting on January 2004 and ending on December 2015. Empirical studies have supported this span of time as being sufficient in analysis. These include Kadilli (2014), whose study was for 12 years, that of Hajek (2007), which was for 11 years and that of Miralles-Marcello *et al.* (2014), which adopted 10 years and that of

Amata and Muturi (2016), who used a period of 13 years in their study . Secondary data was collected with the aid of a data collection sheet where information on daily price movements, monthly risk free interest rates, turnover, number of shares outstanding, dividends paid in a particular year, market capitalization, NSE 20 share index, NSE All Share Index, FTSE NSE 15 Index and FTSE NSE 25 Index was obtained. This data was obtained from NSE, CMA, Central Bank and Kenya National Bureau of Statistics (KNBS) as was the case of Amata and Muturi (2016).

Primary data was collected through the use of structured questionnaires that addressed to all stock brokers and investment bank firms. Since there are only 20 market participants in the NSE, the researcher personally administered the questionnaires to the managers of the licenced market participants. After collection of primary it was edited and coded ready for entry in the SPSS software for analysis. Secondary data was first be input in excel spreadsheets and then analysed through both the Excel and SPSS software.

3.8 Pilot Study

A pilot study was necessary as it revealed weaknesses, if any, of a questionnaire before it is actually sent to the actual respondents (Kothari, 2004). Pilot study is a replica and rehearsal of the main survey and it brings to light the weakness (if any) of the questionnaire. Johanson and Brooks (2010), suggest that 30% participants of the population of interest is a reasonable minimum recommendation for a pilot study since this is representative of the target population. On the basis of the above, this research used six participant firms and self-administered six questionnaires to the financial analysts' of these participants to pilot test the questionnaire and this is about 30% of the stock brokerage firms. This piloting was done in the between the months of September to November 2016. Greener (2008), advocates that in determination of the sample to be used in pilot tests, one needs to consider the population so that the pilot testing will not exhaust all the researchable subjects. These firms were randomly selected and their results were not to be included in the analysis. The purpose of this pilot testing was to ensure that the questionnaire gave accurate information by ensuring that there were no questions that were left

unanswered by the respondents and that the respondents would fully understand the questions addressed to them.

3.8.1 Validity of the Instrument

Validity is concerned with whether the findings are really what they appear to be about (Saunders et al., 2009b). It is also the extent to which differences found with measuring instruments reflect the true differences among those being tested (Kothari, 2004). Validity can be characterized in four main ways: face validity, construct validity, internal validity and external validity (DeMarrais & Lapna, 2004); Greener, 2008). Face validity (also known as content validity) means that a nonprofessional may be able to broadly see that this is a valid method of research on the face of it. It is mostly applicable on surveys or interviews to encourage participation and its existence can be determined by a panel of experts who shall judge how well the measuring instruments meet the standards (Kothari, 2004; Greener, 2008). Construct validity aims at ensuring that the method actually measures what the researcher thinks it measures (Greener, 2008), and it is applicable on mailed questionnaires. With construct validity, the researcher was not be worried that the questions are answered in a way that was not intended.

Internal validity on the other hand relates to causality effect on the variables and a researcher can conduct tests such as factor analysis to establish its existence. External validity looks at generalisability of research outcome in other contexts (Greener, 2008). Saunders *et al.* (2009), observe that validity is the most important criterion as it indicates the degree to which an instrument measures what it is supposed to measure. The questionnaire was given to PhD lecturers in the area of finance as well as to the supervisors. Saunders *et al.* (2009), observes that the threats to validity include history, testing, instrumentation, mortality and maturation.

3.8.2 Reliability of the Instrument

This is simply the extent to which the research results are auditable objectively (Greener, 2008): it should be transparent and clear so that the reader can undertake the same method themselves and produce the same results. Kothari (2004), notes that

if quality of reliability is satisfied by an instrument, then while using it the readers can be confident that the transient and situational factors are not interfering.

The most common test of reliability is testing for internal consistency through the use of Cronbach's alpha as it helps the researcher to predict the value of scores and limits of the relationship among variables (Saunders et al., 2009). An alpha greater than 0.9 indicates that the internal consistency is great, 0.8-0.9 good, 0.7-0.8 acceptable, 0.6-0.7 questionnable, 0.5-0.6 poor and less than 0.5 unacceptable. The researcher used an alpha value of 0.7 in this research. The threats to reliability of research findings may include subject or participant error, subject or participant bias, observer error and observer bias.

Six (6) market participants were used in the pilot testing whose aim was testing the validity and reliability of the research questionnaire. The results of this test were as follows: The overall Cronbach's Alpha was 0.75 which meets the minimum threshold of 0.7 according to (Saunders et al., 2009b).

Table 3.1: Overall Reliability Statistics

Cronbach's Alpha	N of Items
.750	156

The researcher also went ahead and established the Cronbach Alphas for each variable that data was intended to be collected from. All the values of Cronbach Alpha were at least 0.7 indicating that the tool used in data collection was valid

These are as follows:

Table 3.2: Reliability Statistics for each Objective

Objective	Cronbachs Alpha	No o items
Momentum Effect	0.71	22
Financial Contagion Effect	0.777	16
White Noise Effect	0.839	16
Security Price Volatility	0.733	16
Market Herding Effect	0.791	16

3.9 Data Processing and Analysis

Data analysis is decomposition of things or items into components with the aim of studying them. In respect to all hypotheses, they were tested at a significance level of 0.05. A z-test was used in respect data analysis since the observation in the study were more than 30. The reason for choosing this level of significance is that it is the most common level of significance in social sciences (Saunders et al., 2009b).

The data of interest to the researcher was specifically be the monthly share prices of the companies listed in the exchange, and the price movements were computed to obtain monthly stock returns. A point to note is that in monthly prices, the data vendors at NSE normally provide the prices of the last trading day of the month under consideration. A linear time series regression model based on OLS criteria was adopted for each objective and the data analysis tool that was used was the Statistical Package for Social Scientists (SPSS) version 21. The monthly returns were then be input on each model and basing on the formulas given, analysis was done on each variable.

Hypothesis one intended to test the influence of the momentum effect on the Performance of Nairobi Securities Exchange indices. Cuthbertson and Nitzsche

(2004), observes that the price that an investor is prepared to pay today for a stock depends on the price they think they can obtain at some point in the future. (Zhang, 2006), suggests the use of Four-Factor Model to measure the momentum effect which is as follows:

$$R_{it} - R_{ft} = \alpha + b_{iM}\left(R_{mt} - R_{ft}\right) + s_i SMB_t + h_i HML_t + m_i UMD_t + \varepsilon_{it} \ldots\ldots (3.1)$$

Where:

$R_{it} - R_{ft}$ is the excess return of portfolio i in excess of the risk free rate in month t

$R_{mt} - R_{ft}$ are the excess returns of the market value weighted portfolio

UMD_t is the return difference between portfolios of past winners and past losers and this is the variable that is used to capture the momentum factor. Sood and Tellis (2009), observe that the price momentum accounts for the persistence effect in stock returns.

SMB is the size premium which represents the return differential portfolios of small and large stocks. This is obtained by taking the difference between the five big size deciles and five small size deciles

HML is the value premium which represents the return differential of stocks with high book-to-market values and low book-to-market values.

b_{iM} is coefficient of the market risk premium

s_i is the coefficient of the size premium

h_i is the coefficient of the return difference

ε_{it} is the error term of security returns

α is alpha value of security returns

Hypothesis two, which tested how the Kenyan securities markets react to Financial Contagion Effect was be measured by collection of monthly prices ($P_{i,t}$) of the firms listed at the Nairobi Securities Exchange compared to other prices from deveoloped stock markets for the period in which the crisis occured. This was presented by moving averages and adjusted correlation tests. Data analysed helped to capture major global events like the 2008 global crises which affected the financial markets for the whole world. The study used data for year before the crisis and the years after the crisis. The study period before the crisis was between April 10 2006 and July 31 2007, while the period during the crisis was between August 1 2007 and 30 December 2008 (Hmida, 2014a), where it compared how the security market indicators in the developed countries and those in the Kenyan securities market reacted to global financial meltdown. The researcher used data from New York Stock Exchange (NYSE) and that from London Stock Exchange (LSE) since these are the leading stock markets in the world and the global financial crises struck first in these stock markets. This is in line withDungey *et al.* (2007), who note that it would be important to factor several regimes when deciding whether to extend the period. Monthly percentage equity returns at time t would be computed as:

$$S_{it} = 100(\ell n(P_{i,t}) - (\ell n(P_{i,t-1})) \quad \text{...(3.2)}$$

Where:

S_{it} is the equity returns of a country at time t while 100 is the base year index

ℓn is the natural logarithm factor

$P_{i,t}$ is the price of security i at time t

In the above model, missing observations can be filled by use of a linear interpolation between observed prices for this doesnot change the qualitative results of the estimated factor model. A moving average was chosen to capture differences in time zones of the NSE indices with those of developed countries. In addition to moving averages, Financial Contagion Effect was also determined by the use of

adjusted correlation test. This has been used in the research by Hmida (2014), who looked at Financial Contagion Effect effect of subprime crisis on the G 7 countries. In this test, co-movements between two markets are measured by their correlation co-efficients. Increase in correlation co-efficients may be biased by the effect of the changes in variability of the market originated shock which causes heteroskedasticity problem. To correct the bias, a simple linear model can be used as follows:

$$Y_t = \alpha + \beta X_t + \varepsilon_t \quad \text{.....(3.3)}$$

Where Y_t and X_t are two financial series identifying returns of assets in two different markets.

α is the alpha value and ε_t is the error term

Expected Error term ($E(\varepsilon_t)$) = 0 and $E(\varepsilon_t) < \infty$

Correlation co-efficient ($P(x_t y_t)$) was obtained by:

$$P(x_t y_t = \frac{cov\,(x_t y_t)}{\sigma x_t \sigma y_t} \quad \text{.....(3.4)}$$

Where $cov\,(x_t y_t)$ is the covariance between market x and y, σx_t is the standard deviation of market x and σy_t is the standard deviation of market y.

The adjusted co-efficient was P^* which is

$$P^* = \frac{P}{\sqrt{1+\delta(1-(P)^2)}} \quad \text{.....(3.5)}$$

Where δ is known as delta, which is the relative increase of the variance of x between the periods of crisis and stability

$\delta = \frac{V^c(x_t)}{V^t(x_t)} - 1$ c and t indicate the periods of crisis and tranquility.

The adjusted correlation co-efficient for each pair of countries in the sample was then be tested statistically to establish whether or not it is shift contagion, where:

P_1^* was the adjusted correlation co-efficient during crisis period and P_2^* was the adjusted correlation co-efficient during the stable period. A Z test was used to test for the significance of the findings. Hmida (2014), observes that if the null hypothesis is rejected, the correlation co-efficient between the two countries has significantly increased between the stability period and the crisis period, it is evidence of shift contagion. On the otherhand, if null hypothesis is not rejected, it is evidence of fundamental contagion between the two markets. Thus in the analysis, the researcher established each type of contagion that was witnessed in the findings.

In respect to hypothesis three on white noise effect and its relationship with the performance of NSE indices, Cuthbertson and Nitzsche (2004), observe that if the error term ($\acute{\varepsilon}_t$) is serially correlated, the orthogonality property is violated and the best example of this is the first-order Autoregressive Process. The study period of this data was stock prices from 01/01/2005 to 31/12/2014: this is in line with research by Miralles-Marcello *et al* (2014), which used a period of 10 years in their data analysis. This study adopted a model used by (Homm & Breitung, 2011) which is as shown below:

$$R_{t+1} = \frac{P_{t+1} + D_{t+1}}{P_t} - 1 \quad \text{..... (3.6)}$$

Where

P_t = stock price at period t

D_{t+1} =Dividend for period t

R_{t+1} =Return of stock at time t

When there is risk neutrality, no arbitrage opportunities and constant expected returns, stock price is obtained as:

$$P_t = \frac{E_t[P_{t+1}+D_{t+1}]}{1+R} \quad \text{.....(3.7)}$$

Where:

R = Return at time t

E_t= Expectation conditional on the information at time t

Fundamental stock price is determined as follows:

$$P_t^f = \sum_{i-1}^{\infty} \frac{1}{(1+R)^i} E_t(D_t + 1) \quad \text{..... (3.8)}$$

Where P_t^f = Fundamental stock price

Bubble component is the difference between the stock price at period t and the fundamental stock price.

$$B_{t=} \; P_t - P_t^f \quad \text{.....(3.9)}$$

In respect to hypothesis four, which looked at the Influence of Security Price Volatility and the performance of the NSE indices, (Sinha & Agnihotri, 2014) advises on the use of the volatility model. This can be expressed by this model:

$$h_{t+k/_t} = E_t[(\, r_{t+k} - m_{t+k})^2] \quad \text{.....(3.10)}$$

Where:

$h_{t+k/_t}$ represents volatility k periods ahead conditioned on information set at t, r_{t+k}

m_{t+k} represents return and average return at $t + k$ period respectively

The authors' further note that the forecast of future volatility then would depend upon information in today's information set such as today's returns.

Hypothesis five which analysed the Influence of Market Herding Effect and the performance of NSE indices was addressed by the use of cross-sectional standard deviations as advocated for by Demirer and Kutan, (2006), and Chen (2013), who argue that the presence of a herd behaviour would lead security returns no to deviate from the overall market returns. The formula used was:

$$\sqrt{\frac{\sum_{j=1}^{n}(r_{jt}-\overline{r_{jt}})2}{n-1}} \quad \text{.....(3.11)}$$

Where n = number of firms in the aggregate market portfolio

r_{jt} is the observed stock return on firm jt for day $_t$

$\overline{r_{jt}}$ is the cross sub sectorial average of the returns in the portfolio for day t

Demirer and Kutan (2006), note that the behaviour of standard deviation during the periods of market stress can be estimated using a linear regression model shown below:

$$SD_t = \alpha + B_D D_t^L + B_U D_t^U + \varepsilon_t \quad \text{.....(3.12)}$$

Where

$D_t^L = 1$, if the returns on aggregate market portfolio on day t lies in the lower tail of the return distribution. If the above is not met, it is zero.

$D_t^U = 1$, if the return on aggregate market portfolio on day t lies in the upper tail of the return distribution. If the above is not met, it is zero.

α and ε capture differences in return dispersions during periods of extreme price movements.

B_D is the presence of negative and statistically significant coefficients for down markets.

B_U is the presence of negative and statistically significant coefficients for up markets.

B_D and B_U indicate the herd formation by market participants.

After the secondary data analysis has been done, the outcome of each individual model was correlated against all other four models. A Spearman's Rank correlation was used to determine which of the independent variables influences the dependent variable most. Saunders *et al* (2009), observes that this tool addresses the strength of the Influence of two ranked data variables and thus was relevant in this study. According to Kothari (2004), Spearman's coefficient of correlation (r_s) is obtained as follows:

$$r_s = \left[\frac{6\sum_{d_i}{}^2}{n(n^2-1)}\right] \quad \text{.....(3.13)}$$

Where: d_i is the difference between the ranks of the i^{th} pair of the two variables and n is the number of observations

Data for the study period was based on NSE 20 Share Index and was studied for a period of 12 years as is supported by literature in a similar study. For instance, Chen (2013), study period was for 10 years (from January 2001 to December 2009) while that of Demirer and Kutan (2006), was for about eight and a half years (from May 3 1993 to November 16 2001). Basing on the trend set by previous studies, the researcher is therefore going to a dopt a study period of 12 years.

The multiple regression model to establish the Influence of Securities Behaviour and performance of NSE indices was established as follows:

$$Y = \beta_0 + \beta_1 X_{1+} \beta_2 X_{2+} \beta_3 X_{3+} \beta_4 X_{4+} \beta_5 X_5 + \varepsilon \quad \text{.....(3.14)}$$

Where .

Y= the performance of Nairobi Securities Exchange as measured by NSE 20 Share Index, NSE All Share Index (NASI), Financial Times Stock Exchange (FTSE) NSE 15 Index and FTSE NSE 25 Index.

β_0 is the constant element of the model

$\beta_1, \beta_2, \beta_3, \beta_4, and\ \beta_5$ are co-efficients of momentum effect, Financial Contagion Effect, white noise effect, Securities Price Volatility and Market Herding Effect respectively.

X_1 = Momentum effect

X_2 = Financial Contagion Effect

X_3 = White noise effect

X_4 = Security Price Volatility

X_5 = Market Herding Effect

ε= Error term

In order to establish the accuracy of the results, the researcher conducted diagnostic tests. These tests included Autocorrelation tests, linearity tests, normality tests, multicollinearity tests and homoscedasticity, heteroscedasticity tests.

3.9.1: Homoscedasticity Tests

Homoscedasticity can be noted to be a situation where dependent and independent variables have equal variances (Saunders et al., 2009). When this is present, there is a high likely hood of generating high regression errors (Hayes & Cai, 2007). This was tested by plotting P-P and Q-Q plots between residuals and independent variables.

3.9.2 Heteroscedastic Tests

Heteroscedasticity is when unequal variances exist (Saunders et al., 2009). This error is particularly notorious in high frequency financial data (Lean, Mishra, & Smyth, 2015). This phenomenon is checked when a linear regression model has been established. Heteroscedasticity can be eliminated by conducting Augmented Dickey Fuller Tests or graphically using the Q-Q plots(Greener, 2008). In this research, this was tested using the Q-Q plots where the absence was noted by completely random and equal distribution of points on the x axis.

3.9.3 Collinearity Tests

Saunders et al. (2009), on the other hand observes collinearity or multicollinearity as the absence of correlation between two or more independent variables. If there is a high degree of correlation between independent variables, this is called multicollinearity (Kothari, 2004). When collinearity is present, it becomes difficult to separate the effects of individual variables. Multicollinearity was measured by the help of Variance Inflation Factor (VIF) and tolerance factors (Kothari, 2004) (Saunders et al., 2009b). The authors note that a small tolerance (below 0.1) and large Variance Inflation Factor (VIF) of greater than 10 usually indicates high collinearity. It can also be said to be presence of multicollinearity if there is low tolerance accompanied by large standard error and non-significance of the results.

3.9.4 Tests for Autocorrelation

This is when a time lag on the dependent variable at time t is continually reflected at time t+1 making it to be carried over on and on (Saunders et al., 2009). Autocorrelation is also known as serial correlation (Nooshinfard, Nemati-Anaraki, Zikmund, Babin, & Griffin, 2012) which means that the results may become predictable (Peresetsky & Yakubov, 2015). Autocorrelation is normally tested with the help of Durbin Watson tests which ranges from 0 to 4 (Saunders et al., 2009). A value towards zero indicates positive autocorrelation while a value towards four indicates a negative autocorrelation.

3.9.5 Tests for Normality

These are tests that are aimed to ensure that normal distribution is observed in the results(Cooper & Schindler, 2014). These are tested by the use of normal probability curves such as P-P and Q-Q plots, and histograms (Kothari, 2004) and (Crewswell, 2009).The researcher ran composite analysis of the various responses and used the SPSS output to generate data that would help in forming concrete discussion. Normality would be established if the results either formed a normal curve or on the P-P and Q-Q plots the points would fall on a narrow band within the straight line (Cooper & Schindler, 2014).

3.9.6 Tests for Linearity

This is the degree to which a change in a dependent variable is related to the changes in the independent variable(s) (Saunders et al., 2009). These are normally tested by the residual plots generated on SPSS data. When there are extreme variables or variables that violate the linearity assumptions, action need to be done to eliminate these (Cooper & Schindler, 2014). Extreme variables are called outliers and are thus excluded from the analysis while those that violate the linearity assumptions can be addressed by transformation (Saunders et al., 2009). Values greater than 0.05 shows that there is a linear relationship between the independent and dependent variables.

3.10 Operationalization of Variables

This study had five independent variables namely momentum effect, Financial Contagion Effect effect, white noise effect, share price volatility effect and noise effect, one intervening variable, capital Markets Authority Regulation and one dependent variable Performance of the Nairobi Securities Exchange Indices.

Table 3.3: Operationalization of study variables in Secondary Data

Variable/ Nature	Operational Indicators	Measure	Supporting Literature
Performance of NSE indices	NSE 20 Share Index	Abnormal Returns of NSE 20 Share Index	(Muga & Santamaría, 2007b)
Momentum Effect	Interst Rates, Monthly stock Prices	Cahart four factor model	(Kadzikano, 2015), (Zhu & Zhang, 2006)
Financial Contagion Effect Effect	Monthly stock indices and International stock indices	Adjusted Correlation coefficient	(Komo & Ngugi, 2013), (Shen, 2011) and (Hmida, 2014a) and (Dungey & Martin, 2007)
White Noise Effect	Monthly stock Prices, Dividend payouts	Rational Bubbles	(Homm & Breitung, 2011), (Miralles-Marcelo et al., 2014)
Share Price Volatility Effect	Stock abnormal returns,	Stock price volatility	(Sinha & Agnihotri, 2015)
Market Herding Effect	Stock abnormal returns, stock indices	Linear herd formation model	(Demirer & Kutan, 2006)

Table 3.4: Operationalization of study variables in Primary Data

Variable/ Nature	Operational Indicators	Measure	Questionnaire Items	Supporting Literature
Performance of NSE indices	NSE 20 Share Index, NSE All Share Index, FTSE NSE 15 Index, FTSE NSE 25 Index	5 point Likert Scale	Close ended Questionnaire	(Aroni & Namusonge, and Sakwa, 2014)
Momentum Effect	Feedback controls, trading gains, and trading losses	5- point likert scale type questions	Close ended Questionnaire	(Ambrose, 2013)
Financial Contagion Effect	Systematic, idiosyncratic and volatility contagion	5- point likert scale type questions	Close ended Questionnaire	(Osoro & Jagongo, 2013)
White Noise Effect	Over and under reaction, information less actions and agency conflicts	5- point likert scale type questions	Close ended Questionnaire	(Aroni, 2014)
Share Price Volatility Effect	Rational and irrational investments	5- point likert scale type questions	Close ended Questionnaire	(Muturi, 2014)
Market Herding Effect	Normal and abnormal information flow, psychological effects, information driven effects and principal-agent relationship	5- point likert scale type questions	Close ended Questionnaire	(Bohl, Klein, & Siklos, 2014)

3.11 Ethical Considerations

Saunders *et al*. (2009) observe that data collection should not subject the research population to harm, embarrassment or any other material disadvantage. (Cooper & Schindler, 2014) note that some of the research ethics may include: ethical treatment of the participants, observing the rights to privacy, data collection ethics in cyberspace, data mining ethics, sponsor nondisclosures, purpose nondisclosures, and

safety of the research team. Another very important ethical consideration is that of researcher and sponsor ethical relations. Here, the sponsor may want the researcher to participant in unethical behaviour such as violating participants confidentiality, interpreting results with biasness, making recommendations beyond the scope or omitting sections of the data in the final report (Cooper & Schindler, 2014)(Greener, 2008). Observing research ethics is very important because, the means of how things are done ensures that a fair end is arrived at. This research ensured that research ethics in all dimensions were observed in that no information was disclosed about how each respondent answered the questions. For primary data, no market participant was mentioned in the analyis.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter was divided into introduction, general descriptive statistics, diagnostic results, summary statistics, objective-by-objective analysis and hypothesis testing.

4. 2 Descriptive Statistics

A financial analyst in each market participant was chosen and answered the modified questionnaire. Fifteen respondents out of the target 20 responded representing a 75% response rate. This rate is sufficient to have collected data that is representative (Cooper & Schindler, 2014; Kothari, 2004; Saunders et al., 2009).

In terms of years of service since incorporation, below 5 years, 5-9 years, 10-14 years, 15 and above years were 6.7%, 40%, 20% and 33.3% respectively. This is in agreement with the number of years most market participants were established dating back to early 2000s because more than 50% of the firms were more than 10 years since their incorporation. This is presented on Table 4.1.

On the respondent's experience, the researcher found out those who worked less than 5 years, 5-9 years, 10-14 years and 15-19 years were 40% 13.3% 26.7% 20% respectively. From the data, more than 60% of the respondents were having an experience of more than five years. This could imply that most respondents were quite knowledgeable with the way securities behave at the NSE. This is presented on Table 4.1.

On the number of employees, as represented in table 4.3, firms with between 10-19, 20-29 and 30-39 employees were about 28.6%. The numbers of firms with more than 50 employees were about 14.3%. This could imply that the Kenyan securities market is still not yet exploited because this is a relatively small number considering that there are only 20 stock market participants in Kenya. This is presented on Table 4.1.

On the number of branches, the findings showed that 13.3% had less than three branches, 26.7% had between three to six branches, 46.7% had seven to ten branches and 13.3% had more than 10 branches. This is an indication that stock trading is spread only in the major urban centres within the country with most firms. This could be in agreement with the fact that very few Kenyans are aware of securities trading since less than 2% of Kenyans are engaged in securities ownership. This is presented in Table 4.1.

Table 4.1: Demographic Responses on Primary Data

Experience		**Number of Employees**		**Number of Branches**		**Years of Service**	
Range	**Per cent**	**Range**	**Per cent**	**Range**	**Per cent**	**Range**	**Per cent**
Less than 5	40.0	10-19	28.6	Less than 3	13.3	Less than 5	6.7
5-9	13.3	20-29	28.6	3-6	26.7	5-9	40.0
10-14	26.7	30-39	28.6	7-10	46.7	10-14	20.0
15-19	20	40 and above	14.3	More than 10	13.3	15 and Above	33.3
	100		**100**		**100**		**100**

The researcher sought to find out the distribution of these investors and established the following: For domestic retail investors, 26.7% had ownership of less than 25%, 60% had ownership of between 26 to 50 per cent, while only one 6.67% of the respondents stated ownership of between 51 to 75. This implied that most domestic retailers own less than 50% cumulatively. On the question about the distribution of international retail investors, the researcher found out the following: Ownership of below 25% was manifested by about 93.3% while ownership of 26 to 50% was manifested by about 6.7%. This showed that foreign retail investors in Kenya normally own a very small percentage of less than 25%

The research sought out to find the ownership percentages at the NSE by local institutional investors and established the following: ownership of below 25% had 33.33%, ownership of between 26 to 50 % had 53.3% while ownership of between 51 to 75 per cent had 13.33%. This implied that most domestic institutional investors have associate kind of investments where ownership is below 50% but above 20%.

The study also looked at the distribution of international institutional investors as viewed by the market participants trading at the NSE, and the following was noted: on ownership of below 25%, 80%, on ownership of between 26 to 50%, there were 13.3% and between 51-75% 6.7%. This could imply that most foreign investors have investment in Kenya. This is presented in Table 4.2.

Table 4.2: Distribution of Investors in Nairobi Securities Exchange Firms

Category	0-25%	26-50%	51-75%	76-100%
Domestic Retail	26.7	60.0	6.7	6.7
International Retail	93.3	6.7	0	0
Domestic Institutional	33.3	53.3	13.3	0
International Institutional	80.0	13.3	6.7	0

In respect to the composite analysis of momentum effect, the researcher found the mean composite score to be 2.69 implying that most responses were towards agreement with the questions raised. Standard deviation in these responses was at 0.42, skewness of 0.58 and kurtosis of 0.29. For financial contagion effect, the researcher found in the composite index that the mean was 2.53, range of 2 and standard deviation of 0.3. In respect to white noise effect, the researcher found in 15 observations a mean of 2.93, a standard deviation of 0.29 and a range of 1.22.

The results from analysis indicated that in respect to securities price volatility, the mean composite score was 2.9, with a standard deviation of 0.32 and a range of 1.14. Descriptive statistics on market herding effect showed a mean of 2.52, a standard deviation of 0.32 and a range of 1.14. From the data analysis the mean descriptive

data on NSE 20 Share Index was 2.3, range of 2.13 and standard deviation of 0.6. From the data analysis the mean descriptive data on NSE All Share Index (NASI) was 3.025, range of 1.88 and standard deviation of 0.44. From the data analysis the mean descriptive data on FTSE NSE 15 Index was 2.89, range of 1.5 and standard deviation of 0.39. From the data analysis the mean descriptive data on FTSE NSE 25 Index was 3.18, range of 1.25 and standard deviation of 0.29. The above is shown on Table 4.3 .

Table 4.3: Descriptive Statistics on Primary Data

	Mean		**Std. Deviation**	**Skewness**		**Kurtosis**	
	Stat	**Std. Error**	**Stat**	**Stat**	**Std. Error**	**Stat**	**Std. Error**
ME	2.6909	.10895	.42195	.581	.580	.292	1.121
FC	2.5273	.07795	.30190	-.001	.580	-.963	1.121
WN	2.9259	.07564	.29297	1.767	.580	4.483	1.121
SSPV	2.9143	.08224	.31852	1.067	.580	.940	1.121
HE	2.5238	.09625	.37279	-.024	.580	-.920	1.121
20 SHARE	2.3250	.15372	.59537	1.120	.580	.799	1.121
NASI	3.0250	.11326	.43865	.724	.580	2.002	1.121
FTSENSE15	2.8917	.10196	.39491	1.004	.580	1.557	1.121
FTSENSE25	3.1750	.07500	.29047	-.405	.580	1.596	1.121

From the primary data collected, the researcher established that most respondents (in respect to NSE 20 Share Index, Financial Contagion Effect, Momentum Effect and Market Herding Effect) were in agreement with the questions that the researcher had raised during the data collection the response on White Noise Effect and Securities Price Volatility received a ‘not sure’ response. Considering the variations in the responses, the questionnaire on 20 Share Index would fall between strongly agree and not sure making it positively skewed. The response on momentum effect, Securities Price Volatility and that of White Noise Effect would fall between agree

and not sure, still making the responses positively skewed. The response on Financial Contagion Effect would remain in the agree category making it positively skewed. The response of Market Herding Effect would fall on agree category making it also positively skewed.

4.3 Diagnostic Results

The researcher conducted diagnostic tests on both primary and secondary data and their results are shown below:

4.3.1 Diagnostic Results on Primary Data

4.3.1.2 Multicollinearity Results on Primary Data

The researcher established that there was no multicollinearity or collinearity on all the primary data that was collected. Tables 4.4 to 4.8 showed that the eigen values of the variables studied were all less than the threshold of 10 agreeing with the rules discussed by research methodology experts (Saunders et al., 2009).

Table 4.4: Collinearity Diagnostics on NSE 20 Share Index

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions					
				(Constant)	ME	FC	WN	SSPV	HE
1	1	5.942	1.000	.00	.00	.00	.00	.00	.00
	2	.023	16.119	.00	.01	.04	.04	.11	.30
	3	.016	19.232	.01	.79	.00	.04	.05	.00
	4	.010	23.878	.01	.17	.26	.22	.00	.41
	5	.007	28.643	.00	.02	.65	.10	.32	.25
	6	.002	58.555	.98	.01	.05	.59	.52	.04

a. Dependent Variable: 20 SHARE

Table 4.5: Collinearity Diagnostics on NASI

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	ME	FC	WN	SSPV	HE
1	1	5.942	1.000	.00	.00	.00	.00	.00	.00
	2	.023	16.119	.00	.01	.04	.04	.11	.30
	3	.016	19.232	.01	.79	.00	.04	.05	.00
	4	.010	23.878	.01	.17	.26	.22	.00	.41
	5	.007	28.643	.00	.02	.65	.10	.32	.25
	6	.002	58.555	.98	.01	.05	.59	.52	.04

a. Dependent Variable: NASI

Table 4.6: Collinearity Diagnostics on FTSE NSE 15 Index

Model	Dimension	Eigen value	Condition Index	Variance Proportions (Constant)	ME	FC	WNE	SPV	MHE
1	1	5.942	1.000	.00	.00	.00	.00	.00	.00
	2	.023	16.119	.00	.01	.04	.04	.11	.30
	3	.016	19.232	.01	.79	.00	.04	.05	.00
	4	.010	23.878	.01	.17	.26	.22	.00	.41
	5	.007	28.643	.00	.02	.65	.10	.32	.25
	6	.002	58.555	.98	.01	.05	.59	.52	.04

a. Dependent Variable: FTSENSE15

Table 4.7: Collinearity Diagnostics on FTSENSE 25 Index

Model		Eigenvalue	Condition Index	Variance Proportions					
				(Constant)	ME	FC	WN	SSPV	HE
1	1	5.942	1.000	.00	.00	.00	.00	.00	.00
	2	.023	16.119	.00	.01	.04	.04	.11	.30
	3	.016	19.232	.01	.79	.00	.04	.05	.00
	4	.010	23.878	.01	.17	.26	.22	.00	.41
	5	.007	28.643	.00	.02	.65	.10	.32	.25
	6	.002	58.555	.98	.01	.05	.59	.52	.04

a. Dependent Variable: FTSENSE25

Table 4.8: Collinearity Diagnostics on the Overall Performance of NSE Indices

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions					
				(Constant)	ME	FC	WN	SPV	MHE
1	1	5.942	1.000	.00	.00	.00	.00	.00	.00
	2	.023	16.119	.00	.01	.04	.04	.11	.30
	3	.016	19.232	.01	.79	.00	.04	.05	.00
	4	.010	23.878	.01	.17	.26	.22	.00	.41
	5	.007	28.643	.00	.02	.65	.10	.32	.25
	6	.002	58.555	.98	.01	.05	.59	.52	.04

a. Dependent Variable: Performance of NSE

4.3.1.3 Results for Normality on Primary Data

The researcher ran composite analysis of the various responses and used the SPSS output to generate data that would help in forming concrete discussion. From the data analysis the mean descriptive data on NSE 20 Share Index was 2.3, range of 2.13 and standard deviation of 0.6. This is captured in figure 4.1.

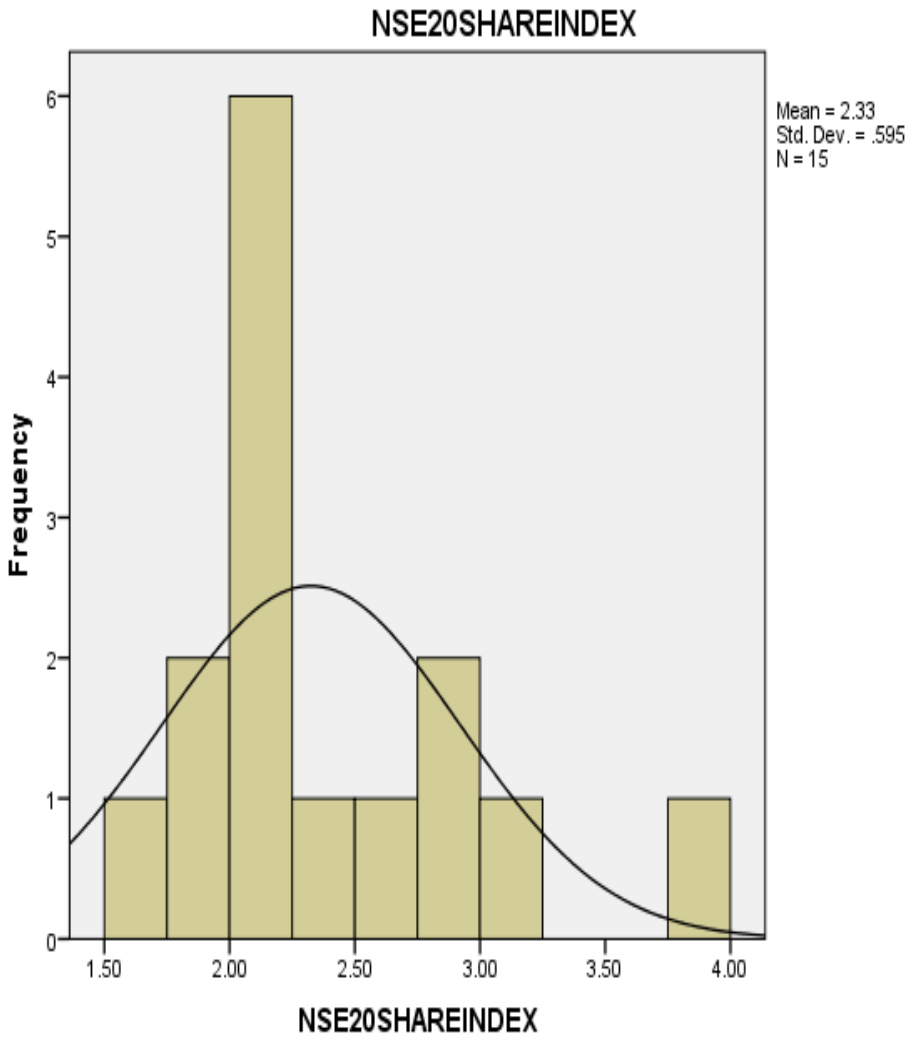

Figure 4.1: Normality Results for NSE 20 Share Index

From the data analysis the mean descriptive data on NSE All Share Index (NASI) was 3.025, range of 1.88 and standard deviation of 0.44. This is captured in figure 4.2.

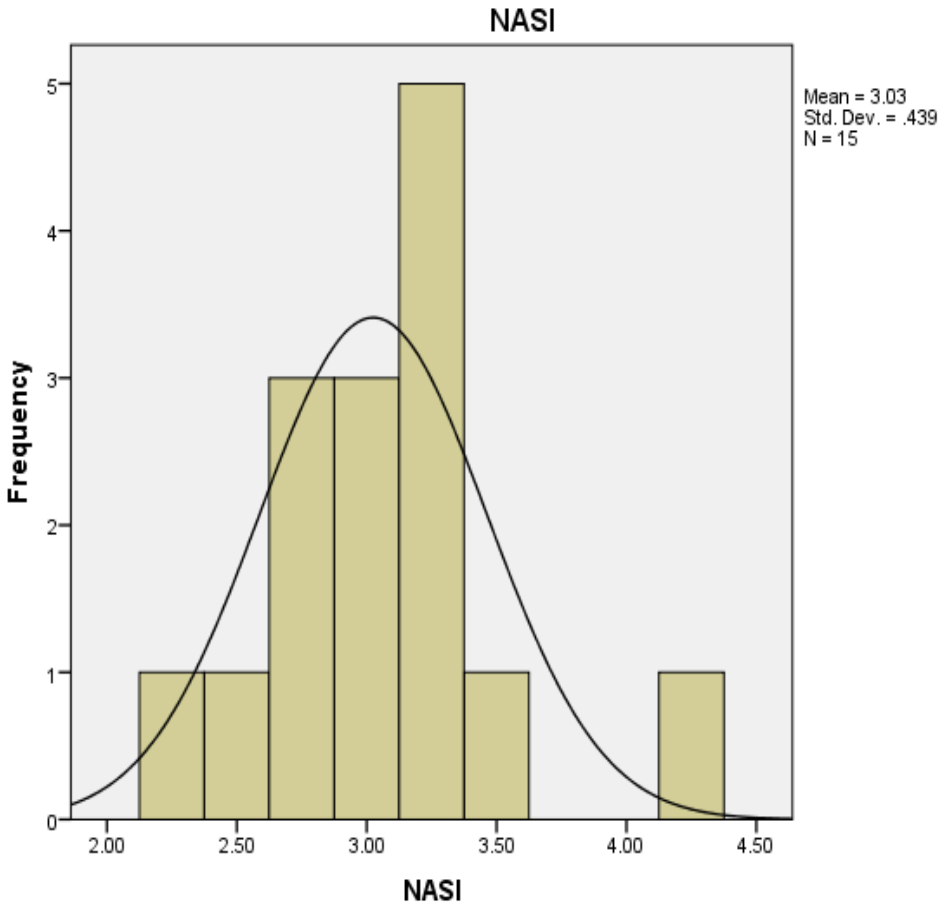

Figure 4.2: Normality Results on NASI

From the data analysis the mean descriptive data on FTSE NSE 15 Index was 2.89, range of 1.5 and standard deviation of 0.39. This is captured in figure 4.3.

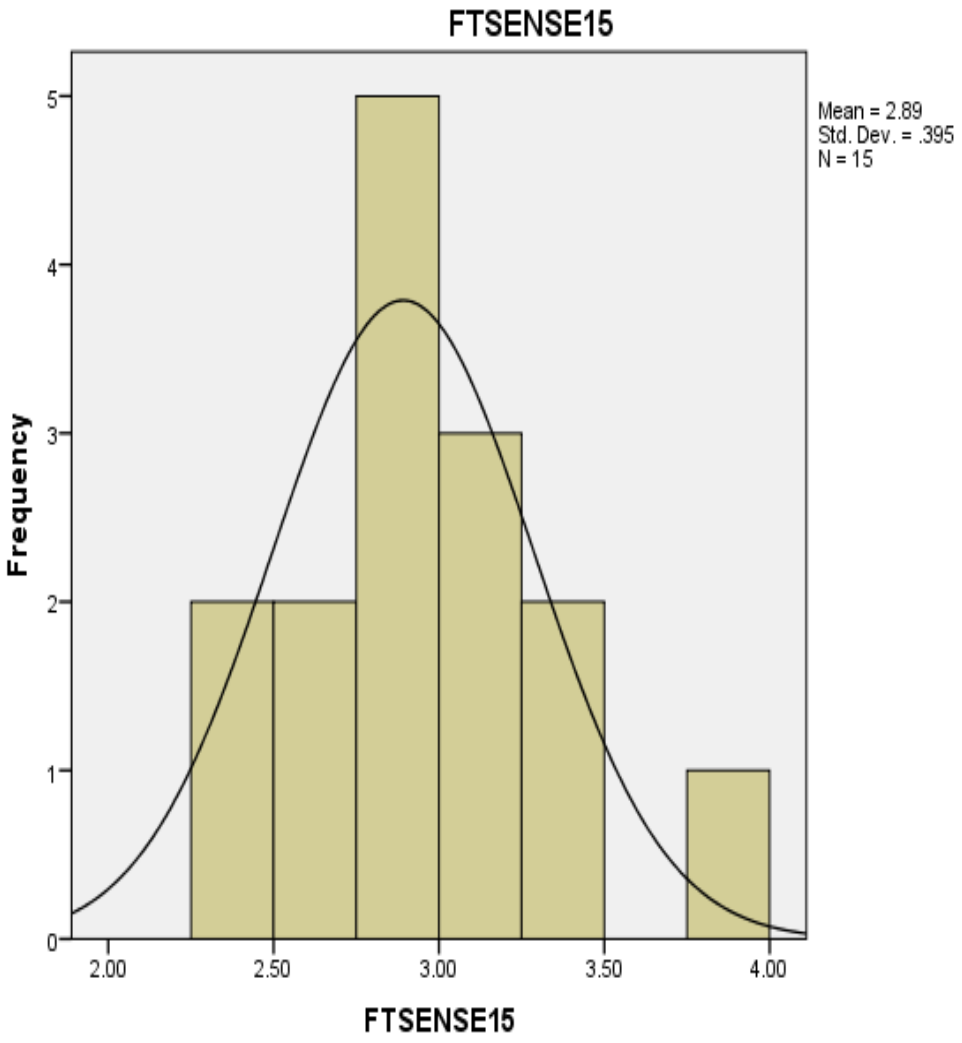

Figure 4.3: Normality Results on FTSE NSE 15 Index

From the data analysis the mean descriptive data on FTSE NSE 25 Index was 3.18, range of 1.25 and standard deviation of 0.29. This is captured in figure 4.4 .

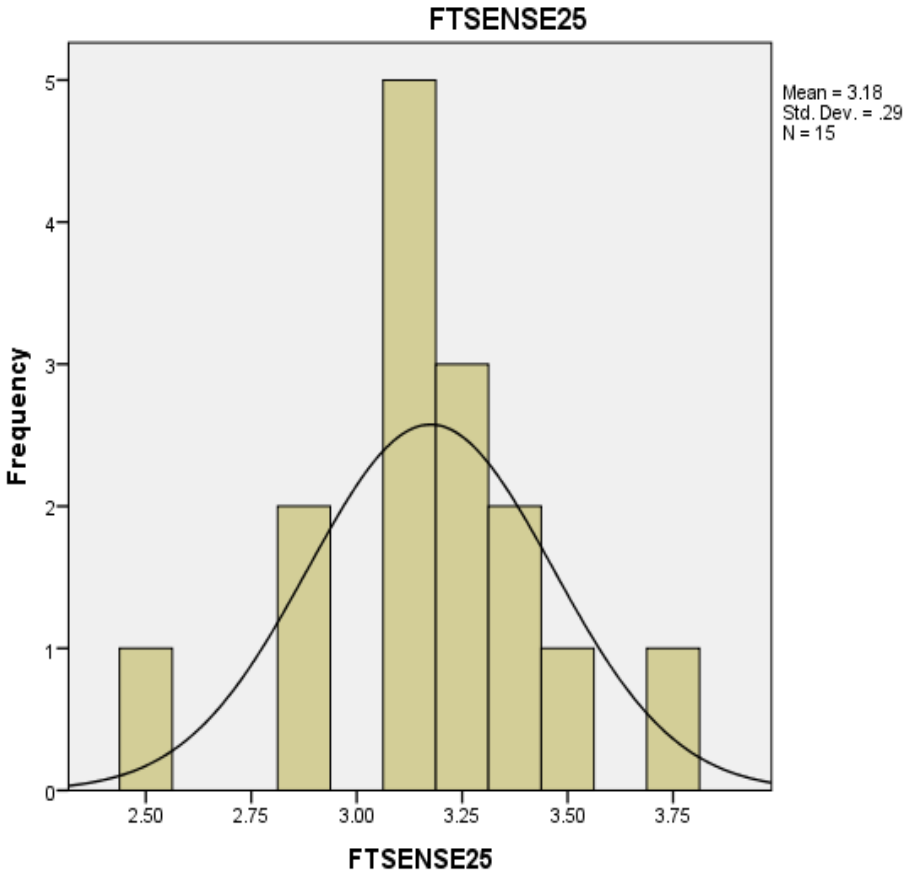

Figure 4.4: Normality Results on FTSE NSE 25 Index

4.3.1.4 Linearity Results on the Primary Data

The research intended to conducted some linearity tests on the primary data variables. The variable of Momentum effect as shown on Table 4.9, Share Price Volatility on Table 4.12 and Market Herding Effect on Table 4.13 had P values greater than 0.05 meaning that there was no linearity on this and the overall performance of NSE indices. The variable of Financial Contagion Effect as shown on Table 4.10 and White on Table 4.11 had P values less than 0.05 implying that there was a statistically significant linear relationship between the independent and dependent variables.

Table 4.9: Linearity Results on Momentum Effect

			Sum of Squares	df	Mean Square	F	Sig.
NSE * ME	Between Groups	(Combined)	1.379	9	.153	2.617	.151
		Linearity	.188	1	.188	3.213	.133
		Deviation from Linearity	1.191	8	.149	2.543	.159
	Within Groups		.293	5	.059		
	Total		1.671	14			

Table 4.10: Linearity Tests on Financial Contagion Effect

			Sum of Squares	df	Mean Square	F	Sig.
NSE * FCE	Between Groups	(Combined)	1.599	10	.160	8.892	.025
		Linearity	.652	1	.652	36.237	.004
		Deviation from Linearity	.948	9	.105	5.854	.052
	Within Groups		.072	4	.018		
	Total		1.671	14			

Table 4.11: Linearity Tests on White Noise Effect

			Sum of Squares	df	Mean Square	F	Sig.
NSE * WNE	Between Groups	(Combined)	1.249	6	.208	3.943	.039
		Linearity	.061	1	.061	1.147	.316
		Deviation from Linearity	1.188	5	.238	4.503	.030
	Within Groups		.422	8	.053		
	Total		1.671	14			

Table 4.12: Linearity Results on Share Price Volatility Effect

			Sum of Squares	df	Mean Square	F	Sig.
NSE * PriceVolatility	Between Groups	(Combined)	.386	5	.077	.541	.742
		Linearity	.260	1	.260	1.818	.211
		Deviation from Linearity	.127	4	.032	.222	.919
	Within Groups		1.285	9	.143		
	Total		1.671	14			

Table 4.13: Linearity Results on Market Herding Effect

			Sum of Squares	df	Mean Square	F	Sig.
NSE * MHE	Between Groups	(Combined)	1.275	8	.159	2.411	.150
		Linearity	.254	1	.254	3.837	.098
		Deviation from Linearity	1.021	7	.146	2.208	.177
	Within Groups		.396	6	.066		
	Total		1.671	14			

4.3.1.5 Autocorrelation Tests on Primary Data

The tests for autocorrelation were conducted using the Durbin Watson tests. This was an indication that the values showed almost no autocorrelation since they were neither close to zero or four in accordance with the observations of Saunders et al. (2009). This is shown on Table 4.14.

Table 4.14: Durbin Watson Test Results on Primary Data

Model	NSE SHARE INDEX	20 NASI	FTSE NSE 15	FTSE NSE 25
	1.457	1.346	1.599	1.855

4.3.1.6 Heteroscedasticity Tests on Primary Data

P-P and Q-Q plots were used to test this and it was found to be absence of homoscedasticity.

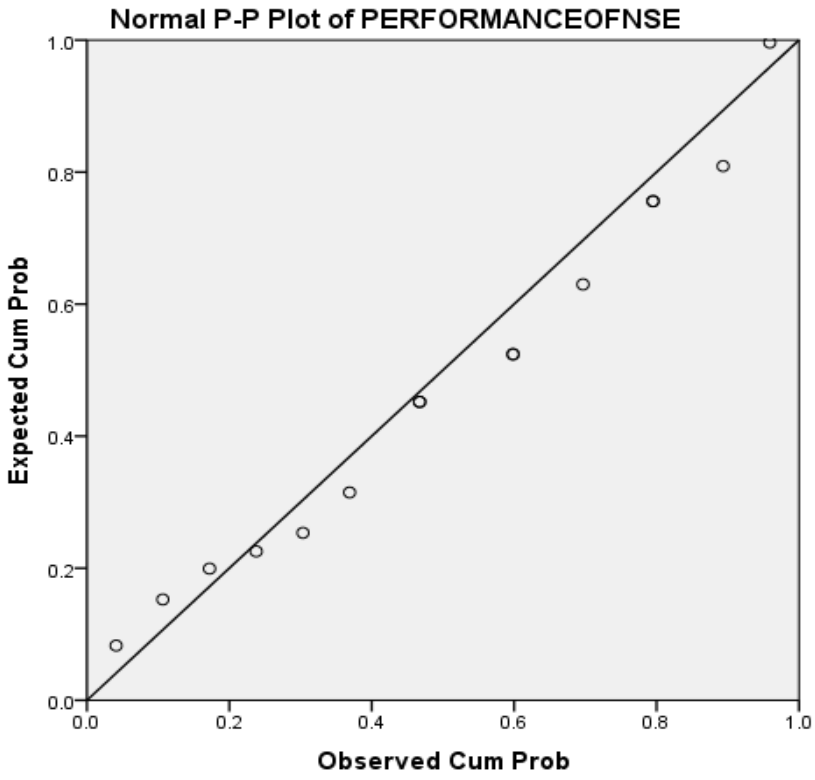

Figure 4.5: Normal P-P Plot on Primary Data

4.3.1.6 Homoscedasticity Tests on Primary Data

Q-Q plots were used to test heteroscedasticity and it was found that the data was normally distributed.

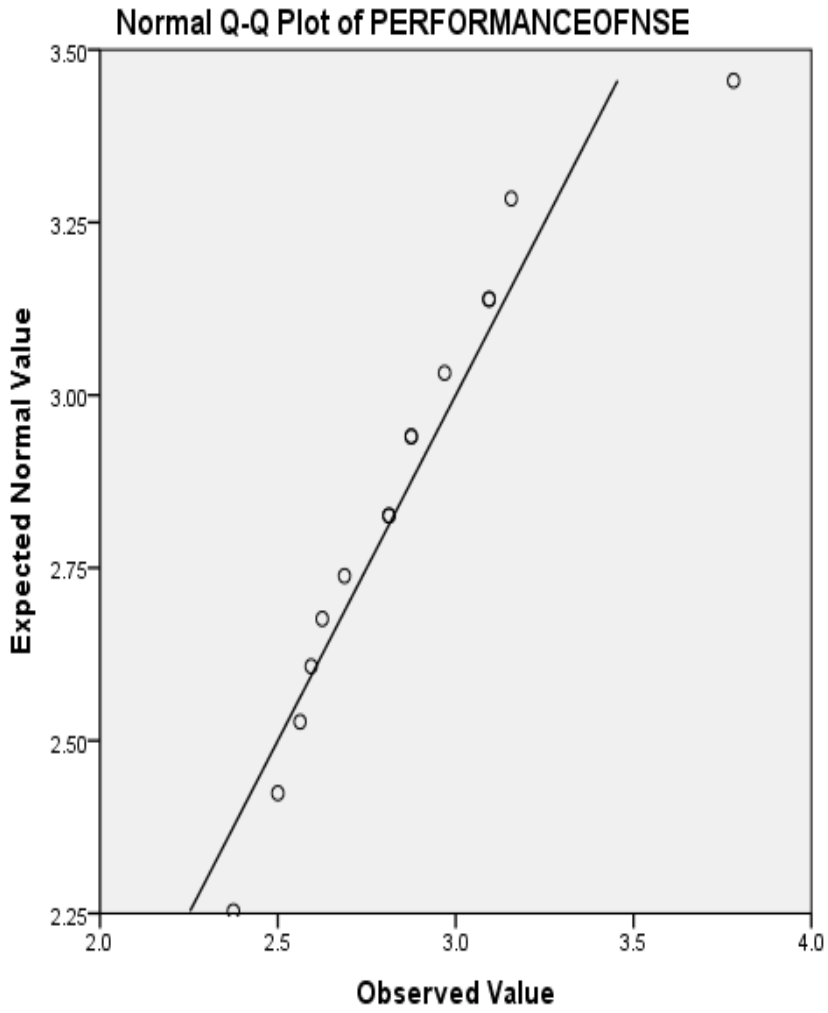

Figure 4.6: Normal Q-Q Plot on Primary Data

4.3.2 Diagnostic Test Results on Secondary Data

4.3.2.1 Homoscedasticity Tests on Secondary Data

Saunders *et al*. (2009) observe that P-P curves can be used to check for homoscedasticity. The results found that there was no homoscedasticity in the secondary data.

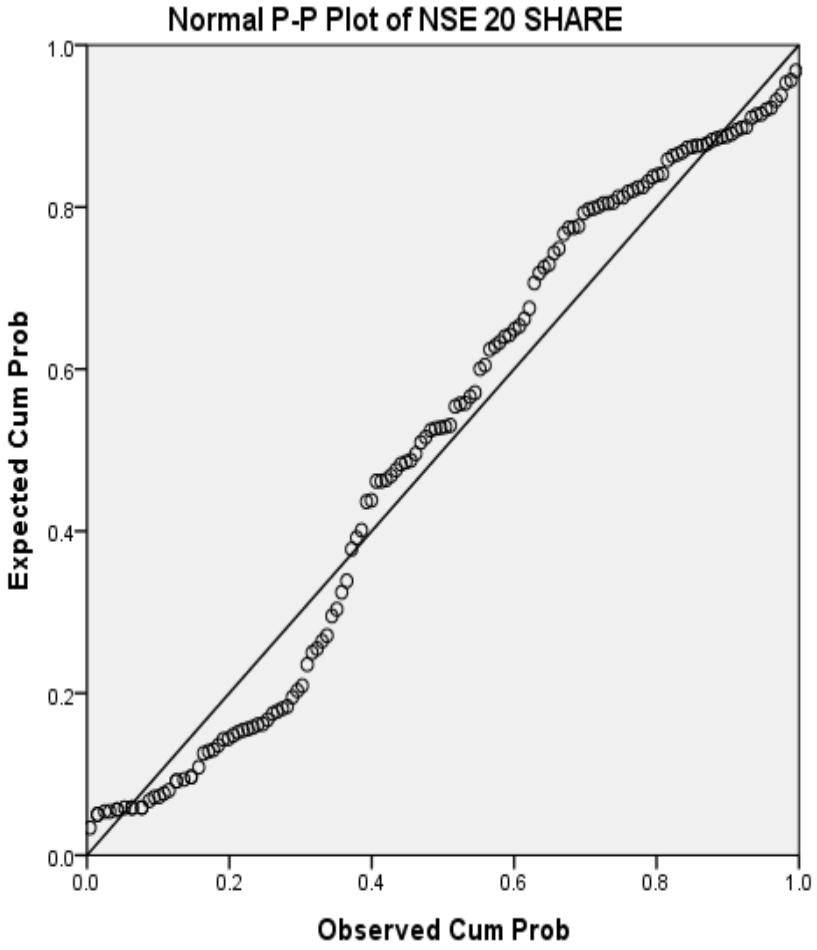

Figure 4.7: Normal P-P Plots on Secondary Data

4.3.2.2 Heteroscedasticity Tests on Secondary Data

The secondary data did not have heteroscedastic properties as tested by Q-Q charts as suggested by Saunders *et al*. (2009).

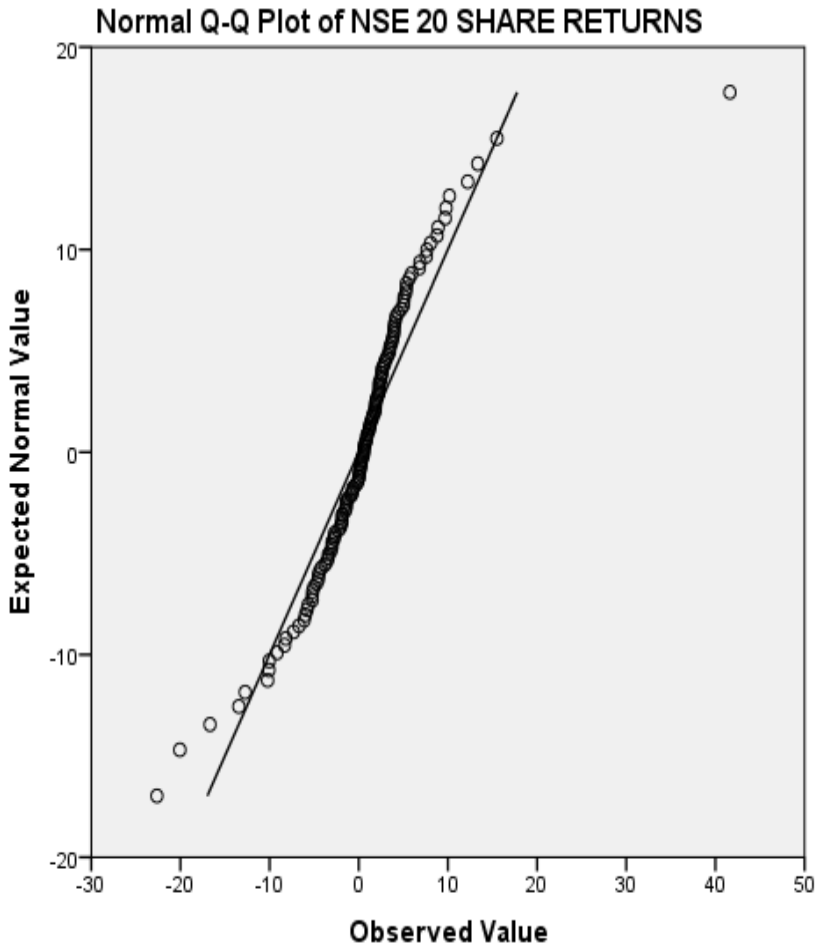

Figure 4.8: Normal Q-Q Plots on Secondary Data

4.3.2.3 Multicollinearity Tests on Secondary Data

The Eigenvalue on the all the secondary data variables studied were less than 10 meaning that there was no presence of multicollinearity or collinearity on the secondary data. This has been captured on Tables 4.15 to 4.20.

Table 4.15: Collinearity Diagnostics on the Influence of Momentum Factor on performance of NSE 20 Share Index

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	ME
1	1	1.706	1.000	.15	.15
	2	.294	2.411	.85	.85

a. Dependent Variable: NSE_20_SHARE

Table 4.16: Collinearity Diagnostics on the Influence of Financial Contagion Effect on the Performance of NSE 20 Share Index

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	FTSE 100	STD & POORS
1	1	1.428	1.000	.26	.20	.16
	2	.902	1.259	.00	.39	.64
	3	.670	1.460	.73	.41	.19

a. Dependent Variable: NSE

Table 4.17: Collinearity Diagnostics on the Influence of White Noise Effect and Performance of NSE 20 Share Index

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	AVERAGE
1	1	1.357	1.000	.32	.32
	2	.643	1.452	.68	.68

a. Dependent Variable: NSE 20 SHARE

Table 4.18: Collinearity Diagnostics on the Influence of Security Price Volatility on Performance of NSE 20 Share Index

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	SPV
1	1	1.175	1.000	.41	.41
	2	.825	1.194	.59	.59

a. Dependent Variable: NSE 20 SHARE RETURNS

Table 4.19: Collinearity coefficients on the Influence of Market Herding Effect on the Performance of NSE Indices

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	MHE
1	1	1.113	1.000	.44	.44
	2	.887	1.120	.56	.56

a. Dependent Variable: AVERAGE NSE 20 SHARE RETURNS

Table 4.20: Collinearity Diagnostic on the Overall Secondary Data Model

Dimension	Eigenvalue	Condition Index	Variance Proportions					
			(Constant)	ME	FCE	WNE	SPV	MHE
1	2.781	1.000	.00	.00	.01	.00	.00	.00
2	2.269	1.107	.00	.00	.00	.00	.01	.00
3	.895	1.762	.00	.00	.68	.00	.00	.00
4	.035	8.856	.02	.01	.00	.00	.91	.17
5	.015	13.836	.32	.03	.13	.93	.08	.01
6	.005	23.889	.66	.96	.18	.07	.00	.82

a. Dependent Variable: NSE 20 SHARE RETURNS

4.3.2.4 Autocorrelation Tests on Secondary Data

The researcher conducted autocorrelation tests to check the serial correlation between the independent and dependent variables. The results are shown on Table 4.26 . There is no serial correlation as the variables are not near any extreme of four or zero as advised by (Saunders et al., 2009).

Table 4.21: Durbin Watson Test Results on Secondary Data

	ME	**FCE**	**WNE**	**SPV**	**MHE**	**Overall Model**
Durbin Watson Results	1.753	2.253	.094	1.877	1.877	1.199

4.3.2.5 Normality Tests on Secondary Data

From the results analysed, it was found the independent and dependent variables were normally distributed thus confirming the results of the variables studied could be generalized. This is in agreement with Nooshinfard *et al*., (2012) who observes that study variables must be normally distributed to enable generalization. This is shown on Figure 4.9.

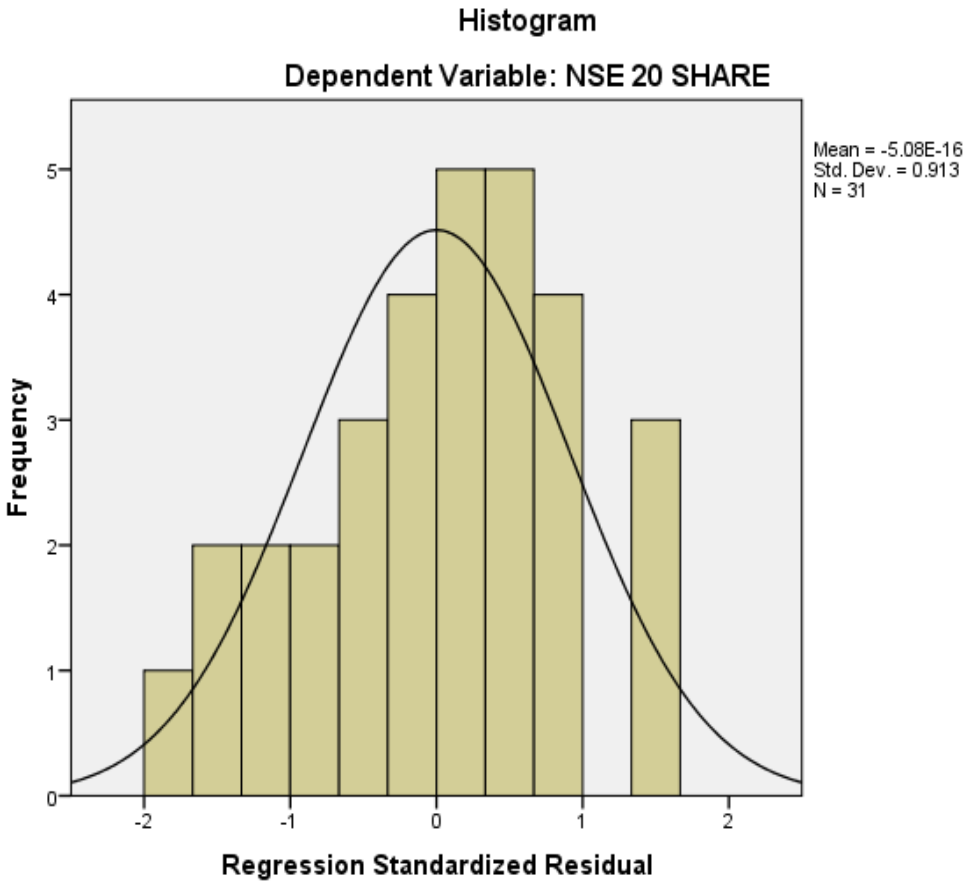

Figure 4.9: Normality output on the influence of securities behaviour on performance of NSE Indices

4.4 Influence of Momentum Effect on Performance of NSE Indices

Data was obtained from the monthly market reports sold by the data vendors at the Nairobi Securities Exchange (NSE) running from January 2004 to December 2015. An important observation is that for monthly prices, the norm of most securities markets is to provide prices on the last trading day of the month. Therefore, these are not the average monthly prices. This totalled 12 years, which translates to 144 months under observation. This is in line with the literature where similar studies used an average period of 10 years. Sixty nine (69) companies were analysed: these are companies that had listed in at least a year analysis period. Some companies

delisted before the analysis period was over while others listed much later in the analysis stage and others listed in between the period under the study and delisted before the period under the study was finalized. Some data was also obtained from the Kenya National Bureau of Statistics (KNBS) relating to inflation rates for the period under the observation.

Data was entered into excel spread sheets that related to each firm that had been listed during the period under review. Sixty nine (69) spread sheet were used classifying companies in accordance to the current sectors as identified by NSE. For each spread sheet, the researcher would have 14 columns containing the following details: Year (column A: this started from 2004 to 2015), Month (Column B which started from January 2014 to December 2015), Price at the close of the month (Column C which captures the last trading price of the month. In case this price was missing, the last nearest trading price was used), Previous Months closing price (Column D), Returns of the Month (Column E), monthly risk free rate of return (Column F), excess returns over the risk free rate of return (Column G), UMD_t (ColumnH), total shares (Column I), market capitalization (Column J), SMB (Column K), par value of the companies per share (Column L), Total nominal value (Column M) and HML (Column 14). Returns of the Month would be obtained by:

$$Returns\ of\ the\ Month = \frac{Today - Previous}{Previous} * 100$$

Excess returns would be obtained by taking Returns of the Month less the monthly risk free rate of return. The risk free rate of return on 91 day Treasury Bills for every month was obtained from the website of the Kenya National Bureau of Statistics for the months starting from January 2004 to December 2015. It is important to note that the monthly prices in stock markets simply reflected the prices at the last day of trading of that particular month as opposed to the average prices of that particular month. This is how stock markets operate even in cases of daily prices, which are normally the closing prices as opposed to the actual average of that day. If on a particular month data was not present in the excel sheets obtained from the NSE data vendors, the researcher would use the most recent daily trading data for that

particular month. This happens especially if the firm did not trade on the last day of the month as provided by the NSE data vendors.

Column G captured the differences between the returns of the stock of the month and the risk free rate of return as provided by the Central Bank. This would be used to obtain the excess return of the stock on a month as explained by the Capital Asset Pricing Model (CAPM) (Frank J. Fabozzi, CFA, Focardi, & Jonas, 2014). Excess return is used to obtain real return from the stock since any investor can be able to get the risk free rate without any effort or financial management skills. Column I would give the total shares outstanding on a particular stock for a specific month as obtained from the CMA Library. Column J that captured market capitalisation was obtained by taking the price at the end of the month (Column C) and multiplying it by the total shares outstanding (Column I). Column L captured the par value of a stock. This was obtained from the monthly prices provided by the NSE data vendors. Column M was about the nominal value of a firm. This was the product of par value (Column L) and the total shares outstanding (Column L). Column N was called High Minus Low (HML). Zhang (2006), guided the computation of HML where they noted this represents the value premium according to the Cahart Model.

Zhang (2006), show that the HML is obtained by taking the nominal value of a stock on a particular month and dividing it by its corresponding market capitalisation. This was done on a month-by-month basis. Cahart model suggests that HML represents the value premium. The model suggests that high minus low equals the return differential between the stocks with high book to market ratios and low book to market ratios. This was obtained by dividing book values (also known as nominal values) by the market values (also known as market capitalisation).

SMB which means Small Minus Big was obtained obtained by further analysis of column N (HML). This followed Cahart model as suggested by (Zhang, 2006). This was done by: First, posting monthly data for all stocks on different spread sheets. Since the research was for 12 years, this translated to 144 spread sheets. Second, for each of the monthly spread sheets, data was sorted from the largest to the smallest. The upper half was classified as high HML while the lower half was classified as low

HML. Thirdly, the difference between the large HML and low HML was obtained and the difference was the SMB factor. This is what was posted on Column K and was the same for all stocks.

Column H represents UMDt and this is the momentum factor that the researcher intended to achieve on objective one. This was obtained by taking the return premium obtained on Column G for further analysis. This further analysis necessitated the researcher to open a work sheet by following these steps. First, the return premium for every firm was posted on a general spread sheet where the firms were in columns and monthly data in rows. Second, this was transposed to have the firms as rows and monthly data as columns. Thirdly, each column was uploaded on a different spread sheet. Forth, data on each spread sheet was arranged from the largest to the smallest. The positives were named gains while negatives were called losses. An aggregate of the two was obtained and this is what was called the momentum effect (UMDt) according to the Cahart model. The momentum effect that appeared on column H was similar for all firms for the period under the study because it was concentrating on the performance of the entire exchange.

Appendix IV (a) shows descriptive statistics on the stock prices from January 2004 to December 2015. Out of the firms studied, 56 demonstrated positive skewness while 9 demonstrated negative skewness, 1 showed no skewness and 2 were invalid in skewness. This is shown on appendix IV (a).

From the analysis results of objective one, the researcher obtained that the mean value of the momentum factor which was measured by UMDT was -362.12 with a standard deviation of 364.15 while for NSE 20 Share Index was 4111.62 points with a standard deviation of 896.21 points. The maximum points were 5774.27 and 703.08, minimum points were 2474.75 and -1731.4 for NSE 20 Share Index and momentum factor respectively. These have been captured on Table 4.22.

Table 4.22: Descriptive Statistics on the Influence of Momentum Effect on the performance of NSE 20 Share Index

	Min	Max	Mean	Std. Dev	Skewness		Kurtosis	
	Stat	Stat	Stat	Stat	Stat	Std. Error	Stat	Std. Error
ME	-1731.40	703.08	-362.12	364.15	-.301	.202	1.28	.4
NSE_20	2474.75	5774.27	4111.62	896.21	-.155	.202	-1.26	.4

The behaviour of investors over the period under the study was also presented using graphs. The influence of momentum effect on the performance of the NSE, influence of financial contagion effect on the performance of NSE, influence of white noise effect on the performance of NSE, and that of the influence of market herding effect on the performance of NSE was captured in the figures below. Figure 4.11 captures the influence of the momentum factor on the performance of the NSE 20 Share Index from January 2004 to December 2015. The figure shows that over the 12 year period, most of the momentum effect was on negative side with few cases going very high on the positive aspects. This could imply that most securities over the study period demonstrate negative momentum.

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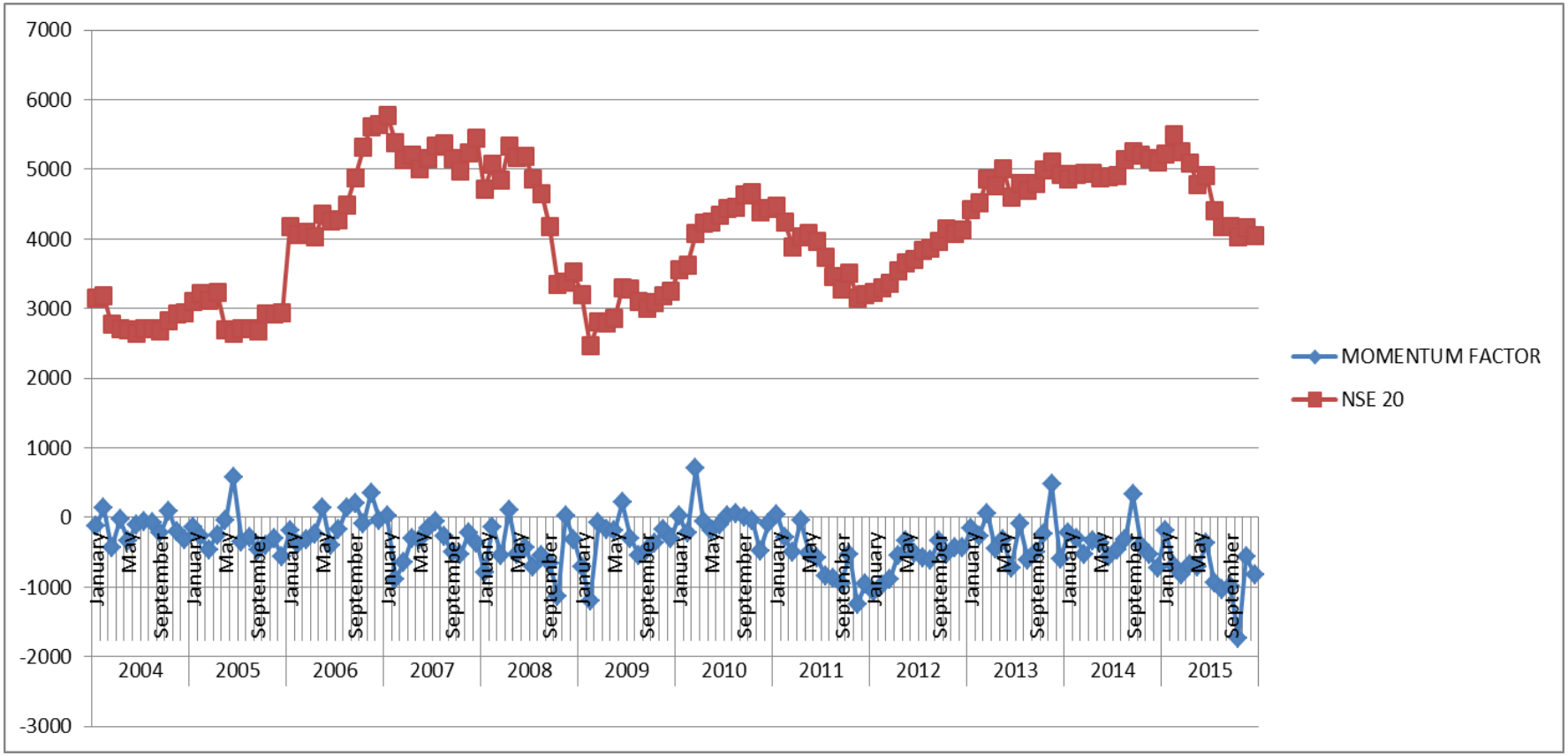

Figure 4.10: Influence of Momentum Effect on the performance of NSE 20 Share index

Research was conducted on 69 listed firms for the period of January 2004 to December 2015, translating to 144 monthly observations. After data was input and the momentum factor computed as explained in section 4.4 above, data was subjected to hypothesis test as shown in Table 4.23. The results of the Influence of the Momentum Effect on the Performance of NSE 20 share index was that the Z test results mean for Momentum effect was -363.763 while that of the NSE 20 Share Index was 4118.29 points. The z statistical value was -55.41, z critical was 1.972 and the P value was 2.1 E-118. The above showed that the z statistical was in the critical region.

Table 4.23: Z Test Results on Momentum Effect

Z test: Two-Sample Assuming Unequal Variances		
	-126.918	*3157.88*
Mean	-363.763	4118.291
Variance	133148.9	802401
Observations	143	143
Z stat	-55.413	
P(T<=t) one-tail	1.1E-118	
Z Critical one-tail	1.652999	
P(T<=t) two-tail	2.1E-118	
Z Critical two-tail	1.972663	

The researcher established the Analysis of Variance as shown on Table 4.24. F Statistical was 49.299 which is greater than the F Critical value of 3.84. This has been confirmed by a p value of 0.000 indicating that the results are statistically significant. This is shown on Table 4.24.

Table 4.24: ANOVA Results on Momentum Effect

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1613.193	1	1613.193	49.299	.000[b]
	Residual	4646.598	142	32.723		
	Total	6259.791	143			

a. Dependent Variable: NSE 20 Share Returns

b. Predictors: (Constant), Momentum Effect

The above results imply that there is a statistically significant Influence of the momentum factor and the performance of the NSE 20 Share Index. The researcher sought to establish the correlation, regression and analysis of variance influence of the momentum factor and the performance of NSE 20 Share Index. These are captured on Table 4.25 where R square was 0.252 implying that momentum effect influences the NSE 20 Share index to the extent of 25.2%. F value of this observation is 49.29 with a significance value of 0.000 and a standard error estimate of 5.727.

Table 4.25: Model Summary on the Influence of Momentum Effect on Performance of NSE 20 Share Index

Model	R	R Square	Adjusted R Square	Std. Error of the Esti	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.508[a]	.258	.252	5.727	.258	49.29	1	142	.000	1.753

a. Predictors: (Constant), ME

b. Dependent: NSE 20 Share Returns

The researcher ran a simple regression equation on the Influence of momentum factor and performance of the NSE 20 Share Index. This Model is

$$y = 3.736 + 0.09x$$

Where Y represents the performance of NSE 20 Share Index and X represents the momentum factor of the listed stocks in the NSE. The standard error term of the above model was 0.673 points.

Table 4.26: Standardized coefficients on the Influence of Momentum Effect on Performance of NSE 20 Share Index

Model		Unstand Coefnts		Stand Coefnts	T	Sig.	95.0% Confidence for B		Correlations	
		B	Std. Error	Beta			Lower	Upper	Partial	Part
1	(Constant)	3.736	.673		5.547	.000	2.404	5.067		
	ME	.009	.001	.508	7.021	.000	.007	.012	.508	.508

a. Dependent Variable: NSE 20 Share Returns

The above observations are in agreement with the research of (Sapp & Twari, 2004) who observed that investors during price fluctuations are smart money traders. (Titman, Wei, & Xie, 2009) also observes that since investors are smart money traders, they get greater investment returns in places where they have heard heavy investments. The findings also agreed with the research of (Muga & Santamaría, 2007a; Zhang, 2006) who observed that news on stock value leads to higher expected returns following good news but lower expected returns following bad news.

4.5 Influence of Financial Contagion Effect on Performance of NSE Indices

Descriptive statistics on the influence of financial contagion effect on the performance of the NSE indices were also established. Figure 4.11 captures the objective of Financial Contagion Effect between NSE 20 Share index and the FTSE 100 index during the pre-crisis period. This period happened to fall between April 2006 to July 2007. There is high interconnection between these indices as portrayed by the figure. FTSE 100 started at around 8900 points, reduced slightly, and then

increased gradually to around 10300 points while NSE 20 Share index started at around 3000 points in April 2006, reduced slightly and rose gradually to around 4100 points in July 2007. This agrees with the observations made by Komo & Ngugi (2013) who agreed that NSE is highly interlinked with the UK stock market despite NSE being an emerging market and also geographically very far from the European Country.

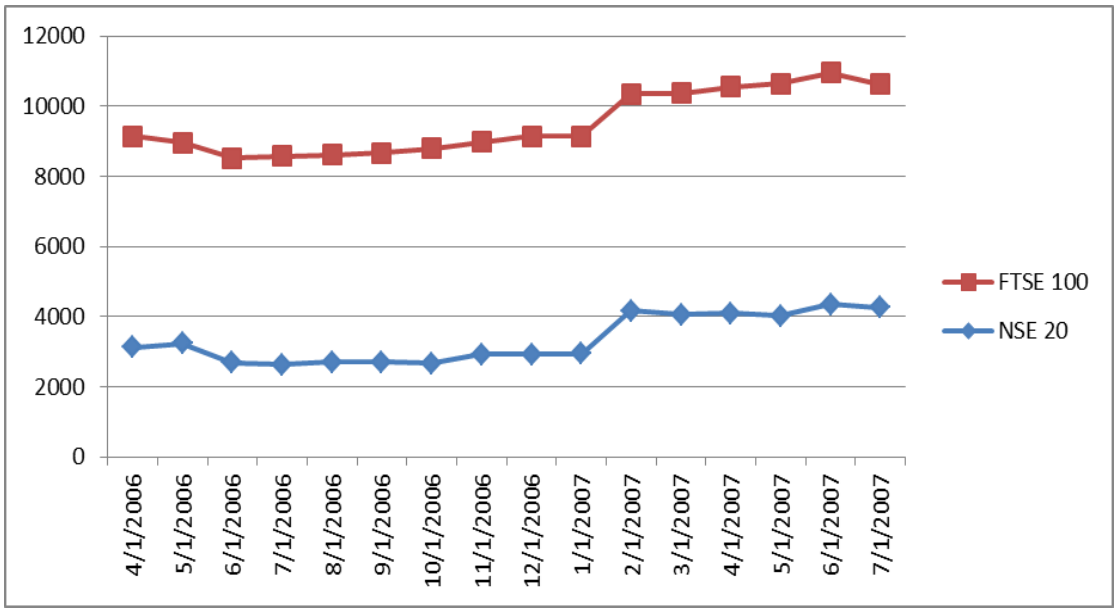

Figure 4.11: Results of NSE 20 Share Index and FTSE 100 Index during the Pre-Crisis Period

Figure 4.12 shows the Influence of the Standard and Poor's 500 and the NSE 20 share index during the pre-crisis period. The NSE 20 share index started at around 3050 points in April 2006 and closed at 4100 points in July 2007 while the Standard and Poor's changed from around 4500 points to around 5800 points in the same period respectively. This figure confirms the works of (Komo & Ngugi, 2013) that NSE is highly interlinked with other exchanges all over the world.

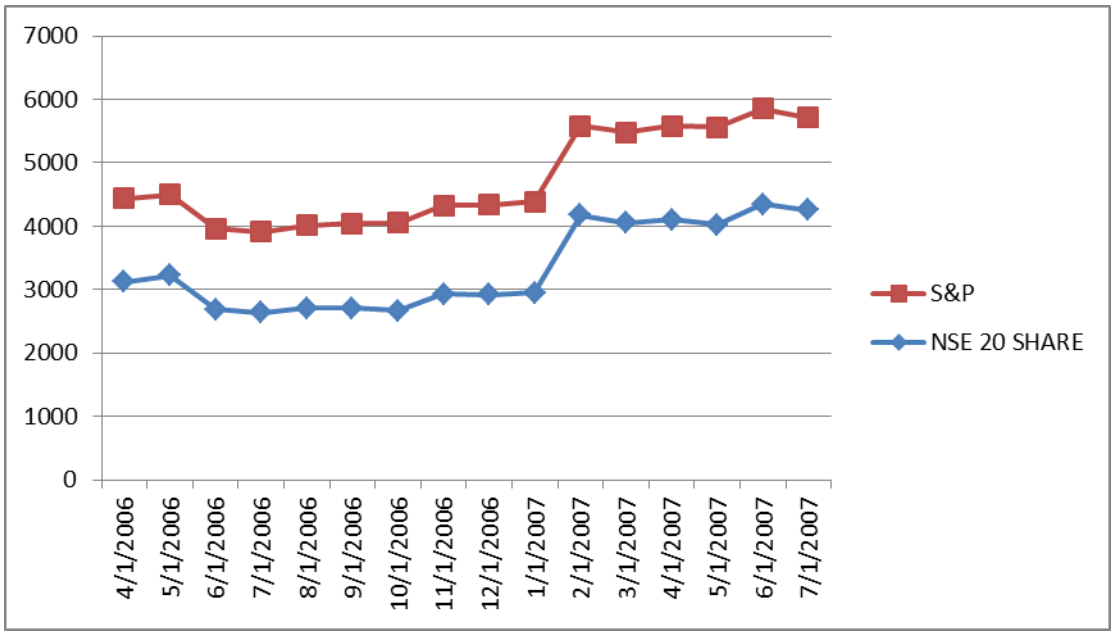

Figure 4.12: Results of NSE 20 Share Index, Standard and Poor's During the Pre-Crisis Period

The post crisis period from August 2007 to December 2008 was also studied and is presented in figures 4.13 and 4.14. Figure 4.13 shows that NSE 20 Share Index lost from 7000 points in August 2007 to just above 4000 points in December 2008 while the FTSE 100 Index lost from 1500 points to slightly below 1000 points. The above observations were in disagreement with the research by Komo and Ngugi, (2013) who stated that there is high correlation between the UK and the Kenyan securities markets. However, it is worth noting that despite the reduction at different rates, all the indices under observation all fell during the post 2008 financial crisis period.

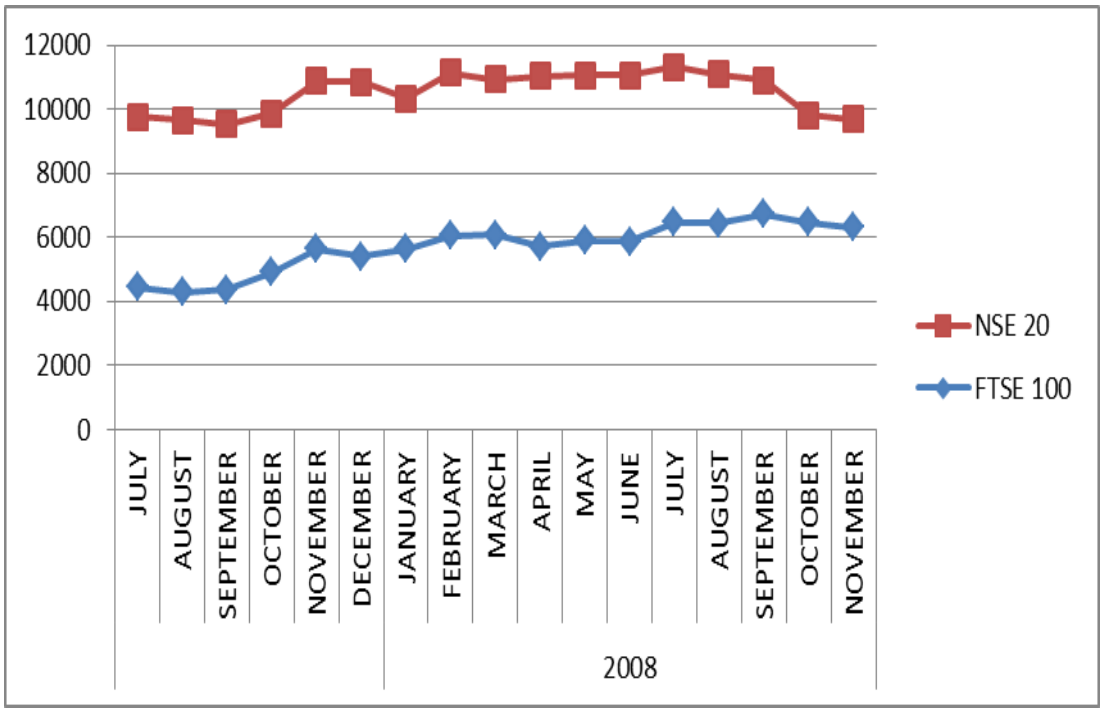

Figure 4.13: Post crisis Results of the NSE 20 Share Index and FTSE 100 Index

In respect to the Influence of NSE 20 Share Index and Standard and poor's during the post crisis period, the NSE 20 Share Index lost from just below 7000 points in August 2007 to just above 4000 points in December 2008 while the Standard and Poor's lost from around 5200 points to around 3500 points in the same periods respectively. This, being shown on figure 4.14, is quite in agreement with the works of Komo and Ngugi (2013) who noted that the NSE is highly interconnected with the global events despite being an emerging market and geographically separated frontier.

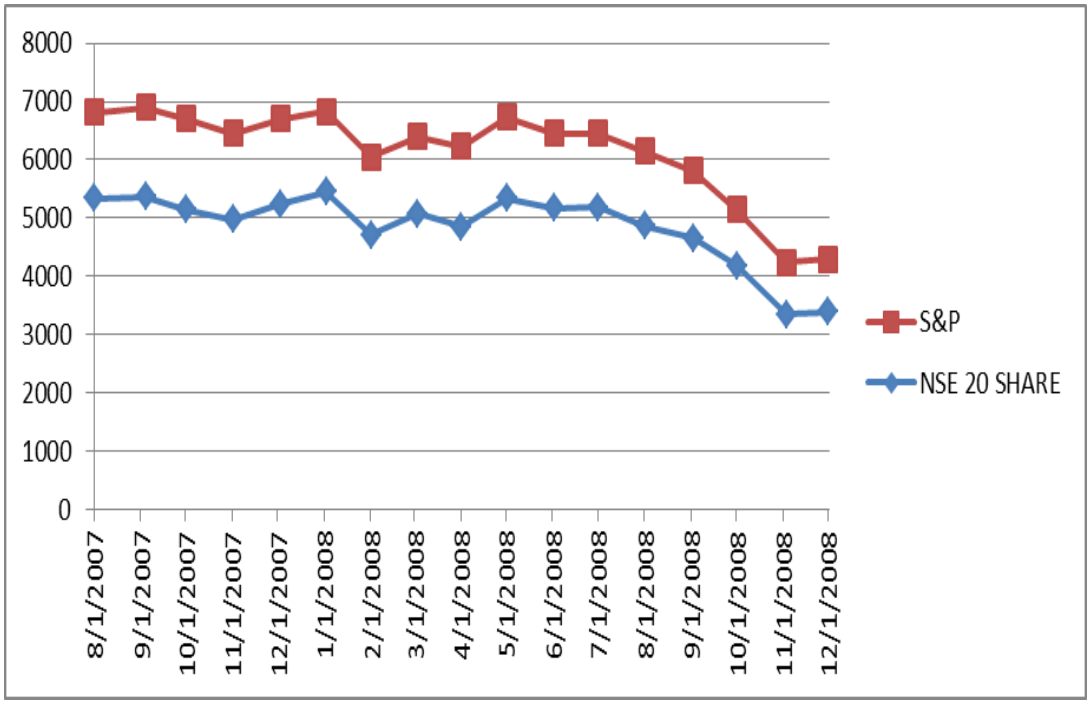

Figure 4.14: Post Crisis Results of the NSE 20 Share Index and Standard & Poor's Index

After conducting pre and post crisis periods separately, the researcher also found it necessary to combine the two and establish their effects. The periods starting from April 2006 to June 2007, and August 2006 to October 2008 were conducted for both NSE 20 Share Index and FTSE 100, and NSE 20 Share Index and Standard and poor's Index. Figure 4.15 captures the pre and post crisis Influence of NSE 20 Share Index and the FTSE 100 Index. As captured in the above figures, for the pre-crisis period, the two indices were moving in the same direction, but this cannot be stated for the post crisis periods.

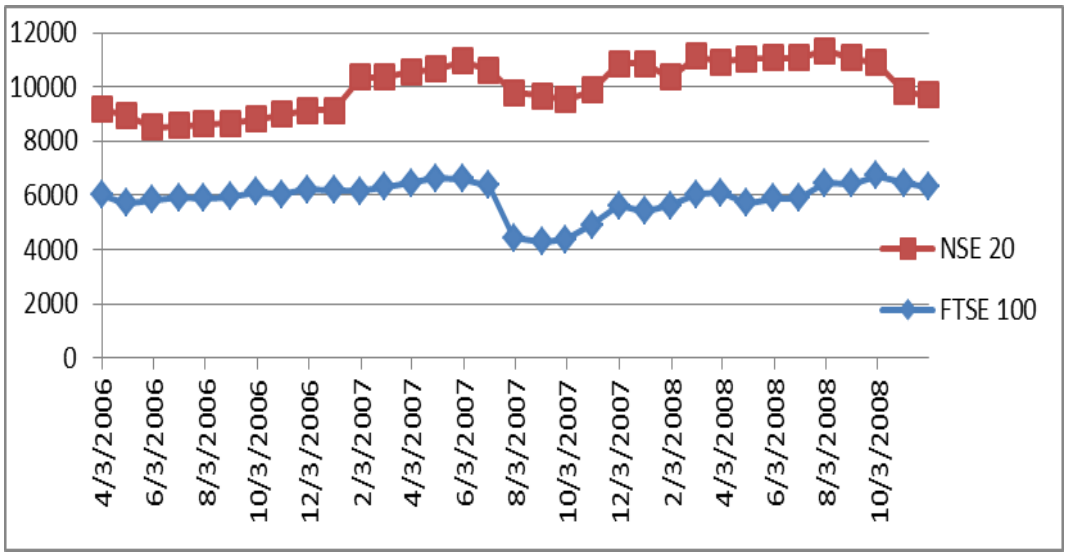

Figure 4.15: Pre and Post Crisis Results of the Performance of NSE 20 Share Index and FTSE 100

The pre and post crisis Influence of the NSE 20 Share Index and Standard and Poor's Index was also established. This is shown on Figure 4.16.

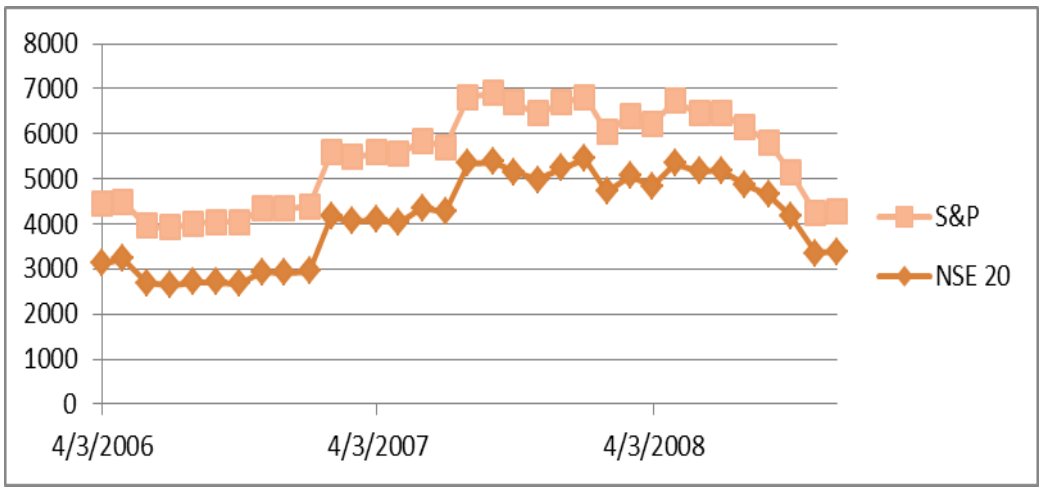

Figure 4.16: Pre and post crisis Period Results of the performance of NSE 20 Share Index and Standard and poor's Index

To cap the discussion was a line chart that captured the three indices studied in respect to the pre and post crisis indices movement. This was captured by figure 4.17. The figure shows that NSE is not highly contagious of the happenings of the outside developed countries and this in itself disagrees with the works of Komo and Ngugi (2013).

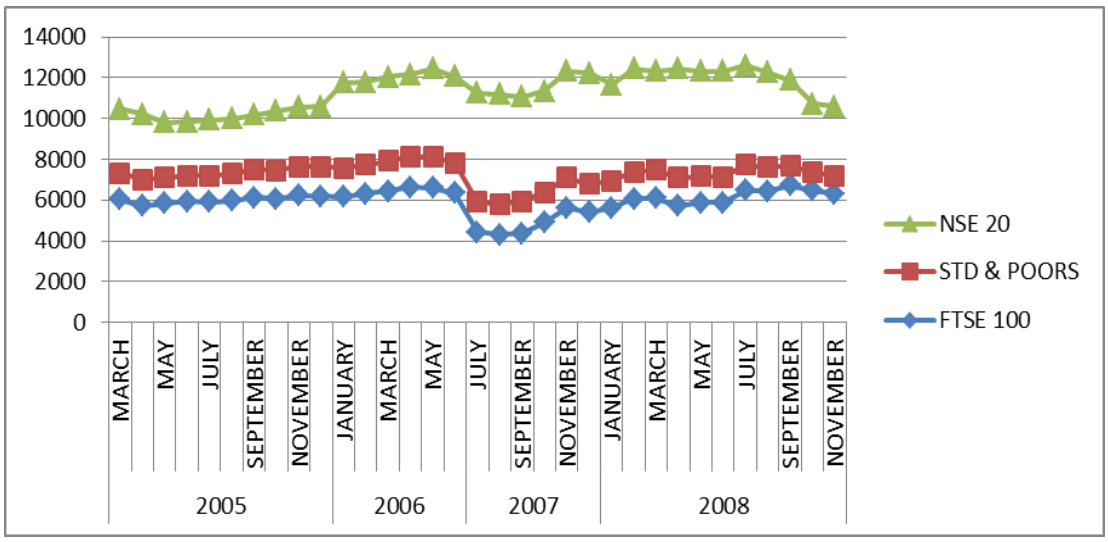

Figure 4.17: Pre and Post Crisis Results of the Performance of NSE 20 Share Index and Standard & Poor Index

The relationship amongst the three variables was established. The overall mean of NSE 20 share index was 4114.83 points with a standard deviation of 996.30, while that of FTSE 100 was 5913.95 points with a standard deviation of 622.2, and that of Standard & Poors was 1341.94 points with a standard deviation of 163. This was for the pre-crisis and post crisis period. This has been captured by Table 4. 27.

Table 4.27: Descriptive Statistics on the Relationship Amongst NSE 20 Share Index, FTSE 100 and Standard & Poor's During the Pre and Post Crisis Period

	Mean	Std. Deviation	N
NSE 20	4114.8255	996.30420	33
FTSE 100	5913.945	622.1936	33
STD & POOR'S	1341.9370	163.24456	33

From the above table, it can be concluded that NSE 20 share index was the most volatile during the global financial crisis period. This disagrees with the work of Komo and Ngugi (2013) who found that the Nairobi Securities Exchange is highly correlated with the developed markets but agrees with the work of Hmida (2014) who noted that the happenings of the developed world adversely affect the developing countries.

On the inferential analysis, data was split into pre crisis period, post crisis period and a combination of the pre and post crisis period. Table 4.28 captures the pre-crisis Influence of FTSE 100 and NSE 20 Share index. From the table, the correlation between these two indices stood at 0.763 implying a strong positive correlation. This is in agreement with the works of Komo and Ngugi (2013) who observed that there is a high correlation between the NSE and the developed stock markets despite the fact that the two are geographically and economically very distinct. This also affirms the figure 4.15, which captured visually this relationship. The z statistical was at -14.532, z critical at 2.1 and P value at 2.118893E-11.

Table 4.28: Pre Crisis Results of FTSE 100 on NSE 20 Share Index

Z test: Two-Sample Assuming Unequal Variances		
Mean	3360.216667	6164.84
Variance	484981.8756	73755.21543
Observations	15	15
Pearson Correlation	0.763160061	
Z stat	-14.43169992	
P(T<=t) one-tail	1.09446E-11	
Z Critical one-tail	1.734063607	
P(T<=t) two-tail	2.18893E-11	
Z Critical two-tail	2.10092204	

The above observations showed that the Influence of FTSE 100 and NSE 20 Share Index was statistically significant at 0.05 Level of significance. This was also

confirmed by the P value which was lower than 0.05. Table 4.29 captures the Influence of the Standard & Poors Index and the performance of NSE 20 Share Index. There were 15 observations with z statistical of 10.86, Z critical of 2.144 a P value of 3.328 E-12. These observations showed that the statistical value of z was inside the critical region.

Table 4.29: Pre Crisis Results of Standard and Poor's on NSE 20 Share Index

Z-Test: Two-Sample Assuming Unequal Variances		
Mean	1392.734667	3360.216667
Variance	7275.694241	484981.8756
Observations	15	15
Z Stat		10.86075947
P(T<=z) one-tail		1.66407E-08
z Critical one-tail		1.761310136
P(T<=z) two-tail		3.32813E-08
z Critical two-tail		2.144786688

The above observations showed that the Influence of Standard and Poor's and NSE 20 Share Index was statistically significant at 0.05 Level of significance. This was also confirmed by the P value which was lower than 0.05.

Post crisis period started from July 2007 to November 2008. The researcher studied the post crisis period Influence of FTSE 100 and NSE 20 Share index , Standard and Poor's Index and NSE 20 Share Index. These are captured on Tables 4.30 and 4.31. On the influence of Standard & Poors and NSE 20 share index as shown on Table 4.30, the correlation between the two indices was 0.847 implying that it was a strong

positive correlation between Standard & Poors and NSE 20 Share index. This is in agreement with the research of Komo and Ngugi (2013), who found that there was a strong correlation between Kenyan Securities Markets and developed markets in the world. Z statistical was 20.72016097, z critical was 2.10092204, and the P value was 5.22553E-14.

Table 4.30: Post Crisis Results of Standard and Poor's on NSE 20 Share Index

Z-Test: Two-Sample Assuming Unequal Variances		
Mean	4807.491875	1288.01875
Variance	418473.9567	43150.7442
Observations	16	16
Pearson Correlation	0.84753574	
Z Stat	20.72016097	
P(T<=t) one-tail	2.61277E-14	
Z Critical one-tail	1.734063607	
P(T<=t) two-tail	5.22553E-14	
Z Critical two-tail	2.10092204	

The above results imply that since the P value is less than 0.05 and that the Z statistical is greater than Z critical, the post crisis Influence of Standard & Poors and the NSE 20 Share Index was statistically significant at 0.05 level of significance.

Table 4.31 showed the post crisis Influence of FTSE 100 and NSE 20 Share Index. The correlation between the two indices stood at -0.57, Z statistical was 3.94383631, Z critical was 2.042272456 and the p value was 0.000445474. Z statistical was inside the critical region since it was greater than Z statistical.

Table 4.31: Post Crisis Results of FTSE 100 and NSE 20 Share Index

Z-Test: Two-Sample Assuming Unequal Variances		
Mean	5764.39375	4807.491875
Variance	523452.578	418473.9567
Observations	16	16
Pearson Correlation	-0.573601547	
Z Stat	3.94383631	
P(T<=t) one-tail	0.000222737	
Z Critical one-tail	1.697260887	
P(T<=t) two-tail	0.000445474	
Z Critical two-tail	2.042272456	

A negative correlation in the above table implies that the FTSE 100 and NSE 20 Share Index were moving in opposite directions after the 2008 crisis. This goes against the findings of Komo and Ngugi (2013) who had observed that the NSE is highly interlinked with the developments of the developed economies making it highly contagious in its price movements. The post crisis Influence of the FTSE 100 and the NSE 20 Share Index was statistically significant at 0.05 level of significance since Z statistical was greater than Z critical. This was also confirmed by the p value, which was less than 0.05.

The final aspect of inferential statistics on the pre and post crisis Influence of Financial Contagion Effect and the performance of NSE indices was conducted. The researcher first established the influence of each variable and NSE indices, and then conducted a combined influence of Standard and poor's, and FTSE 100 indices and

NSE 20 Share index where the latter would be the dependent variable. Table 4.32 shows the pre and post crisis Influence of the FTSE 100 and NSE 20 Share Index. The correlation between the two variables stood at -0.4261121, Z statistical was 8.463637222, z critical was 2.006646805 and the p value was 2.37289E-11.

Table 4.32: Pre and Post Crisis Results of FTSE 100 on NSE 20 Share Index

Z-Test: Two-Sample Assuming Unequal Variances		
Mean	5910.534375	4145.725
Variance	399216.4017	992117.9339
Observations	32	32
Pearson Correlation	-0.4261121	
Z Stat	8.463637222	
P(T<=t) one-tail	1.18645E-11	
Z Critical one-tail	1.674689154	
P(T<=t) two-tail	2.37289E-11	
Z Critical two-tail	2.006646805	

From the above table, one would draw that there existed a negative correlation between FTSE 100 index and NSE 20 Share index. These findings are not in agreement with the research of Komo and Ngugi (2013) who found that NSE is highly contagious on the happenings of the developed world. These findings refute the statement that 'When America catches a cold, the world gets a flu'. Z statistical was in the critical region since it was greater than Z critical. This would make one to conclude that the pre and post crisis Influence of FTSE 100 and NSE 20 Share index was statistically significant at 95% confidence level. This was confirmed by the p value being less than 0.05.

Table 4.33 captured the pre and post crisis influence of Standard and poor's index and NSE 20 Share Index. The correlation between these two variables stood at 0.27, Z statistical was 15.70199838, Z critical was 2.034515297 and p value was 7.14253E-17.

Table 4.33: Post Crisis Influence of Standard and Poor's on NSE 20 Share Index

Z-Test: Two-Sample Assuming Unequal Variances

Mean	4145.725	1342.915938
Variance	992117.9339	27475.77735
Observations	32	32
Pearson Correlation	0.270427572	
Z Stat	15.70199838	
P(T<=t) one-tail	3.57126E-17	
Z Critical one-tail	1.692360309	
P(T<=t) two-tail	7.14253E-17	
Z Critical two-tail	2.034515297	

From the table above, it is evident that there was a weak positive correlation on the pre and post crisis Influence of Standard & Poors index and NSE 20 Share index. This is in disagreement with the works of Komo and Ngugi (2013), who found that there was high Financial Contagion Effect between the developed world and the performance of NSE 20 Share index. Z statistical was greater than Z critical and this led to the statistical value appearing in the critical region. This meant that the Influence of the two indices was statistically significant at 0.05 level of significance. This was confirmed by the p value, which was less than 0.05.

Finally, on the inferential statistics in respect to Financial Contagion Effect, a relationship amongst the three indices, FTSE 100, Standard & Poors and NSE 20 Share Index was established. Table 4.34 captures the correlation coefficients of that relationship. Pearson correlation between NSE 20 and FTSE 100 was -0.125, NSE 20

and Standard & Poors 0.205 while that of FTSE 100 and Standard & Poors -0.034. The above observations are not in agreement with the work Komo and Ngugi (2013).

Table 4.34: Correlation Coefficients on the Influence of Financial Contagion Effect on the Performance of NSE 20 Share Index

		NSE	FTSE	STD & POORS
Pearson Correlation	NSE	1.000	-.125	.205
	FTSE	-.125	1.000	-.034
	STD & POORS	.205	-.034	1.000
Sig. (1-tailed)	NSE	.	.251	.134
	FTSE	.251	.	.427
	STD & POORS	.134	.427	.
N	NSE	31	31	31
	FTSE	31	31	31
	STD & POORS	31	31	31

The above results show weak negative correlations between the Influence of NSE 20 Share Index and FTSE 100, and FTSE 100 and Standard & Poors Index with statistically significant p values. This shows that the movements of these indices during the pre and post crisis periods were statistically significant. The correlation between NSE 20 Share Index and Standard & Poors was weak positive correlation though not statistically significant at 0.05 level of significance. This could imply that the NSE 20 Share index and Standard and Poor's were moving in the same direction.

The model regression summary showed an R-value of 0.237, R square of 0.056, F Statistical of 0.832 and significance value of 0.446. The ANOVA Results show an F value of 0.832 that is greater than F critical of 3.84 implying that they are not statistically significant. This is confirmed by the p value of 0.446. This is captured on tables 4.35 and 4.36.

Table 4.35: ANOVA Results on Financial Contagion Effect

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	180.663	2	90.331	.832	.446[b]
	Residual	3039.447	28	108.552		
	Total	3220.110	30			

a. Dependent Variable: NSE Abnormal Returns

b. Predictors: (Constant), Std & Poors Abnormal Returns, FTSE Abnormal Returns

Table 4.36: Model Summary on the Influence of Financial Contagion Effect on Performance of NSE 20 Share Index

Model	R	R Sqre	Adjstd R Sqre	Std. Error of the Estmte	Change Statistics				
					R Sqre Change	F Change	df1	df2	Sig. F Change
1	.237[a]	.056	-.011	10.418	.056	.832	2	28	.446

From the above, it is worth noting that the relationship among the three indices was statistically significant at 0.05 level of significance.. The multiple regression models for the three indices was as follows:

$$y = 0.873 - 0.257\text{FTSE 100} + 0.445 \text{ Standard and Poors}$$

This relationship confirms correlation matrix shown in Table 4.34. This is shown on Table 4.37.

Table 4.37: Regression Coefficients on the Influence of Financial Contagion Effect on the Performance of NSE 20 Share Index

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.873	2.004		.436	.666
	FTSE 100	-.257	.400	-.118	-.643	.525
	STD & POORS	.445	.407	.201	1.095	.283

The overall model which was a combination of the pre and post crisis period was not statistically significant on all dimensions and this supports the views of Pilinkus, (2010), who observed that African stock markets are characterised by thin trading. This however, does not agree with the observations of (Dewandaru, Rizvi, Bacha, & Masih, 2014; Hmida, 2014b; Komo & Ngugi, 2013; Ozkan & Unsal, 2012) who all agreed that in the world today there is increased market integration which has led to escalated financial linkage.

4.6 Influence of White Noise Effect on Performance of NSE Indices

The study did a twelve year study of the computation of the white noise effect, which were in line with the suggestion by Miralles-Marcelo, Miralles-Quiros, and Miralles-Quiros (2014). White noise effect was computed by first obtaining the monthly stock prices for each firm from January 2004 to December 2015. Secondly, the dividends paid by each company were established from the financial statements of these companies. These were obtained from the CMA Library and the firm's websites. Returns of the stocks at time t were computed according to the model suggested by Homm and Breitung (2011). Next, the expectation conditional of information at time *t* was obtained. The risk free rate of return as determined by the 91 day Treasury bill was used. This helped in the determination of the expected conditional of information. The ultimate outcome was the determination of the fundamental stock

price of every month. This was obtained by using an equation that comprised of the interest rate as determined by the 91 day Treasury bill, expected conditional of information and the dividends paid by particular stocks for one year. The white noise effect was measured by the rational bubble. Bubble component according to Homm and Breitung (2011), was obtained by getting the difference between the monthly stock price and the monthly fundamental price. The bubble component tests whether a stock has been over or undervalued.

The above computations for every stock and every month were put on a different spread sheet and the weighted average for each month was established. This led to a total of 144 observations for the white noise effect for each stock which was run against the NSE 20 Share Index for the 144 months. The output of this study is captured on Figure 4.18.

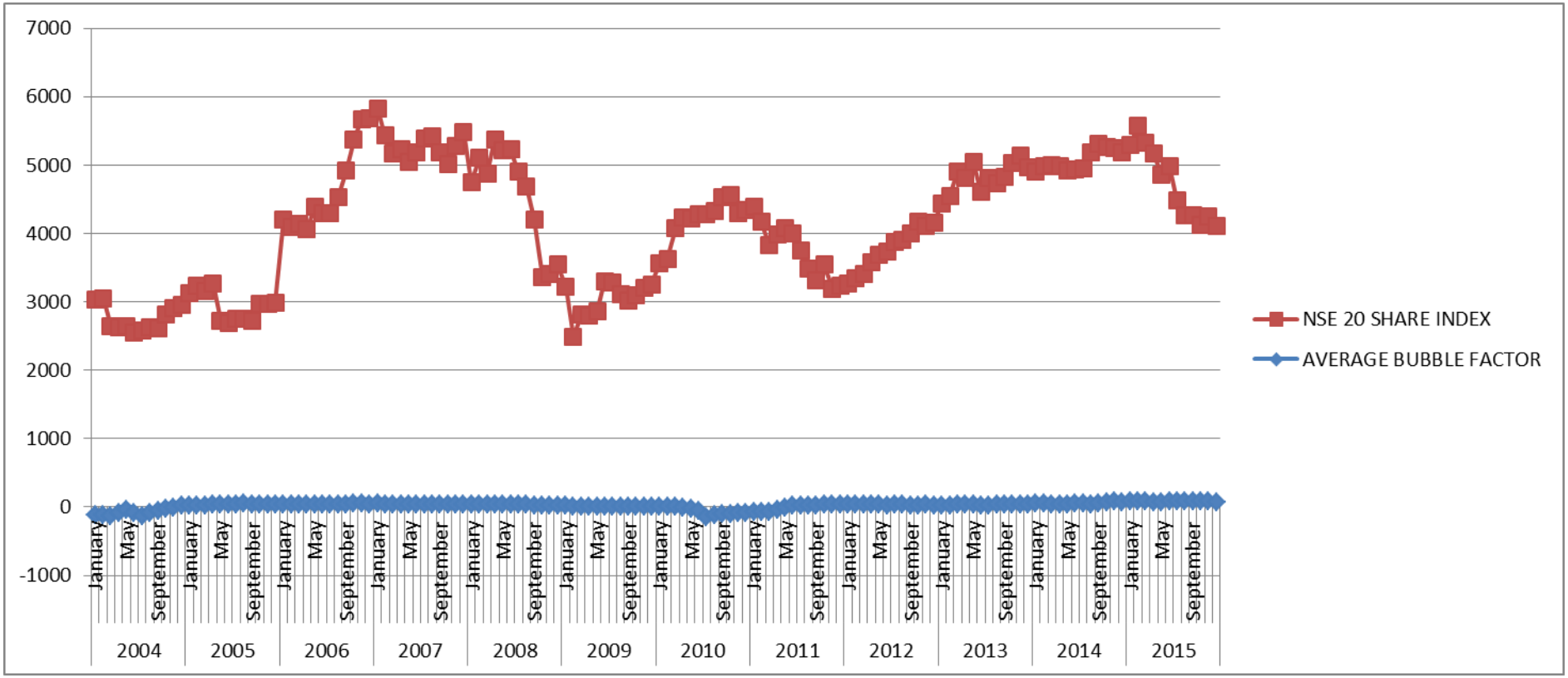

Figure 4.18: Relationship between NSE 20 Share Index and White Noise Effect

The mean of the white noise effect over the study period was 0.88 with a standard deviation of 7.786 while the mean factor of the average NSE 20 Share Index returns was 0.40 with a standard deviation of 6.616. this has been captured on Table 4.38.

Table 4.38: Descriptive Statistics on the Influence of White Noise Effect and Average NSE 20 Share Index Returns

	Mean	Std. Deviation	N
Average NSE 20 Share Returns	.3956	6.616	144
White Noise Effect	.8797	7.7866	144

In terms of getting dividends per share, for the Ugandan based firm (the only foreign cross listed firm in the NSE), the researcher had to obtain the exchange rates as per 31/12 2013 through 2015. This was as follows: in 31st December 2013, Ksh. 1 was exchanging for Ush. 29.2078, 31st December 2014 for 30.60205 and 31st December 2015 30.86069. It was necessary to convert since the Ugandan based firm paid its dividends in Ugandan Shillings.

Table 4.40 shows the correlation between the white noise effect that was explained on appendix VI. This was based on 144 observations where the correlation between rational bubble and NSE 20 share index was 0.369 with a p value of 0.000. Tables 4.39, 4.40 and 4.41 capture the regression model on the Influence of white Noise Effect, as measured by the rational bubble, on performance of NSE Indices. The R square was 0.136 implying that white noise effect influences the NSE 20 share index to the extent of 13.6%. These had a p value of 0.00 lower than the threshold value of 0.05. The ANOVA results showed an F statistical value of 22.387 greater than 3.84. This implied that the results were statistically significant and were confirmed by a p value less than 0.05. The simple regression model was as shown:

$$y = 3985.74 + 6.571\ White\ Noise\ Effect$$

Table 4.39: ANOVA Results on White Noise Effect on performance of NSE Indices

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	15641723.541	1	15641723.541	22.387	.000[b]
	Residual	99215207.591	142	698698.645		
	Total	114856931.132	143			

a. Dependent Variable: NSE 20 SHARE

b. Predictors: (Constant), WNE

Table 4.40: Model Summary on the Influence of White Noise Effect on Performance of NSE Indices

Model	R	R Square	Adjusted R Square	Std. Error of the Esti	Change Stat				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.369[a]	.136	.130	835.88	.136	22.387	1	142	.000

Table 4.41: Regression Coefficients of White Noise Effect and the Performance of NSE Indices

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	3985.738	74.465		53.453	.000	3838.338	4133.139
	WNE	6.571	1.389	.369	4.731	.000	3.826	9.316

a. Dependent Variable: NSE 20 SHARE

Table 4.40 above would make one infer that at 0.05 level of significance there was a statistically significant Influence of White Noise Effect, as measured by White Noise Effect , and performance of NSE 20 share index albeit weak positive correlation. One would draw that even though the White Noise Effect and NSE 20 share index are moving in the same direction, the uninformed traders would confuse the information with uncertainty as noted by Dow and Gorton (2006).

4.7 Influence of Security Price Volatility on Performance of NSE Indices

It is important to bring attention to the prospective readers that the analysis of this objective was similar to that of the objective of market herding effect the only difference being that the market herding effect objective went deeper and brought new dynamics in this analysis. As a result, the researcher clearly demarcated the discussions in respect to these two objectives that were interdependent on each other. Table 4.42 captures the influence of Securities Price Volatility on the performance of NSE indices.

Table 4.42: The Influence of Securities Price Volatility on the Performance of NSE Indices

Firms	Mean	Std Dev	Kurtosis	Skewness	LOS (0.05)
Stanbic	2.194	28.605	99.581	9.030	4.71
Kenya Orchards	4.275	35.027	96.681	9.408	5.77
I&M	4.554	40.608	96.366	8.904	6.69
Nic	1.974	27.254	83.693	7.757	4.49
Eaagads	2.241	27.686	58.915	6.543	4.56
A Baumann	2.580	28.655	45.496	6.503	7.90
Olympia	-0.411	17.331	32.232	4.084	2.85
Eabl	0.361	9.959	24.453	-3.282	1.64
Scan Group	2.381	22.161	22.757	3.547	4.13
Kenya Power	-0.099	11.976	21.764	-2.584	1.97
Kcb	0.791	12.135	20.410	-2.666	2.00
Kobil	-0.296	14.429	19.272	-3.137	2.38
Marshalls	0.873	11.873	18.615	3.213	1.96
Barclays	-0.810	12.703	17.273	-2.757	2.09
Rea Vipingo	0.848	15.159	17.136	-1.708	2.74
Umeme	2.390	9.068	16.763	3.586	3.16
Arm	1.394	11.727	15.493	-1.880	1.93
Cmc	-1.303	18.195	14.876	-3.122	3.75
Limuru Tea	1.664	8.464	13.064	2.065	1.39

Firms	Mean	Std Dev	Kurtosis	Skewness	LOS (0.05)
Carbacid	-1.220	11.614	12.886	-1.317	2.33
Williamson	2.035	15.860	12.116	3.016	2.61
Ea Cables	1.484	17.171	11.608	0.877	2.83
Jubilee	2.026	12.114	10.352	1.676	2.00
Portland	0.439	12.025	10.329	1.662	1.98
Mumias	0.531	17.373	10.122	1.515	2.86
Centum	1.519	16.197	10.116	-0.216	2.67
Sasini	0.586	19.932	9.893	-0.561	3.28
Express	-0.187	13.423	9.154	1.679	2.21
Kapchorua	1.010	12.356	8.658	2.132	2.04
Equity	0.758	16.974	8.568	-0.931	3.18
Sanlam	1.508	13.207	7.844	0.567	2.18
Tps Serena	0.520	11.244	7.604	1.002	1.85
Coop	1.312	9.462	5.711	1.385	2.07
Longhorn	-1.527	18.631	5.574	0.335	5.73
Boc	-0.084	8.255	5.374	1.230	1.66
Uchumi	-0.329	15.675	4.764	1.572	3.38
Crown	1.190	13.758	4.736	0.355	2.27
Eveready	-1.037	12.354	4.394	1.255	2.36
Kenya Re	0.732	10.052	3.763	1.042	1.99
Kakuzi	2.687	13.857	3.640	1.264	2.28
H. Afrika	-7.124	15.550	3.242	-0.069	5.91
Nmg	0.359	9.178	3.136	-0.301	1.51
Kq	0.225	12.758	3.026	0.927	2.10
Unga	0.833	11.597	2.774	0.254	1.91
Bat	0.891	6.764	2.658	0.203	1.11
Kengen	-0.654	11.668	2.630	0.713	2.16
Nbk	0.338	12.393	2.500	0.568	2.04
Housing Finance	1.031	14.458	2.391	1.012	2.38
Transcentury	-2.559	10.436	2.380	-0.006	2.91
Car And Gen	1.672	12.437	2.378	0.980	2.05
Liberty	0.832	12.272	2.321	1.035	3.29
Stan Chart	0.223	6.886	2.049	-0.229	1.13
Total	-0.426	7.947	2.048	0.526	1.31
Dtb	1.356	8.510	1.759	-0.522	1.40
Britam	2.511	13.448	1.596	0.895	3.78
Unilever	0.051	8.655	1.365	-0.242	2.39
Bamburi	0.389	6.151	1.355	-0.030	1.01
Sameer	-0.274	12.032	1.338	0.729	1.98
Safaricom	1.319	9.160	1.007	-0.609	1.92
Standard Group	-0.265	9.180	0.988	0.740	1.51
Cic	1.132	12.228	0.901	0.697	3.86
Access Kenya	0.459	13.478	0.310	0.203	3.19
NSE	1.575	5.040	-0.178	0.499	2.91
Atlas	-12.349	16.885	-0.449	-1.153	10.73
Flame Tree	-1.716	5.966	-0.452	0.092	3.61

The mean of the NSE 20 Share Index returns and Security Price Volatility were 0.40 and 0.99 respectively with a standard deviation of 6.62 and 5.57 respectively. These are captured on Table 4.43:

Table 4.43 Descriptive Statistics on the influence of Security Price Volatility on the Performance of NSE 20 Share Index

	Mean	Std. Deviation	N
NSE 20 Share Returns	.3956	6.6162	144
Security Price Volatility	.9878	5.5651	144

In the Analysis of Variance, F statistical was 107.43 being greater than the threshold F critical of 3.84 there by confirming the statistical significance of the findings. This was confirmed with a p value less than 0.05 as shown on Table 4.44. The correlation between Securities Price Volatility and performance of NSE 20 Share Index was 0.656 implying a strong positive relationship. R square was 0.431 indicating that Securities Price Volatility influenced the performance of NSE 20 Share Index by about 43.1%. This relationship had a p value of 0.00 and is demonstrated on Table 4.45 and 4.46.

Table 4.44: ANOVA Results on the Influence of Security Price Volatility on Performance of NSE Indices

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2696.070	1	2696.070	107.428	.000[b]
	Residual	3563.721	142	25.097		
	Total	6259.791	143			

a. Dependent Variable: NSE 20 Share Returns

b. Predictors: (Constant), Share Price Volatility

Table 4.45: Model Summary on the Influence of Security Price Volatility on Performance of NSE 20 Share Index

Model	R	R Square	Adjstd R Square	Std. Error of the Estmte	Change Statistics				
					R Sqre Chnge	F Change	df1	df2	Sig. F Change
1	.656[a]	.431	.427	5.00965	.431	107.428	1	142	.000

The simple regression model shown on Table 4.46 was:

$$y = -0.375 + 0.780x$$

Where Y is the performance of NSE 20 Share Index and X is the Securities Price Volatility. The p value of the model was 0.000 indicating that the model was statistically significant at 0.05 level of significance.

Table 4.46: Regression Coefficients Security Price Volatility and Performance of NSE 20 Share Index

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.375	.424		-.885	.378
	SPV	.780	.075	.656	10.365	.000

The above observations show mixed signals. The overall model shows statistically insignificant inferences while the ANOVA model shows that indeed share price volatility existed in the NSE stocks.

4.8 Influence of Market Herding Effect on Performance of NSE Indices

In respect to Market Herding Effect, the prices were analysed in order to evaluate herd formations. This objective relied on the same data of getting abnormal returns for each stock each month as it was computed in the objective of momentum effect. Just like the momentum effect objective, descriptive statistics for each stock running for the entire period that the stocks were actively trading were run on individual excel sheets and then a consolidated one was established to capture all the stocks studied. Measures such as mean, standard error, median, mode, standard deviation, sample variance, kurtosis, skewness, range, maximum, minimum, sum, count and level of confidence of all observations were established.

These monthly prices were dating from January 2004 to December 2015. Secondary data was incomplete for three firms (Hutchings Biemer, Kurwitu Investments and Stanlib Fahari) and these firms were subsequently eliminated from the analysis. The study adopted the model used by Demirer and Kutan (2006), where standard deviations for each stock was computed as shown in Appendix VII (a). These results were computed by taking the average returns for each stock under the period under review(January 2004 to December 2015). These average returns were obtained from the monthly prices of the period under review. The results were classified into up markets and down markets where those that had right tails were classified as upmarkets and downmarkets had left tails.

In order to establish the up and down markets, the researcher used the monthly prices for the 12 year period as opposed to the returns for the entire period. This is because prices would have a smoothing effect (especially where there would be abrupt price changes due to rights issue, stocks split) as opposed to monthly returns for the same period. The results for up and down markets were established through kurtosis values which were established by running the descriptive data analysis in excel sheet. The researcher also established the abnormal returns for the NSE 20 Share index for the 144 monthly observations under study. Figure 4.19 captures the influence of the Average Monthly Abnormal Returns for all stocks listed in the NSE and the NSE 20 Share Index returns for the period starting from January 2004 to December 2015.

From the Figure 4.19, it can be established that the abnormal returns of all stocks were moving in the same direction with those of the NSE 20 Share index only that the NSE 20 Share returns were more pronounced over the 144 month period under observations.

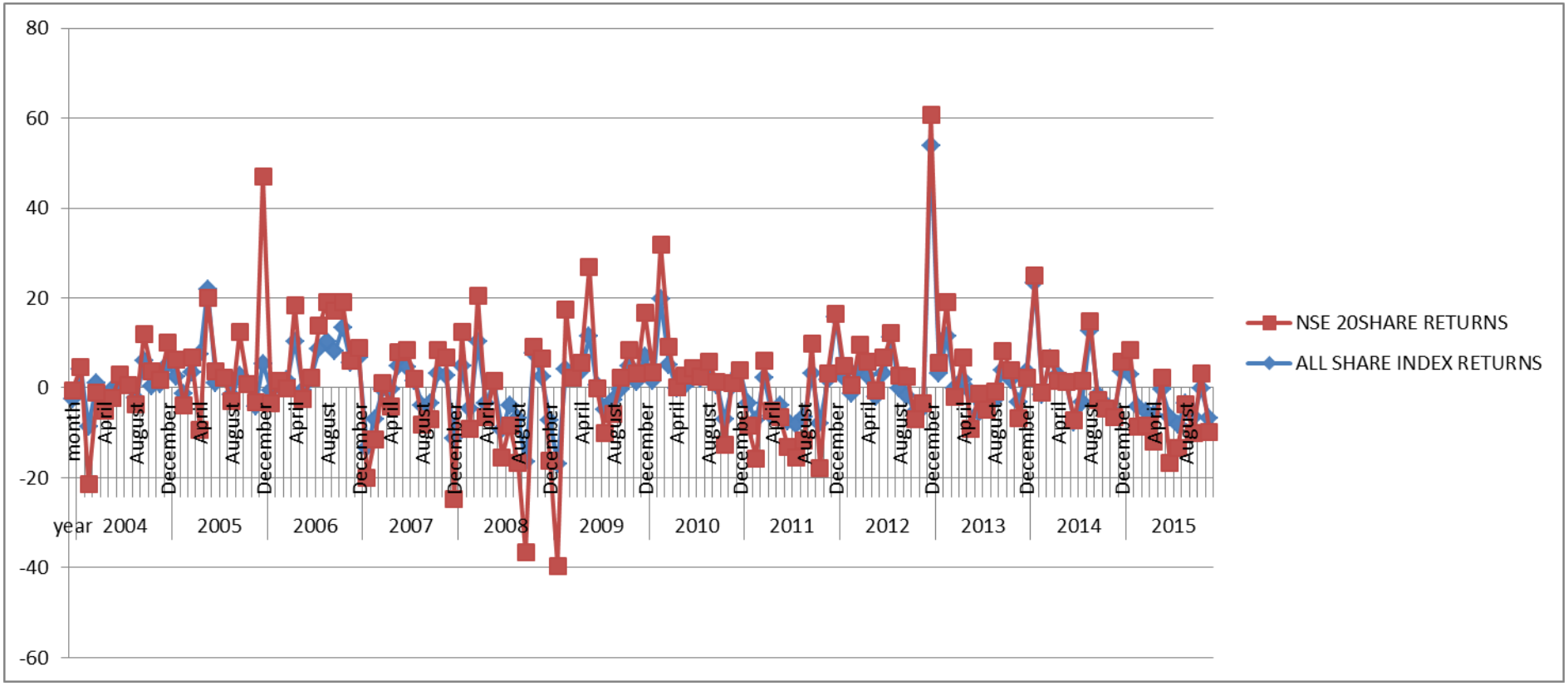

Figure 4.19: Relationship Between Market Herding Effect and the Performance of the NSE 20 Share Index

The data sheet about the influence of the market herding effect on the performance of NSE 20 Share Index was transferred to SPSS for further statistical analysis. The SPSS analysis generated both inferential and descriptive data but this section is going to concentrate only on the descriptive analysis. A point to note is that the SPSS analysis concentrated on the entire NSE stocks for the entire period under study. The average mean of the NSE 20 Share returns for the period from January 2004 to December 2015 was 0.396 with a standard deviation of 6.61 while the average aggregate mean of the NSE stocks returns was 0.88 with a standard deviation of 7.79. This is captured on appendix VII (a).

In each of the upmarkets and downmarkets, those that were statistically significant at 95% confidence level were established. In respect to the up markets, those that were statistically significant at 95% confidence level included 30, out of which 14 were statistically significant at 95% degree of confidence. In the period under the study (Monthly prices from January 2004 to December 2015), there were stocks that were facing a downward trend in their prices. Their prices were skewed to the left and those that were statistically significant were 26.

To obtain the cross subsectoral returns for the period under review, the researcher used the monthly NSE indice from January 2004 to December 2015 which were obtained from the data vendors at the NSE. These indices were then used to compute the returns on the monthly NSE indices as shown on Appendix VII(b) . The researcher further went to compute the statistical observations portrayed by the NSE cross subsectorial average. It is worth noting that the NSE 20 Share index, which is the barometer for establishing the cross sectorial performance. Out of 144 observations, it was observed that the mean was 4111.6 with the highest value at 5774, lowest of 2474. The standard deviation of the analysis was 896.2 with a median observation 4175 and mode of 2689 points. These are captured on Table 4.47.

Table 4.47: NSE 20 Share Index Returns from 2004 to 2015

NSE 20 Share Index	Statistics
Mean	4111.621
Standard Error	74.6843
Standard Deviation	896.2117
Kurtosis	-1.25565
Skewness	-0.15537
Count	144

The above implies that the NSE 20 share index has had turbulent times over the 12 years under the study. This could partly be caused by the introduction of several stocks in the index that had just been recently listed and failure to revise stocks that were not adding much value to the index.

Monthly returns for each stock were computed and also for each month were computed. It is worth noting that the average monthly returns from 2004 to 2015 amounted to a mean of 0.88 for 144 monthly observations. They were positively skewed at 2.45, standard deviation of about 7.79, lowest returns of about -17% and maximum returns of 53.89%. At 95% confidence level, the significance value was 0.0128 with a standard error of about 0.65. these were captured by Table 4.48.

Table 4.48: Average Returns of the Listed Firms in NSE from January 2004 to December 2015

Average Returns	Statistics
Mean	0.879716487
Standard Error	0.648891083
Standard Deviation	7.786693001
Kurtosis	14.78182727
Skewness	2.45027462
Range	70.90411269
Count	144
Confidence Level (95.0%)	1.282657942

From the above, it is worth noting that the results of the returns of the stocks listed at the NSE from January 2004 to December 2015 were stastically significant at 0.05 level of significance. This implies that the price movements of the listed stocks was statiscally significant over the 12 year period under the study.

The standard deviation results showed that the influence of observed stock returns and the cross subsectorial average returns had a standard deviation of about 7%, skewness of 1.79, kurtosis of 19.34 and a mean of 0.48. the observed results had a significance level of about 0.0155 indicating that the observations were statistically significant at 95% degree of confidence. The standard error for this analysis was 0.58 and this is captured in Table 4.49.

Table 4.49: Correlation Coefficients on Market Herding Effect and the Performance of NSE Indices

		Average NSE 20 Share Returns	MHE
Pearson Correlation	Average NSE 20 Share Returns	1.000	.536
	MHE	.536	1.000
Sig. (1-tailed)	Average NSE 20 Share Returns	.	.000
	MHE	.000	.
N	Average NSE 20 Share Returns	144	144
	MHE	144	144

The implication the researcher drew from the above observations is that NSE herds in a positive way as shown by the positive correlation over a period of 144 monthly observations. This positive herding was also statistically significant at 0.05 level of significance.

An ANOVA was established where F Statistical was 57.143 against the threshold of 3.844 meaning that the results were statistically significant. This was confirmed by a p value which was less than 0.05 as shown on Table 4.50. The researcher conducted the simple regression model on the influence of herding formation and performance of NSE 20 share index. This has been captured by Tables 4.51 and 4.52. Correlation between market herding effect on the performance of NSE 20 share index was 0.536 implying a positive correlation. The R square capturing the simple regression model was 0.287. The simple regression model is as follows:

$$y = -0.05 + 0.455\ Herding\ Effect$$

Table 4.50: ANOVA Results on the Influence of Market Herding Effect

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1796.216	1	1796.216	57.143	.000[b]
	Residual	4463.576	142	31.434		
	Total	6259.791	143			

a. Dependent Variable: Average NSE 20 Share Returns

b. Predictors: (Constant), Average All Share Returns

Table 4.51: Model summary on the Influence of Market Herding Effect on the Performance of NSE Indices

Model	R	R Square	Adjstd R Square	Std. Error of the Estmte	Change Statistics			
					R Square Change	F Change	df1	df2	Sig. F Change
1	.536[a]	.287	.282	5.60657	.287	57.143	1	142	.000

a. Predictors: (Constant), WHE

b. Dependent Variable: Average NSE 20 Share Returns

Table 4.52: Regression Coefficients On The Influence of Market Herding Effect on the Performance Of NSE Indices

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.005	.470		-.010	.992
	MHE	.455	.060	.536	7.559	.000

From the above results, one can conclude that there is a statistically positive significant Influence of herd formation and performance of NSE 20 share index. The p value of the observations is less than 0.05 at 0.05 level of significance.

The researcher further computed the inferential statistics on the influence of observed stock returns and cross sub sectorial returns as shown on Table 4.53. The observation were that the relationship was statistically significant at 0.016, mean of 0.48, skewness of 1.79 on a count of 144 observations.

Table 4.53. Inferential Statistics on the Influence of Market Herding Effect on Performance of NSE Indices

Details	**Statistics**
Mean	0.484105447
Standard Error	0.584600086
Median	-0.092216455
Standard Deviation	7.015201036
Sample Variance	49.21304558
Kurtosis	19.34697869
Skewness	1.785011146
Count	144
Confidence Level (95.0%)	1.15557443

From the above analysis, it is worth noting that in herd formation, most stocks showed negative herds more that positive herding implying that investors react more to negative news that positive news. The research also sought to estalish the herding equation as recommended by Demirer and Kutan, (2006);

$$SD_t = \alpha + B_D D_t^L + B_U D_t^U + \varepsilon_t$$

$$y = 2.3 + 4.86 D_t^L - 0.73 D_t^U + 0.58$$

Where:

Y is the standard deviation

Where

$D_t^L = 1$, if the returns on aggregate market portfolio on day t lies in the lower tail of the return distribution. If the above is not met, it is zero.

$D_t^U = 1$, if the return on aggregate market portfolio on day t lies in the upper tail of the return distribution. If the above is not met, it is zero.

α and ε capture differences in return dispersions during periods of extreme price movements.

B_D is the presence of negative and statistically significant coefficients for down markets.

B_U is the presence of negative and statistically significant coefficients for up markets.

B_D and B_U indicate the herd formation by market participants.

In the above model, it can be established that the herding factor was 4.86 for the 13 statistically significant up markets, -0.73 for the 26 statistically significant down markets, with an error term of 0.58. the herding factor for the period starting from January 2004 to December 2015 was established as 2.3 with a significant value of 0.0115 implying that the 39 stocks that qualified for herd formations were statistically significant. In the stocks that were studied, 26 did not qualify to be studied for herding as they were not statistically significant at 95% confidence level.

The above results agree with the views of Demirer and Kutan (2006) who observed that investors will suppress their own beliefs in favour of market consensus. It also agrees with the notion that investors believe that market gurus know something that

they-the investors-do not know and their actions reveal this information (Chen, 2013; Demirer & Kutan, 2006).

4.9 Influence of Securities Behaviour on Performance of NSE Indices

The researcher conducted both secondary and primary data collection and analysis. This subsection is broken down into primary and secondary data analysis.

4.9.1 Primary Data Analysis on the influence of Securities Behaviour on Performance of NSE Indices

For primary data, analysis was conducted by combining all the independent variables against one component of dependent variable at a time. For instance, all independent variables were analysed against NSE 20 Share Index, all the independent variables were analysed against NASI and so on.

4.9.1.1 Influence of Securities Behaviour on the Performance of NSE 20 Share Index

The study was aimed at analysing the influence of securities behaviour and performance of the NSE indices. To capture the relationship, it was deemed necessary to do a correlation analysis as shown in Table 4.54. From the results, the correlation between NSE 20 Share Index and Momentum effect, Financial Contagion Effect, White Noise Effect, Securities Price Volatility and Market Herding Effect was 0.525, 0.672, -0.148, 0.332 and -0.155 respectively. The level of significance with the said variables was 0.022, 0.003, 0.299, 0.113 and 0.290 respectively. From the analysis, it was observed that NSE 20 Share index had a strong positive correlation with Momentum Effect and Financial Contagion Effect, weak positive correlation with Securities Price Volatility and weak negative correlation with White Noise Effect and Market Herding Effect. In testing of significance, it was found that NSE 20 share Index had a statistically significant relationship with Momentum Effect and Financial Contagion Effect where P values were less than 0.05 and insignificant relationship with White Noise Effect, Securities Price Volatility and Market Herding Effect with the P values all greater than 0.05. The above could imply

that the stocks comprising the NSE 20 share index are highly interlinked with the global markets and that they also highly influence each other. This could be the reason why at times we see all stocks rising in prices (Bull Run) or falling in prices (Bear Run) without a fundamental reason to justify such behaviour.

Table 4.54: Correlation Analysis between Primary Security Drivers and NSE 20 Share Index

		20 SHARE	ME	FC	WN	SPV	MHE
Pearson Correlation	20 SHARE	1.000	.525	.672	-.148	.332	-.155
	ME	.525	1.000	.365	.093	.141	.259
	FC	.672	.365	1.000	-.171	.301	.115
	WN	-.148	.093	-.171	1.000	-.437	.329
	SPV	.332	.141	.301	-.437	1.000	-.282
	MHE	-.155	.259	.115	.329	-.282	1.000
Sig. (1-tailed)	20 SHARE	.	.022	.003	.299	.113	.290
	ME	.022	.	.090	.370	.308	.175
	FC	.003	.090	.	.271	.138	.341
	WN	.299	.370	.271	.	.052	.116
	SPV	.113	.308	.138	.052	.	.154
	MHE	.290	.175	.341	.116	.154	.

The results from the analysis produced a model showing the Influence of securities behaviour on the performance of NSE 20 Share Index. This is presented in tables 4.55, 4.56 and 4.57 respectively. From the analysis, the R square showed a value of 0.641 implying that the dependent variable was influenced by the independent variables to the extent of about 64.1%. F statistical value was 3.219 being less than F critical value of 3.84, standard error estimate of 0.44 and P value was 0.061. The p value implied that the results were not statistically significant at 5% level of significance meaning that momentum effect, financial contagion effect, white noise effect, securities price volatility and market herding effect did not have a significant

effect on the performance of NSE 20 Share Index. The regression model as shown in Table 4.57 was as follows:

$$y = -1.01 + 0.562x_1 + 1.105x_2 + 0.062x_3 + 0.054x_4 - 5.19x_5$$

Where:y is the performance of NSE 20 Share Index. The p value of the overall model was -0.428 implying that the model was not statistically significant in respect to the Influence of securities behaviour and performance of NSE 20 Share Index.

Table 4.55: ANOVA Results on Influence of Securities Behaviour on Performance of NSE 20 Share Index

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	3.183	5	.637	3.219	.061[b]
	Residual	1.780	9	.198		
	Total	4.963	14			

a. Dependent Variable: NSE 20 Share Index

b. Predictors: (Constant), HB, FC, WNE, ME, PriceVolatility

Table 4.56: Model Summary on NSE 20 Share Index

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Stat					
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.801[a]	.641	.442	.44468	.641	3.219	5	9	.061	

Table 4.57: Regression Model on NSE 20 Share Index

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.010	2.360		-.428	.679
	ME	.562	.317	.398	1.771	.110
	FC	1.105	.447	.561	2.471	.035
	WN	.062	.472	.031	.131	.898
	SPV	.054	.446	.029	.122	.906
	HE	-.519	.361	-.325	-1.437	.185

The results from the primary data analysis first produced a model showing the influence of securities behaviour and performance of NSE 20 Share Index. The R square showed a value of 0.641, Durbin-Watson value was 1.457, F value was 3.219, standard error estimate of 0.44 and P value was 0.061. The p value implied that the results were not statistically significant at 5% level of significance meaning that Momentum Effect, Financial Contagion Effect, White Noise Effect, Securities Price Volatility and Market Herding Effect did not have a significant effect on the performance of NSE 20 Share Index. The p value of the overall model was -0.428 implying that the model was not statistically significant in respect to the Influence of securities behaviour and performance of NSE 20 Share Index. Therefore, the hypothesis that there is no significant influence of investor's behaviour and performance of NSE 20 Share index was not rejected at 0.05 level of significance which agreeing with the research of (Amata & Muturi, 2016), (Osoro & Jagongo, 2013) and (Mugo & Matano, 2017) .

4.9.1.2 Influence of Securities Behaviour on Performance of NSE All Share Index (NASI)

Analysis was conducted to show the influence of securities behaviour on performance of NASI. The correlation between NASI and momentum effect, financial contagion effect, white noise effect, securities price volatility and market herding effect (as shown on Table 4.58 was 0.26, 0.427, -0.093, 0.172 and -0.452 respectively. This showed a weak positive correlation on momentum effect, financial contagion effect and securities price volatility, while a weak negative correlation on white noise effect and market herding effect. Results on the same table showed a significance of 0.175, 0.056, 0.371, 0.27 and 0.045 for FC, WNE, SPV, HE and ME respectively. All the results on correlation were insignificant with exception of market herding effect, which was 0.045 (slightly below the threshold value of 0.05). This could imply that since the NASI is an aggregate of all stocks, the effects of momentum, contagion, volatility and white noise effect are offset by the numerous stocks involved while the effect of herding is a key factor in the Kenyan securities markets. This is in disagreement with the findings of Osoro and Jagongo (2013).

Table 4.58: Correlation Results on Primary Data in NASI

		NASI	ME	FC	WN	SPV	HE
Pearson Correlation	NASI	1.000	.260	.427	-.093	.172	-.452
	ME	.260	1.000	.365	.093	.141	.259
	FC	.427	.365	1.000	-.171	.301	.115
	WN	-.093	.093	-.171	1.000	-.437	.329
	SPV	.172	.141	.301	-.437	1.000	-.282
	HE	-.452	.259	.115	.329	-.282	1.000
Sig. (1-tailed)	NASI	.	.175	.056	.371	.270	.045
	ME	.175	.	.090	.370	.308	.175
	FC	.056	.090	.	.271	.138	.341
	WN	.371	.370	.271	.	.052	.116
	SPV	.270	.308	.138	.052	.	.154
	HE	.045	.175	.341	.116	.154	.

The results from the analysis produced a model showing the Influence of securities behaviour and performance of NASI. This is shown in tables 4.59, 4.60 and 4.61. From the analysis, the R square showed a value of 0.529 implying that the dependent variable was influenced by the independent variables to the extent of about 52.9%. F Statistical value was 2.023 being less than F Critical value of 3.84, standard error estimate of 0.37 and p value was 0.169. The P value implied that the results were not statistically significant at 5% level of significance meaning that momentum effect, financial contagion effect, white noise effect, securities price volatility and market herding effect did not have a significant effect on the performance of NSE 20 Share Index. This agrees with the work of Osoro and Jagongo (2013) who found that investors perceive the NASI index as an inferior index to the NSE 20 share Index.

The regression model as shown in Table 4.61 was as follows:

$$y = 2.561 + 0.278x_1 + 0.677x_2 + 0.173x_3 - 0.193x_4 - 0.769x_5$$

Where: y is the performance of NSE 20 Share Index, x_1 is the Momentum Effect, x_2 is the Financial Contagion Effect, x_3 is the White Noise Effect, x_4 is the Securities Price Volatility and x_5 is the Market Herding Effect. The p value of the overall model was 0.231 implying that the model was not statistically significant in respect to the Influence of securities behaviour and performance of NASI.

Table 4.59: ANOVA Results on Influence of Securities Behaviour on Performance of NASI

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1.426	5	.285	2.023	.169[b]
	Residual	1.268	9	.141		
	Total	2.694	14			

a. Dependent Variable: NASI

b. Predictors: (Constant), HB, FC, WNE, ME, PriceVolatility

Table 4.60: Model Summary on NASI

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Stat				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.727[a]	.529	.268	.37538	.529	2.023	5	9	.169

Table 4.61: Regression Model on NASI

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.561	1.992		1.285	.231
	ME	.278	.268	.268	1.040	.325
	FC	.677	.378	.466	1.794	.106
	WN	.173	.398	.116	.435	.674
	SPV	-.193	.377	-.140	-.513	.620
	MHE	-.769	.305	-.653	-2.521	.033

Primary data results from the analysis produced a model showing the influence of securities behaviour and performance of NASI. From the analysis, the R square showed a value of 0.529, Durbin-Watson value was 1.346, F value was 2.023, standard error estimate of 0.37 and P value was 0.169. The P value implied that the results were not statistically significant at 5% level of significance meaning that Momentum Effect, Financial Contagion Effect, White Noise Effect, Securities Price Volatility and Market Herding Effect did not have a significant effect on the performance of NSE 20 Share Index. The p value of the overall multiple regression model was 0.231 implying that the model was not statistically significant in respect to the Influence of securities behaviour and performance of NASI. The null hypothesis that Securities Behaviour do not significantly affect the performance of NASI index was therefore not rejected at 0.05 level of significance disagreeing with the findings of (Osoro & Jagongo, 2013).

4.9.1.3 Influence of Securities Behaviour and FTSE NSE 15 Index

The study also tested the influence of securities behaviour on performance of FTSE NSE 15 Index. The 15 Index captures the 15 largest companies by market capitalisation in the NSE. Correlation analysis was captured in Table 4.62 where it was found that the correlations were 0.384, 0.595, -1, -0.37 and -0.271 for momentum effect, financial contagion effect, white noise effect, securities price volatility and market herding effect respectively. The level of significance was 0.079, 0.01, 0.361, 0.117 and 0.164 for the above stated variables respectively. On Pearson correlation co-efficients all behaviours portrayed a weak or negative correlation with exception of financial contagion effect which had a correlation of about 0.6. In terms of significance, it was established that only the financial contagion effect variable was statistically significant at 0.01. This could imply that the largest stocks in the NSE are highly interlinked with the outside financial world as suggested by Komo and Ngugi (2013), as they observed that Kenyan security markets are highly interconnected with the developed countries.

Table 4.62: Correlation Analysis on Primary Data in NSE 20 Share Index

		FTSENSE15	ME	FC	WN	SPV	MHE
Pearson Correlation	FTSENSE15	1.000	.384	.595	-.100	.327	-.271
	ME	.384	1.000	.365	.093	.141	.259
	FC	.595	.365	1.000	-.171	.301	.115
	WN	-.100	.093	-.171	1.000	-.437	.329
	SPV	.327	.141	.301	-.437	1.000	-.282
	MHE	-.271	.259	.115	.329	-.282	1.000
Sig. (1-tailed)	FTSENSE15	.	.079	.010	.361	.117	.164
	ME	.079	.	.090	.370	.308	.175
	FC	.010	.090	.	.271	.138	.341
	WN	.361	.370	.271	.	.052	.116
	SPV	.117	.308	.138	.052	.	.154
	MHE	.164	.175	.341	.116	.154	.

The results from the field analysis produced a model showing the influence of securities behaviour on performance of FTSE NSE 15 Index. This is shown in tables 4.63, 4.64 and 4.65. An R square o 0.557 was obtained implying that the dependent variable was influenced by the independent variable to the extent of about 55.7%. The model produced a Durbin Watson value of 1.599, F Statistical value of 2.26 being less than F Critical of 3.84, Standard Error Estimate of 0.33 and p value of 0.136. The p value indicated that the results were not statistically significant at 0.05 level of significance. This would imply that momentum effect, financial contagion effect, white noise effect, securities price volatility and market herding effect did not have a statistically significant effect on the performance of the FTSE NSE 15 Index.

The regression model as shown in Table 4.65 was as follows:

$$y = 0.784 + 0.257_{x1} + 0.72_{x2} + 0.186_{x3} + 0.074_{x4} + -0.46_{x5} + 1.41\varepsilon$$

Where: y is the performance of FTSE NSE 15 Index, x_1 is the Momentum Effect, x_2 is the Financial Contagion Effect, x_3 is the White Noise Effect, x_4 is the Securities Price Volatility and x_5 is the Market Herding Effect. The p value of the overall model was 0.45 implying that the model was not statistically significant in respect to the Influence of securities behaviour and performance of FTSE NSE 15 Index.

Table 4.63: ANOVA Results on the Influence of Securities Behaviour on Performance of FTSE NSE 15 Index

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1.215	5	.243	2.260	.136[b]
	Residual	.968	9	.108		
	Total	2.183	14			

a. Dependent Variable: FTSENSE15

b. Predictors: (Constant), HB, FCE, WNE, ME, SPV

Table 4.64: Model Summary on FTSE NSE 15 Index

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Stat				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.746[a]	.557	.310	.32796	.557	2.260	5	9	.136

Table 4.65: Regression Model on FTSE NSE 15 Index

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.784	1.741		.450	.663
	ME	.257	.234	.274	1.098	.301
	FC	.720	.330	.551	2.183	.057
	WN	.186	.348	.138	.533	.607
	SPV	.074	.329	.060	.225	.827
	MHE	-.460	.266	-.435	-1.728	.118

The results from the field analysis as responded by the market informants produced a model showing the Influence of securities behaviour and performance of FTSE NSE 15 Index. An R square o 0.557 was obtained, a Durbin Watson value of 1.599, F Value of 2.26, Standard Error Estimate of 0.33 and P value of 0.136. The P value indicated that the results were not statistically significant at 0.05 level of significance while the Durbin Watson value of between 1.0 and 2.9 confirmed that there was no autocorrelation between the variables studied. This would imply that momentum effect, Financial Contagion Effect, White Noise Effect, Securities Price Volatility and Market Herding Effect did not have a statistically significant effect on the

performance of the FTSE NSE 15 Index. The p value of the overall multi regression model was 0.45 implying that the model was not statistically significant in respect to the Influence of securities behaviour and performance of FTSE NSE 15 Index. The null hypothesis that the Securities Behaviour do not significantly affect the performance of FTSE NSE 15 index was not rejected and this was in disagreement with the work of Aduda *et al*., (2012), and the work of Mugo and Idd Matano (2017).

4.9.1.4 Influence of Securities Behaviour and FTSE NSE 25 Index

The study also tested the influence of securities behaviour and performance of FTSE NSE 25 Index. The 25 Index captures the 25 most traded companies in the NSE. A point to note is that the constituent firms of this index keep on fluctuating depending on the forces of demand and supply on companies' stocks. Correlation analysis was captured in Table 4.66 where it was found that the correlations were -0.395, 0.141,-0.326, 0.491 and -0.483 for momentum effect, financial contagion effect, white noise effect, securities price volatility and market herding effect respectively. The level of significance was 0.073, 0.308, 0.118, 0.032 and 0.034 for the above stated variables respectively. On Pearson correlation co-efficients all behaviours portrayed a weak or negative correlation. In terms of significance, it was established that only the market herding effect and securities price volatility variable were statistically significant at 0.05. The p values were 0.032 and 0.034 for the two variables respectively. This could imply that the liquid stocks in the NSE are highly influenced by securities price volatility and market herding effect.

Table 4.66: Correlation Analysis on Primary Data in FTSE NSE 25 Index

		FTSENSE25	ME	FC	WN	SPV	MHE
Pearson Correlation	FTSENSE25	1.000	-.395	.141	-.326	.491	-.483
	ME	-.395	1.000	.365	.093	.141	.259
	FC	.141	.365	1.000	-.171	.301	.115
	WN	-.326	.093	-.171	1.000	-.437	.329
	SPV	.491	.141	.301	-.437	1.000	-.282
	MHE	-.483	.259	.115	.329	-.282	1.000
Sig. (1-tailed)	FTSENSE25	.	.073	.308	.118	.032	.034
	ME	.073	.	.090	.370	.308	.175
	FC	.308	.090	.	.271	.138	.341
	WN	.118	.370	.271	.	.052	.116
	SPV	.032	.308	.138	.052	.	.154
	MHE	.034	.175	.341	.116	.154	.

The results from the field analysis produced a model showing the Influence of securities behaviour and performance of FTSE NSE 15 Index. This is shown in tables 4.67, 4.68 and 4.69. An R square of 0.548 was obtained implying that the dependent variable was influenced by the independent variable to the extent of about 54.8%. The model produced an F Statistical value of 2.26 which was less than F Critical Value of 3.84, Standard Error Estimate of 0.24 and p value of 0.146. The p value indicated that the results were no Z statistically significant at 0.05 level of significance This would imply that momentum effect, financial contagion effect, white noise effect, securities price volatility and market herding effect did not have a statistically significant effect on the performance of the FTSE NSE 15 Index again agreeing with the works of Osoro and Jagongo (2013).

The regression model as shown in Table 4.69 was as follows:

$$y = 2.83 + -0.321_{x1} + 0.212_{x2} + 0.032_{x3} + 0.388_{x4} - 0.217_{x5} + 1.293$$

Where; y is the performance of FTSE NSE 25 Index, x_1 is the Momentum Effect, x_2 is the Financial Contagion Effect, x_3 is the White Noise Effect, x_4 is the Securities Price Volatility and x_5 is the Market Herding Effect. The p value of the overall model was -0.103 implying that the model was not statistically significant in respect to the Influence of securities behaviour and performance of FTSE NSE 25 Index.

Table 4.67: ANOVA Results on Influence of Securities Behaviour on Performance of FTSE NSE 25 Index

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.647	5	.129	2.178	.146[b]
	Residual	.534	9	.059		
	Total	1.181	14			

a. Dependent Variable: FTSENSE25

b. Predictors: (Constant), HB, FC, WNE, ME, SPV

Table 4.68: Model Summary on FTSE NSE 25 Index

Model	R	R Sqre	Adjstd R Sqre	Std. Error of the Est	Change Stat				
					R Sqre Change	F Change	df1	df2	Sig. F Change
1	.740[a]	.548	.296	.24369	.548	2.178	5	9	.146

Table 4.69: Regression Model of FTSE NSE 25 Index

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.823	1.293		2.183	.057
	ME	-.321	.174	-.466	-1.846	.098
	FC	.212	.245	.220	.865	.410
	WN	.032	.259	.032	.124	.904
	SPV	.388	.245	.426	1.588	.147
	MHE	-.217	.198	-.278	-1.094	.302

a. Dependent Variable: FTSENSE25

Inferential results from the primary field analysis produced a model showing the Influence of securities behaviour and performance of FTSE NSE 15 Index that had n R square of 0.548, a Durbin Watson value of 1.599, F Value of 2.26, Standard Error Estimate of 0.24 and P value of 0.146. The P value indicated that the results were not statistically significant at 0.05 level of significance. The Durbin Watson value confirmed that there was no autocorrelation. The p value of the overall multiple regression model was -0.103 implying that the model was also not statistically significant in respect to the Influence of securities behaviour and performance of FTSE NSE 25 Index. The null hypothesis that the Securities Behaviour do not significantly affect the performance of FTSE NSE 25 index was also not rejected at 0.05 level of significance.

4.9.1.5: Influence of Securities Behaviour on Overall Performance of NSE

The apex of the analysis was establishing the Influence of securities behaviour on the overall performance of NSE Indices. The Model Regression shown on Table 4.71, , gave an R square of 0.667, Standard error estimate of 0.25, F Critical of 3.612 which was less than F Critical of 3.84 and a p value of 0.045. The above results implied that the factors studied (securities behaviour) account for about 66.7% of the performance of NSE Indices. The Durbin Watson value was within the range of between 1.0 and

2.90 confirming that there was no autocorrelation between the independent variables. The remaining 33.3% could be due chance or error, or other factors not studied in this research. The overall model was statistically significant at 0.05 level of significance implying that securities behaviour have a statistically significant relationship with the performance of NSE Indices. This is despite the insignificant Influence of securities behaviour and performance of singular models as portrayed in the discussions above.

The regression model as shown in Table 4.72 was as follows:

$$y = 1.289 + 0.194_{x1} + 0.679_{x2} + 0.113_{x3} + 0.081_{x4} - 0.491_{x5} + 1.319$$

Where:y is the performance of NSE Indices , x_1 is the Momentum Effect, x_2 is the Financial Contagion Effect, x_3 is the White Noise Effect, x_4 is the Securities Price Volatility and x_5 is the Market Herding Effect. The p value of the overall model was 0.354 implying that the model was not statistically significant in respect to the Influence of securities behaviour and performance of NSE Indices. The standard error of the model was 1.319. this is in agreement with the findings of Osoro and Jagongo, (2013) but disagreeing with Mugo and Idd Matano (2017).

Table 4.70: Primary ANOVA Results on Influence of Securities Behaviour and Performance of NSE Indices

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1.115	5	.223	3.612	.045[b]
	Residual	.556	9	.062		
	Total	1.671	14			

a. Dependent Variable: Performance of NSE

b. Predictors: (Constant), HB, FC, WNE, ME, SPV

Table 4.71: Model Summary on the Influence of Securities Behaviour and Performance of NSE

Model	R	R Square	Adjusted R Square	Std. Error of the Esti	Change Stat				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.817[a]	.667	.483	.24852	.667	3.612	5	9	.045

Table 4.72: Regression Coefficients on the Overall Performance of NSE Indices

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.289	1.319		.978	.354
	ME	.194	.177	.237	1.095	.302
	FC	.679	.250	.593	2.715	.024
	WN	.113	.264	.096	.429	.678
	SPV	.081	.249	.075	.324	.753
	MHE	-.491	.202	-.530	-2.433	.038

The apex of the primary analysis was establishing the Influence of securities behaviour and the overall performance of NSE Indices. The model regression gave an R square o 0.667, Standard error estimate of 0.25, F Critical of 3.612, and a p value of 0.045.. The overall model was statistically significant at 0.05 level of significance implying that securities behaviour have a statistically significant relationship with the performance of NSE Indices. This is despite the insignificant Influence of securities behaviour and performance of singular models as portrayed in the discussions above. The p value of the overall multiple regression model was

0.354 implying that the model was not statistically significant in respect to the Influence of securities behaviour and performance of NSE Indices. The hypothesis that the Securities Behaviour do not significantly affect the overall performance of NSE indices was therefore rejected.

4.9.2 Secondary Data Analysis on the Influence of Securities Behaviour on Performance of NSE Indices

Analysis was conducted on the overall influence of the securities behaviour on the performance of NSE indices. Table 4.73 captured the descriptive statistics of the variables studied.

Table 4.73: Descriptive Statistics on the influence of Securities Behaviour on Performance of NSE 20 Share Index

	Mean	Std. Deviation
NSE 20 Share Returns	.007	10.36
ME	-345.66	312.62
FCE	.917	3.78
WNE	38.177	7.65
SPV	1.075	7.03
MHE	.615	7.12

The correlations between NSE 20 Share Index Returns and Momentum effect, Financial Contagion Effect, White Noise Effect, Securities Price Volatility effect and Market Herding Effect was 0.09, 0.314, 0.034, 0.08 and 0.04 respectively. Only White Noise Effect as measured by rational bubble and Market Herding Effect were statistically significant. This has been captured on Table 4.74.

Table 4.74: Correlation Statistics on the influence of Securities Behaviour on Performance of NSE 20 Share Index

		NSE 20	ME	FCE	WNE	SPV	MHE
Pearson Correlation	NSE 20	1.000	.425	-.090	.331	.433	.472
	ME	.425	1.000	-.054	.335	.958	.986
	FC	-.090	-.054	1.000	.269	-.095	-.112
	WNE	.331	.335	.269	1.000	.417	.372
	SPV	.433	.958	-.095	.417	1.000	.967
	MHE	.472	.986	-.112	.372	.967	1.000
Sig. (1-tailed)	NSE 20	.	.009	.314	.034	.008	.004
	ME	.009	.	.386	.033	.000	.000
	FC	.314	.386	.	.071	.306	.274
	WHE	.034	.033	.071	.	.010	.020
	SPV	.008	.000	.306	.010	.	.000
	MHE	.004	.000	.274	.020	.000	.

The correlation between securities behaviour and performance of NSE 20 share index in respect to secondary data analysis was 0.55 with a co-efficient of determination of 0.308. This implied that the securities behaviour in the study influenced the performance of NSE 20 Share Index to the extent of about 30.8%. Other factors not in the study influenced the remaining part of performance. F Statistics value had a value of 2.23 as opposed to F critical value of 3.84, this confirming insignificant observation. The significance value was 0.083 implying that the behaviours studied were not statistically significant. This disagrees with the research of Komo and Ngugi (2013), who noted that Kenyan stock market is highly interlinked with developed countries stock markets. These have been captured on Tables 4.75, 4.76 and 4.77.The multiple regression model on the secondary data analysis was:

$$y = -23.289 - 0.039x_1 - 0.05x_2 + 0.231x_3 - 0.621x_4 + 2.864x_5$$

Where y is the performance of NSE 20 Share Index, x_1 is the momentum effect, x_2 is Financial Contagion Effect, x_3 is White Noise Effect, x_4 is Security Price Volatility effect and x_5 is Market Herding Effect.

Table 4.75: Secondary ANOVA Results on Influence of Securities Behaviour on Performance of NSE 20 Share Index

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	993.270	5	198.654	2.230	.083[b]
	Residual	2226.839	25	89.074		
	Total	3220.110	30			

a. Dependent Variable: NSE 20 Share Returns

b. Predictors: (Constant), HE, FCE, WNE, SPV, ME

Table 4.76: Model Summary Statistics on the influence of Securities Behaviour on Performance of NSE 20 Share Index

Model	R	R Square	Adjusted R Sqre	Std. Error of the Est	Change Stats				
					R Sqre Change	F Change	df1	df2	Sig. F Change
1	.555[a]	.308	.170	9.438	.308	2.230	5	25	.083

a. Predictors: (Constant), MHE, FCE, WNE, SPV, ME

Table 4.77: Regression Coefficients on the influence of Securities Behaviour on Performance of NSE 20 Share Index

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-23.289	14.355		-1.622	.117
	ME	-.039	.039	-1.172	-.999	.327
	FC	-.050	.550	-.018	-.092	.928
	WNE	.231	.290	.171	.796	.434
	SPV	-.621	1.007	-.421	-.617	.543
	HE	2.864	1.813	1.970	1.579	.127

4.10 Hypothesis Testing Results

The research was based on five hypotheses that were subjected to tests as highlighted on subtopics 4.4, 4.5, 4.6, 4.7 and 4.8. Since the research used both primary and secondary data, it is worth noting that in statistics, figures never lie. Therefore, this implies that where the primary data and secondary data would conflict, the secondary data would take preference but the differences noted to form suggestions for further research. For primary data, market informant responses were tested based on the NSE indices and therefore the researcher tested the five objectives against each component of the dependent variable. Table 4.78 shows the consolidated summary of hypotheses testing results

4.10.1 Hypothesis Testing of the Influence of Momentum Effect on the Performance of NSE Indices

It was found that the correlation between Momentum Effect on the performance of NSE 20 Share index was primary data to positive at 0.525 and statistically significant with a P value of 0.022. The correlation in respect to primary data between Momentum Effect and NASI, 0.26. This showed a weak positive correlation on Momentum Effect that was not statistically significant at 0.05 level of significance

since the P value was 0.175. Third item to be studied on the primary data was the Influence of momentum effect on the performance of FTSE NSE 15 index. It was established that the correlation was a weak positive of 0.384 with a P value of 0.079. These results were statistically insignificant at 0.05 level of significance. On the Influence of Momentum Effect on the Performance of FTSE NSE 25 index, the market informants were of the view that the correlation between the two was a weak with a factor of -0.395 and a p value of 0.073 indicating that it was not statistically significant at 95% degree of confidence.

The secondary data correlation results of the Influence of the Momentum Effect on the Performance of NSE 20 share index was that the z statistical value was -55.41, z critical was 1.972 and the p value was 2.1 E-118 meaning that there was a statistically significant Influence of Momentum Effect on the performance of NSE . The researcher obtained an R square was 0.252 implying that momentum factor influences the NSE 20 Share Index to the extent of 25.2%. F value of this observation is 49.29 with a P value of 0.000, which meant that the relationship was statistically significant. From the above observations, it can be observed that there were mixed observations in respect to the hypothesis of momentum effect but as the researcher had highlighted, whenever conflicts would arise, the secondary data observations would carry the day. Therefore, the hypothesis that momentum effect does not significantly affect the performance of NSE indices was rejected at 0.05 level of significance.

4.5.2 Hypothesis Testing of the Influence of Financial Contagion Effect on the Performance of NSE Indices

Inferential statistics on the primary data analysis of the Influence of Financial Contagion Effect on the Performance of NSE 20 share index was positive at 0.672 and statistically significant with a p value of 0.03. The above observations were in respect to primary data. The correlation between Financial Contagion Effect and NASI, 0.427; this was a weak positive correlation. .Results on the same table showed a significance of 0.056. This implied that the results were not statistically significant. The primary data correlation Influence of Financial Contagion Effect on the

Performance of FTSE NSE 15 index was a strong positive at 0.595 with a p value of 0.01. This was below the threshold of 0.05 implying that the observations were statistically significant. The correlation between Financial Contagion Effect on the Performance of FTSE NSE 25 Index as captured by the primary data was a weak negative of -0.141 and a p value of 0.308, this being statistically insignificant at 0.05 level of significance.

On secondary data analysis on the relationship this analysis, data was split into pre crisis period, post crisis period and a combination of the pre and post crisis period. The correlation between FTSE 100 and NSE 20 Share Index stood at 0.763. The z statistical was at -14.532, Z critical at 2.1 and P value at 2.118893E-11. At 0.05 level of significance, the results were statistically significant. The Influence of the Standard and Poor's Index and the performance of NSE 20 Share Index. There were a total of 15 observations with z statistical of 10.86, Z critical of 2.144 an P value of 3.328 E-12. These observations showed that the statistical value of z was inside the critical region and therefore were statistically significant.

The researcher studied the post crisis period Influence of FTSE 100 and NSE 20 Share index, Standard and Poor's Index and NSE 20 Share Index. On the influence of Standard & Poors and NSE 20 share index, the correlation between the two indices was 0.847, Z statistical was 20.72016097, z critical was 2.10092204, and the P value was 5.22553E-14. These results were statistically significant at 95% degree of confidence. The post crisis influence of FTSE 100 and NSE 20 Share Index. The correlation between the two indices stood at -0.57, Z statistical was 3.94383631, Z critical was 2.042272456 and the p value was 0.00044547 making the Influence of the two to be statistically significant.

The final aspect hypothesis testing was done on the pre and post crisis Influence of Financial Contagion Effect and the performance of NSE indices. The pre and post crisis Influence of the FTSE 100 and NSE 20 Share Index found that the correlation between the two variables stood at -0.4261121, Z statistical was 8.463637222, Z critical was 2.006646805 and the p value was 2.37289E-11. This was statistically significant at 0.05 level of significance. The pre and post crisis Influence of Standard

and poor's index and NSE 20 Share Index found that the correlation between these two variables stood at 0.27, z statistical was 15.70199838 , Z critical was 2.034515297 and p value was 7.14253E-17 which was statistically significant. Finally, on the inferential statistics in respect to financial contagion effect, a relationship amongst the three indices, FTSE 100, Standard & Poors and NSE 20 Share Index was established. The Pearson correlation between NSE 20 and FTSE 100 was -0.425, NSE 20 and Standard & Poors 0.272 while that of FTSE 100 and Standard & Poors -0.415. The p values attributed to the above observations were 0.007 and 0.063, which were all statistically significant. The model multiple regression summary showed an R value of 0.438, R square of 0.19, F Statistical of 3.552 and significance value of 0.041. From the above, it is worth noting that the relationship among the three indices was statistically significant at 0.05 level of significance. From the above, the null hypothesis that there is not significant Influence of Market Herding Effect on the Performance of NSE indices was therefore rejected at 0.05 level of significance.

4.5.3 Hypothesis Testing of the Influence of White Noise Effect on the Performance of NSE Indices

It was found that White Noise Effect variable was negatively correlated (weak) with performance of NSE 20 Share index at -0.148 and not statistically significant with a P value of 0.299. The correlation between White Noise Effect and NASI -0.093 indicating a weak negative correlation. Results on the same showed a significance of 0.371, which was not significant at 0.05 level of significance. On FTSE NSE 15 index, the correlation with White Noise Effect was a weak negative with a coefficient of -0.37 and a p value of 0.361. This relationship was not statistically significant at 0.05 level of significance. The correlation between White Noise Effect and FTSE NSE 25 as captured by primary data was a weak negative of -0.326 with a p value of 0.118., this not being statistically significant at 95% degree of confidence.

For the secondary data analysis, the correlation between the White Noise Effect and NSE 20 share index was 0.369 with a p value of 0.000. This would make one infer that at 0.05 level of significance there was a statistically significant Influence of

White Noise Effect (as measured by rational White Noise Effect) and performance of NSE. The multiple regression model showed an R square was 0.136 implying that White Noise Effect influences the NSE 20 share index to the extent of 13.6%. All the market informants views were not statistically significant but the secondary data analysis showed a statistically significant Influence of White Noise Effect on the Performance of NSE indices. Therefore, the researcher concluded that the null hypothesis which stated that there is no statistically significant Influence of White Noise Effect on the Performance of NSE indices was rejected at 0.05 level of significance.

4.5.4 Hypothesis Testing of the Influence of Security Price Volatility and Performance of NSE Indices

Correlation of Securities Price Volatility and performance of NSE 20 Share index was found to be weak positive at 0.332 and not statistically significant with a p value of 0.113. The primary data captured the Influence of Securities Price Volatility and performance of NASI and showed a weak positive correlation of 0.172 with a p value of 0.27 this being not statistically significance at 0.05 level of significance. The Influence of Securities Price Volatility and performance of FTSE NSE 15 Index as captured by market informants had a weak negative correlation of-0.37 with a p value of 0.117. This was not statistically significant at 0.05 level of significance. The market experts were of the opinion that Securities Price Volatility and FTSE NSE 25 were having a negative correlation of -0.491 and a statistically significant p value of 0.032. Three indices (NSE, NASI, FTSE NSE 15) portrayed insignificant results but that of FTSE NSE 25 index posted statistically significant results. The hypothesis that there is not significant Influence of Securities Price Volatility and performance of NSE indices was therefore not rejected at 0.05 level of significance.

4.5.5 Hypothesis Testing of the Influence of Market Herding Effect on the Performance of NSE Indices

The research established that there was a weak negative correlation between the market herding effect on the performance of NSE 20 share index (for primary data) which stood at -0.155. This relationship was not statistically significant at 0.05 level

of significance since the p value was 0.290. The second aspect on the primary data was to establish the Influence of investor's behaviour and performance of NASI. It was established that the correlation between market herding effect on the performance of NASI was a weak negative of -0.45 with a P value of 0.045. This showed that this relationship was statistically significant. Market informants through their responses showed that the correlation between Market Herding Effect on the Performance of FTSE NSE 15 Index was a weak positive of 0.271 with a significance value of 0.164, this being statistically insignificant at 0.05 level of significance. Correlation between market herding effect and FTSE NSE 25 index was a weak negative of -0.483 with a p value of 0.034 this being statistically significant at 0.05 level of significance.

In respect to the up markets, those that were statistically significant at 95% confidence level were 14 in number while those that were down markets that were statistically significant at were 26 in number. The results of the returns of the stocks listed at the NSE from January 2004 to December 2015 were stastically significant at 0.05 Level of Significance. The standard deviation results showed that the Influence of observed stock returns and the cross subsectorial average returns had a standard deviation of about 7%, skewness of 1.79, kurtosis of 19.34 and a mean of 0.48. the observed results had a significance level of about 0.0155 indicating that the observations were statistically significant at 95% degree of confidence. The simple regression model showed an R square capturing the simple regression model was 0.287, which had a p value less than 0.05 confirming that a statistically significant relationship existed. For primary data, half of the indices posted statistically significant observations while the other half showed statistically insignificant observations. For the secondary data analysis, all the observations were statistically significant. The null hypothesis that market-herding effect does not statistically affect the performance of NSE indices was therefore rejected at 0.05 level of significance.

Table 4.78: Summary Hypotheses Testing results

Hypothesis	Field P values	**Field**	**Panel P value**	**Panel Conclusion**	**Overall Conclusion**
Overall Model	0.045	Significant	0.083	Not significant	Not Significant
$H_0$1: Momentum Effect	NSE 20 0.022 NASI 0.175 FTSE 15 0.079 FTSE 25 0.073	All not significant except NSE 20	0.024	Significant	significant
$H_0$2: Financial Contagion Effect	NSE 20 0.03 NASI 0.056 FTSE 15 0.01 FTSE 25 0.308	Half significant, half not significant	Pre-Crisis 0.00 Post Crisis 0.00 Overall 0.00	Significant	All significant
$H_0$3: White Noise Effect	NSE 20 0.299 NASI 0.371 FTSE 15	Not Significant	0.000	Significant	Significant

	0.361 FTSE 25 0.118				
$H_0$4: Price Volatility Effect	NSE 20 0.113 NASI 0.27 FTSE 15 0.117 FTSE 25 0.032	All not Significant except FTSE 25			Not Significant
$H_0$5: Herding Effect	NSE 20 0.290 NASI 0.045 FTSE 15 0.164 FTSE 25 0.034	Half significant, half not significant	0.0155	Significant	Significant

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter builds on the findings and results that were discussed in Chapter Four. It will make critical conclusions based on what the researcher has inferred. It is from these conclusions that recommendations for further studies and to policyholders will be made.

5.2 Summary of the Findings

In respect to the responses received from the market informants, there is no single index observation that was statistically significant on its own. However, conducting an overall model on the significance of the Influence of the securities behaviour and overall performance of the NSE indices, it was found to be statistically significant.

The objective of the influence of momentum effect on the performance of NSE indices was analysed both for primary and secondary data. From the primary data, all indices showed insignificant results for correlation with exception of the correlation between momentum effect and NSE 20 share index. The correlation on the secondary data was statistically significant. The simple regression model showing the influence of momentum effect on the performance of NSE indices was 0.252, meaning that momentum effect had about 25.2% influence on the performance of NSE indices. The regression model had a p value of 0.024 meaning it was statistically significant at 0.05 level of significance. This was confirmed with an F Statistical Value of 49.999, which was greater than F Critical Value of 3.84.

For financial contagion effect, primary data results showed that the indices produced mixed results: NSE 20 Share and FTSE NSE 15 indices were statistically significant while NASI and FTSE NSE 25 index produced statistically insignificant results. For the secondary data analysis, it was conducted in three fold: pre crisis, post crisis and a combination of pre and post crisis. In all the three folds, it was found that all the

results were statistically significant albeit that the Influence of FTSE 100 and NSE 20 share index produced mostly statistically significant negative correlations. The R square showed that the combined influence of FTSE 100 and Standard and Poor's on the performance of NSE 20 Share index was at 19%. However, when the pre and post crisis periods were combined, the results were not statistically significant with F Statistical Value being 0.832 this being less than the threshold F Critical Value of 3.84. This was confirmed by the p value being 0.446 being greater than 0.05. the combined model on financial contagion effect had a correlation of 0.237 with an R square value of 0.056 meaning that this variable influence the performance of NSE 20 Share index to the extent of about 5.6%.

In respect to the objective of white noise effect, it was found to have a statistically insignificant influence of white noise effect and all the components of NSE indices individually (here p values were 0.299, 0.371, 0.361 and 0.118 for NSE 20, NASI, FTSE NSE 15 and FTSE NSE 25 respectively), but the secondary data analysis showed otherwise; the p value was 0.000 indicating and confirming statistical significance. This was confirmed with an F Statistical value of 22.387 which was greater than F Critical Value of 3.84. White noise effect, on the combined model was found to only influence the performance of NSE indices to the extent of about 13.6% and had a correlation of 0.369.

For objective four on securities price volatility, the researcher only tested the hypothesis basing on primary data findings. This is because in respect to secondary data, the same objective was an ingredient in the analysis of objective five of market herding effect. Results in respect to the influence of securities price volatility and NSE 20 Share index, securities price volatility and NASI and securities price volatility and FTSE 15 iIndex were not statistically significant with p values of 0.113, 0.27, 0.117 respectively. At 0.05 level of significance securities price volatility and FTSE NSE 25 index was statistically significant at 0.05 with p value of 0.032. F statistical value however was 107.428 against F critical value of 3.84, this showing statistically significant results. This was confirmed with a p value of 0.000 being less than the threshold of 0.05. The correlation between share price volatility

and performance of NSE indices was 0.656 indicating a strong positive correlation with an R squared of 0.431 implying that according to primary data, 43.1% of the performance of NSE indices was influenced by the share price volatility.

The objective of market herding effect had mixed reactions in respect to primary data. It was found to significantly affect the performance of NASI and FTSE 25 indices (with p values of 0.045 and 0.034 respectively), while it did not significantly affect the performance of NSE 20 Share index and FTSE NSE 15 indices (with p values of 0.29 and 0.164 respectively). For secondary data analysis, the researcher used the results that were obtained from the objective of security price volatility and subjected them to further statistical analysis. These were classified into up and down markets where 14 up markets were statistically significant and 26 down markets were statistically significant. The research established that the Influence of observed stock returns and cross subsectorial returns to be statistically significant. The simple regression model on the influence of market herding effect on the Performance of NSE indices was found to have an adjusted R square of 28.7% meaning that herd formations influence the performance of NSE indices to the extent of about 28.7%. correlation between market herding effect and performance of NSE 20 share index was 0.536 with an F Statistical value of 57.13, this being greater than F critical Value of 3.84 giving an inference that the results were statistically significant. This was confirmed by p value of 0.000 being less than the threshold of 0.05.

5.3 Conclusions of the Study

The researcher ran both primary and secondary models which were totally independent of each other. In the discussion, the secondary data would always carry the day if a conflict arose. However, the market informants opinions would also contribute in making conclusions. These conclusions were made on an objective-by-objective basis.

The first objective was to establish the influence of momentum effect on performance of NSE Indices. For market participants' opinions, none of the indices were significant with exception of the NSE 20 Share Index. For panel data, it was

significant implying that momentum effect influences the performance of NSE Indices. This indeed confirms that both the market informants and the panel data agreed and they were in line with what the experts in similar studies had observed. While NSE 20 Share index was confirmed momentum effect, other indices did not confirm so. The study therefore concludes that like other studies elsewhere in the world, there is also momentum effect that affects the performance of NSE indices.

The second objective was to establish the influence of financial contagion on performance of NSE Indices. For field data, it was found out that NSE 20 and FTSE NSE 15 index were significant with NASI and FTSE NSE 25 index being insignificant. Panel data was statistically significant. It is evident from the results and discussion that NSE is highly interlinked with other parts of the world and thus confirming indeed that it is among the most vibrant markets in the continent. However, the overall model was not statistically significant thus going against the observations made by some scholars while vindicating an observation made by another scholar. This insignificance of the results might have been caused by combining the pre and post crisis periods which had the eventual effect of smoothing out.

This could imply that our exchange performance is highly contagious of the happenings surrounding it, which could be local or foreign based events. Our exchange is highly affected by the economic booms or downs, exchange rate fluctuations and even global events like recession. On this objective, market participants gave the impression through their responses that the indices that were highly contagious with the external world were the NSE20 Share and FTSE NSE 15 index while the contagion of the NASI and FTSE NSE 25 indices were not statistically significant in respect to Financial Contagion Effect. This could be because the best firms are found in the NSE 20 share index and the largest 15 firms by market value are found on the FTSE NSE 15 index-by this, they are also among the best firms.

Market informants brought to the attention of the researcher that the stocks comprising the NSE 20 share index are highly interlinked with the global markets and that they also highly influence each other. This could be the reason why at times we see all stocks rising in prices (Bull Run) or falling in prices (Bear Run) without a fundamental reason to justify such behaviour.

The third objective was to assess the influence of white noise effect on performance of NSE Indices. For the field data, it was established than none of the outcomes was statistically significant while the panel data outcome was statistically significant. however, for the field data, it was found to be statistically significant at 0.05 level and this confirms that indeed bubbles existed in the NSE as was suggested by empirical studies. The conflict between the primary and secondary data results could majorly because investors are unpredictable and not even the market participants could really mention that they understood how they operate.

In respect to the fourth objective on share price volatility, the researcher found out that the model was not statistically significant yet the ANOVA results were. This could imply that the stock prices are quite volatile since the CMA rules allows a stock price to move up or down but maintain the 10% range except when the firms make announcements. This volatility as indicated by the market informants, showed that yes, there was volatility, but this in relative terms was not statistically significant. In respect to the objective of Securities Price Volatility, the market informants gave the impression that the 25 most liquid companies listed in the NSE are significantly affected by the Securities Price Volatility trends in the index. This is due to the fact that being the most liquid firms, price fluctuations really affect the index performance.

For the last objective of market herding effect, field data showed mixed reactions while panel data was statistically significant . The researcher can draw conclusions that herd formations did not have a significant influence on the NSE 20 Share index and FTSE NSE 15 index. The opposite could be said for the all share index and the 25-share index. This shows that herds are least likely to form where the security numbers are less especially the FTSE NSE15 index which contains the 15 largest

companies by market capitalisation and the NSE 20 share index which comprises of the best overall performing companies in the exchange.

Drawing from the informants view on the securities behaviour, it can be concluded from the hypothesis tests that it is necessary that all the four indices maintained at the NSE continue running. This is because no single index was statistically significant but putting all the indices and getting their composite scores, the observations turned statistically significant. Each index plays a role that cannot be substituted by existence of another index.

5.4 Recommendations of the Study

Basing on the fieldwork observations and results generated by the research, the researcher would like to make recommendations to both the policy holders and future researchers.

5.4.1 Recommendations for further Study

In respect to objective of momentum effect, the researcher found the NSE 20 Share index statistically significant both in secondary and primary results. However, the same could not be said on the other indices that were strictly using primary data. This study therefore recommends to future researchers to study each index on its own to establish whether the momentum effect can be felt on each index case by case basis.

In respect to the objective of financial contagion effect, it was found that the field and panel analysis was significant for this objective. The study recommends to future researchers to do a further research on primary data on the NASI and FTSE NSE 25 index. There are very many aspects of contagion and this study only looked at the international aspects of systematic contagion. The study therefore recommends that future researchers should concentrate on other aspects of contagion notably idiosyncratic and volatility with bias on the domestic front. Because of the conflicts on the views of the literature reviewed, the researcher would recommend to future

researchers to conduct a whole study on financial contagion where the specific objectives would actually be the aspects of financial contagion.

For the objective of white noise effect, the study recommends further research that is sector based since this study looked at the entire exchange or specific indices for the analysis. This could have new insights for some industries that are generally affected by regulations or turbulence. This sector based approach will ensure that the results cancel any smoothing effects that could arise due to looking at the entire exchange in wholesome. For the objective of share price volatility, recommendations will be made together with the objective of market herding effect since the former was an input of the latter. For market herding effect, it would also make a lot of sense to look at it in the dimension of specific sectors. This is because some sectors are dominated by a few gurus and it would be necessary to conduct a research and establish if in deed those securities expose any herding attributes.

Future researchers should concentrate on the glaring conflicts from the market informants. For instance, the informants observed that the indices of NSE 20 Share and FTSE NSE 15 index are statistically contagious with the happenings of the outside world. The other two indices were not statistically significant. For the objective of Market Herding Effect, the market informants were of the opinion that herd formation is statistically significant with respect to NASI and FTSE NSE 25 but insignificant with respect to NSE 20 Share index and FTSE NSE 15 Index. This is contradicting since one would expect the same behaviour to be manifested in the two objectives. The researcher would suggest that future researchers should widen the primary data collection net by also incorporating investors who have been actively trading.

The study on secondary data found that the FTSE 100 was negatively correlated with the performance of NSE 20 Share index and at the same time Standard & Poors and NSE 20 Share index were positively correlated. This behaviour becomes a puzzle that needs to be resolved. This study therefore would recommend future researchers to expand the exchanges to be studied. They can include more developed markets, semi developed markets and even least developed markets in the studying

5.4.2 Recommendations to policy Holders

In respect to the objective of momentum effect, the researcher would like to recommend the policy holders (NSE and CMA) to avail secondary data on the NASI, FTSE NSE 15 and FTSE NSE 25 indices to enable academic research which would add more knowledge in the financial markets. This goes to the same recommendation for financial contagion effect, white noise effect, share price volatility and market herding effect for all the variables in the all three indices whose secondary data was not readily available.

The researcher would like to recommend to the Nairobi Securities Exchange and Capital Markets Authority to avail all information relating to the securities market for public usage at free cost. Information is power, and withholding of information for public usage would only make the investors less informed and reduce the potential researchers from conducting more research. During the data collection, the researcher would obtain information at NSE website at a cost of Ksh. 350 per folder (Twelve years with each month as a folder would translate to 350*12*12=Ksh. 50,400) in respect to monthly prices. If one was using that information for academic use, it would be obtained at a 10% that previous cost translating to Ksh. 35 per folder (in the case of this research Ksh. 5040). The catch for academic usage of information would be having the possession of an email address of an academic institution. In addition to this, getting other information from NSE data vendors would cost money and this becomes discouraging for researchers.

On the contrary, in developed markets, getting information would not cost you anything more that the internet costs. It was easier to get organised and up to date information on reputable indices such as Standard and Poors; FTSE 100 faster and easier that getting monthly stock prices at the NSE. The CMA should make laws that would make it mandatory for all companies and the NSE to post information to their public portals free. It was notable that some listed companies such as those listed in the GEMS sector did not have functional websites where one would get financial reports with ease. This would actually imply that some of these firms do not qualify for being quoted in the exchange.

The researcher would also recommend to NSE and CMA to ensure that secondary data statistics are availed for the NASI, FTSE NSE 15 and FTSE NSE 25 indices. This data cannot even be obtained from the data vendors at NSE which slows down the uptake of research on stock markets. By providing official verified data, this will increase information on the Kenya securities markets.

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APPENDICES

Appendix I: Letter of Introduction

Robert Mugo Karungu,

Jomo Kenyatta University of Agriculture and Technology

Dear Respondent,

Re: Request to collect Data

I am a graduate student taking a Doctor of Philosophy degree at Jomo Kenyatta University of Agriculture and Technology (JKUAT), specializing in Finance . My research titled 'Influence of Securities Behaviour and Performance of Nairobi Securities Exchange Indices in Kenya.' This is a partial requirement for the fulfillment of the requirements of the award of a degree. The purpose of this questionnaire is to collect information appropriate for this study. The outcome of this research will be availed to you as it may enhance policy making in the financial sector. The information and views collected shall be treated with utmost confidentiality and will only be used for academic purposes.

Yours sincerely,

……..

Robert Mugo.

Appendix II: Research Questionnaire

Section A: Background Information:

1. Years of service since incorporation (Please select one category)

Less than 5	5-9	10-14	15 and Above

2. Experience of the respondent in years (Please select one category)

Less than 5	5-9	10-14	15 and Above

3. What is the number of employees in your firm (Please select one category)

Less than 10	10-19	20-29	30-39	40 and Above

4. How many branches does your firm have? (Please select one)

Less than 3	3-6	7-10	More than 10

5. Please indicate the estimated percentage of these clients in your firm (The overall outcome should not be less or more that 100)

Type of Investor	Domestic Retail	International Retail	Domestic Institutional	International Institutional
Estimated Percentage (%)				

Section B: Momentum Effect in Securities Markets

Please use the scale below to answer the questions that follow

Where 1-Strongly Agree; 2-Agree; 3-Not Sure; 4-Disagree; 5-Strongly Disagree

	Phrase	**1**	**2**	**3**	**4**	**5**
6.	Securities price movements in Kenya follow a linear pattern					
7.	Patterns discovered by investors will gradually fade over time					
8.	Excess returns gained from investing in stocks after announcements are compensation for risk					
9.	Transaction costs affect the momentum of price movements					
10.	Wise investors benefit from the movements of security prices after an announcement has been made					
11.	For a security price to remain steady, the firm must always ensure that it is making good news					
12.	Momentum effect is usually due to methodological error as opposed to facts					
13.	Price movement momentum is usually as a result of cross-sectional dispersion in stock returns					
14.	Losing portfolios/securities contribute more to the momentum effect than their winning counterparts					
15.	Investors view positive trading results as their ability and skills					
16.	Investors view negative trading results as bad luck and misfortune					

Section C: Financial Contagion Effect in Securities Markets

In your opinion, what kind of financial contagion do securities markets experience in Kenya? (Tick as appropriate)

17.	Systematic	Idiosyncratic	Volatility	None

Please use the scale below to answer the questions that follow

Where 1-Strongly Agree; 2-Agree; 3-Not Sure; 4-Disagree; 5-Strongly Disagree

	Phrase	1	2	3	4	5
18.	Financial developments may affect the country of transmission more than the country of origin					
19.	Financial interconnectivity can only be transmitted from a developed to a less developed market					
20.	Less developed markets are isolated from the developments in capital markets of markets					
21.	African securities markets are highly interconnected with other stock markets					
22.	East African Security Markets are highly interconnected					
23.	Kenya is the financial hub of East African Securities Markets					
24.	Political activities in the world affects the happenings of Securities Markets In Kenya					
25.	Economic activities in Kenya affect the performance of the Nairobi Securities Market					
26.	Kenya experiences more than one type of financial contagion					
27.	Fear of economic shocks leads investors to act on new developments					
28.	Small and highly correlated risk factors compound financial					

	contagion during crisis period					

Section D: White noise effect in Securities Markets

Please use the scale below to answer the questions that follow

Where 1-Strongly Agree; 2-Agree; 3-Not Sure; 4-Disagree; 5-Strongly Disagree

	Phrase	**1**	**2**	**3**	**4**	**5**
29.	Securities at the NSE over react in times of positive news					
30.	Securities in NSE experience a bear run in times of bad news					
31.	Investors react more to positive news than they react to negative news					
32.	Investors in NSE do not react immediately to news					
33.	Stock prices react very fast to an unfounded rumor					
34.	It is impossible for an investor with superior information to benefit from trading					
35.	Noise model can be used to measure the market opinion that is not captured by fundamental factors					
36.	Traders do not follow market fundamentals					
37.	Irrational traders exist in the Nairobi Securities Exchange					

Section E: Security Price Volatility in Securities Markets

Please use the scale below to answer the questions that follow

Where 1-Strongly Agree; 2-Agree; 3-Not Sure; 4-Disagree; 5-Strongly Disagree

	Phrase	**1**	**2**	**3**	**4**	**5**
38.	Investors are always rational					
39.	Prices react in a sequential manner					
40.	Securities Price Volatility is good for a stock market					
41.	Securities Price Volatility helps in price discovery					
42.	There is a causal relationship among stock returns, trading volume and fluctuations of stock returns					
43.	Current returns shock have a large effect on forecast variance					
44.	High Volume stocks have a tendency of reacting to market wide information					

Section F: Market Herding Effect in Securities Markets

45. In your own opinion, what are the main reasons why investors follow the Market Herding Effect? (Select appropriately)

Psychological Effect	Information-driven effect	Principal-Agent relationship	None of the above

Please use the scale below to answer the questions that follow

Where 1-Strongly Agree; 2-Agree; 3-Not Sure; 4-Disagree; 5-Strongly Disagree

	Phrase	**1**	**2**	**3**	**4**	**5**
46.	Investors follow a market consensus dictated by investment gurus					
47.	Investors may suppress their own behaviour and make decisions based on the actions of the market					
48.	Rational investment is not followed in all circumstances					
49.	At times Market Herding Effect does not always indicate that investors are irrational					
50.	Market Herding Effect mostly occurs on securities that are highly interconnected					
51.	Sectors with smaller capitalization and small retail investors are more likely to be subjected to herding					
52.	During the periods of market swings, there is herd formation					

Section G: Performance of NSE Indices

NSE 20 Share Index

Please use the scale below to answer the questions that follow

Where 1-Strongly Agree; 2-Agree; 3-Not Sure; 4-Disagree; 5-Strongly Disagree

	Phrase	**1**	**2**	**3**	**4**	**5**
53.	The index is an accurate measure of performance of the Stock Markets					
54.	The index is a barometer of the economic performance of the country					

55.	The index has left out other factors which are important					
56.	Firms in this index are representative of all firms					
57.	Macro-economic factors affects the index rapidly					
58.	The index is highly interlinked with other countries					
59.	The index is the best among the existing indices					
60.	The index needs to be revised					

NSE All Share Index

Please use the scale below to answer the questions that follow

Where 1-Strongly Agree; 2-Agree; 3-Not Sure; 4-Disagree; 5-Strongly Disagree

	Phrase	**1**	**2**	**3**	**4**	**5**
61.	The index is an accurate measure of performance of the Stock Markets					
62.	The index is a barometer of the economic performance of the country					
63.	The index has left out other factors which are important					
64.	Firms in this index are representative of all firms					
65.	Macro-economic factors affects the index rapidly					
66.	The index is highly interlinked with other countries					
67.	The index is the best among the existing indices					
68.	The index needs to be revised					

FTSE NSE 15 Index

Please use the scale below to answer the questions that follow

Where 1-Strongly Agree; 2-Agree; 3-Not Sure; 4-Disagree; 5-Strongly Disagree

	Phrase	**1**	**2**	**3**	**4**	**5**
69.	The index is an accurate measure of performance of the Stock Markets					
70.	The index is a barometer of the economic performance of the country					
71.	The index has left out other factors which are important					
72.	Firms in this index are representative of all firms					
73.	Macro-economic factors affects the index rapidly					
74.	The index is highly interlinked with other countries					
75.	The index is the best among the existing indices					
76.	The index needs to be revised					

FTSE NSE 25 Index

Please use the scale below to answer the questions that follow

Where 1-Strongly Agree; 2-Agree; 3-Not Sure; 4-Disagree; 5-Strongly Disagree

	Phrase	**1**	**2**	**3**	**4**	**5**
77.	The index is an accurate measure of performance of the Stock Markets					
78.	The index is a barometer of the economic performance of the country					

79.	The index has left out other factors which are important					
80.	Firms in this index are representative of all firms					
81.	Macro-economic factors affects the index rapidly					
82.	The index is highly interlinked with other countries					
83.	The index is the best among the existing indices					
84.	The index needs to be revised					

Thank you for your time

Appendix III: Data Collection Sheet

Year	Month	Today	Previous Rit	Rft	Rmt	UMDt	Total Shares	Market Cap	Par value	Nominal Value	HML	DPS
2004	January											
	February											
	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											
2005	January											
	February											
	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											
2006	January											
	February											
	March											
	April											
	May											
	June											

	July											
	August											
	September											
	October											
	November											
	December											
2007	January											
	February											
	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											
2008	January											
	February											
	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											
2009	January											
	February											
	March											
	April											

	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											
2010	January											
	February											
	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											
2011	January											
	February											
	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											
2012	January											
	February											

	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											
2013	January											
	February											
	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											
2014	January											
	February											
	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											

2015	January											
	February											
	March											
	April											
	May											
	June											
	July											
	August											
	September											
	October											
	November											
	December											

Appendix IV: Momentum Factor Results

a) Descriptive Statistics on Momentum Effect

Firm	Mean	Mode	Std Devn	Skewness	Range	Count
Unilever	81.26	80	17.10	0.18	69.5	53
Eegads	32.20	17	12.65	0.57	55.9	143
Kakuzi	82.24	35	78.29	2.16	336	143
Kapchorua	117.37	100	31.07	0.59	155	143
Limuru Tea	446.51	305	234.40	1.99	1029	143
Rea Vipingo	17.27	20.5	4.63	0.00	20.6	118
Sasini	19.46	17.5	19.82	4.74	136.6	143
Williamson	172.84	200	90.02	0.56	368	143
Car & Gen	35.69	50	12.73	-0.03	49.35	143
Cmc	35.70	50	35.83	2.29	171.2	91
Marshalls	19.91	24	9.37	0.91	35	143
Sameer	9.19	5.55	5.49	1.20	23.75	143
Barclays	86.83	250	94.85	1.40	448.35	143
Cfc	78.92	42	38.18	3.26	329.25	143
Dtb	108.58	30	67.22	0.85	244.25	143
Equity	67.50	129	70.54	1.69	290.55	113
Housing Finance	23.84	13.95	10.85	0.70	47	143
I&M	117.55	127	14.63	-0.44	55	31
Kcb	53.57	20.5	49.04	2.28	226	143
Nbk	31.91	39	12.55	0.69	52.5	143
Nic	55.53	50	28.18	2.58	175.05	143
Stanchart	209.38	139	64.91	0.54	236	143
Coop	15.30	8.95	4.36	-0.27	16.65	84
Atlas	8.13		4.23	-0.65	10.1	13
Express	10.70	9	7.11	0.99	25.85	143
Kq	37.85	45.75	32.83	1.17	126.5	143
Longhorn	12.31	9	5.39	0.93	22.6	44
Nation	213.13	140	67.90	0.44	243	143
Std Grp	40.13	45	11.16	0.47	51	143
Tps Serena	55.75	81	20.91	0.84	94.75	143
Uchumi	14.63	10.05	4.40	0.04	17.35	84
Scan Grp	40.32	25.5	15.13	0.40	56.7	113
Arm	92.20	90	52.91	0.67	217.5	143
Bamburi	164.05	150	35.75	-0.59	141.5	143
Crown Paint	45.79	38	27.40	1.98	148.05	143
Ea Cables	44.09	10.55	69.55	4.75	584.9	143

Portland	82.91	120	29.63	0.36	108	143
Kengen	16.09	26	7.79	1.14	32	116
Kobil	60.81	100	72.02	2.66	412	143
Kplc	97.80	97.5	81.86	0.43	263.1	143
Total	28.60	29.75	8.81	0.18	44.9	143
Umeme	15.71	13	3.64	0.06	12	35
Britam	13.80	6.05	8.48	0.66	31.5	52
Cic	6.84	6.5	2.39	0.28	7.8	42
Jubilee	208.01	113	132.39	1.25	522	143
Kenya Re	13.77	14.95	3.59	0.03	14.6	101
Liberty	14.43	7.7	6.13	0.21	18.45	57
Sanlam	62.53	40	31.20	0.65	122.5	143
Centum	46.03	23	57.92	4.27	395.25	143
City Trust	150.69	150	105.04	1.36	440	112
Home Afrika	4.77	4.3	3.46	2.80	17.6	30
Kurwitu	1500.00	1500	0.00		0	14
Olympia	10.40	17	6.95	1.12	32.3	143
Transcentury	23.53	25	6.79	-0.25	30.7	53
Nse	21.16	20	1.79	1.37	5.4	15
A Bauman	14.84	8	7.43	1.07	25.1	52
Boc	127.95	135	17.70	-0.16	79	96
Bat	339.33	200	226.37	1.27	905	143
Carbacid	99.58	125	48.26	-0.63	197.75	96
Eabl	215.46	140	95.12	1.34	428	143
Eveready	3.95	3.95	2.54	2.44	16.1	109
Flame Tree	7.92	8.2	1.08	-0.24	3.1	14
Kenya Orchard	16.73	5	33.82	2.82	186.2	143
Mumias	13.86	10.8	15.05	1.76	60.5	143
Unga	17.43	11	10.09	1.76	41.9	143
Access	15.26	20.75	8.59	0.31	31.15	72
Safcom	7.22	5.8	4.42	0.90	14.85	91
Stanlib	20.88		0.88		1.25	2

b) Analysed Cahart Model Results

Year	Month	Momentum Effect	NSE 20 Share
2004	January	-126.918	3157.88
	February	136.9196	3175.36
	March	-437.376	2770.66
	April	-32.9622	2707.6
	May	-341.873	2689.14
	June	-102.547	2639.75
	July	-65.0996	2708.03
	August	-79.7568	2708.86
	September	-224.862	2670.69
	October	86.53891	2829.65
	November	-211.274	2918.34
	December	-324.969	2945.58
2005	January	-144.06	3094.38
	February	-272.298	3212.81
	March	-460.783	3126.04
	April	-246.78	3227.59
	May	-43.5798	2689.14
	June	581.2161	2639.75
	July	-349.606	2708.03
	August	-287.693	2708.86
	September	-461.889	2670.79
	October	-393.141	2929.65
	November	-304.868	2918.34
	December	-568.957	2945.58
2006	January	-195.816	4171.8
	February	-377.846	4056.63
	March	-321.488	4101.64
	April	-235.886	4025.21
	May	129.969	4349.75
	June	-396.899	4260.49
	July	-178.062	4271.68
	August	136.2434	4486.04
	September	206.4675	4879.86
	October	-87.6215	5314.36
	November	353.9136	5615.2
	December	-35.375	5645.65
2007	January	22.34195	5774.27
	February	-886.279	5387.28

	March	-643.195	5133.67
	April	-302.752	5199.44
	May	-315.626	5001.77
	June	-155.284	5146.73
	July	-54.3488	5340.08
	August	-265.778	5371.72
	September	-500.553	5146.46
	October	-537.207	4971.04
	November	-222.898	5234.44
	December	-366.957	5444.83
2008	January	-782.85	4,712.71
	February	-131.456	5,072.41
	March	-546.025	4,843.17
	April	100.7165	5,336.03
	May	-528.635	5,175.83
	June	-426.744	5,185.56
	July	-710.991	4,868.27
	August	-546.169	4,648.78
	September	-657.424	4,180.40
	October	-1140.4	3,341.47
	November	21.16362	3,386.65
	December	-325.393	3,521.18
2009	January	-706.438	3,198.90
	February	-1196.21	2,474.75
	March	-74.0039	2,805.03
	April	-173.373	2,800.10
	May	-189.453	2,852.57
	June	212.6855	3,294.46
	July	-295.808	3,273.10
	August	-552.057	3,102.68
	September	-472.488	3,005.41
	October	-374.72	3,083.63
	November	-168.252	3,189.55
	December	-296.962	3,247.44
2010	January	21.45875	3,565.28
	February	-222.504	3,629.41
	March	703.0798	4,072.93
	April	-59.5928	4,233.24
	May	-191.79	4,241.81
	June	-104.948	4,339.28
	July	22.7765	4,438.58
	August	58.39205	4,454.49

	September	15.13831	4,629.80
	October	-47.886	4,659.56
	November	-480.566	4,395.17
	December	-93.3774	4,432.60
2011	January	44.65562	4,464.92
	February	-292.349	4,240.18
	March	-502.158	3,887.07
	April	-43.2675	4,029.23
	May	-508.285	4,078.10
	June	-573.1	3,968.12
	July	-838.072	3,738.46
	August	-870.968	3,465.02
	September	-952.292	3,284.06
	October	-525.994	3,507.34
	November	-1249.89	3,155.46
	December	-947.299	3,205.02
2012	January	-1067.89	3224.18
	February	-964.316	3303.75
	March	-883.144	3366.89
	April	-539.804	3546.66
	May	-337.767	3650.85
	June	-520.108	3703.94
	July	-579.309	3832.42
	August	-610.068	3865.76
	September	-338.912	3972.03
	October	-526.42	4147.28
	November	-430.55	4083.52
	December	-433.856	4133.02
2013	January	-163.187	4416.6
	February	-264.964	4518.59
	March	58.23434	4860.83
	April	-447.306	4765.23
	May	-321.159	5006.96
	June	-719.439	4598.16
	July	-96.9486	4787.56
	August	-613.408	4697.75
	September	-504.256	4793.2
	October	-230.503	4992.88
	November	472.5772	5100.88
	December	-601.234	4926.97
2014	January	-218.664	4856.15
	February	-298.548	4933.41

	March	-537.519	4945.78
	April	-327.993	4948.97
	May	-374.701	4881.56
	June	-565.839	4885.04
	July	-472.043	4906.09
	August	-325.206	5139.39
	September	332.6618	5255.62
	October	-404.667	5194.89
	November	-528.421	5156.33
	December	-732.573	5112.65
2015	January	-190.531	5212.11
	February	-698.816	5491.37
	March	-817.589	5248.16
	April	-670.565	5091.43
	May	-707.322	4786.74
	June	-370.906	4906.07
	July	-929.188	4404.72
	August	-1032.96	4176.59
	September	-983.858	4173.52
	October	-1731.4	4025.55
	November	-561.734	4166.59
	December	-825.285	4040.75

Appendix V: Financial Contagion Effect Results

a) Pre-crisis Period NSE 20 AND FTSE 100

		NSE 20	FTSE 100
03/04/2006	March	3126.04	6023.1
01/05/2006	April	3227.59	5723.8
01/06/2006	May	2689.14	5833.4
03/07/2006	June	2639.75	5928.3
01/08/2006	July	2708.03	5906.1
01/09/2006	August	2708.86	5960.8
02/10/2006	September	2670.79	6129.2
01/11/2006	October	2929.65	6048.9
01/12/2006	November	2918.34	6220.8
01/01/2007	December	2945.58	6203.1
01/02/2007	January	4171.8	6171.5
01/03/2007	February	4056.63	6308
02/04/2007	March	4101.64	6449.2
01/05/2007	April	4025.21	6621.5
01/06/2007	May	4349.75	6607.9
02/07/2007	June	4260.49	6360.1

b) Pre-Crisis NSE 20 and Standard and Poor's

Date		NSE	Standard & Poor's
03/04/2006	March	3126.04	1310.61
01/05/2006	April	3227.59	1270.09
01/06/2006	May	2689.14	1270.2
03/07/2006	June	2639.75	1276.66
01/08/2006	July	2708.03	1303.82
01/09/2006	August	2708.86	1335.85
02/10/2006	September	2670.79	1377.94
01/11/2006	October	2929.65	1400.63
01/12/2006	November	2918.34	1418.3
03/01/2007	December	2945.58	1438.24
01/02/2007	January	4171.8	1406.82
01/03/2007	February	4056.63	1420.86
02/04/2007	March	4101.64	1482.37
01/05/2007	April	4025.21	1530.62
01/06/2007	May	4349.75	1503.35
02/07/2007	June	4260.49	1455.27

Post Crisis Period

c) FTSE 100 AND NSE 20 Share Index

Date		FTSE 100	NSE 20
01/08/2007	July	1473.99	5340.08
04/09/2007	August	1526.75	5371.72
01/10/2007	September	1549.38	5146.46
01/11/2007	October	1481.14	4971.04
03/12/2007	November	1468.36	5234.44
02/01/2008	December	1378.55	5444.83
01/02/2008	January	1330.63	4,712.71
03/03/2008	February	1322.7	5,072.41
01/04/2008	March	1385.59	4,843.17
01/05/2008	April	1400.38	5,336.03
02/06/2008	May	1280	5,175.83
01/07/2008	June	1267.38	5,185.56
01/08/2008	July	1282.83	4,868.27
02/09/2008	August	1166.36	4,648.78
01/10/2008	September	968.75	4,180.40
03/11/2008	October	896.24	3,341.47
01/12/2008	November	903.26	3,386.65

d) Standard & Poors And NSE 20 Share Index

		NSE 20	S&P
01/08/2007	July	5340.08	1473.99
04/09/2007	August	5371.72	1526.75
01/10/2007	September	5146.46	1549.38
01/11/2007	October	4971.04	1481.14
03/12/2007	November	5234.44	1468.36
02/01/2008	December	5444.83	1378.55
01/02/2008	January	4,712.71	1330.63
03/03/2008	February	5,072.41	1322.7
01/04/2008	March	4,843.17	1385.59
01/05/2008	April	5,336.03	1400.38
02/06/2008	May	5,175.83	1280
01/07/2008	June	5,185.56	1267.38
01/08/2008	July	4,868.27	1282.83
02/09/2008	August	4,648.78	1166.36
01/10/2008	September	4,180.40	968.75
03/11/2008	October	3,341.47	896.24
01/12/2008	November	3,386.65	903.26

Post And Pre Crisis Period

e) FTSE AND NSE 20 Share Index

Date		FTSE 100	NSE 20
03/04/2006	March	6023.1	3126.04
01/05/2006	April	5723.8	3227.59
01/06/2006	May	5833.4	2689.14
03/07/2006	June	5928.3	2639.75
01/08/2006	July	5906.1	2708.03
01/09/2006	August	5960.8	2708.86
02/10/2006	September	6129.2	2670.79
01/11/2006	October	6048.9	2929.65
01/12/2006	November	6220.8	2918.34
01/01/2007	December	6203.1	2945.58
01/02/2007	January	6171.5	4171.8
01/03/2007	February	6308	4056.63
02/04/2007	March	6449.2	4101.64
01/05/2007	April	6621.5	4025.21
01/06/2007	May	6607.9	4349.75
02/07/2007	June	6360.1	4260.49
01/08/2007	July	1473.99	5340.08
04/09/2007	August	1526.75	5371.72
01/10/2007	September	1549.38	5146.46
01/11/2007	October	1481.14	4971.04
03/12/2007	November	1468.36	5234.44
02/01/2008	December	1378.55	5444.83
01/02/2008	January	1330.63	4,712.71
03/03/2008	February	1322.7	5,072.41
01/04/2008	March	1385.59	4,843.17
01/05/2008	April	1400.38	5,336.03
02/06/2008	May	1280	5,175.83
01/07/2008	June	1267.38	5,185.56
01/08/2008	July	1282.83	4,868.27
02/09/2008	August	1166.36	4,648.78
01/10/2008	September	968.75	4,180.40
03/11/2008	October	896.24	3,341.47
01/12/2008	November	903.26	3,386.65

f) Standards And Poors And NSE 20 Share Index

DATE		NSE 20	S&P
03/04/2006	MARCH	3126.04	1310.61
01/05/2006	APRIL	3227.59	1270.09
01/06/2006	MAY	2689.14	1270.2
03/07/2006	JUNE	2639.75	1276.66
01/08/2006	JULY	2708.03	1303.82
01/09/2006	AUGUST	2708.86	1335.85
02/10/2006	SEPTEMBER	2670.79	1377.94
01/11/2006	OCTOBER	2929.65	1400.63
01/12/2006	NOVEMBER	2918.34	1418.3
03/01/2007	DECEMBER	2945.58	1438.24
01/02/2007	JANUARY	4171.8	1406.82
01/03/2007	FEBRUARY	4056.63	1420.86
02/04/2007	MARCH	4101.64	1482.37
01/05/2007	APRIL	4025.21	1530.62
01/06/2007	MAY	4349.75	1503.35
02/07/2007	JUNE	4260.49	1455.27
01/08/2007	JULY	5340.08	1473.99
04/09/2007	AUGUST	5371.72	1526.75
01/10/2007	SEPTEMBER	5146.46	1549.38
01/11/2007	OCTOBER	4971.04	1481.14
03/12/2007	NOVEMBER	5234.44	1468.36
02/01/2008	DECEMBER	5444.83	1378.55
01/02/2008	JANUARY	4,712.71	1330.63
03/03/2008	FEBRUARY	5,072.41	1322.7
01/04/2008	MARCH	4,843.17	1385.59
01/05/2008	APRIL	5,336.03	1400.38
02/06/2008	MAY	5,175.83	1280
01/07/2008	JUNE	5,185.56	1267.38
01/08/2008	JULY	4,868.27	1282.83
02/09/2008	AUGUST	4,648.78	1166.36
01/10/2008	SEPTEMBER	4,180.40	968.75
03/11/2008	OCTOBER	3,341.47	896.24
01/12/2008	NOVEMBER	3,386.65	903.26

Appendix VI: White Noise Effect Filled Sheet

Year	Month	Average Bubble Factor	NSE 20 SHARE
2004	January	-120.6915729	3157.88
	February	-120.245014	3175.36
	March	-127.7769715	2770.66
	April	-82.50698881	2707.6
	May	-45.08349354	2689.14
	June	-92.54942232	2639.75
	July	-129.0225216	2708.03
	August	-81.69289613	2708.86
	September	-55.03665797	2670.69
	October	-19.14858624	2829.65
	November	-7.689994861	2918.34
	December	15.75373688	2945.58
2005	January	25.62662723	3094.38
	February	28.93049019	3212.81
	March	29.00015843	3126.04
	April	33.9867609	3227.59
	May	37.15462453	2689.14
	June	45.88077719	2639.75
	July	45.71727271	2708.03
	August	47.73208193	2708.86
	September	46.36739744	2670.79
	October	43.01413665	2929.65
	November	45.066779	2918.34
	December	44.99958734	2945.58
2006	January	38.55564105	4171.8
	February	37.23803015	4056.63
	March	36.26529886	4101.64
	April	31.83542546	4025.21
	May	37.84311934	4349.75
	June	35.96991557	4260.49
	July	31.84988193	4271.68
	August	42.63039524	4486.04
	September	45.33427813	4879.86
	October	55.81294373	5314.36
	November	56.81615687	5615.2
	December	45.15085292	5645.65
2007	January	56.21704878	5774.27
	February	43.29973614	5387.28
	March	40.04287846	5133.67

	April	40.32680339	5199.44
	May	38.5825046	5001.77
	June	38.11427212	5146.73
	July	41.72231937	5340.08
	August	46.50198748	5371.72
	September	44.96731708	5146.46
	October	43.17627298	4971.04
	November	45.59043732	5234.44
	December	41.60057189	5444.83
2008	January	32.20237385	4712.71
	February	37.27790669	5072.41
	March	32.55738949	4843.17
	April	39.53523108	5336.03
	May	40.83435765	5175.83
	June	41.93410467	5185.56
	July	34.83381317	4868.27
	August	32.66703231	4648.78
	September	25.23999026	4180.4
	October	16.28159212	3341.47
	November	20.64728219	3386.65
	December	21.10730627	3521.18
2009	January	17.16098052	3198.9
	February	5.46131104	2474.75
	March	2.919265673	2805.03
	April	3.085713798	2800.1
	May	4.874734874	2852.57
	June	9.046230435	3294.46
	July	8.882687181	3273.1
	August	7.10210455	3102.68
	September	6.410022861	3005.41
	October	5.966030389	3083.63
	November	9.173943725	3189.55
	December	6.569823165	3247.44
2010	January	2.620050363	3565.28
	February	0.923562604	3629.41
	March	7.137866024	4072.93
	April	-1.736442833	4233.24
	May	-19.26917925	4241.81
	June	-54.80275078	4339.28
	July	-154.3128821	4438.58
	August	-123.8921863	4454.49
	September	-101.0733092	4629.8

	October	-94.31822594	4659.56
	November	-92.68827997	4395.17
	December	-88.66982211	4432.6
2011	January	-76.70718625	4464.92
	February	-71.00726136	4240.18
	March	-65.62489836	3887.07
	April	-38.47149115	4029.23
	May	-0.698490534	4078.1
	June	24.88089831	3968.12
	July	19.66308731	3738.46
	August	19.02224771	3465.02
	September	24.43550097	3284.06
	October	34.16690748	3507.34
	November	33.68342254	3155.46
	December	36.34680701	3205.02
2012	January	36.82987638	3224.18
	February	40.61810332	3303.75
	March	38.34081771	3366.89
	April	38.31655459	3546.66
	May	32.01550804	3650.85
	June	30.51847321	3703.94
	July	35.201543	3832.42
	August	33.47253463	3865.76
	September	22.71674977	3972.03
	October	29.60018408	4147.28
	November	32.59321364	4083.52
	December	24.98205108	4133.02
2013	January	27.26175617	4416.6
	February	29.43792019	4518.59
	March	42.65698193	4860.83
	April	43.87379384	4765.23
	May	44.26829882	5006.96
	June	16.15714217	4598.16
	July	16.23220328	4787.56
	August	39.55514017	4697.75
	September	39.3307644	4793.2
	October	42.45804787	4992.88
	November	43.53934238	5100.88
	December	41.256806	4926.97
2014	January	47.15802757	4856.15
	February	47.98109301	4933.41
	March	46.49848279	4945.78

	April	40.07240551	4948.97
	May	42.71940961	4881.56
	June	48.52448243	4885.04
	July	49.59408003	4906.09
	August	45.27065353	5139.39
	September	55.87500904	5255.62
	October	62.66898422	5194.89
	November	84.15792296	5156.33
	December	72.56770302	5112.65
2015	January	79.08513902	5212.11
	February	84.67463016	5491.37
	March	80.02751203	5248.16
	April	77.37542345	5091.43
	May	74.11450798	4786.74
	June	79.82334394	4906.07
	July	86.07290214	4404.72
	August	86.4935463	4176.59
	September	90.7322504	4173.52
	October	92.75749397	4025.55
	November	83.21321704	4166.59
	December	75.43678479	4040.75

Appendix VII: Market Herding Effect

a) Market Herding Filled Sheet

Firm	Mean	Strd Err	St Dev	Kurtosis	Sknes	Min	Max	95.0% conf
Unilever	81.26	2.35	17.10	-0.23	0.18	47.50	117.00	4.71
Eaagads	32.20	1.06	12.65	-0.31	0.57	13.60	69.50	2.09
Kakuzi	82.24	6.55	78.29	3.91	2.16	19.00	355.00	12.94
Kapchorua	117.37	2.60	31.07	0.50	0.59	63.00	218.00	5.14
Limuru Tea	446.51	19.61	234.40	2.95	1.99	171.00	1200.00	38.76
Rea Vip	17.27	0.43	4.63	-0.42	0.00	7.40	28.00	0.84
Sasini	19.46	1.66	19.82	24.96	4.74	4.30	141.00	3.28
Williamson	172.84	7.53	90.02	-0.61	0.56	46.00	414.00	14.88
Car & Gen	35.69	1.06	12.73	-0.97	-0.03	10.65	60.00	2.10
Cmc	35.70	3.76	35.83	6.03	2.29	9.80	181.00	7.46
Marshalls	19.91	0.78	9.37	-0.35	0.91	9.00	44.00	1.55
Sameer	9.19	0.46	5.49	0.61	1.20	3.50	27.25	0.91
Barclays	86.83	7.93	94.85	1.03	1.40	10.65	459.00	15.68
Cfc Stanbic	78.92	3.19	38.18	21.78	3.26	38.75	368.00	6.31
Dtb	108.58	5.62	67.22	-0.32	0.85	25.75	270.00	11.11
Equity	67.50	6.64	70.54	2.10	1.69	13.45	304.00	13.15
Housing Finance	23.84	0.91	10.85	-0.37	0.70	8.50	55.50	1.79
I&M	142.76	7.85	94.22	2.96	1.69	24.00	464.00	15.52
Kcb	53.57	4.10	49.04	4.94	2.28	15.00	241.00	8.11
Nbk	31.91	1.05	12.55	-0.30	0.69	15.00	67.50	2.07

Nic	55.53	2.36	28.18	8.22	2.58	10.95	186.00	4.66
Stanchart	209.38	5.43	64.91	-0.89	0.54	118.00	354.00	10.73
Coop	15.30	0.48	4.36	-0.94	-0.27	6.10	22.75	0.95
Atlas	8.13	1.17	4.23	-1.62	-0.65	1.95	12.05	2.56
Express	10.70	0.59	7.11	-0.24	0.99	3.40	29.25	1.17
Hutchings	0.00	0.00	0.00			0.00	0.00	0.00
Kq	37.85	2.75	32.83	0.41	1.17	4.40	131.00	5.43
Longhorn	12.31	0.81	5.39	0.87	0.93	3.90	26.50	1.64
Nmg	213.13	5.68	67.90	-1.10	0.44	112.00	355.00	11.23
Std Grp	40.13	0.93	11.16	-0.08	0.47	21.00	72.00	1.84
Tps Serena	55.75	1.75	20.91	0.20	0.84	25.25	120.00	3.46
Uchumi	14.63	0.49	4.40	-1.02	0.04	7.15	24.40	0.98
Scan Grp	40.32	1.42	15.13	-1.09	0.40	14.80	71.50	2.82
Arm	92.20	4.32	52.91	-0.17	0.67	14.40	232.00	8.75
Bamburi	164.05	2.99	35.75	-0.37	-0.59	79.50	221.00	5.91
Crown	45.79	2.29	27.40	3.90	1.98	12.95	161.00	4.43
Ea Cables	44.09	5.82	69.55	29.91	4.75	10.10	595.00	11.50
Portland	82.91	2.48	29.63	-1.25	0.36	32.00	140.00	4.90
Kengen	16.09	0.72	7.79	0.42	1.14	7.25	39.25	1.43
Kenol	60.81	6.02	72.02	9.29	2.66	8.00	420.00	11.91
Kenya Power	97.80	6.85	81.86	-1.18	0.43	12.90	276.00	13.53
Total	28.60	0.74	8.81	-0.23	0.18	13.10	58.00	1.46
Umeme	15.71	0.61	3.64	-1.39	0.06	10.00	22.00	1.25
Britam	13.80	1.18	8.48	-0.65	0.66	4.00	35.50	2.36
Cic	6.84	0.37	2.39	-1.24	0.28	3.40	11.20	0.74
Jubilee	208.01	11.07	132.39	0.95	1.25	52.00	574.00	21.89

Kenya Re	13.77	0.36	3.59	-0.85	0.03	7.15	21.75	0.71
Liberty	14.43	0.81	6.13	-1.38	0.21	6.55	25.00	1.63
Sanlam	62.53	2.61	31.20	-0.43	0.65	18.50	141.00	5.16
Centum	46.03	4.84	57.92	20.86	4.27	9.75	405.00	9.58
Home Afrika	4.77	0.63	3.46	9.96	2.80	1.40	19.00	1.29
Kurwitu	1500.00	0.00	0.00	#DIV/0!	#DIV/0!	1500.00	1500.00	0.00
Olympia	10.40	0.58	6.95	0.96	1.12	3.20	35.50	1.15
Transcentury	23.53	0.93	6.79	-0.28	-0.25	7.30	38.00	1.87
Nse	21.16	0.46	1.79	0.58	1.37	19.60	25.00	0.99
Au Baumann	14.84	1.03	7.43	-0.30	1.07	7.90	33.00	2.07
Boc Gases	127.95	1.81	17.70	-0.58	-0.16	91.00	170.00	3.59
Bat	339.33	18.93	226.37	0.37	1.27	131.00	1036.00	37.42
Carbacid	99.58	4.93	48.26	-0.76	-0.63	14.25	212.00	9.78
Eabl	215.46	7.95	95.12	1.51	1.34	100.00	528.00	15.72
Eveready	3.95	0.24	2.54	8.29	2.44	1.45	17.55	0.48
Flame Tree	7.92	0.29	1.08	-1.36	-0.24	6.30	9.40	0.62
Kenya Orchards	16.73	2.83	33.82	7.25	2.82	3.80	190.00	5.59
Mumias	13.86	1.26	15.05	2.15	1.76	1.50	62.00	2.49
Unga	17.43	0.84	10.09	2.13	1.76	7.10	49.00	1.67
Access Kenya	15.26	1.01	8.59	-0.74	0.31	3.85	35.00	2.02
Safaricom	7.22	0.47	4.42	-0.70	0.90	2.55	17.40	0.94
Stanlib	20.88	0.63	0.88			20.25	21.50	7.94

b) Comparison Between Average Monthly Returns And NSE 20 Share Returns

Year	Month	Average Monthly Returns (x)	NSE 20 Share Returns (y)	(X-Y)
2004	January	-2.41	1.87	-4.27
	February	4.08	0.55	3.52
	March	-8.59	-12.75	4.15
	April	1.09	-2.28	3.37
	May	-4.30	-0.68	-3.72
	June	-0.30	-1.84	1.53
	July	0.29	2.59	-2.30
	August	0.52	0.03	0.49
	September	-2.34	-1.41	-0.93
	October	5.99	5.95	0.04
	November	0.44	3.13	-2.70
	December	0.83	0.93	-0.10
2005	January	4.97	5.05	-0.08
	February	2.55	3.83	-1.28
	March	-1.29	-2.70	1.41
	April	3.41	3.25	0.16
	May	7.34	-16.68	24.02
	June	21.92	-1.84	23.75
	July	1.08	2.59	-1.51
	August	2.25	0.03	2.22
	September	-1.60	-1.41	-0.19
	October	2.62	9.69	-7.07
	November	1.14	-0.39	1.53
	December	-4.18	0.93	-5.12
2006	January	5.39	41.63	-36.24
	February	-0.60	-2.76	2.16
	March	0.33	1.11	-0.78
	April	1.74	-1.86	3.60
	May	10.30	8.06	2.23
	June	-0.54	-2.05	1.51
	July	2.03	0.26	1.77
	August	8.72	5.02	3.70
	September	10.31	8.78	1.53
	October	8.27	8.90	-0.63

	November	13.38	5.66	7.72
	December	5.48	0.54	4.93
2007	January	6.70	2.28	4.32
	February	-13.31	-6.70	-6.61
	March	-6.90	-4.71	-2.19
	April	-0.31	1.28	-1.59
	May	-0.30	-3.80	3.50
	June	4.96	2.90	2.06
	July	4.49	3.76	0.83
	August	1.43	0.59	0.84
	September	-3.92	-4.19	0.27
	October	-3.46	-3.41	-0.05
	November	3.15	5.30	-2.15
	December	2.77	4.02	-1.24
2008	January	-11.25	-13.45	2.20
	February	4.78	7.63	-2.85
	March	-4.45	-4.42	-0.03
	April	10.25	10.18	0.08
	May	-3.49	-3.00	-0.49
	June	1.36	0.19	1.17
	July	-9.28	-6.12	-3.16
	August	-3.88	-4.41	0.63
	September	-6.69	-10.08	3.38
	October	-16.54	-20.07	3.53
	November	7.75	1.35	6.40
	December	2.45	3.97	-1.52
2009	January	-7.15	-9.15	2.00
	February	-17.02	-22.64	5.62
	March	4.05	13.35	-9.30
	April	2.45	-0.18	2.63
	May	3.65	1.87	1.77
	June	11.39	15.49	-4.11
	July	0.50	-0.65	1.15
	August	-4.79	-5.21	0.41
	September	-2.64	-3.14	0.50
	October	-0.36	2.60	-2.96
	November	4.87	3.43	1.43
	December	1.32	1.81	-0.50
2010	January	7.01	9.79	-2.78
	February	1.59	1.80	-0.21
	March	19.68	12.22	7.46
	April	5.07	3.94	1.14

	May	-0.10	0.20	-0.31
	June	0.45	2.30	-1.84
	July	2.07	2.29	-0.21
	August	2.11	0.36	1.75
	September	1.97	3.93	-1.96
	October	0.63	0.64	-0.01
	November	-7.08	-5.67	-1.41
	December	0.29	0.85	-0.56
2011	January	3.26	0.73	2.53
	February	-3.43	-5.03	1.60
	March	-7.33	-8.33	1.00
	April	2.27	3.66	-1.39
	May	-6.27	1.21	-7.49
	June	-3.84	-2.70	-1.14
	July	-7.47	-5.79	-1.68
	August	-8.21	-7.31	-0.90
	September	-6.52	-5.22	-1.30
	October	3.14	6.80	-3.66
	November	-7.90	-10.03	2.13
	December	1.69	1.57	0.12
2012	January	15.82	0.60	15.22
	February	2.28	2.47	-0.19
	March	-1.22	1.91	-3.13
	April	4.22	5.34	-1.12
	May	2.76	2.94	-0.18
	June	-1.99	1.45	-3.45
	July	3.20	3.47	-0.27
	August	11.20	0.87	10.33
	September	-0.13	2.75	-2.88
	October	-1.81	4.31	-6.23
	November	-5.42	-1.54	-3.88
	December	-4.62	1.21	-5.84
2013	January	53.88	6.86	47.02
	February	3.19	2.31	0.88
	March	11.42	7.57	3.85
	April	-0.09	-1.97	1.87
	May	1.66	5.07	-3.41
	June	-0.90	-8.16	7.27
	July	-5.53	4.12	-9.65
	August	-3.01	-1.88	-1.13
	September	-2.82	2.03	-4.86
	October	3.97	4.17	-0.19

	November	1.78	2.16	-0.39
	December	-3.26	-3.41	0.15
2014	January	3.65	-1.44	5.08
	February	23.29	1.59	21.70
	March	-1.43	0.25	-1.68
	April	6.40	0.06	6.33
	May	2.96	-1.36	4.33
	June	1.34	0.07	1.27
	July	-7.64	0.43	-8.07
	August	-3.12	4.76	-7.87
	September	12.63	2.26	10.37
	October	-1.64	-1.16	-0.49
	November	-3.77	-0.74	-3.02
	December	-5.55	-0.85	-4.71
2015	January	3.74	1.95	1.79
	February	3.04	5.36	-2.31
	March	-4.14	-4.33	0.28
	April	-5.33	-2.99	-2.34
	May	-6.06	-5.98	-0.08
	June	-0.34	2.49	-2.83
	July	-6.54	-10.22	3.68
	August	-8.13	-5.18	-2.95
	September	-3.53	-0.07	-3.45
	October	-6.63	-3.55	-3.09
	November	-0.20	3.50	-3.70
	December	-6.79	-3.02	-3.77

Appendix VIII: Companies Listed at the Nairobi Securities Exchange

Company	**Par**	**Company**	**Par**
Agricultural Sector		Crown Paints Kenya	Ord 5
Eaagads	Ord 1.25	E. A Cables	Ord 0.5
Kakuzi	Ord 5	E. A Portland Cement	Ord 5
Kapchorua Tea co.	Ord 5	**Energy and Petroleum**	
The Limuru Tea Co.	Ord 20	KenGen	Ord 2.5
Rea Vipingo Plantations	*Ord 5*	KenolKobil Ltd	Ord 0.05
Sasini Ltd	Ord 1	KPL&C	Ord 2.5
Williamson Tea Kenya	Ord 5	*KPL&C 4%*	*Pref 20*
Automobiles and Accessories		*KPL&C 7%*	*Pref 20*
Car & General (K)	Ord 5	Total Kenya	Ord 5
		Umeme Ltd	Ord 0.50
Marshalls (EA)	Ord 5	**Insurance**	
Sameer Africa	Ord 5	British American Investments Co.	Ord 0.10
Banking		CIC Insurance Group	Ord 1
Barclays Bank	Ord 0.5	Jubilee Holdings	Ord 5
CFC Stanbic Holdings	Ord 5	Kenya Re Corporation	Ord 2.5
Diamond Trust Bank	Ord 5	Liberty Kenya Holdings	Ord 1
Equity Bank	Ord 0.5	Pan Africa Insurance	Ord 5
Housing Finance Co	Ord 5	**Investment**	
I & M Holdings Ltd	Ord 1	Centum Investment Co	Ord 0.50
KCB	Ord 1	Home Afrika Ltd	Ord 1
NBK	Ord 5	Kurwitu Ventures Ltd.	Ord 100
NIC Bank	Ord 5	Olympia Capital Holdings	Ord 5
Standard Chartered	Ord 5	Trans-Century Ltd.	Ord 0.5
The Co-op Bank of Kenya	Ord 1	**Investment Services**	

Commercial and Services		Nairobi Securities Exchange	Ord 4
Atlas Development & Support Services	Ord. 5	**Manufacturing and Allied**	
Express	Ord 5	*Au Baumann & Co.*	Ord 5
Hutchings Biemer	*Ord 5*	B.O.C Kenya	Ord 5
Kenya Airways	Ord 5	British American Tobacco Kenya Ltd.	Ord 10
Longhorn Kenya	Ord 5	Carbacid Investments	Ord 5
Nation Media Group	Ord 2.5	East African Breweries	Ord 2
Standard Group	Ord 5	Eveready E. A	Ord 1
TPS EA (Serena)	Ord 1	Flame Tree Group Holdings	Ord 0.825
Uchumi Supermarket	Ord 5	Kenya Orchards	Ord 5
WPP ScanGroup	Ord 1	Mumias Sugar Co.	Ord 2
Construction & Allied		Unga Group	Ord 5
ARM Cement	Ord 5	**Telecommunications and Technology**	
Bamburi Cement	Ord 5	Safaricom Ltd.	Ord 0.05

Those companies that have been italicized do not engage in active trading because they are currently suspended. The only exception is KPLC preference shares which are italicized since they are not ordinary shares

Source: *www.nse.co.ke*

Appendix IX: Trading Participants in the Nairobi Securities Exchange

Dyer & Blair Investment Bank Ltd Pension Towers, 10th floor,	Francis Drummond & Company Limited Hughes Building, 2nd floor,	Ngenye Kariuki & Co. Ltd. (Under Statutory Management) Corner House, 8th floor,
Suntra Investment Bank Ltd Nation Centre,7th Floor,	Old Mutual Securities Ltd IPS Building, 6th Floor,	SBG Securities Ltd CfC Stanbic Centre, 58 Westlands Road,
Kingdom Securities Ltd Co-operative Bank House,5th Floor,	Afrika Investment Bank Ltd Finance House, 9th Floor,	ABC Capital Ltd IPS Building, 5th floor,
Sterling Capital Ltd Barclays Plaza, 11th Floor, Loita Street,	Apex Africa Capital Ltd Rehani House, 4th Floor,	Faida Investment Bank Ltd Crawford Business park, Ground Floor, State House Road,
NIC Securities Limited Ground Floor, NIC House, Masaba Road,	Standard Investment Bank Ltd ICEA Building, 16th floor,	Kestrel Capital (EA) Limited ICEA Building, 5th floor,
Discount Securities Ltd. (Under Statutory management)	African Alliance Kenya Investment Bank Ltd 1st Floor, Trans-national Plaza,	Renaissance Capital (Kenya) Ltd Purshottam Place ,6th Floor, Westland , Chiromo Road,
Genghis Capital Ltd Prudential Building, 5th Floor, KCB Capital Kencom House 2nd Floor,	CBA Capital Limited CBA Centre Mara Ragati Road Junction, Upper Hill,	Equity Investment Bank Limited Equity Centre, Hospital Road, Upper Hill,

Source: https://www.nse.co.ke/member-firms/firms.html

Appendix XI: Constituent Firms of the NSE 20 Share Index

Sector	Firm
Agricultural	Sasini
Banking	Kenya Commercial Bank Limited The Co-operative Bank of Kenya Limited Standard Chattered Bank Limited Barclays Bank Limited Equity Bank Limited CFC Stanbic Holdings Limited
Commercial and Services	Kenya Airways Limited Nation Media Group Scan Group Limited
Construction and Allied	Athi River Mining Bamburi Cement Limited
Energy and Petroleum	KenolKobil Limited Kenya Power Limited Kenya Electricity Generating Company Limited
Insurance	British American Investments Company (Kenya) Limited
Investment	Centum Investment Company Limited
Manufacturing and Allied	East African Breweries Limited British American Tobacco Kenya Limited
Telecommunication and Technology	Safaricom Limited

Source: www.nse.co.ke

Appendix XII: Constituent firms in the FTSE NSE Kenya 15 Index

Sector	Firm
Banking	Kenya Commercial Bank Limited The Co-operative Bank of Kenya Limited Standard Chattered Bank Limited Barclays Bank Limited Equity Bank Limited CFC Stanbic Holdings Limited Diamond Trust Bank Kenya Limited I & M Holdings Limited
Commercial and Services	Nation Media Group
Construction and Allied	Bamburi Cement Limited
Insurance	British American Investments Company (Kenya) Limited
Investment	Centum Investment Company Limited
Manufacturing and Allied	East African Breweries Limited British American Tobacco Kenya Limited
Telecommunication and Technology	Safaricom Limited

Source: www.nse.co.ke